

Wood Bison Restoration in Alaska: **A Review of Environmental and Regulatory Issues and** **Proposed Decisions for Project Implementation**



Painting by Randall Compton

Alaska Department of Fish and Game
Division of Wildlife Conservation



April 2007

ACKNOWLEDGMENTS

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ADF&G would like to hear your views on the wood bison restoration project

The purpose of this report is to provide the public and decision makers with comprehensive information on wood bison restoration, to fully identify and discuss the issues related to wood bison restoration in Alaska, and provide an opportunity for additional public review and comment. Public comment on this report will be used to help make decisions on whether ADF&G will proceed with wood bison restoration in Alaska and, if the project proceeds, will play a significant role in determining where initial wood bison restoration efforts will be focused.

Comments should be received by *June 30, 2007* at:

Wood Bison Environmental Review Comments
ADF&G, Division of Wildlife Conservation
1300 College Road
Fairbanks, AK 99701-1599

Comments can also be sent by fax to
(907) 452-6410 or email at
woodbison@fishgame.state.ak.us

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DIVISION OF WILDLIFE CONSERVATION

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April 17, 2007

Dear Alaska Wildlife Enthusiast:

On behalf of the Alaska Department of Fish and Game, Division of Wildlife Conservation (ADF&G/DWC), I am happy to announce completion of the report “Wood Bison Restoration in Alaska: A Review of Environmental and Regulatory Issues and Proposed Decisions for Project Implementation” (Environmental Review). This Environmental Review represents a significant milestone in the department’s efforts to evaluate wood bison restoration in Alaska. Public comment on this report will have a major influence in determining whether the department continues to pursue wood bison restoration in Alaska and, if so, where we attempt to restore this historically important species.

Up to this point the proposal to restore wood bison has received support from a wide variety of organizations and individuals interested in Alaska wildlife management and wood bison conservation. In spring 2005 the department established a Wood Bison Restoration Advisory Group that included representatives of several state Fish and Game advisory committees, Native organizations, conservation groups, including both environmental and sportsman’s organizations, and animal welfare interests. After thoroughly reviewing and discussing available information on wood bison, the group unanimously recommended that the department continue to pursue wood bison restoration. The members of this advisory group showed a willingness to set aside differences of opinion on some issues and work together to achieve the common objective of returning wood bison to the wild in Alaska. Continuing this spirit of cooperation will be a key factor in the success of any restoration efforts that are pursued in the future.

Based on public input and thorough biological evaluation, ADF&G believes that wood bison restoration in Alaska represents an outstanding wildlife conservation opportunity and that wood bison restoration will ultimately provide benefits for local and nonlocal hunters and wildlife viewing enthusiasts. It is clear that wood bison are compatible with other wildlife species in the state and can play an important role in restoring and maintaining natural processes. The wood bison restoration project also has significance beyond Alaska. Wood bison restoration in Alaska would help to achieve several goals in Canada’s Wood Bison Recovery Plan and will contribute to international efforts to restore the ecological role of bison throughout North America.

There are some remaining challenges described in the Environmental Review that must be addressed in a cooperative manner in order for the project to move forward. While the department has been preparing this Environmental Review we have also been pursuing several other actions that are necessary to restore wood bison in Alaska. If these actions resolve some regulatory and permitting issues in time, and sufficient public support is evident, we hope to import wood bison stock from Canada in winter 2007–08, and complete preparations to release wood bison into the wild by spring 2010 or 2011.

At present it appears that the issues related to importing bison can be resolved in the coming months, and that there is substantial public interest in working to prepare cooperative management plans to guide wood bison reintroduction and management in specific areas. Continued public support and advocacy from diverse wildlife users will be essential in achieving the wildlife conservation objective of restoring wood bison in Alaska and creating opportunities for diverse users to share in the benefits.

ADF&G is pleased to provide the public with an additional opportunity to comment on this proposal to restore a historically important species to Alaska. We look forward to receiving additional public comments on wood bison restoration. If the public continues to support the project, we are eager to work with various wildlife users, landowners, local governments and managing agencies to evaluate and plan for wood bison restoration in specific locations in Alaska.

Sincerely,

A handwritten signature in cursive script, appearing to read "David D. James".

David D. James
Regional Supervisor
Division of Wildlife Conservation

Wood Bison Restoration in Alaska:

A Review of Environmental and Regulatory Issues and Proposed Decisions for Project Implementation



Photo by Cormack Gates

Wood bison bull in the Mackenzie Bison Sanctuary, Northwest Territory, Canada

This report was prepared by Bob Stephenson and Randy R. Rogers, Alaska Department of Fish and Game, with assistance from Andrea Hunter, Hunter Environmental Associates, Inc.

EXECUTIVE SUMMARY

The Alaska Department of Fish and Game (ADF&G or “department”) is evaluating the possibility of restoring wood bison (*Bison bison athabascaae*) in Alaska because of the potential for substantial benefits to wood bison conservation and to people. At the same time we recognize that restoring an animal that has not been present for at least 100 years requires careful consideration and extensive public involvement and support. During the nearly 15 years the wood bison restoration project has been considered, it has consistently received broad support by people and organizations with diverse interests in Alaska’s wildlife. In June 2005 the ADF&G Wood Bison Restoration Advisory Group (WBRAG) recommended that the department continue to pursue wood bison restoration and initiate site-specific planning efforts. After additional public review and comment on this report, ADF&G will decide whether to proceed with further consideration of wood bison restoration in specific areas.

This Environmental Review (ER) evaluates the potential to restore wood bison at three sites, as well as considering a “No Action” alternative. The results of the review indicate that wood bison restoration can be accomplished with minimal or no negative environmental impacts, and would enhance the diversity of Alaska’s wildlife resources and provide significant benefits to people. Wood bison restoration in Alaska would make a significant contribution to international efforts to conserve wood bison and would represent a major step in meeting several key conservation goals outlined in Canada’s Wood Bison Recovery Plan.

The three sites for wood bison restoration considered in the ER are the Yukon Flats, Minto Flats and the lower Innoko–Yukon River area. Because of logistic and cost considerations, wood bison restoration in each area would initially involve releasing bison on private lands near a local community, with the understanding that bison would be likely to range onto other lands as the population grew. Bison would be expected to eventually occur on state and/or federal public lands.

ADF&G concludes that all three sites are suitable for wood bison restoration and that the environmental effects of restoration at the three sites are similar. However, the three alternatives differ in terms of habitat potential, long-term conservation benefits, current levels of public awareness, and potential obstacles related to federal policies. The Yukon Flats site has the best habitat potential and ranks most favorably overall. The U.S. Fish and Wildlife Service (FWS) has indicated they prefer that ADF&G initiate wood bison restoration on lands outside of the Yukon Flats National Wildlife Refuge. However, they do not object to the proposal to restore wood bison onto private lands on the Yukon Flats.

ADF&G proposes to proceed with efforts to restore wood bison in Alaska and continue to consider all three of the potential restoration sites identified in the ER. ADF&G proposes to initiate site-specific planning efforts for both the Yukon Flats and Minto Flats locations while also increasing efforts to discuss wood bison restoration with residents of the lower Innoko–Yukon River area and evaluate local support for bison restoration in this area. Attempting to restore wood bison almost simultaneously on both Yukon Flats and Minto Flats is the approach that has the potential to provide the most benefits for various wildlife user groups in the shortest period of time. Because wood bison restoration on the Yukon Flats has been considered for many years, as well as other factors discussed in the ER, ADF&G recommends that the Yukon Flats location be the first priority in terms of initiating a site-specific planning process. Implementing

wood bison restoration at more than one of the potential sites would result in more positive effects in terms of wood bison conservation, biological diversity, and socioeconomic benefits.

Most of the permitting requirements for the project can be met without much difficulty. However, several significant legal and policy issues must be adequately addressed before wood bison restoration can proceed. Even if ADF&G reaches a final decision to proceed with wood bison restoration in Alaska, there is no guarantee of success at any of the sites being considered.

Because wood bison restoration appears to be an outstanding opportunity for wildlife conservation in Alaska and, up to this point has received substantial public support, ADF&G proposes to continue the effort to achieve the following goal:

“Restore wood bison populations to portions of their former habitat in Alaska so 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 animal.”

In all potential scenarios involving proceeding with the wood bison restoration program, ADF&G is committed to:

- ◆ Following the disease testing and health certification requirements established by the Alaska State Veterinarian and U.S. Department of Agriculture.
- ◆ Conducting site-specific planning efforts to provide additional opportunity for public review and comment and close involvement of local residents and other wildlife users.
- ◆ Conducting a cost-effective and affordable biological monitoring program to monitor the wood bison population and potential effects on other wildlife and the environment.
- ◆ Continuing to work with FWS and others to address issues related to the U.S. Endangered Species Act in a manner that ensures that wood bison restoration in Alaska does not limit opportunities for future uses and enjoyment of wood bison, or other resource development activities.
- ◆ Working to ensure that diverse wildlife users have an opportunity to share in the benefits of wood bison restoration.

The purpose of this report is to provide the public and decision makers with comprehensive information on wood bison restoration, to fully identify and discuss the issues related to wood bison restoration in Alaska and provide an opportunity for additional public review and comment. Public comment on this report will be used to help make decisions on whether ADF&G will proceed with wood bison restoration in Alaska and, if the project proceeds, will play a significant role in determining where initial wood bison restoration efforts will be focused.

ADF&G would like to hear your views on the wood bison restoration project

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FREQUENTLY USED ACRONYMS IN THIS DOCUMENT

Full name	Acronym
Alaska Board of Game	BOG
Alaska Department of Environmental Conservation	DEC
Alaska Department of Fish and Game	ADF&G
Division of Wildlife Conservation	DWC
Alaska Department of Natural Resources	DNR
Office of Habitat Management and Permitting	OHMP
Minto Flats State Game Refuge	MFSGR
Alaska Wildlife Conservation Center	AWCC
Bovine Spongiform Encephalopathy	BSE
Bureau of Land Management	BLM
Council of Athabascan Tribal Governments	CATG
Customary and Traditional	C&T
Elk Island National Park	EINP
Endangered Species Act	ESA
Environmental Assessment	EA
Environmental Review	ER or "report"
Federal Subsistence Board	FSB
Hunter Environmental Associates, Inc.	HEA
International Union for the Conservation of Nature	IUCN
National Ambient Air Quality Standards	NAAQS
National Environmental Policy Act	NEPA
U.S. Army Corps of Engineers	USACE
U.S. Department of Agriculture	USDA
U.S. Fish and Wildlife Service	FWS
Yukon Flats National Wildlife Refuge	YFNWR
Wildlife Transplant Policy	WTP
Wood Bison Restoration Advisory Group	WBAG
Wood Bison Recovery Team	WBRT

PROPOSED VISION FOR THE FUTURE OF WOOD BISON IN ALASKA

Wild, free-ranging wood bison again occupy suitable habitat and we continue to make significant contributions to international wood bison conservation. Wood bison are again an integral part of Alaska's natural wildlife diversity, can be enjoyed by Alaskans and visitors to the state, and also provide local and statewide economic benefits.

SECTION 1: INTRODUCTION

Wood bison (*Bison bison athabascae*) are a subspecies of North American bison that are larger than plains bison (*Bison bison bison*) and are well adapted to northern meadow and forest habitats. Wood bison were extirpated in Alaska during the last few hundred years, and by 1900 only a few hundred remained in Canada (Stephenson et al. 2001; Gardner and DeGange 2003). There are now about 4,000 wood bison in healthy, free-ranging herds in Canada. Canada's National Recovery Plan for the Wood Bison includes a recommendation to reestablish one or more populations in Alaska to help secure the future of the subspecies. Restoring wood bison to one or more parts of their original range in Alaska is a priority in wood bison conservation (Gates et al. 2001).

This Environmental Review (ER or "report") evaluates the possibility of restoring wood bison at one or more of three sites in Interior Alaska: 1) Yukon Flats, 2) Minto Flats, and 3) the lower Innoko–Yukon River area (Figure 1; also see Section 5, Figures 4, 5 and 6 for more detailed maps of each site). Three other potential sites, the Aniak River, Hogatza River and North Fork Kuskokwim River, were determined to be less suitable as initial locations for wood bison restoration and are not being further considered at this time. The ER also evaluates a "no action" alternative in which ADF&G's efforts to restore wood bison to Alaska would be discontinued.

The ER provides a thorough evaluation of the proposal to restore wood bison in Alaska. It includes a review of available information, identifies the major issues involved and reviews the public involvement that has occurred up to this point. The report describes ADF&G's proposed goals, objectives, and decisions about proceeding with wood bison restoration in Alaska. Following public review and comment on the ER, ADF&G will make a final decision on whether wood bison restoration in Alaska will continue to be pursued and, if so, how. The decisions made after public review and comment will complete the first phase of the wood bison restoration planning process.

If the project continues, a second phase of planning will be undertaken. "Phase II" site-specific planning would involve working with local residents, other wildlife users, other agencies, and landowners to develop recommendations on whether to proceed with restoring wood bison at a specific location. If the recommendation is to move forward, the next step would be to work to obtain the necessary permits and approvals and develop area-specific cooperative management and implementation plans. These plans would address wood bison restoration and future management in more detail.

Alaska's proposed wood bison restoration program would make a significant contribution to several key conservation goals and objectives outlined in Canada's Wood Bison Recovery Plan including: 1) fostering the restoration of wood bison in parts of their original range outside

Canada, 2) ensuring that the genetic integrity of wood bison is maintained without further loss as a consequence of human intervention, 3) reestablishing wood bison in areas where they will be subject to natural selection, and 4) restoring disease-free wood bison herds, thereby contributing to the aesthetic, cultural, economic, and social well-being of local communities and society in general.

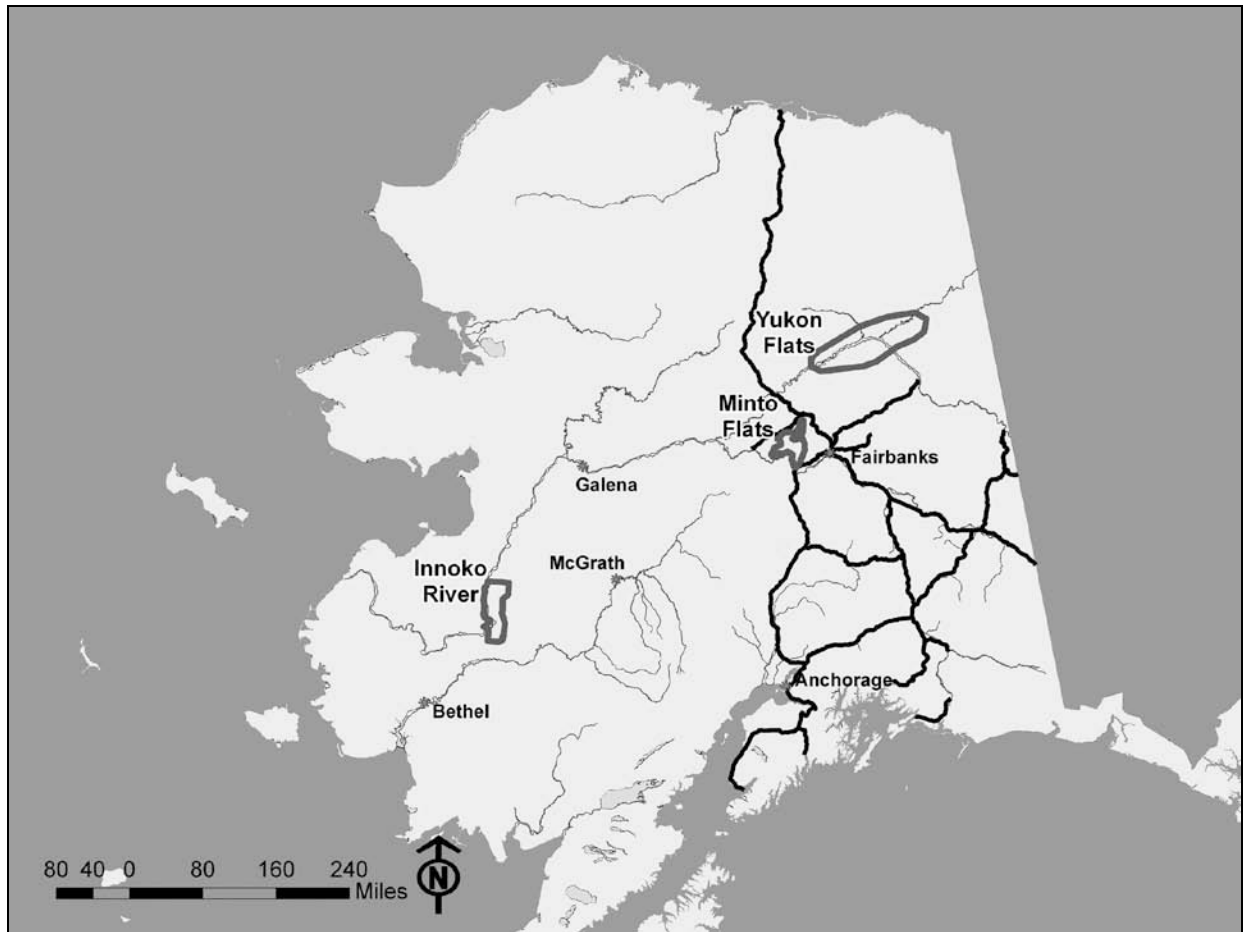


FIGURE 1 Location of the three sites being considered for wood bison restoration in Alaska

PURPOSES, GOALS AND OBJECTIVES

ADF&G is evaluating the possibility of restoring wood bison in Alaska because restoration of wood bison would: 1) be a major step forward in wood bison conservation and would improve the outlook for the long-term survival of the subspecies; 2) restore and enhance Alaska's natural wildlife diversity and natural processes; and 3) provide opportunities for education, hunting, and viewing and provide social, economic and cultural benefits to Alaskan's and others. In addition, restoration of wood bison in Alaska would:

- Enhance Alaska's wildlife resources by restoring a key indigenous grazing animal to our northern ecosystems.
- Restore them in suitable habitats within their known or likely original range.

- Provide a basis for sustainable development, including opportunities for local tourism or hunting and other guiding businesses.
- Restore a historic, cultural connection between bison and people in Alaska.
- 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.

The following proposed goal and objectives define the chronologic timeline that ADF&G will pursue to further evaluate and possibly move forward with wood bison restoration in Alaska. Due to regulatory issues beyond the direct control of ADF&G there is no certainty that these objectives can be met within the specified time frames, but they provide target dates that can be achieved if the necessary regulatory decisions are made and personnel and funding resources are available to allow the project to move forward. Additional detail on projected timelines to accomplish specific tasks is provided in Section 8, Table 12.

GOAL: 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.

- Objective 1:* Through public review and comment on this report, increase public awareness, evaluate public support and decide whether to proceed with wood bison restoration in Alaska by July 2007.
- Objective 2:* If the decision is made to proceed with wood bison restoration, complete cooperative implementation and management plans for wood bison restoration in one or more of the three identified potential release sites by March 2008.
- Objective 3:* Depending on progress on objectives 1 and 2, complete necessary testing for health certification, obtain permits and complete cooperative agreements so that wood bison can be moved to a temporary holding facility in Alaska in late 2007 or early 2008.
- Objective 4:* Release wood bison into the wild at one or more locations in Alaska by May 2010, or as soon as circumstances allow.

ORGANIZATION OF THE REPORT

Section 2 of this report provides background on the history and status of wood bison and describes wood bison habitat requirements and the habitat assessments that ADF&G has conducted to identify suitable locations for possible wood bison restoration. Section 2 also includes an overview of the history of the wood bison project, describes the findings made under the ADF&G/DWC Wildlife Transplant Policy, explains the general logistical approach to be used to restore wood bison, provides an overview of projected growth and monitoring of wood bison herds and other biological resources, and describes the conservation guidelines that are being applied. Section 3 identifies several major issues involved in wood bison restoration and how ADF&G intends to address them. Section 4 provides a detailed review of the public consultation on wood bison restoration that occurred through fall 2006. Section 5 includes a

review of the potential environmental effects of wood bison restoration at all three of the sites being considered. This section includes much of the information and analysis that is required for an Environmental Assessment (EA) that would meet the requirements of the National Environmental Policy Act (NEPA). It could be used as the basis for preparing an EA in the future if a federal action occurs that requires NEPA compliance. Section 6 provides an analysis and response to the scoping letters that were received from other agencies and landowners when the effort to prepare this ER was initiated. Section 7 provides a review of the permitting and legal requirements involved in wood bison restoration, including a review of NEPA; the Endangered Species Act (ESA); FWS refuge mandates and policies; and disease testing and health certification requirements. Finally, Section 8 outlines the conclusions of the environmental review and ADF&G's proposed decisions.

In addition to the information presented in the body of this report, there are several appendices that provide important information on wood bison restoration in Alaska. These include a joint review of issues involved in wood bison restoration completed by FWS and ADF&G (Appendix A), the FWS determination on the status of wood bison in Alaska under the Endangered Species Act (Appendix B), copies of letters of support from early public consultation on the Yukon Flats and the summary of public comments from April 2005 Wood Bison News (Appendix C). Appendix D is a list of the presentations at the Wood Bison Restoration Advisory Group (WBRAG) meetings identifying the extensive number of experts involved and the thorough review of information related to wood bison restoration which occurred at the meetings. Appendix E includes copies of scoping comments received early in the process of preparing this ER. Appendix F includes the findings that have been made during the review of the wood bison restoration project under the ADF&G/DWC Wildlife Transplant Policy.

SECTION 2: BACKGROUND

HISTORY AND STATUS OF WOOD BISON IN NORTH AMERICA

Radiocarbon dates and paleontological data show bison were present in Alaska for more than 400,000 years. Dated bison skeletal remains range from over 40,000 to 170 years old. Large-horned Pleistocene bison existed in North America until about 10,000 years ago, after which smaller horned bison evolved, ultimately leading to the existence of the two most recent North American subspecies, wood bison and plains bison. 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 and were a component in the economies of Athabascan people in central and eastern Alaska during this period. Wood bison were the last subspecies of bison to live in Alaska, and were present for most of the last 5,000 to 10,000 years. Archaeological evidence and oral accounts from Native Alaskan elders indicate that wood bison were hunted until they disappeared from Alaska during the last few hundred years. Detailed historic accounts from Athabascan elders in Alaska describe how bison were hunted and used and indicate that they were an important source of food for Athabascan people before they 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 occur in 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 hunting and changes in habitat distribution (Stephenson et al. 2001; Gardner and DeGange 2003).

Soper (1941) estimated that a total of 168,000 wood bison existed in North America in 1800. By the end of the 19th century, wood bison had nearly vanished as a result of unregulated hunting following the fur trade and westward expansion of European settlement (Gates et al. 1992). Conservation efforts subsequently improved their status in Canada. Currently, there are about 4,000 wood bison in six free-ranging, healthy populations and an additional 700 in captive herds in Canada.

Under the Canadian Species at Risk Act, which is similar to the U.S. ESA, wood bison are currently listed as a “threatened” species. The Committee on the Status of Endangered Wildlife in Canada downlisted wood bison from “endangered” to “threatened” status in 1988 because Canadian populations of wood bison were recovering. The U.S. Endangered Species list (which includes both foreign and domestic species) currently lists wood bison as endangered “in Canada.” The FWS is currently evaluating a proposal to revise the status of wood bison under the ESA to threatened “in Canada,” which is their current legal status under Canadian law.

In October 2004, in response to an inquiry from the Commissioner of the ADF&G, the Director of the FWS determined that, if wood bison are restored to Alaska, they would not need to be listed domestically under the ESA (Appendix B). Wood bison brought into Alaska would be treated as a foreign listed species for import permitting purposes. After arriving in Alaska, wood bison would have the same legal status as other resident wildlife, although depending on their status as a foreign listed species, FWS has indicated that there may be a need for some type of federal authorization to allow harvest if the species were still listed in Canada. If the species is downlisted to threatened status “in Canada” on the U.S. list of endangered species, an action likely to occur before the harvest of wood bison in Alaska is feasible, it would be easier to obtain any needed federal approval for harvest or exportation of trophies. Even if wood bison in Canada are not downlisted on the ESA, FWS indicates that provisions can be made to allow harvests that are necessary for herd management. Sections 3 and 7 provide more information on ESA considerations.

The proposed restoration program would increase the worldwide population of wild wood bison substantially. Wood bison restoration in Alaska is widely regarded as an important initiative in wildlife conservation and ecosystem restoration. It is consistent with accepted conservation principles and Alaska's constitutional mandate to maintain and enhance the states' natural resources. It would be a major step forward in bison conservation, and is a significant opportunity for international cooperation in improving the status of a historically important native species. In August 2006 the Director of DWC found “that wood bison are an extirpated indigenous species and are native to Alaska. Once restored to Alaska wood bison will again be an integral part of Alaska's natural wildlife diversity and will be managed by ADF&G like other resident species of wildlife.” (See discussion of the ADF&G Wildlife Transplant Policy below).

Alaska currently supports four plains bison populations, with the largest being the Delta and Farewell herds. The original herd in Delta Junction was established in 1928 with stock obtained from the National Bison Range in Montana. Three other herds were subsequently established with stock from the Delta herd. Because the founding stock for these herds was obtained from

the National Bison Range before there was some introgression of cattle genes into bison at the National Bison Range, the Alaska herds (particularly the isolated Farewell herd) may be among the relatively small number of herds that include genetically pure plains bison. Therefore, Alaska's plains bison may be important in terms of conserving the genetic integrity of plains bison over the long term. The areas being considered for wood bison restoration are 100 miles or more from existing plains bison herds and it is important that these subspecies be maintained separately so that hybridization is prevented. Restoring wood bison in Alaska will not detract from the management of Alaska's plains bison herds. If however, in the future, wood bison were to become more widespread in Interior Alaska, it might be desirable to replace plains bison herds with wood bison, the subspecies endemic to Alaska. Replacing plains bison herds with wood bison could only be considered in areas where livestock and captive plains bison are not present (e.g., this would not be a viable consideration for the Delta bison herd) and is beyond the scope of the present environmental review.

WOOD BISON HABITAT REQUIREMENTS AND HABITAT ASSESSMENT

Potential areas in Alaska for wood bison restoration must offer suitable habitat characteristics and quantity and quality of forage species, while not having conflicting land use practices. Also, as recommended by Canada's Wood Bison Recovery Team (WBRT), restoring wood bison must not negatively impact Alaska's ecosystems by harming indigenous species, damaging habitat, or introducing diseases or parasites. To provide benefits to wood bison conservation, new herds must be established in areas where they will not interbreed with plains bison or cattle. It is also critical that new wood bison herds not have contact with domestic livestock that might be a source of diseases or parasites. The WBRT recommended the following criteria for suitable habitat: 1) the area should be able to support a minimum population of at least 400 bison (Minimum Viable Population or "MVP"), 2) restoration sites should be located in areas where wood bison will not mix with plains bison, and 3) restoration sites should not have conflicting land uses such as agriculture (Gates et al. 2001).

Wood bison populations remain within a fairly stable home range, the size of which depends on habitat availability and numbers, and tends to increase as population density increases. In general, the range of a population will tend to expand when density reaches about 1–1.6 bison/square mile. For example, a population of 500 bison could be expected to remain within an area of about 300 to 500 square miles. During most of the year, wood bison occur in small groups ranging from 1–60 animals. The larger groups include primarily cows, calves, and juveniles. Wood bison move frequently, generally remaining in a meadow for less than one day, moving before forage is depleted, and using only the top part of plants. More detailed information on wood bison ecology and behavior can be found in Section 5, the references cited, and Appendix A.

Wood bison are primarily grazers and select for sedges and grasses (Reynolds et al. 1978). Compared to other ungulates, bison are less selective in using available forage. However, although bison are forage generalists, certain sedge and grass species are preferred. Reynolds et al. (1978), Larter and Gates (1990), and Fortin et al. (2003) found that slough sedge (*Carex atherodes*) is the most important forage species for wood bison in areas where it is available, especially during winter. To meet nutritional needs, wood bison use a variety of habitats

throughout the year but generally show an affinity for wet and mesic sedge/grass meadows (Berger et al. 1995; Larter and Gates 1991).

Soil conditions and snow cover can affect bison movements and foraging behavior. Snow depth and hardness can reduce range use (Van Camp 1975; Reynolds and Peden 1987). Bison exert a relatively high weight load on track (Telfer and Kelsall 1979), have relatively short legs and do not dig craters, but use their head to push away snow to access forage. It appears that deep snow or a snow pack with hard layers will limit bison feeding sites and access to forage. Boggy or muddy conditions also affect bison movements, and bison prefer relatively dry meadows during the spring and summer.

Van Camp (1975) found that snow depths up to 30 inches (76 cm) and 24 inches (61 cm) do not restrict foraging behavior of adult and calf bison, respectively. Bison can tolerate deeper snow without affecting mortality or productivity as long as wind or icing does not increase snow density. Plains bison have been observed foraging in snow about 4 feet deep without hard layers in Yellowstone National Park (Meagher 1973). Snow hardness was found to be the principal characteristic of snow cover influencing bison use of feeding sites. Reynolds and Peden (1987) found that bison selected for areas with soft snow for winter feeding habitat and avoided large windswept meadows. Based on habitat used by most free-ranging wood bison herds in Canada, optimum wood bison range would include extensive sedge/grass meadow systems with an abundance of slough sedge. However, the thriving wood bison herd in Yukon, Canada demonstrates that wood bison can prosper on lower quality ranges as long as snow depth is limited, making suitable sedge and grass species accessible.

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, but 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. Additional aerial and ground reconnaissance surveys were conducted in areas north and south of the Yukon River near Beaver in 1998. These surveys indicated that meadow plant communities were similar to those studied earlier, and that a substantial amount of habitat exists outside the areas studied by Berger et al. (1995). Land-sat and color IR aerial photographs were used to identify the extent of meadow habitat in all of the areas mentioned above. This information was used in combination to estimate the overall extent of high quality wood bison habitat on the Yukon Flats, which includes an area of about 3,800 square miles. Aerial observations indicate some additional bison habitat exists outside this area. Additional details regarding the Yukon Flats habitat studies are presented in Appendix A.

In 2003, ADF&G initiated a broader wood bison habitat assessment effort with the objective of identifying suitable areas within Interior Alaska that could sustain a population of 400 or more wood bison. This study used the criteria recommended by the WBRT as well as abundance indices for suitable forage to evaluate potential wood bison release sites (Gardner 2007).

The "Habitat Assessment of Potential Wood Bison Relocation Sites in Alaska" (Gardner 2007) examined the Minto Flats, North Fork of the Kuskokwim River, the Aniak River, the lower

Innoko–Yukon area and an area on the Hogatza River (Figure 2). The North Fork Kuskokwim was found to include only marginal habitat and is too close to the existing Farewell plains bison herd. The Aniak area offers adequate forage but is too limited in size to support a herd of 400 wood bison. In the Hogatza area deep snow conditions are common and would be restrictive to winter foraging. For these reasons, the North Fork Kuskokwim, Hogatza River, and the area near Aniak are not being further considered at this time (see Section 5 for further detail).

The habitat assessment identified the Minto Flats and lower Yukon–Innoko River areas as suitable sites for wood bison restoration. As noted above, Berger et al. (1995) concluded that extensive high quality habitat exists on the Yukon Flats and that the two areas, totaling 1,043 square miles, could support at least 2,000 wood bison. Gardner concluded that, based on the size of the area and available forage quality and quantity, Minto Flats could support a herd of about 500 wood bison, and that the herd should be limited to this size, at least initially, to reduce the likelihood that the population would expand into areas along the southeastern edge of the Minto Flats where there is some agricultural development. Gardner also concluded that extensive habitat with an abundance of suitable forage occurs in the lower Innoko–Yukon River area, which could easily support a herd of 400 or more wood bison. He recommends further study of snow depth and spring flooding before considering a population goal of more than 500 wood bison in this area.

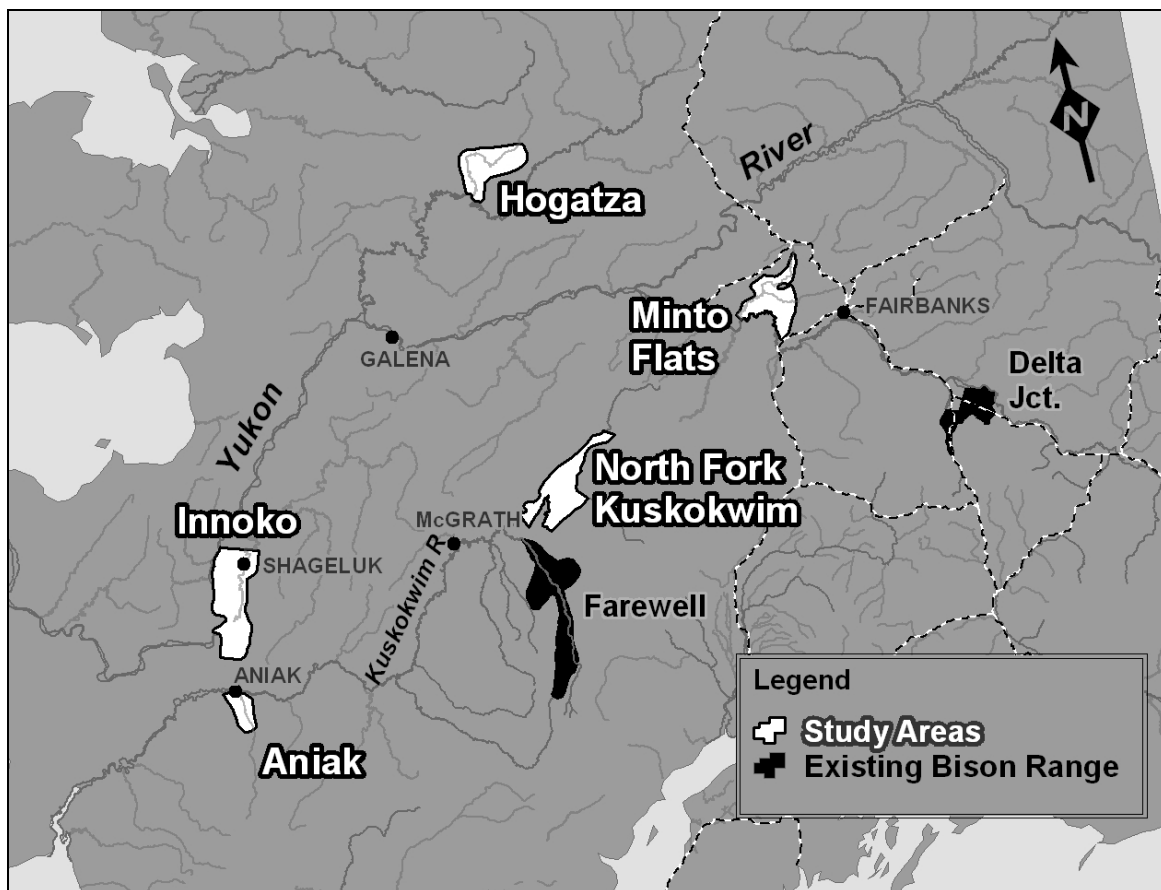


FIGURE 2 Study areas for potential wood bison habitat in Interior Alaska

OVERVIEW OF PROJECT HISTORY AND PUBLIC CONSULTATION

Restoring wood bison to the Yukon Flats has been a focus of cooperative efforts among ADF&G, Canada, local landowners and other conservation interests since 1991. Early on the Yukon Flats National Wildlife Refuge (YFNWR) was an active participant in meetings held in Yukon Flats villages to discuss wood bison restoration. There is an extensive record of support for the project among tribal councils on the Yukon Flats dating back to this time (Appendix C-1). As a result of the numerous public meetings, discussions and presentations in local communities on the Yukon Flats beginning in the early 1990s the level of public awareness about wood bison restoration is greater than in the other areas now being considered. The Council of Athabaskan Tribal Governments (CATG), a consortium of the 10 tribal governments within the Yukon Flats, has identified wood bison restoration as a priority for their natural resource management program.

In 1997 the FWS determined they could not support the project due to concerns that wood bison restoration would not be compatible with the purposes of the YFNWR (see further discussion in Section 7). FWS opposition to wood bison restoration on Yukon Flats delayed progress on the project for several years. However, residents of Yukon Flats and other organizations with an interest in Alaska wildlife management continued to advocate for wood bison restoration. In 2000, ADF&G staff reevaluated the proposal and determined that wood bison restoration is an outstanding wildlife conservation opportunity for Alaska that should be fully examined in an open, public decision-making process. Due in part to uncertainty about whether FWS would support a restoration effort on the Yukon Flats, ADF&G undertook a renewed evaluation of potential wood bison habitat in other parts of Interior Alaska.

In spring 2005, DWC initiated further public planning and consultation efforts to evaluate wood bison restoration in Alaska. As the first step in additional planning, the department established a citizen's advisory group (Wood Bison Restoration Advisory Group [WBRAG]) representing stakeholders in Alaska wildlife and land management to review information on the proposal to restore wood bison, discuss the relevant issues, and provide recommendations to the department on wood bison restoration. WBRAG's recommendations were to move forward with wood bison restoration in Alaska and continue to pursue restoration at all three potential release sites, with the understanding that further planning and public involvement would be required before final decisions are made. The group also developed a list of 20 guidelines for wood bison restoration. The complete recommendations of the WBRAG are provided in Section 4.

In May 2005, ADF&G distributed a newsletter that summarized the results of the first WBRAG meeting and provided an opportunity for written public comment on the proposal to restore wood bison. Although the newsletter was not widely circulated the comments received strongly favored wood bison restoration.

In winter 2005–06, ADF&G staff attended local Fish and Game advisory committees meetings in the Minto and lower Innoko–Yukon River areas to provide information about the wood bison project and seek input from the committees. The Minto–Nenana, Tanana–Manley–Rampart and Grayling–Anvik–Shageluk–Holy Cross advisory committees each endorsed wood bison restoration and continued planning to consider such an initiative in their respective areas. Discussion of wood bison restoration with advisory committees continued during fall 2006 with further support expressed. The Eastern Interior and Western Interior federal subsistence advisory

councils have also voiced support for wood bison restoration. Section 4 and Appendix C provide a more detailed review of public involvement and comment.

As noted in the Executive Summary, most recently the FWS has indicated they prefer that ADF&G initiate the wood bison restoration on lands outside of the Yukon Flats National Wildlife Refuge. However, they do not object to the proposal to restore wood bison onto private lands in the Yukon Flats.

WILDLIFE TRANSPLANT POLICY REVIEW

The ADF&G/DWC Wildlife Transplant Policy (WTP) was established in July 1995 and was designed to contribute to the:

1. Conservation of Alaska's native wildlife and their habitats;
2. Restoration and maintenance of wildlife diversity;
3. Protection of the state's rich natural heritage; and
4. Enhancement of wildlife values for the benefit of the people.

The purposes of the WTP are to identify concerns that must be appraised and establish a protocol for systematically evaluating those concerns to ensure that the public benefits from transplants substantially outweigh ecological and socioeconomic risks.

In August 2006 the department initiated an evaluation of the proposal to restore wood bison according to the process required in the WTP. The DWC Director approved a WTP Scoping Report and issued a finding "that wood bison are an extirpated indigenous species and are native to Alaska. Once restored to Alaska wood bison will again be an integral part of Alaska's natural wildlife diversity and will be managed by ADF&G like other resident species of wildlife." The Director also instructed staff to establish a WTP Review Committee for the project. The primary duty of the review committee, as defined in the WTP, was "to determine whether wood bison restoration is likely to effect a significant reduction in the range, distribution, habitat, or pre-existing human use of other species."

In January 2007 the WTP Review Committee concluded that wood bison restoration is not likely to effect a significant reduction in the range, distribution, habitat, or preexisting human use of other species. Public comment on the findings of the WTP Review Committee is being sought as part of the review of this ER. The Director's finding on the status of wood bison in Alaska and the Findings of the Wood Bison Restoration Wildlife Transplant Policy Review Committee are included in Appendix F.

GENERAL LOGISTIC APPROACH TO WOOD BISON RESTORATION

A number of steps would be involved in restoring wood bison populations at remote sites in their former habitat. There are two approaches that could be used to create a source of suitable stock for Alaska's restoration effort.

One approach is to import young bison from captive herds in Canada. Once necessary import permits are obtained and after health certification, the animals would be transported by truck to a

holding facility at the Alaska Wildlife Conservation Center (AWCC) near Portage, Alaska. AWCC presently manages a herd of 22 wood bison that include 13 wood bison provided by the FWS, and their progeny. Additional calves will be born in spring 2007. The AWCC facility includes several enclosures encompassing over 100 acres that are available for wood bison, as well as a handling facility that can be used for veterinary work and other purposes. ADF&G is in the process of completing a Memorandum of Understanding with AWCC that will guide husbandry practices for wood bison that are temporarily held at the facility, and provide for their eventual use for restoration efforts in the wild. The temporary use of additional Chugach National Forest land adjacent to AWCC to help support wood bison is also being pursued.

Bison would likely be held at AWCC for approximately one to two years for additional disease testing and observation. This will allow ample time to make preparations for their release at one or more of the potential restoration sites. At the appropriate time bison would be transported by truck or in large horse trailers to Anchorage or Fairbanks. Wood bison could be transported to the Minto Flats site by truck. For the Yukon Flats or lower Innoko–Yukon sites, they would be loaded on a C-130 or other large aircraft and flown to an airstrip near a local community where they would be transferred to a small temporary holding corral in late winter, where they would be held for several weeks before being released.

If it is not possible to bring additional wood bison stock from Canada into Alaska, it may be necessary to use the existing stock at AWCC and allow additional time for them to increase in numbers. This approach would also involve efforts to obtain surplus semen and/or embryos from captive wood bison in Canada and implant them in bison in Alaska to provide increased genetic diversity quickly at a relatively low cost. Artificial insemination and embryo transplants are commonly used in cattle and other species, and have been successfully used with plains bison. ADF&G is exploring this approach with the Wood Bison Reproductive Research Group in Canada, which is refining the techniques necessary to apply this reproductive technology in northern bison. ADF&G and cooperators will attempt to incorporate as much genetic diversity as possible in stock used in restoration efforts.

Because of logistic and cost considerations, wood bison restoration would initially involve releasing bison on private lands near a local community, with the understanding that bison would range onto other lands as the population grew. Bison would eventually occupy state, federal, and private lands. A temporary holding facility consisting of up to 5–10 fenced acres, a small camp and a supply of hay would be established at a release site near a local community. The final step in the reintroduction would involve transporting 40–50 or more wood bison to this site in late winter, where they would be held and allowed to acclimate in their new location before being released several weeks later, in early spring. Section 5 includes an additional description of the physical infrastructure that would be required.

PROJECTED POPULATION GROWTH AND MONITORING

Based on experience with reintroduced populations elsewhere, wood bison would be expected to increase at a rate of 15%–25% annually after becoming established (Gates and Larter 1990; ADF&G, unpublished data). With an average annual growth rate of 20%, an initial precalving population of 50 bison would increase to 500 in approximately 13 years. If the population were augmented with an additional 50 bison in the year following the initial release, it would take

about 10 years to reach 500. Variation in the rate of growth could lengthen or reduce the period necessary to reach the population objective. For example, if the average growth rate were 25%, a herd of 50 would increase to 500 in only 11 years. Biological data necessary for long-term management of a herd of bison would be obtained from an annual spring census, fall composition counts, and monitoring of herd movements. Bison populations are relatively easy to monitor because of their visibility, gregarious nature, and fidelity to seasonal ranges (ADF&G 1994).

A population of about 500 wood bison would be expected to remain within an area of about 500 square miles, based on wood bison population ecology in Mackenzie Bison Sanctuary, (Gates and Larter 1990). However, the total area occupied could be smaller if habitat for wood bison is more abundant than in the Mackenzie Bison Sanctuary, as it appears to be in the three areas being considered in Alaska (Berger et al. 1995; Gardner 2007). It seems likely that in these settings populations of about 500 bison would occur largely within an area of 300–500 square miles, as is the case for the Delta and Farewell plains bison herds. This area is equivalent in size to 8–14 townships.

In terms of the Yukon Flats and Innoko areas this suggests that, given the patterns of landownership in these areas a population established on private land near local communities would probably occur at least periodically in small numbers on federal public lands within a few years or less, and possibly within months after their release. As numbers increased the number of bison on both private and public lands would increase, but it is not possible to predict their exact distribution over time. This is partly because of the large amount of suitable habitat in these areas and the difficulty in anticipating the precise seasonal use patterns that would develop over the long term. Potential release sites in the Yukon Flats and lower Innoko areas would probably be located about 3–12 miles from federal public land, depending on the community involved and landownership patterns. The Minto Flats area includes primarily Alaska Native corporation lands and state lands, including the Minto Flats State Game Refuge (MFSGR). Land in the lower Innoko–Yukon area is primarily owned by Alaska Native corporations and the Bureau of Land Management (BLM). (See Figures 4, 5 and 6 in Section 5 for detailed maps showing landownership patterns at each site).

LONG-TERM ENVIRONMENTAL RESEARCH AND MONITORING

Based on the information reviewed in Section 5 and Appendix A, as well as reviews by the department (ADF&G 1994) and the Alaska Chapter of *The Wildlife Society* (Griffith et al. (1998), and information presented to the WBRAG (Appendix D), wood bison are unlikely to have significant effects on other wildlife or the environment at the population densities that would be expected to occur. Griffith et al. (1998) recommended post-release studies to document the effect on waterfowl habitat and production. In his presentation to the WBRAG, Dr. Mark Lindberg, an Associate Professor of Biology and Wildlife at the University of Alaska Fairbanks who specializes in waterfowl research, concluded that bison would have little or no effect on waterfowl populations, that any negative effects would be localized, and that beneficial effects might include an increase in the quality and quantity of meadows. He also reviewed studies showing that changes in water levels and predation cause large annual variation in waterfowl production in Interior Alaska, which would make it difficult to detect any minor effects of wood bison. Dr. Lindberg emphasized the need for control sites (no bison present) and treatment sites

(with bison present) to examine the effects of bison on waterfowl and suggests that a “Before-After-Control-Impact/Interrupted Times Series” approach might be the best study design for monitoring long-term relationships between bison and waterfowl. He recommends that efforts to establish baseline nesting density should include other waterbird and landbird species that are in national decline such as red necked and horned grebes, lesser yellowlegs, solitary sandpiper, and rusty blackbird. In addition to waterfowl studies, long-term monitoring to study the effects of grazing on plant and animal communities using exclosures will also be considered. ADF&G will work with other scientists to develop research and monitoring plans appropriate for each site.

CONSERVATION GUIDELINES

Wood bison restoration efforts will be pursued based on accepted biological principles and will incorporate guidelines and recommendations found in ADF&G’s Wildlife Transplant Policy, the International Union for the Conservation of Nature (IUCN)/Species Survival Commission guidelines for the Translocation of Living Organisms and also the IUCN Guidelines for the Reintroduction of Native Species. In addition, the IUCN Bison Specialist Group for North America is completing a North American Bison Conservation Status and Action Plan. This document will include recommendations on conservation and management of biodiversity, genetics, populations, habitat and other aspects of bison restoration and management. ADF&G is participating in the completion of this plan, and has considered and incorporated many of the key recommendations into plans for developing Alaska’s wood bison restoration program. These include the desirability of managing for relatively large populations wherever possible to help conserve genetic diversity.

SECTION 3: MAJOR ISSUES INVOLVED IN WOOD BISON RESTORATION

As wood bison restoration in Alaska has been evaluated, several major issues have been identified that, if not satisfactorily addressed, could result in a lengthy delay or inability to proceed with wood bison restoration. This section provides an overview of these issues and generally how ADF&G intends to address them. ADF&G believes these issues can be resolved; however, it is important for the public and decision-makers to be aware of them and the potential ramifications to the effort to restore wood bison in Alaska. If wood bison restoration proceeds to site-specific planning, all of the applicable issues will be reexamined in greater detail in the context of each particular situation.

U.S. DEPARTMENT OF AGRICULTURE IMPORT REGULATIONS

U.S. Department of Agriculture (USDA) regulations (9 C.F.R. §93.401) currently ban the import of bovines (cattle and bison) into the U.S. from Canada for breeding purposes due to concerns about mad cow disease (bovine spongiform encephalopathy or BSE). However, the USDA recently proposed a new regulation which, with some modification, would allow the import of bison and other animals from Canada for breeding and other purposes. USDA will prepare a final regulation after a comment period ending in March 2007. The USDA is authorized to make exceptions to the current regulations when such action will not endanger the livestock or poultry of the United States, and it may be possible to obtain an exemption to allow import from Canada for the purpose of restoring wood bison in Alaska if the regulations are not changed. Until the present situation changes or an exemption is obtained, wood bison stock cannot be brought into

Alaska from Canada. There is no identified threat of BSE from wood bison, but they were included in the import ban, which applies to all bovines. If the import obstacle persists, it is possible that the genetic diversity of wood bison stock currently at the AWCC can be supplemented through artificial insemination and/or embryo transfer, as described previously.

ADF&G intends to work with the USDA to modify bovine import regulations to allow the import of wood bison into Alaska for breeding purposes to support the wood bison restoration program. Section 6 includes a summary of a letter received from the USDA that addresses this issue and Section 7 includes a more detailed discussion of USDA regulations.

DISEASE TESTING AND HEALTH CERTIFICATION

Wood bison brought into Alaska have to be free of a number of serious diseases and must be certified as healthy by the Alaska State Veterinarian before they can be imported into the state. Preliminary testing of wood bison at Elk Island National Park, Alberta (EINP) using an experimental technique showed the possible presence of Johne's disease, or a related mycobacterium, and one case of Johne's disease was recently confirmed. Although Johne's disease already exists in areas where livestock occurs in Alaska (R. Gerlach, Alaska State Veterinarian, unpublished data), it would be unwise to release bison in the wild that were known to be infected with Johne's disease. The EINP herd has a long history of being free of other diseases of concern.

In cooperation with the Yukon Government, ADF&G recently completed disease testing procedures for the wood bison herd at LaPrairie Bison Ranch near Whitehorse. The results indicate the herd is free of Johne's and other diseases that would preclude importing stock from this herd. There are currently 22 wood bison at the AWCC near Anchorage. These animals are descended from the Yukon wood bison herd, which was established with stock obtained from EINP in the 1980s. Future testing will determine whether the health status of these animals will allow them to contribute to restoration efforts. As described above, ADF&G is also exploring the possibility of using artificial insemination techniques, perhaps in combination with importing more animals, to increase the genetic diversity of wood bison stock. While the outlook for obtaining a suitable source of stock is good, it is still true that if potential stock cannot be demonstrated to the satisfaction of the Alaska State Veterinarian and ADF&G to be disease-free, there may be no source of animals that can be used for wood bison restoration in Alaska. There appears to be little chance that wood bison would acquire any serious disease from other indigenous wildlife in Alaska (ADF&G 1994; Gardner and DeGange 2003).

ADF&G staff, including the DWC Wildlife Veterinarian, will work with the State Veterinarian to refine disease testing procedures and complete all animal health certification requirements necessary to import suitable stock from Canada and to ensure that wood bison brought into Alaska and released into the wild will not adversely affect other wildlife or domestic animals. If wood bison were released into the wild and later found to have a disease that could adversely affect other wildlife, ADF&G would consider culling individual diseased animals or even removing an entire herd. See Section 7 for further detail on diseases of concern and how they will be addressed.

CONCERNS RELATED TO THE U.S. ENDANGERED SPECIES ACT

As previously noted, FWS has made a policy determination that wood bison brought into Alaska would not need to be listed under the ESA (Appendix B). This policy determination means that wood bison would not have any special legal status that could affect other land use activities. ADF&G does not envision a need to designate special habitat or other protected areas in connection with wood bison conservation and management. However, the public can petition to list a species under the ESA and there are continuing concerns that if wood bison were listed in the future it could constrain other natural resource development projects. In particular, Doyon, Ltd., the Native regional corporation in Interior Alaska, has an interest in developing oil and/or gas on the Yukon Flats and Minto Flats areas and is concerned about the possibility that wood bison would somehow become listed under the ESA. Based on discussions with FWS and an analysis of the listing criteria that would have to be met, ADF&G believes that it is extremely unlikely that wood bison in Alaska would be listed under the ESA in the future. However, if a petition for listing, revised policy interpretations or legal action resulted in listing, or other complications involving the ESA occurred, public support for the wood bison restoration could be reduced.

Restoring wood bison to Alaska would help to secure the future of the species and, as such, is consistent with the intent of the ESA. As recognized in discussions with FWS, under the circumstances there would be no additional conservation benefit from listing Alaskan populations of wood bison under the ESA. Such an action would create obstacles to wood bison restoration, and increase costs substantially, while at the same time raising concerns about the effects of listing on resource development and other land uses. While the ESA has been an effective tool in assisting the recovery of wildlife under certain circumstances, it was not designed for a situation like that presented by wood bison restoration.

ADF&G has carefully studied the provisions of the ESA and worked with FWS to arrive at a policy interpretation that will allow wood bison restoration in Alaska to occur without unnecessary regulatory complications. If a petition were filed to list wood bison, it is likely the petition would be denied or be given such a low priority that no listing action would occur. When the circumstances surrounding reestablishing one or more wood bison herds is evaluated according to the five factors that must be considered in listing species under the ESA, it appears that a decision to list would not be supported. Section 7 provides a more detailed discussion of the ESA, the five factors that must be considered in listing a species as threatened or endangered, and the options that have been considered by ADF&G to minimize the possibility of listing and adverse impacts to other resource development projects.

ADF&G intends to continue discussions with FWS, Doyon, Ltd., and others in an effort to provide all possible reassurance that wood bison restoration will not impact other resource development activities due to provisions of the ESA. Conceptually, ADF&G would support congressional action to exempt wood bison populations in Alaska from the ESA if there is sufficient public support, and it can be accomplished in a way that is not perceived as undermining provisions of the ESA or its application in cases where it is an appropriate tool to help conserve plants or animals. At the same time, ADF&G believes the FWS decision that wood bison brought into Alaska do not need to be listed under the ESA is well founded. The

department does not consider congressional action to be a requirement for moving forward with wood bison restoration in Alaska.

FUTURE HARVEST ALLOCATION

ADF&G believes that wood bison restoration will eventually provide opportunities for diverse wildlife uses including viewing, general recreation, and subsistence and other hunting. Once wood bison are restored to the wild it would likely be 10 years or more before harvest could be allowed, depending on the number of animals initially released and other factors.

Discussions with groups interested in wood bison restoration, public comments received in response to the ADF&G newsletter *Wood Bison News*, and public testimony at the WBRAG meetings all demonstrated a high level of interest in how future harvests might be managed. Local residents, landowners and hunters want to derive benefits from wood bison, while others want to have the opportunity to travel to these areas to view and hunt wood bison. Some people feel that subsistence use of wood bison should be given priority, while others have suggested that wood bison be treated as a trophy hunting species with equal opportunity for all Alaska residents and nonresidents. There are concerns on both sides about how state and federal determinations on customary and traditional (C&T) subsistence use of wood bison might be made and how they might affect the allocation of future harvest opportunities. Depending on these C&T determinations, harvest allocation options may be different on lands where subsistence is managed by the state or federal governments. As a result, some people have advocated making wood bison restoration on state managed lands a priority (e.g., Minto Flats), while others may see restoration on or near federal lands as preferable (e.g., Yukon Flats). In view of the historical information detailing the human use of wood bison prior to their extirpation, it is possible that the Federal Subsistence Board (FSB) and/or the Alaska Board of Game (BOG) would find that there has been C&T subsistence use of wood bison.

It is also important to consider that it will likely be necessary to have cooperative agreements to use private lands for construction of temporary holding facilities to implement wood bison restoration. Part of the incentive for landowners to cooperate in wood bison restoration is the possibility of future harvest opportunity. The existing plains bison herd at Delta provides an example of how harvest is allocated with the use of drawing permits available to all Alaska residents and nonresidents. In the spring 2005 drawing, less than 1% of the applicants received permits. Farmers in the Delta area who often have bison grazing in their fields have expressed frustration because they have a very small chance of getting a permit to harvest an animal. Landowners and other local residents would likely have a low success rate in obtaining permits to harvest wood bison if harvest were managed by a drawing permit system alone, because the number of permit applications from nonlocal hunters would probably be very large.

The history of muskox management on the Seward Peninsula provides an example of another species of wildlife that was extirpated from Alaska and restored. There have been some difficult and controversial decisions about managing harvest of Seward Peninsula muskox. However, over time harvest opportunities have progressed from federal subsistence permits only, to a combination of federal permits and state Tier II permits to, more recently, harvest opportunities gradually being broadened through registration and drawing permit systems. Nonetheless, frustration over the slow progress in opening up general hunting opportunities for Seward

Peninsula muskox likely led to a statewide regulation proposal that was adopted by the Alaska BOG in January 2006. The policy for hunting seasons and bag limits for new species of game established by this action provides:

“The Board of Game will not adopt regulations to establish a hunting season and bag limit under this chapter for a new species of game that is introduced in a region of the state, where the species of game does not already naturally exist, until the board determines that there is a harvestable surplus of the species of game that is large enough to provide a general hunt for eligible residents and nonresidents” (5 AAC 85.005).

The regulation was probably intended to prevent wood bison harvest from being limited only to subsistence uses for an extended period. It is not clear if this regulation is meant to preclude the option of managing harvest through registration and drawing permits. If the regulation were strictly interpreted to mean that harvest must be managed by general harvest tickets for residents and nonresidents there would have to be either a very large population of wood bison to support that level of harvest opportunity or severe restrictions on access or harvest methods and means to avoid exceeding sustained yield and maintain hunt quality.

It is important that various groups and individuals that have an interest in use and enjoyment of wood bison in the future reach at least a conceptual agreement on sharing in the benefits of bison restoration. If agreement cannot be reached it could result in controversy and loss of public and political support, which might prevent the project from moving forward.

ADF&G believes the experience gained in managing harvest of muskox can be used to develop harvest management systems that would provide both subsistence and general harvest opportunities for wood bison. One option might be to not initiate any harvest until a herd reaches sufficient size to provide for both some subsistence and nonsubsistence hunting. If wood bison restoration proceeds to the site-specific planning phase, it is ADF&G’s intent to seek consensus among all user interests on the principles that will guide future harvest allocation. This would include recommendations on how future harvest would be managed under state and federal subsistence laws. Critical components of harvest management plans include 1) agreeing on a commitment to manage for herd growth to reach a population level that can provide diverse hunting opportunities, 2) determining the number of wood bison that are reasonably necessary to provide subsistence opportunity, and 3) defining the population level where nonsubsistence harvests will occur. Proposed harvest allocation plans and principles would need to be developed during management planning efforts and included in each cooperative wood bison management plan. These would be brought to the appropriate state Fish and Game advisory committees and federal subsistence councils for review and comment. Once approved by these entities the plans would be presented to the BOG and FSB for their review and formal endorsement. This approach will provide the greatest possible level of certainty that the benefits of wood bison restoration will be shared by various wildlife consumptive users. Additional discussion of harvest is included in Section 5 under “Hunting” and “Subsistence.”

FUNDING

The wood bison restoration program has been developed by a variety of DWC staff, including the former Fort Yukon Area Biologist, research biologists, wildlife planners, and several others

who have worked on the project as an adjunct to their routine duties, and often with limited funding. DWC budgets have been especially limited in the last few years, and although some additional funding has recently been provided to DWC, it is largely tied to Intensive Management programs designed to increase existing ungulate populations for human consumptive use. It would be advantageous if ADF&G could dedicate a greater amount of staff time to wood bison restoration, and provide a higher level of funding for project development. It is possible that wood bison restoration may have to be delayed or discontinued if sufficient staff and funding are not available.

Implementing wood bison restoration will require substantial funding over a period of years, and there appears to be a variety of promising funding opportunities, including sources other than the State of Alaska. For example, Safari Club International Foundation, and the Pope & Young Club contributed funding for this environmental review. These and other private organizations have expressed interest in supporting wood bison restoration and are assisting in the development of the holding facility at AWCC. Capital Improvement Project funding from the Alaska Legislature may also be a possibility. Other potential future sources of funding for wood bison restoration include various foundations such as those listed above, other national and international conservation organizations, outdoor equipment manufacturers or other private corporations, federal Pitman–Robertson and State Wildlife Grant funds, and Native American or Alaska Native organizations and governments. The AWCC is actively involved in informing the public about wood bison restoration and has also expressed interest in helping to raise funds for the project. While many funding possibilities exist, coordinating fundraising and preparing proposals also require considerable staff time.

SECTION 4: SUMMARY OF PREVIOUS PUBLIC INVOLVEMENT

This section of the report provides a summary of public involvement and comment on the wood bison restoration project between 1991 and fall 2006. Public comment received on the proposal to restore wood bison to Alaska demonstrates a high level of support for the project. Appendix C includes the statements of support for wood bison restoration that arose during early public consultation on the Yukon Flats and a summary of the public comment received in response to the spring 2005 *Wood Bison News*.

Early public consultation focused on communities on the Yukon Flats where wood bison restoration was first proposed. The WBRAG was created in spring 2005 to provide a public forum to review information on wood bison restoration in Alaska and seek recommendations from an advisory group that included representatives of some of the major organizations with an interest in wood bison restoration and public land management in Alaska. When DWC expanded consideration of wood bison restoration to Minto Flats and the lower Innoko–Yukon River, efforts to consult with local residents and Fish and Game advisory committees that represent those areas were initiated. The last part of this section describes actions taken by state Fish and Game advisory committees and federal regional subsistence advisory councils. The review of scoping letters that were received from landowners and governmental agencies as part of this ER is provided in Section 6.

EARLY PUBLIC CONSULTATION EFFORTS ON THE YUKON FLATS

Several village councils, including Birch Creek, Beaver, Fort Yukon, Circle, and Chalkyitsik, passed resolutions supporting wood bison restoration on the Yukon Flats. In 1997 the Beaver Village Council approved a resolution authorizing the Tribal Council and staff to cooperate in an effort to reintroduce wood bison on or near Beaver tribal lands. Later, First Chief Bobby Winer wrote to other Yukon Flats tribal councils and other organizations requesting support for the concept of wood bison reintroduction. Appendix C includes copies of several of the early resolutions and correspondence supporting wood bison restoration on the Yukon Flats. Interest and support for wood bison restoration remains strong in this area, as evidenced by the scoping letter received from CATG (Appendix E). It should also be noted that Stevens Village, located at the western edge of Yukon Flats has an active interest in wood bison restoration. Because they have pursued wood bison restoration somewhat independently, ADF&G does not have resolutions of support or other documentation from Stevens Village. Representatives of the Stevens Village Tribal Council and village corporation participated in the WBRAG meetings.

WOOD BISON RESTORATION ADVISORY GROUP

The WBRAG included participation from the local, statewide and national groups interested in wood bison restoration. Representatives for the WBRAG were sought from a number of local Fish and Game advisory committees in the locations of the potential restoration sites, outdoor and conservation organizations, and others who might have an interest in the project. The members of the WBRAG and the organizations they represent are listed in Table 1.

TABLE 1 Members of the Wood Bison Restoration Advisory Committee

Name	Organization	Location
Bruce Thomas (Alternate: Ben Stevens)	CATG Natural Resources Department	Fort Yukon
Paul Edwin	Chalkyitsik Village Council	Chalkyitsik
Nancy Fresco	Northern Alaska Environmental Center	Fairbanks
Bob Byrne	Safari Club International	Washington, D.C.
Nicole Whittington-Evans	The Wilderness Society	Anchorage
Arnold Hamilton	Grayling–Anvik–Shageluk–Holy Cross Advisory Committee	Shageluk
Ron Silas	Minto–Nenana Advisory Committee, Minto Village Council	Minto
Oliver Burris	Fairbanks Advisory Committee and the Alaska Outdoors Council	Fairbanks
Ronnie Rosenberg	Represents animal welfare interests (no formal organization)	Fairbanks

Two, 2-day public meetings of the WBRAG were conducted in April and June 2005. The meetings provided a public forum for an exhaustive review of information provided by numerous

experts on wood bison and associated wildlife and land management issues. The presenters included ADF&G, FWS, and BLM staff; Native organizations including CATG, Doyon, and Stevens Village; eight faculty members with expertise in various fields from the University of Alaska Fairbanks; the Alaska State Veterinarian; and a biologist from the Yukon Department of Environment with firsthand experience in wood bison restoration and management. Appendix D provides a list of the presentations at the WBRAG meetings and a list of experts involved. All of the information produced during the WBRAG meetings is included in notebooks provided to members of the WBRAG and is available for review at the Fairbanks ADF&G office.

The following are the primary recommendations and additional measures agreed upon by the WBRAG at their June 2005 meeting. These recommendations were based on the understanding that, if ADF&G proceeds with wood bison restoration, there will be additional site-specific planning and opportunity for public comment. Several topics identified in the guiding principles are discussed more fully in the section pertaining to the environmental review of wood bison restoration in Alaska. As reflected in item #15 below, the WBRAG agreed on the need to develop harvest management guidelines during site-specific planning efforts consistent with the goal of providing for subsistence and non-subsistence opportunities to harvest wood bison. Allocation was not a major focus of the WBRAG's discussions. At the conclusion of the second meeting one member of the group stated:

“I am not going to argue over harvest allocation that won't occur for at least 10 years. Let's work together to get wood bison into the state and then work to resolve those questions when the time comes.”

PRIMARY RECOMMENDATIONS OF THE WBRAG

1. WBRAG supports restoration of wood bison to Alaska, and recommends ADF&G move forward without delay.
2. WBRAG recommends that ADF&G should continue to pursue wood bison restoration at all three of the primary potential release sites (Yukon Flats, Minto Flats and the lower Yukon–Innokko area).

As wood bison restoration efforts move forward, ADF&G should remain flexible and take advantage of opportunities to proceed with wood bison restoration at each site as they arise. Independent of whichever site is implemented first, knowledge gained from restoring wood bison at the first site should be used to benefit restoration planning and monitoring at the other potential release sites. There should be no fixed time required to wait for the results of studies at one site before proceeding with wood bison releases at the other sites.

Additional measures recommended by the WBRAG to guide ADF&G's wood bison restoration efforts include:

1. Restoring wood bison in Alaska is a significant step towards conservation and preservation of the subspecies on an international scale. Keep the focus of the project on restoration of wood bison as a component of international wood bison recovery efforts

and work to raise awareness of the state, continental, and international importance of the project. The story of restoring a species extirpated from Alaska should be told.

2. ADF&G's efforts should remain focused on restoring wild, free-ranging wood bison herd(s) in Alaska. Wood bison physically contained (like at a game ranch) are not an option for wild wood bison recovery efforts.
3. Wood bison stock brought to Alaska for restoration must be shown to be disease-free. Testing protocols should be developed for: a) wood bison stock in Canada being considered for release in Alaska, b) testing that may be necessary during temporary holding, and; c) follow-up testing that may be necessary following release into the wild.
4. Predation by wolves (*Canis lupus*) and bears has not been shown to significantly affect wood bison populations in Canada. In keeping with the ADF&G Division of Wildlife Conservation, Wildlife Transplant Policy, extraordinary management actions such as predator control should not be considered as part of a wood bison restoration program.
5. Protocols for monitoring wood bison and possible effects on other species should be developed. Pre- and post-release research studies should be outlined. Research and monitoring efforts should address the points identified in the Alaska Chapter of *The Wildlife Society's* Technical Peer Review of Reintroducing Wood Bison to the Upper Yukon Valley.
6. International standards of humane care should be followed in transport, temporary holding and release of wood bison to the wild. Wood bison should be contained for the shortest possible time period prior to release.
7. The first release to be completed must be conducted in a way to create a positive public image for wood bison restoration because it will reflect on future releases in terms of ecological concerns, public participation, animal welfare, etc.
8. The breeding/release and management program should be designed to maintain genetic diversity. Subjecting wood bison populations to natural selection via predation and other natural forces is important to international bison conservation goals and maintaining genetic strength and diversity.
9. Protocols should be developed outlining what to do if wood bison move onto lands where they are not intended or wanted or if biological problems are identified. Thresholds for what would constitute an adverse impact should be identified. Environmental change is not necessarily environmental damage. Options to address problems should include limiting or reducing herd size or possible removal of wood bison in a specific location, if necessary.
10. The possible impacts of wood bison on "noncharismatic" species in ecosystems should be considered. Existing research should be reviewed.
11. Wood bison may not stay only where released. Possible expansion or changes in their range must be considered in planning.

12. Landowners' concerns must be addressed and considered in decision-making.
13. Involve local people and others in wood bison monitoring efforts, management, etc.
14. The overall health of the ecosystem should be monitored during a restoration program.
15. During site-specific planning processes ADF&G needs to spell out how subsistence and other uses will be managed. Consider subsistence values especially on Native corporation lands. Subsistence should have priority, as herd grows, then provide other opportunities.
16. ADF&G should work with others to develop a wood bison holding/breeding facility in Alaska and place wood bison there as soon as they are available. This would create a "clean reservoir" of wood bison in Alaska.
17. ADF&G should seek import permits and international agreements necessary before the first release site is chosen to bring wood bison to the holding/breeding facility.
18. ADF&G should pursue nontraditional (nongovernment) funding for this project.
19. ADF&G should develop an education program on wood bison to be used in local schools and other locations.
20. ADF&G should consider other large-scale natural resource plans and mesh wood bison planning with them. ADF&G should inform other agencies developing land use plans about possible wood bison restoration so it can be accommodated in those planning processes.

PUBLIC COMMENTS RECEIVED FROM THE SPRING 2005 WOOD BISON NEWS

The department received 20 written comments, emails and Public Comment Response Forms that were included in the spring 2005 *Wood Bison News*. These comments were all provided to members of the WBAG prior to the group developing their recommendations and guiding principles. The responses to the questions in the comment form and the individual comments on each question are provided in Appendix C-2.

The responses to the first question on the comment form, "Do you support the Alaska Department of Fish and Game continuing to pursue wood bison restoration in Alaska?" were: Yes (13), No (3), and Maybe (1). Of the three comments who opposed continuing to pursue wood bison restoration, one came from a youth in Beaver who was concerned about wood bison transmitting disease to moose; one came from a resident of Arctic Village who was concerned that wood bison would disrupt the ecosystem and affect caribou and moose; and one came from a Fairbanks resident who felt that wood bison are not a native species, that good hunting opportunities are already available, and that any risk of disease transmittal to native species is too great a risk.

Of those who favored continuing to pursue wood bison in Alaska, some of the comments provided were as follows:

- I feel wood bison are natural and much better suited for Alaskan conditions. I think they could provide an expanded resource for multiple uses: recreation, viewing, consumption, hunting, etc.
- What a great conservation project to reintroduce these animals.
- They were indigenous to Alaska before being overharvested to elimination. The modern (future) generations should be able to enjoy the viewing, harvesting and managing of the wood bison, as it was a natural part of the landscape in recent history.
- I think it is a good deal transplanting wood bison where planned. Another resource of subsistence food since the moose population is going down.
- Restoration of wood bison would be a positive contribution to Alaskan ecosystems, to people's opportunities for uses and appreciation of Alaska's outdoors, and a significant conservation accomplishment by helping to perpetuate a species population that was formerly viable in Alaska, but was probably diminished through human activity. A real parallel with muskox.

The "maybe" response included the following comment:

- Maybe, it depends on many things but the first is "what's [it] going to cost and can you afford it"? With the current financial situation we need to know a projected cost and source of funding. If we are to sacrifice other ADF&G programs to make this restoration happen, will we the public get a chance to evaluate these options?

The second question on the comment form asked which of the three suitable habitat areas should be considered first. Most of the respondents favored either the Minto Flats or Yukon Flats sites, however relatively few people in the lower Innoko–Yukon River area were informed about the project or received the newsletter.

Comments in favor of the Minto Flats site included:

- I guess personally I would like to see bison (wood) started at Minto Flats because the greatest number of residents would be able to see them the easiest.
- Minto Flats because they would be on state land. I think this project should stay as far as possible from the feds. Feds would just gum it up.
- Minto Flats: This is the obvious first choice. It's closer to Fairbanks, which makes it less expensive and easier to monitor the condition of the herd. But perhaps more importantly this area is comprised of mostly state land with the least amount of private land. We don't need to expend huge sums of public money establishing a herd of bison on private land.

Comments in favor of the Yukon Flats site included:

- Yukon Flats seems to be the best habitat for wood bison combined with the fact of its most recent extinction in that area. However, I believe they would do well in many places in Alaska.
- Yukon Flats has endless prime wood bison habitat. Native elders remember wood bison stories passed on by their parents. We should restore wood bison for the Native community.

Several respondents supported more than one site with comments such as:

- 1st: Yukon Flats, 2nd: Minto Flats. Just don't ever let them be classified for "traditional" subsistence use. Traditional "subsistence" hunters wiped them out in the first place! Make them accessible for viewing and hunting to everyone, with no special opportunities for any group of the population.
- Transplant them to Minto, then Yukon Flats, then to Innoko. Three Alaskan "herds" would help their survival. Minto is the most accessible area for seeing, and hopefully, eventually hunting them.

A respondent who opposed the project stated:

- All three sites are unsuitable. The potential effects of wood bison on Alaskan ecology are unknown and potentially mildly damaging to our local ecosystem and the native species that depend on it. I believe in the precautionary principle which to my mind is similar to a doctor's Hippocratic oath – First do no harm! If you don't know what the effects will be you cannot assume they will only be positive.

Overall, public comment was supportive of wood bison restoration. At the same time, comments showed concern about possible ecological effects of wood bison restoration and how all segments of the public would share in the benefits of wood bison restoration. The reader is encouraged to review all the comments included in Appendix C-2.

ADVISORY COMMITTEE AND REGIONAL ADVISORY COUNCIL ACTIONS

The Yukon Flats Advisory Committee (AC) has discussed wood bison restoration on Yukon Flats on several occasions over the last 15 years and has supported the proposal. Similarly, the Fairbanks AC has discussed wood bison restoration and has supported the project. In 1997 the federal Eastern Interior Regional Advisory Council voted to support the concept of wood bison reintroduction on Yukon Flats (Appendix C-1). In October 2005 the federal Western Interior Regional Advisory Council received a report from ADF&G staff on the wood bison restoration program. Council members expressed support for the proposal but also wanted to be sure there would not be any threats to the health of other wildlife species. ADF&G staff provided presentations on the wood bison project to the Minto–Nenana AC (November 15, 2005), the Grayling–Anvik–Shageluk–Holy Cross AC (February 1, 2006), and the Tanana–Rampart–

Manley AC (February 10, 2006). All of these state Fish and Game advisory committees unanimously endorsed wood bison restoration in their areas.

In October 2006 the Fairbanks AC wrote to the Director of DWC supporting efforts to create a huntable population of wood bison but also expressing concerns about placing wood bison where they would occur on federal lands and might be subject to the federal subsistence priority. The committee encouraged focusing restoration efforts on state land in the Minto Flats area. In fall 2006 the Minto–Nenana Advisory reaffirmed its support for wood bison restoration on Minto Flats and the Tanana–Manley–Rampart AC selected a member to participate in site-specific planning. In November 2006 the Yukon Flats AC was updated on the wood bison project but took no action. ADF&G hopes to obtain additional advisory committee and regional council review and comment on the wood bison restoration proposal during the public review of this report.

SECTION 5: REVIEW OF POTENTIAL ENVIRONMENTAL AFFECTS

In April 2005 ADF&G initiated an environmental review of the wood bison project to provide information that will help the public evaluate the restoration proposal. ADF&G contracted Hunter Environmental Associates, Inc. (HEA) to assist in this effort, and particularly to help identify various federal and state permitting requirements and prepare information that may be needed for NEPA compliance in the future. This section of the report provides a detailed evaluation of the potential environmental effects of wood bison restoration in the three potential release areas.

In summer 2005, ADF&G and HEA sent letters to agencies, landowners and others requesting scoping comments for this report. This consultation effort focused primarily on public agencies with potential permitting requirements and landowners adjacent to local communities where a temporary holding facility might be constructed in connection with potential restoration efforts. We asked for assistance in identifying issues that need to be addressed in connection with the three potential restoration sites being considered, and specifically those associated with constructing a temporary holding facility in remote areas. Section 6 provides an analysis of the scoping comments received and ADF&G's responses to the comments. Information on agency permitting requirements comes from the scoping letters and ADF&G's ongoing communication with other agencies and is summarized in Section 7. Appendix E includes the distribution list for the letters requesting scoping comments, an example scoping letter and the comments received.

OVERVIEW OF ALTERNATIVES CONSIDERED

To supplement the habitat assessment already completed for Yukon Flats, ADF&G staff conducted an evaluation of potential wood bison habitat in Interior Alaska during 2002–2005. Using available habitat information, ADF&G identified three potential sites for wood bison restoration (Figure 1) and rejected three locations, at least as initial restoration sites (Gardner 2007). The three potential restoration sites being further evaluated include the Yukon Flats, Minto Flats, and the lower Innoko–Yukon River area. Wood bison could also be restored at one, two, or all three of the sites being considered. The following four alternatives for wood bison restoration are analyzed in this section (see the local area landownership maps in Figures 4, 5, and 6).

Alternative A: 'Yukon Flats' would involve restoration within an area of approximately 3,800 square miles consisting of 63% refuge, 32% private, and 4% state-owned land.

Alternative B: 'Minto Flats' would involve restoration on about 800 square miles consisting of 85% state and 14% private-owned land.

Alternative C: 'Lower Innoko–Yukon River area' would involve restoration within an area of about 1,348 square miles consisting of 51% private, 48% BLM, and 1% state-owned land.

Alternative D: 'No Action' would involve no wood bison restoration activities.

Sites Not Being Further Considered at this Time

Hogatza River. The Hogatza River is a tributary of the Koyukuk River and is located to the west of the community of Hughes (Figure 2). The area includes about 600 square miles and would provide high quality summer habitat, but winter habitat is limited. This area usually receives heavy snowfall that could make it difficult to sustain a bison herd. Bison might survive in this area, but it is a less than ideal location.

North Fork Kuskokwim River. The area evaluated is northeast of McGrath (Figure 2). This area includes about 400 square miles of potential habitat, part of which is quite wet. The area may not be sufficient to sustain a bison herd over the long term, and is in close proximity to the range of the Farewell plains bison herd. Creating a situation in which the two species are likely to mix would conflict with bison conservation guidelines (Gates et al. 2001).

Aniak River. The Aniak River was identified as a potential site through conversations with local residents and biologists. ADF&G surveyed the Swift Creek and Aniak River drainages from their confluence with the Kuskokwim River (Figure 2). The sedge/grass meadow system extended approximately a half mile on either side of drainages from the mouth of each drain to about 15 miles upstream before transitioning to upland tundra. The area contained multiple large and small sedge meadows scattered throughout the floodplain woodlands. The meadows were small compared to those in the Innoko area and their characteristics were different. The tundra habitats contained few bison forage species. The general assessment is the area offers suitable forage but is too limited in size to support a herd of 400 wood bison.

The proposed restoration effort would entail reestablishing populations of wood bison using stock obtained from Canada. Over the long term, population levels could range from 500 to 2,000 or more depending on the area involved along with cooperatively developed management objectives. The area eventually inhabited by bison populations would also vary from a low of approximately 800 square miles on the Minto Flats to 3,800 square miles or more on the Yukon Flats (Table 2). The total area potentially involved at all three sites could include approximately 6,000 square miles or more. The actual size of the area occupied at each site would depend on bison population size as well as local habitat characteristics.

TABLE 2 Comparison of potential wood bison restoration sites^a

Area	Size (mi ²)	% Meadow habitat (mi ²)	% Bison forage (mi ²)	Potential habitat carrying capacity	Land status	Habitat characteristics	Other considerations
Yukon Flats	3,800	6.6–10.1% (250–385)	62.2% (156–239)	>2,000	63% refuge 32% private 4% state	Excellent habitat-estimated to be able to support at least 2,000 bison	Local support; initial release on private lands but bison expected to also occur on federal refuge lands as herd size increases; low density moose; important. waterfowl production area.
Minto	812	25.8% (210)	46.7% (98)	500 or slightly more	85% state 14% private	Small area in southeastern portion may not be accessible during spring/summer. Carrying capacity limited to about 500.	State game refuge; combination of state and private lands; public support not well established; high density moose; important waterfowl production area.
Innoko	1,348	7.6% (103.1)	48.7% (50.2)	>500	51% private 48% BLM 1% state	Spring flooding (during some years 70%+ of available land can be flooded); deep snow at times. Carrying capacity estimated to be in excess of 500.	Combination of federal, state, and private lands; public support not well established; moderate density moose; important waterfowl production area.

^a The minimum viable population size for bison is estimated to be at least 400 animals. Areas that could not easily support populations at or above this level are not being considered. Where possible, larger populations are preferable in terms of long-term maintenance of genetic diversity.

This section evaluates several environmental and socioeconomic issues. These include the relationship between wood bison restoration and a variety of physical factors (i.e., water, soil, and air quality), biological and ecological factors (fisheries, vegetation, wildlife), and cultural and socioeconomic factors (hunting, recreation, and resource development).

DESCRIPTION OF NEEDED PHYSICAL DEVELOPMENTS

The letters sent out by HEA that requested scoping comments for this ER included a description of the likely physical developments that would be needed for temporary wood bison holding facilities in remote locations. These descriptions were used by landowners and agencies identify their requirements. The same general description is provided below.

A temporary corral would be constructed at a release site by late fall so posts could be set prior to freeze-up. Fencing would be attached to trees as much as possible and 4–8 inch diameter posts would be set 3 feet into the ground every 20 feet in open areas, to enclose an area of up to 5–10 acres (Figure 3). No cement or fill material would be required. The fence would be removed by early summer the following year (after approximately 10 months), unless there is an opportunity to bring in additional founding stock in subsequent years. It is unlikely that any particular enclosure would remain in place for more than 2–3 years. Supplemental food (primarily hay) for the bison will be stored at the release site as long as bison are held there. In order to minimize the risk of introducing noxious weeds, only certified weed-free Alaska-grown hay, would be used. A temporary bison food-storage enclosure measuring 25 ft × 25 ft would be constructed in a way that would preclude access by other wildlife. This would not require breaking the ground surface, since the structure would be supported above the ground with a base consisting of cement blocks spaced evenly to support a floating floor. The cement blocks would be the only contact with the ground. The structure would be removed by early summer (after a total of about 6 months), unless there were plans to release additional bison in subsequent years.

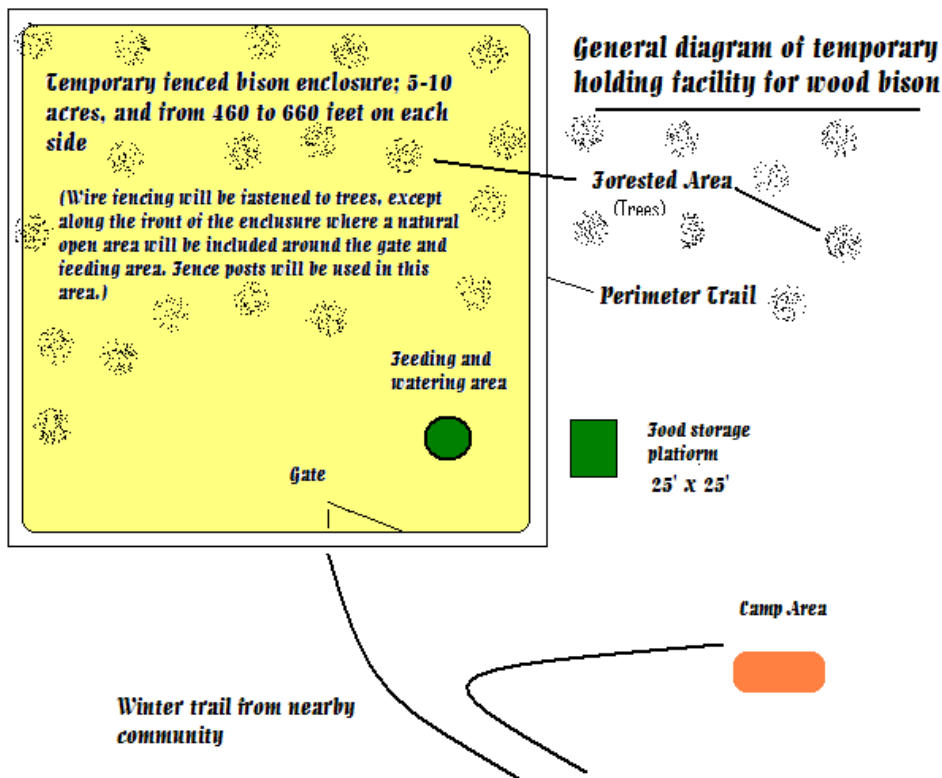


FIGURE 3 Diagram of the general layout of a temporary holding facility

A temporary holding facility would be constructed near one or more of the following communities:

- 1) Yukon Flats: Beaver, Birch Creek, or Chalkyitsik
- 2) Minto Flats: Minto
- 3) Lower Innoko–Yukon River area: Shageluk or Holy Cross

The exact location of a temporary holding facility is flexible and will be partly determined by cultural resources, wetlands, and other permitting considerations. Except for limited foot paths, there will be no need for new trail construction to access the temporary holding fence/food storage facility at any of the potential restoration sites. Most access will occur during the winter months when the ground is frozen and will rely on existing vehicle trails. If some clearing is required to construct the fence or food storage facility, it would be done using hand axes and chain saws.

DESCRIPTION OF ALTERNATIVE SITES

Alternative A – Yukon Flats

This alternative would involve restoration in an area that includes about 3,800 square miles of high quality wood bison habitat, consisting of 63% YFNWR lands, 32% private and 4%

state-owned land (Table 2, Figure 4). The Yukon Flats could support a relatively large bison population.

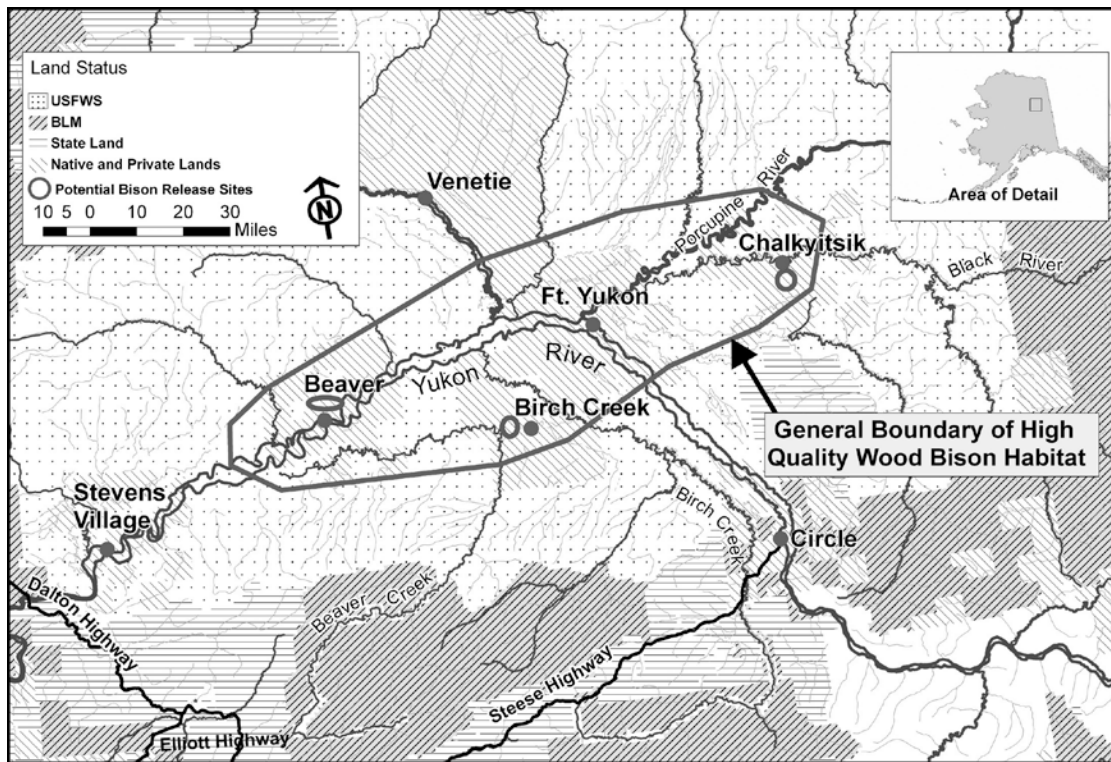


FIGURE 4 Alternative A – Landownership patterns on the Yukon Flats and approximate area with high quality wood bison habitat

Alternative B – Minto Flats

This alternative would involve restoration in an area including about 800 square miles of bison habitat, consisting of 85% state land in the MFSGR, 14% privately-owned land and a small component of BLM land (Table 2, Figure 5). BLM lands in the Minto area have been selected under the Alaska Native Claims Settlement Act and are scheduled to be conveyed in the next year. Minto Flats is less remote than Yukon Flats or the lower Innoko–Yukon River with road access to the area available from the Elliot Highway and Minto Road.

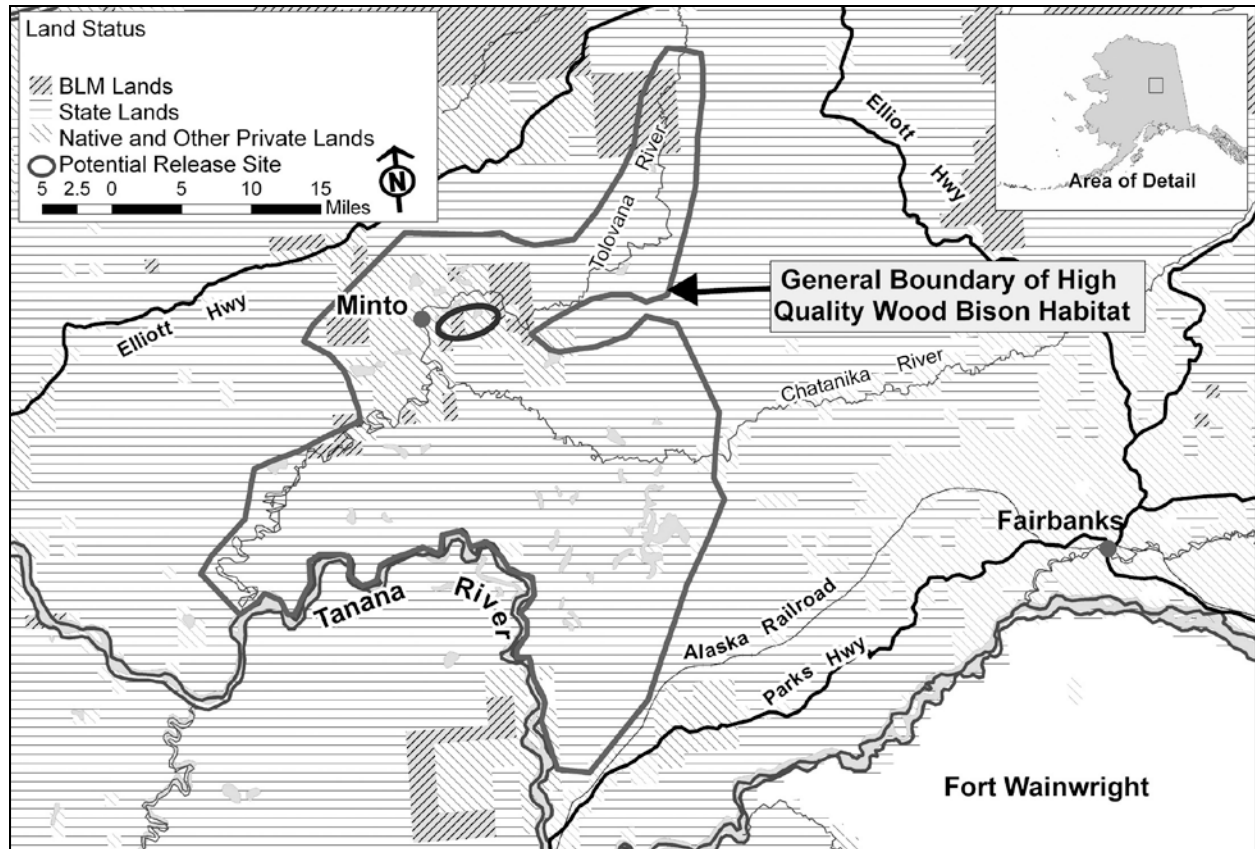


FIGURE 5 Alternative B – Land-ownership patterns in the Minto Flats area and approximate area with high quality wood bison habitat

Alternative C – Lower Innoko–Yukon River

This alternative would involve restoration in an area including at least 1,348 square miles of bison habitat, consisting of 51% private, 48% BLM, and 1% state-owned land (Table 2, Figure 6). The lower Innoko–Yukon River area includes a large amount of habitat that likely extends beyond what has been inventoried up to this point, and could support a relatively large bison population.

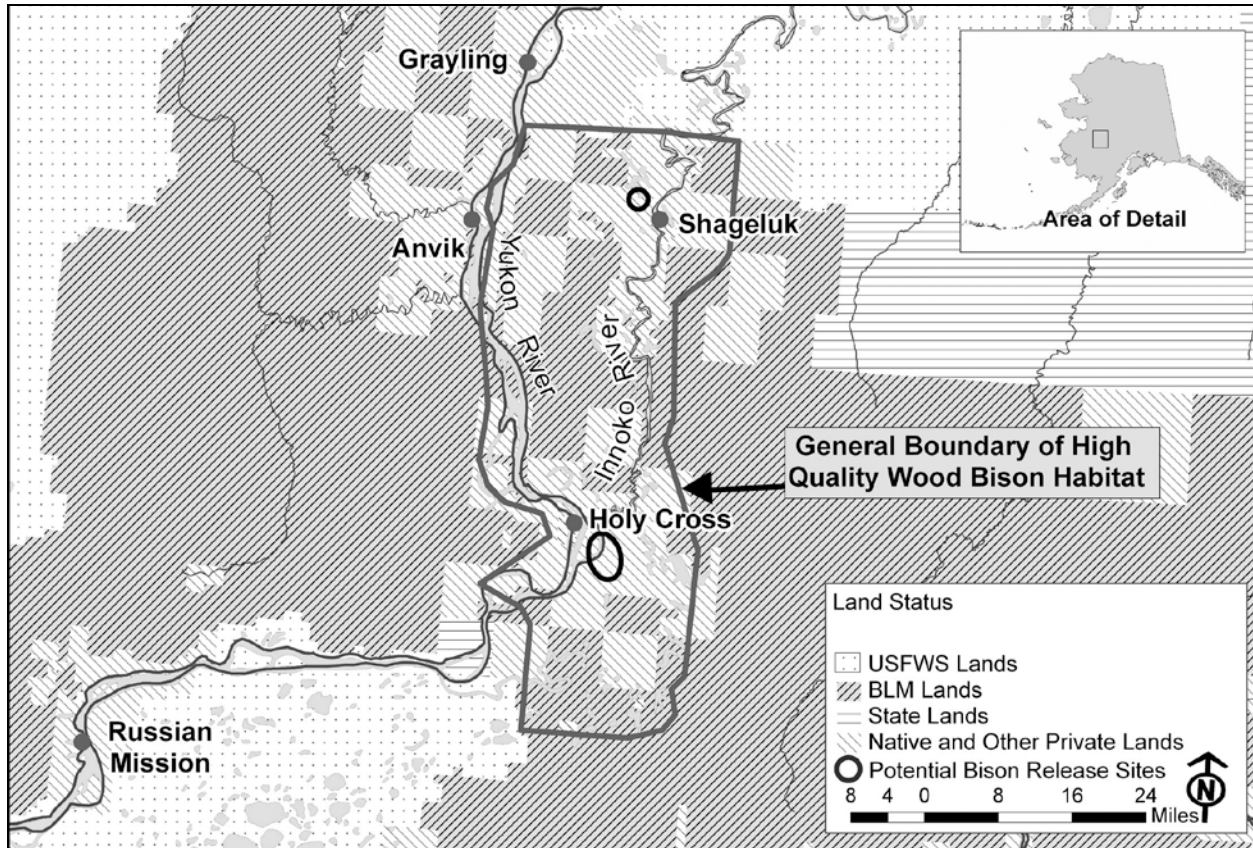


FIGURE 6 Alternative C – Land-ownership patterns in the lower Innoko–Yukon River area and approximate area where studies have identified high quality wood bison habitat

Alternative D – No Action Alternative

The no action alternative would mean that ADF&G would discontinue the wood bison restoration program. Wood bison would not be restored at any location in Alaska, and this would result in a number of lost opportunities. Alaska would forego the opportunity to contribute to wood bison conservation and enhance biodiversity, renewable resources, hunting, educational programs, and tourism. Loss of the uses and activities associated with wood bison restoration would result in a loss of economic opportunity for Alaska, and particularly for rural communities in potential wood bison restoration areas.

Under the no action alternative, ADF&G would not be required to use resources to address several key issues involved in wood bison restoration. Public information, education and planning efforts related to wood bison restoration would be discontinued. There would be no risk of disease transmission to other wildlife or domestic animals as a result of wood bison restoration. Concerns about the possible listing of wood bison in Alaska under the ESA and potential adverse effects to other resource developments activities would not have to be addressed. ADF&G funds for wood bison restoration could be allocated to other programs; however, the opportunity to obtain private and other funding for this wildlife conservation initiative would be lost.

This alternative would mean that an ecologically important native herbivore that could contribute to restoring and maintaining boreal ecosystems would remain absent from the state. Alaska would lose an opportunity to monitor long-term ecological effects of a large grazing mammal as global climate change occurs, possible shifting northern ecosystems towards grasslands. This might lessen Alaska's ability to sustain large mammal populations if global climate change occurs, as is predicted by many scientists. The continued absence of this native herbivore would result in reduced biological diversity, the absence of some basic ecological processes, and the loss of an opportunity to restore and enhance Alaska's renewable resources and increase the basis for sustainable economies. Except for the loss of economic opportunity, described below, the effects associated with this alternative are difficult to quantify. However, they include a variety of negative effects in terms of ecology, culture and aesthetics, and lost opportunities to make a major contribution to international wood bison recovery and wildlife conservation in general. Wood bison conservation efforts would be limited to Canada, where there are some constraints relating to loss of habitat in some areas, potential transmission of cattle diseases to healthy herds and the potential for hybridization with plains bison.

AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

Physical Factors

Water Quality. This section addresses potential effects of wood bison on surface water quality. Wetland permitting requirements are addressed in Section 7.

Alternative A – Yukon Flats — The effects bison might have on water quality can be evaluated based on evidence from other areas where bison inhabit wetlands. A diversity of river systems, dry, mesic and wet meadows, and lakes and ponds, some of which are eutrophic, characterize the Yukon Flats. Concern has been expressed that bison activity could cause hypereutrophy or increased water turbidity. As described below in the section on fisheries, extremely high population densities of bison could have indirect effects on aquatic systems. Although grazing by high densities of cattle has been shown to have detrimental effects on streamside vegetation, erosion, 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. Plains bison in the Delta area have caused localized effects in some high-use riparian areas and caused some stream sedimentation (J. Durst, DNR, personal communication, 2006). This is less likely to occur in the Yukon Flats or other areas being considered for wood bison restoration, where sources of water are abundant and widespread and the animals would be unlikely to concentrate near individual water sources or use them frequently.

The effects of cattle have been most apparent in relatively arid areas in the western U.S. and Canada, where ponds, lakes, and rivers are limited in number and the use of aquatic systems and riparian areas by ungulates and other animals is concentrated in relatively small areas. In contrast, the areas being considered for wood bison restoration are characterized by an abundance and diversity of lakes and rivers, which would tend to disperse use by bison and other wildlife. For example, King (1962) estimated there were about 30,000, mostly shallow, lakes on the Yukon Flats. This number may have declined because of a general drying trend. In 2002 FWS estimated there were 20,000 water bodies, based on an analysis using LANDSAT imagery and GIS. The widespread availability of water sources combined with the relatively low densities of grazing ungulates would minimize the potential for effects on water quality. As described

below in the sections regarding the effects of wood bison on vegetation and waterfowl, there are differences in the grazing behavior of bison and cattle, and northern ecosystems were shaped, in part, by the influence of large herbivores.

Relevant information is provided by studies in Elk Island National Park, Alberta, where high densities of bison and other ungulates inhabit an area with hundreds of lakes and ponds that are naturally eutrophic or hypereutrophic. Park biologists have seen no indication that bison have increased the level of eutrophy, noting that lakes outside the park are identical in terms of their trophic status, and that eutrophication is a natural characteristic of lakes in the region. In addition, water quality in this park has been 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, personal communication).

It is unlikely that wood bison would have detrimental effects on water quality on the Yukon Flats. The influence of bison would certainly be overshadowed by the effects of drought, flooding, siltation, and beaver and waterfowl activity on the dynamic wetlands on the Yukon Flats. The available information suggests that the effects of wood bison on water quality will be minor or nonexistent.

Information on water quality on the Yukon Flats is available, and can serve as a basis for comparison with future water quality data. Water quality data is available from 129 lakes in 7 plots distributed across the Yukon Flats that were sampled in the mid 1980s. The areas sampled represent much of the potential wood bison habitat in the area. Most lakes were either eutrophic or hypereutrophic (Heglund and Jones 2003). Three of these areas were sampled again in 2001 and some additional water quality data were obtained in 1989–1990. FWS initiated a water quality monitoring program on Beaver Creek in 2006. This involves monitoring water quality near the confluence with Victoria Creek and at two sites downstream on Beaver Creek (M. Bertram, FWS, personal communication).

Alternative B – Minto Flats — The discussion of effects on water quality on the Yukon Flats generally applies to the Minto Flats as well. Minto Flats is categorized as an “open” wetland system. 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 effects of wood bison on water quality would be minor or nonexistent, especially in view of the frequent flow of water through the area’s water bodies.

Alternative C – Lower Innoko–Yukon River — As is the case on the Yukon Flats and Minto Flats, the effects of wood bison on water quality in the lower Innoko–Yukon River area would be minor or nonexistent. 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, 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 topography and its relatively low elevation. The periodic influx of large amounts of flood water would negate any long-term effects of bison.

Soil Quality. The following information applies to all potential restoration sites. Wood bison should 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 affect nutrient cycling processes and patterns of nutrient availability. They increase nitrogen availability and influence 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.

Floodplain and Potential Affect on Local Communities. Compliance with Executive Order 11988, 1977, Floodplain Management, amended by Executive Order 12148, July 20, 1979; 44 FR 43239, 3 CFR, 1979 Comp., p.412, is required as part of the NEPA process. This order states that structures cannot impede or channelize water flow.

Complete avoidance of the floodplain for temporary holding facilities is not possible in some areas. However, a temporary holding facility will not impede or channelize flow on floodplains given its temporary nature and use primarily during the winter months. Attempts will be made to place the temporary holding facility in an upland area where surface water flooding/flow impediment would not be an issue (based on elevation and flood data for the adjacent community) if a project were expected to extend into the spring months. It should be noted that wood bison would be released from the facility in early spring just prior to ice break-up, and would be able to avoid flood waters after their release. Human activity at a holding facility would also end prior to break-up.

The flood data below represents the highest known flood elevations that have been recorded. The data also shows the number of recorded floods and in-town flood heights, giving an indication of flooding frequency near each community. The flood potential in surrounding areas could be different from the villages themselves. However, these data are the recorded flood information points closest to potential temporary bison holding facility locations. The following information was obtained from the U.S. Army Corps of Engineers (USACE) website for flood records.

Alternative A – Yukon Flats — There is a general downward trend in the incidence of flooding on the upper Yukon River, and a temporary holding facility would be located a considerable distance from a community. There is limited potential that a fenced enclosure could somehow redirect flood waters and cause impacts on structures in nearby communities.

Beaver: Beaver village tends to be prone to floods from the Yukon River, with a recommended building elevation of 365.5. Floods were recorded in 1948, 1958, and 1992. A holding facility would be located some distance from the village, and therefore would not influence the effects of flooding in the community.

Birch Creek: The village of Birch Creek tends to have little potential for flooding from Birch Creek, but flooding was recorded in 1967 and 1992. Both floods reached about the same elevation. Greater flood volumes will raise the river only slightly because of the broad floodplain of the river. All floods are open water floods; ice jams do not occur. Because a temporary holding facility would be located a mile or more from the community and downstream, the community is unlikely to be affected by flooding.

Chalkyitsik: Chalkyitsik is a highly flood prone area because of snowmelt/ice jams. Floods occurred almost every year from the 1920s through the 1940s and were documented in 1937, 1947, 1948, 1967, and 1997. The 1937 flood was the most serious. However, a handling facility constructed in connection with wood bison restoration would probably be located about 2 miles south of the community at an elevation that is several feet higher than in the community. There is little chance that floodwaters could affect a temporary facility, or that it would affect the nature of flooding in the community.

Alternative B – Minto Flats — Minto Village is located on a bluff above the Tolovana River and has no history of flooding. Lowland areas east and south of the village can, however, experience flooding. The temporary holding facilities would be situated on higher ground to avoid potential flooding, and be located a mile or more from Minto Village.

Alternative C – Lower Innoko–Yukon River —

Shageluk: Shageluk Village was flooded from the Innoko River prior to 1967 when the community moved to its present location. Most of the new community is 20 feet or more above the river. There is no known flooding at the present town site. The service road from the current town site 3 miles north to the airstrip has been inundated with floodwaters, cutting access to the airport. A holding facility would be located a mile or more from the community and therefore would have no effect on structures within the community.

Holy Cross: Only one Yukon River flood has been recorded at Holy Cross. A holding facility would be located east of the community, on the east side of the Yukon River, where flooding may be more likely than in the community. There would be no effects on community structures as a result of potential flooding of temporary holding facilities.

Air Quality. The air quality division of the Alaska Department of Environmental Conservation (DEC) was contacted concerning air quality regulations and whether the project would require permitting through the Air Quality Control Regulations, 18 AAC 50, based on the information provided below (Table 3).

TABLE 3 Potential emission sources during construction of temporary bison holding facility

Emission sources	3-Hour period	24-Hour period	9-Month period
Gas-powered auger	1 hour	2 hours	504 hours
Pick-up trucks	1 hour	3 hours	756 hours
Snowmachines	1 hour	3 hours	756 hours
ATVs	1 hour	3 hours	756 hours
Generator (1 kW)	1 hour	3 hours	756 hours

Air pollution sources are regulated under 18 AAC 50 and 40 CFR Part 71, based on their “potential to emit,” which means the maximum capacity of a stationary source to emit a pollutant given its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on the hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally

enforceable. Potential-to-emit estimates are based on 8,760 hours/year of operation and the information provided by the source.

Using the following formula, the NO_x emissions for the generator described in Table 3 totaled 0.0182 tons per year, which is well below the 100 tons/year threshold.

$$\frac{\text{ENGINE hp} \times .031 \text{ lb NO}_x/\text{hp-hr} \times 8760 \text{ hr/yr}}{2000 \text{ lb/ton}} = \text{X tons of NO}_x/\text{yr}$$

The minor permits program (18 AAC 50.502) requires air quality permitting prior to construction if the potential to emit is greater than the maximum allowable tons/year for each pollutant source (Table 4).

TABLE 4 Source thresholds for obtaining a minor permit

Pollutant Source	Maximum tons/year
PM 10 (Particulate matter)	15 tons/year
NO _x (Nitrous monoxide or dioxide)	40 tons/year
SO ₂ (Sulfur dioxide)	40 tons/year
Lead	0.6 tons/year
CO (Carbon monoxide)	100 tons/year

The NO_x potential to emit for the 1 kW generator does not require a minor permit under 18 AAC 50.502. The other emission sources mentioned in Table 2 are deemed non-road engines. The actual and potential emissions of non-road engines and equipment are not included when determining the classification of a stationary source or modification under AS 46.14.130. However, non-road engines are not exempt from compliance with other applicable air pollution control requirements, such as visible emission standard cited in 18 AAC 50.055.

National Ambient Air Quality Standards (NAAQS) were developed as part of the Clean Air Act. The NAAQS are health-based standards, and were established by the Environmental Protection Agency to protect human health and the environment. Major source thresholds will vary depending upon the local attainment status for a pollutant with an established NAAQS (Table 5).

TABLE 5 Attainment status for pollutants with an established National Ambient Air Quality Standard within Alaska

	Fairbanks	Juneau	Anchorage	Unalaska	St. Paul	Random
Nonattainment	CO	PM-10	CO	SO ₂	SO ₂	PM-10
Special protection areas	n/a	n/a	n/a	SO ₂	SO ₂	n/a

n/a = not applicable.

Other areas of the state are in attainment. There are small pockets assessed for PM-10 around the state, but none of the areas we evaluated are in those pockets. There would be minor impacts to air quality as the result of wood bison restoration.

Biological and Ecological Factors

Fisheries. The following evaluation of the potential effects of wood bison on fisheries applies to all three potential wood bison restoration sites. The fish fauna of the Yukon River drainage is described in detail by Mecklenburg et al. 2002. Except for a few isolated lakes in the Tanana River system, all populations are wild; there is presently no enhancement of fish populations in the remainder of the drainage. Five species of Pacific salmon including chinook salmon, coho salmon, chum salmon, sockeye salmon, and pink salmon 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, long-nosed sucker, and Alaska blackfish. Lake trout are present in many higher elevation lakes. Rainbow trout do not occur naturally in drainages north of the Gulkana and Kuskokwim Rivers. A summary of Yukon area sport fisheries can be found in Burr 2004; commercial and subsistence use is described in Vania et al. 2002.

Because bison are predicted to have minor effects on water quality, and minor or beneficial effects on vegetation (Smith 1990), there is little likelihood that they would have any detrimental effect on fisheries. 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. Their effects on fisheries in these areas would be minor or nonexistent. Any minor effects could be mitigated by limiting population size at a level where effects would be nonexistent. There do not appear to be any studies of the effects of bison in general, or wood bison in particular, on fisheries. 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, erosion, and aquatic systems, these effects do not seem to occur at relatively low densities that characterize northern free-ranging bison populations.

Negative and other effects of grazing by cattle 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). These densities are much higher than those that would occur as a result of wood bison restoration in Alaska, which would approximate 0.5–1 bison/square mile of total habitat and a maximum of 10–12 bison/square mile of meadow habitat. Based on range use patterns of wood bison populations in Canada, densities there approximate 5–7 bison/square mile of meadow habitat (Gardner and DeGange 2003). It is also known that the effects of intensive grazing on aquatic systems can be mitigated by limiting cattle density, and by using rest-rotation grazing and other management practices (Fitch and Adams 1998). As described below in the sections regarding the effects of wood bison on vegetation and waterfowl, there are differences in the grazing behavior of bison and cattle, and northern ecosystems were shaped, in part, through the influence of large herbivores. As noted above, the abundance of water sources in the three areas being considered for wood bison restoration would avoid the effects observed in arid habitats, where use by large numbers of ungulates is concentrated near limited sources of water.

Vegetation. The following evaluation of the potential effects of wood bison on vegetation applies to all three areas being considered for wood bison restoration. A review of the literature on the effects of grazing by bison indicates that they would have a beneficial effect on plant communities on the Yukon Flats. The effects of bison and other large herbivores on vegetation, and their relationships with plant communities, have been evaluated in a number of studies including Reynolds et al. (1978), Reynolds and Hawley (1987), Larter and Gates (1990), Larter and Gates (1991) Smith (1990), Berger (1996), Frank et al. (1998), and Knapp et al. (1999), and were reviewed by ADF&G (1994) and more recently by ADF&G and FWS (Gardner and DeGange 2003). The joint review of this and other biological issues (Gardner and DeGange 2003) is included in Appendix A, and includes additional analysis and references related to the effects of bison on the environment.

Grasslands and wild ungulates have coexisted for millions of years, indicating the long-term sustainability of grazing ecosystems. Typically, these grazers are continually on the move and grazing at any one site may be intense but never lasts long. Key factors are the large spatial and temporal variation in mineral-rich forage, the ability of defoliated grass and sedges to regrow after grazing, and the migratory nature of bison and other grazers. In the absence of grazing, nutrient cycling is reduced. Wood bison are adapted to boreal regions and have a highly efficient digestive system and an ability to forage on a variety of common grasses and sedges found in meadows and early successional habitats.

Reestablishing wood bison in certain areas would restore natural processes including more rapid nutrient cycling and the effects of grazing on meadow plant communities. Studies of grazing ecology show that ungulates can effect 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, overgrazed areas are species-poor and provide little forage value, while moderate grazing results in increased species diversity, richness, and 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. Grazing has been shown to enhance forage quality, and to cause changes in plant composition by reducing preferred grass species and leguminous plants in favor of less palatable sedges and forbs.

Bluffs along the upper Yukon River 100–175 miles southeast of Fort Yukon support some of the few remaining steppe plant communities in Alaska. Four species (*Cryptantha shackletteana*, *Oraba murrayi*, *Eriogonum flavum*, *Podistera yukonensis*) were once on the Category II Candidate Species List in Alaska, meaning they might qualify for protection under the Endangered Species Act. However, this list was abolished in the mid 1990s, and these species do not have status under the ESA (S. Detwiler, FWS, personal communication). In addition, a new species of gentian was recently identified on bluffs along the Porcupine River, about 40 miles east of the nearest meadow habitat. Bison are not known to forage on any of these plant genera or species. It should also be noted that steppe plant communities coexisted with bison and other large grazers for millennia (Guthrie 1990). About 75 miles of primarily upland terrain lies between the eastern edge of wood bison habitat and the closest known steppe community at Woodchopper Bluff. In view of the lack of suitable bison range in these areas, and the limited and predictable movements of existing bison herds in Alaska and Canada, it is unlikely that wood bison would venture this far from suitable habitat.

An additional concern about impacts to vegetation communities is the possibility of introducing exotic species of weeds into remote areas by feeding wood bison hay grown in other parts of Alaska. This concern can be mitigated by feeding wood bison only certified weed-free hay prior to and after their being moved to temporary containment facilities at remote locations.

Wildlife.

Waterfowl — The following evaluation of the potential effects of wood bison on waterfowl applies to all three areas being considered for wood bison restoration. Waterfowl species in Interior Alaska include mallards, pintails, canvasbacks, wigeon, shoveler, scaup, gadwall, green-winged teal, blue-winged teal, redhead, ring-necked duck, goldeneye, bufflehead, oldsquaw, scoter, ruddy duck, and mergansers, as well as Canada geese, white-fronted geese, loons, and trumpeter swans. 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 (U.S. Fish and Wildlife Service 1987). The Minto Flats area is a high quality waterfowl nesting and staging area and a variety of waterfowl species occur in the lower Innoko/Yukon River area.

Water levels and predation are major factors determining waterfowl nesting success in Interior Alaska. Spring floods often occur in the lower Innoko drainage because of its relatively low elevation compared to the Yukon River. Floods can have a large effect on waterfowl production in these areas by reducing the amount of available nesting habitat. The effects of flooding on waterfowl nest success can be substantial in a given year. Flooding reduces available habitat and can destroy nests that are already initiated. The effects of flooding, however, are limited to geographic areas with open lake systems (lakes connected by surface water) and these open systems, although very important to waterfowl production, are relatively rare compared to closed lakes. For example, the open lake portion of Minto Flats is highly productive for waterfowl and can be subject to flooding, but this type of system is less common in the Interior than closed lake systems (e.g., much of the Yukon Flats).

The possible effects of bison on waterfowl were mentioned as a concern by FWS and Griffith et al. (1998) because of the importance of the Yukon Flats for waterfowl. Although there have been no studies specifically addressing the effects of bison on waterfowl in the northern boreal forest, there is a substantial number of relevant studies and empirical data available from other areas. Rather than being concentrated in a few areas, waterfowl nesting activity is widely distributed on the Yukon Flats and the other two areas under consideration, a situation that limits the potential effects of bison to a small number of waterfowl nests at any given time. The incubation period for most species of ducks is about one month or less (Bellrose 1980), and occurs during a period when wood bison generally avoid wet meadows (Larter and Gates 1991). There is no indication of adverse effects of wood bison on waterfowl populations in Elk Island National Park, Alberta, or in the Mackenzie Bison Sanctuary or Mills Lake area in the Northwest Territories (ADF&G 1994).

The potential effects of wood bison and other large ungulates on waterfowl in Interior Alaska were reviewed by ADF&G (1994) and again in the joint ADF&G and FWS review of wood bison restoration conducted in 2003 by Gardner and DeGange (Appendix A). Based on 1) a review of major studies on the effects of grazing ungulates (primarily 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 herd on the Yukon Flats, Gardner and DeGange concluded that a medium density wood bison population is unlikely to have negative effects on waterfowl.

Mark Lindberg, an Associate Professor of Wildlife Biology at the University of Alaska Fairbanks who specializes in waterfowl biology, provided comments to the WRAG on the potential for wood bison restoration causing impacts to waterfowl. Dr. Lindberg 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 any negative effects on overall population levels (Lindberg 2005). He suggested 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, grazing by bison could 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 could cause positive changes in meadow plant communities by helping reverse encroachment by trees and shrubs and 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 about 60% based on surveys in 7 years between 1989 and 2003, demonstrating that substantial variability in nesting success occurs under current conditions. Dr. Lindberg concluded that bison would have little or no effect on waterfowl populations, that any negative effects would be localized, and that beneficial effects might include an increase in the quality and quantity of meadows.

The available information indicates that wood bison would have minor or beneficial effects on waterfowl at any of the wood bison restoration sites being considered. If minor negative effects were to occur in any of the three areas under consideration, they could be mitigated by limiting bison population size and density at levels that will not have detrimental effects on waterfowl.

Moose — The following conclusions pertain to all three alternative wood bison restoration sites. The potential effects of wood bison on moose populations have been reviewed by ADF&G (1994) and Gardner and DeGange (2003; Appendix A). The major difference in the general ecology of moose in these areas is that they support a wide range of moose densities. Moose population density on the Yukon Flats is relatively low at about 1 moose/3–4 square miles (Stephenson 2002). Moose are relatively abundant in the Minto Flats area, with a population density of about 2–4 moose/square mile. The lower Innoko–Yukon River area also supports a relatively healthy moose population of about 1 moose/square mile. The potential effects of bison on moose numbers via effects on predator numbers are discussed in a separate section below.

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/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

bison and moose despite relatively high overlap in habitat use in Elk Island National Park. 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 that bison and moose can coexist at high densities. Examples include the Delta and Farewell areas in Alaska and Elk Island National Park in Alberta, where moose populations in excess of 1 moose/square mile have coexisted with 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 and provides a source of meat that reduces demand for harvest of moose at a time when cow moose are often taken (Jung 2005). Harvesting fewer cow moose can help maintain the reproductive potential of the population.

Plains Bison — ADF&G agrees with the recommendations of other bison conservation authorities, which emphasize the importance of maintaining separation between free-ranging wood bison and plains bison populations. The areas being considered for wood bison restoration are at least 100 miles from the Farewell or Delta Junction plains bison populations. There is a small, privately-owned herd of plains bison in an enclosure in the lower Cosna River area, about 45 miles west of the western edge of the bison habitat on the Minto Flats. There is little naturally occurring bison habitat in this area, and it is unlikely that wood bison would occur in this area or interbreed with these captive animals. Geographical separation as well as management that will limit wood bison population size will prevent mixing of the two bison subspecies in all areas.

Caribou and Dall Sheep — Wood bison should have no effect on caribou and Dall sheep populations in the upper Yukon basin. There is little history of caribou using the Yukon Flats, and there appears to be little chance that bison could have adverse effects on this species. In addition, bison and caribou have different dietary preferences, with caribou using a broad range of plants including forbs, twigs and leaves of shrubs, lichens, fungi, sedges and grasses (Miller 1982; Fischer and Gates 2005), while bison have a strong preference for graminoid plants during most of the year. Bison and caribou seem to be behaviorally compatible, and can be found in the same geographic areas (Fischer and Gates 2005), although their ranges often do not overlap. Although the White Mountains, Fortymile, Porcupine, and Western Arctic herds have occasionally used the uplands surrounding the flats at some time in the last century, caribou are rarely found closer than about 50 miles from the area where potential wood bison habitat occurs. If caribou were to occasionally winter on the Yukon Flats in the future, the small overlap in food habits and behavioral compatibility between caribou and bison suggest that bison would not interfere with caribou use of the area.

Dall sheep occur south of the Yukon Flats in the White Mountains, with the nearest sheep populations being located about 20 miles from the major wood bison habitat. Bison would be unlikely to occur in this area unless the population was allowed to increase to an extremely high level that would cause some bison to disperse from low elevation meadow systems. Even if that were to occur, it is known that 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 and M. Oakley, personal communication).

Dall sheep and caribou do not normally occur in the Minto Flats or the lower Innoko–Yukon River areas.

Predator–Prey Interactions — The relationship between wood bison and predators 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). The latter review is included in Appendix A and includes a detailed analysis of the relationship between wood bison and predators.

Predation on bison by black (*Ursus americanus*) or brown 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 (C. Gates, personal communication). The existence of wood bison on the Yukon Flats, Minto Flats, or lower Innoko–Yukon River area is unlikely to cause significant changes in bear or wolf numbers or predation rates on moose, and will have a minor effect on these species.

Disease-free wood bison have not been found to be the preferred prey for wolves, but wolves can be an important predator on bison, especially on calves (Oosenbrug and Carbyn 1985; Van Camp and Calef 1987; Carbyn and Trottier 1988; Larter et al. 1994). The conditions that would hypothetically be necessary to cause changes in wolf prey selection and increased predation on moose (Larter et al. 1994) do not seem to occur during the first 15–20 years after wood bison are established in an area. There are no studies that demonstrate that wolf numbers or wolf predation on moose increased following the reestablishment of bison in northern habitats (N. Larter, personal communication, 2006). Wolf predation on wood bison still has not been detected 15 years after their release in the Nisling River valley (B. Hayes, M. Oakley, Yukon Department of Environment, personal communication) and was not detected during the first 19 years in the Mackenzie Bison Sanctuary (Gates and Larter 1990). Both herds increased by at least 15% annually during these periods, suggesting low levels of predation. Few wolf kills have been documented in the 40-year history of the Farewell herd, which has numbered 300–400 bison since 1992 (Whitman and Stephenson 1998; Boudreau 2002). These studies indicate there is little interaction between wolves and bison when bison numbers are below 500 (Gates et al. 2001; Boudreau 2002; DuBois 2002) and are not limited by habitat (Gates and Larter 1990). Gates et al. (2001) concluded that the potential for indirect effects of bison on moose or other ungulates can be mitigated by limiting bison population size.

Furbearers — The Yukon Flats, Minto Flats, and lower Innoko–Yukon River area support populations of lynx, marten, wolverine, red fox, beaver, muskrats, mink and river otter. Bison appear to coexist with a variety of furbearers without detrimental effects. 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. There is no reason to anticipate detrimental effects on furbearers, which could benefit from increases in biological diversity and productivity. The existence of wood bison should have no, or beneficial, effects on furbearer populations.

Small Mammals and Birds — The following discussion applies to all three sites where wood bison restoration is being considered. A wide variety of small mammals and birds occur on the Yukon Flats, Minto Flats, and lower Innoko–Yukon River areas. Small mammals include red-

backed, tundra, taiga (yellow-cheeked) and meadow voles, meadow jumping mice, brown lemmings, porcupines, snowshoe hares, arctic ground squirrels, red squirrels and shrews (MacDonald and Cook 2002). Small birds present are typical of Interior Alaska and include various thrushes, warblers, sparrows, swallows, chickadees, juncos, grosbeaks, ravens, and gulls. The projected effects of wood bison on upland birds are generally similar to those indicated for waterfowl. Based on studies of the relationship between grazing and upland bird species diversity and richness elsewhere in North America, it appears that wood bison would have a neutral or beneficial effect on upland birds. Kantrud and Kologiski (1982) studied the effects of grazing on upland birds in a 600,000 km² area on the Great Plains, and reviewed 241 related articles in the scientific literature. Their study showed that light to moderate grazing resulted in increased species richness for 19 upland species studied. 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. The favorable status of the 227 bird species recorded in Elk Island National Park despite the high densities of bison and other ungulates also indicates that healthy upland bird populations exist in the presence of even relatively high densities of bison (Blyth and Hudson 1987; Blyth et al. 1993).

There are few studies focusing on the relationship between large ungulates and small mammals such as microtines, ground squirrels, beavers, and snowshoe hares. However, these species occur in Elk Island National Park, Wood Buffalo National Park, and the Mackenzie Bison Sanctuary at levels of abundance typical of northern environments. It is difficult to foresee a mechanism by which bison would adversely affect small mammal populations, and an increase in habitat diversity and productivity could benefit small mammals such as microtine rodents. The effects of wood bison on small birds and mammals should be minor and could be somewhat beneficial.

Raptors — Although the effect of grazing on ground-nesting raptors such as short-eared owls and northern harriers in boreal environments has apparently not been specifically evaluated, studies in other habitat indicate that grazing can have both positive and negative effects on these species, depending on 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, and is used in some areas as a management tool (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 should have little negative effect on ground nesting raptors, and may be beneficial in the long term. Long-term monitoring of raptor populations could help assess whether wood bison would have any effect on these species.

Effects of Climate Change. This discussion applies to all three sites and to Interior Alaska in general. Bison are adapted to a wide range of climates, with their original distribution including much of North America and Eurasia and 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 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. Various areas 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. Studies show that parts of the Arctic are getting drier and/or warmer, and the area burned by forest fires is increasing (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. Wood bison are well adapted to northern grassland environments and their restoration could help offset possible future declines in other northern mammals such as moose and caribou. Wood bison populations would help maintain grassland habitats, and maintain or enhance subsistence economies in the north (F. S. Chapin III, presentation to Wood Bison Restoration Advisory Committee, June 2005).

Land Use and Economic Factors

Recreational Use. The State of Alaska, Division of Parks and Outdoor Recreation indicates there do not appear to be any issues affecting the Alaska State Park system (Appendix E). As described above, common activities on existing bison ranges include hunting, trapping, woodcutting, berry picking, fishing, camping, hiking and other forms of recreation and resource use. Elk Island National Park, for example, is used by thousands of visitors each year who camp, hike, and picnic in an area where they routinely encounter bison and other ungulates (Blyth et al. 1993; W. Olson, personal communication). Bison generally avoid people, but should be treated with the same respect as other large animals. Wood bison restoration would not reduce opportunities for recreational use, and would enhance wildlife viewing opportunities and outdoor recreational opportunities in general.

Cultural Resources. As required in Section 106 of the National Historic Preservation Act, a letter was submitted to the State Historic Preservation Officer regarding the wood bison restoration and placement of temporary food storage and fence facilities near historic properties or archeological sites. All three alternative restoration sites were considered. The State Historic Preservation Officer concurred with the finding of “No Historic Properties Affected” for all three alternative restoration locations (Section 6 and 7; Appendix E).

Trapping. Recent experience with wood bison populations in the north shows they are compatible with the variety of activities that 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. Bison could have a minor effect on trapping activity because, like moose, they may occasionally cross or travel on snowmachine trails during winter, temporarily resulting in a rough surface (ADF&G 1994), or get caught in snares set for furbearers. Except for minor effects on snowmachine trails and snares, wood bison would have little effect on trapping activity. The presence of bison could have minor beneficial effects on trapping by increasing biodiversity and furbearer populations.

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. Their presence would have little or no effect on hunting for other species, and in the long term will result in increased hunting opportunity.

At present, the Yukon Flats supports a harvest of approximately 200–300 moose annually, with the majority being taken by local residents. An estimated 75–150 black bears and 10–15 grizzly

bears are taken each year (ADF&G 2002). The successful reestablishment of a wood bison population would eventually allow for additional hunting activity. A population of 500 bison would probably support an annual harvest of 50–100 bison, while a population of 1,000 could support harvests of 100–200 bison each year.

Bison restoration would have a generally beneficial effect on hunting activities by restoring a big game species and providing additional hunting opportunity. Based on studies elsewhere that indicate that bison have no apparent affect on waterfowl production, we anticipate no negative effects on hunting success for resident waterfowl in any of the three areas being considered. Similarly, wood bison restoration should have no negative effects on hunting of other species and a beneficial effect on overall hunting opportunities in both the Minto Flats and lower Yukon/Innoko sites.

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 and trapping. Their presence would have no effect on subsistence hunting for other species, and in the long term would result in increased hunting opportunities and harvest. In practical terms, bison restoration should have a beneficial effect on subsistence hunting in areas where it is implemented. In terms of helping meet subsistence needs, wood bison could make an especially important contribution on the Yukon Flats in view of the area's chronically low moose population and limited alternative resources.

Allocation of wood bison hunting opportunities is a major issue that is addressed in Section 3. The status of wood bison relative to state and federal subsistence laws would depend on future actions that might be taken by the BOG and/or the FSB. If one or both of these regulatory bodies made a positive determination regarding 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 BOG positive C&T determination would apply to all Alaska residents and all landownerships. 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.

If subsistence use is established through a positive C&T determination it is likely that subsistence hunters would account for a significant portion of the initial harvests. As a wood bison herd grew and a higher level of harvest could be provided, more opportunities for nonsubsistence uses would be available. If a large number of additional nonlocal subsistence or nonsubsistence hunters were attracted to areas where wood bison herds are restored in the future, this could cause some level of friction or conflict with local hunters. At least initially, the number of nonlocal hunters involved is likely to be fairly limited. For example, population and harvest modeling completed in connection with a preliminary cost–benefit analysis (Stephenson and Fix 2005) suggests that with a 14% harvest rate and a population of about 1,000 bison on the Yukon Flats harvests might (depending on state and federal C&T determinations) involve the participation of 130–180 local hunters and 130–175 nonlocal hunters in bison hunting activities each year. Hunting effort could be distributed over a relatively long period through the use of various permit systems, and would occur in an area of approximately 1,000 square miles or more. Minor conflicts between various user groups could be mitigated through a cooperative management planning process and the 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.

Resource Development. Wood bison are compatible with a variety of resource development activities. The main concern about wood bison restoration affecting resource development is the possibility of restriction on land use due to a possible future listing of wood bison under the ESA. Section 3 addresses the ESA and Section 7 provides a more detailed discussion of the ESA in relation to potential effects on resource development projects.

Agriculture — The major human activities that result in conflicts with free-ranging bison are large scale agriculture and the existence of high-speed highways. There are no roads or large scale agricultural developments in the areas being considered for wood bison restoration in the Yukon Flats and Innoko areas. However, there is some agricultural development in the uplands near the southeastern edge of the Minto Flats, and bison could have a negative effect on domestic hay production or pastures in the future, probably after the population approached 500 animals and occupied its maximum range. One secondary road, the Minto–Manley Road lies north of the Minto Flats. The Parks Highway is located in the uplands east of Minto Flats and to the south of the main areas of bison habitat. The Alaska Railroad also traverses the area near the base of the hills on the southeastern edge of the Minto Flats. There could be some potential for future problems with train and/or vehicle collisions in this area, but these would be limited because these roads occur in areas with little or no bison habitat. A Minto Flats wood bison population would be limited to about 500 animals, which would reduce the likelihood that individual bison would spend significant amounts of time outside the low elevation areas, where habitat is abundant.

Oil and Gas and Mineral Development —

Alternative A – Yukon Flats: The major potential resource development in the Yukon Flats area involves a proposed land exchange between FWS and Doyon, Ltd., an Alaska Native Claims Settlement Act regional Native corporation, to facilitate oil development. This would involve FWS receiving approximately 150,000 acres of land currently owned by Doyon, Ltd. within the YFNRW boundary and in exchange giving Doyon title to refuge lands that may hold developable oil and gas resources. The lands obtained by Doyon would include 110,000 acres in the southcentral portion of the refuge around Beaver Creek, south of the village of Birch Creek (U.S. Department of Interior 2005).

The northern edge of the area that would be transferred to Doyon, Ltd. ownership lies about 13 miles south of Birch Creek, which is located near the southern edge of the area that includes high quality wood bison habitat. Directional drilling might also be used to access petroleum deposits along the northern and western edge of this area, and along the southern and eastern edge of Native owned lands south of the community of Birch Creek. The lands in this area that would potentially be affected by oil and gas development include little or no potential wood bison habitat, consisting primarily of forested uplands. The area would be connected to the trans-Alaska pipeline along the Elliot Highway by a pipeline, and possibly also a road constructed along one of two potential routes near the northern edge of the White Mountains, about 5–10 miles south of the any significant amount of bison habitat. A road in this area would

also have little or no direct effect on wood bison or their habitat, although it could increase access to the area if it were open for public use.

While the area south of Birch Creek is a major focus of the proposed Yukon Flats land exchange, it is possible that oil and gas development could occur beyond that area, possibly extending all the way north to the Yukon River and beyond. Because of the fact that wood bison are generally tolerant of various human activities, the effects of the proposed development on wood bison or their habitat would most likely be very limited. Similarly, the presence of wood bison should have little effect on development activities. Roads and pipelines may have to be designed to allow passage of wood bison and other wildlife, similar to what has occurred in connection with Alaska's North Slope oil developments.

At this stage in the exploration for oil and gas on the Yukon Flats it is not well known whether economically recoverable oil deposits exist or where they are located. Should extensive economically recoverable oil deposits be found in an extensive area on the Yukon Flats, it is possible that infrastructure and activity from oil and gas development could limit the range and movements of wood bison to some extent. Even in a scenario of major oil and gas development, wood bison could coexist with industry.

Alternative B – Minto Flats: The Nenana Basin gas exploration project is occurring primarily in the area west of the Nenana River and south of the Tanana River, with some initial seismic testing just north of the Tanana River near the southern edge of the Minto Flats State Game Refuge. Depending on the results of test wells that will be drilled south of the Tanana River, additional seismic testing and possibly gas wells could occur in the southeastern portion of the MFSGR in the future (Bailey 2005). The eastern part of the Minto Flats is relatively wet, and would probably be used by wood bison primarily during winter (Gardner 2007). Gas development would be regulated by the Alaska Department of Natural Resources (DNR).

There is little potential wood bison habitat south of the Tanana River, and development activities in this area would have little or no effect on bison. Development in the southeastern portion of the MFSGR could have a minor effect on wood bison by limiting access to winter habitat immediately adjacent to roads and gas wells. Similar to the Yukon Flats, the presence of wood bison on Minto Flats may require designing roads and pipelines to allow passage of wood bison and other wildlife, but this is unlikely to have a significant effect on oil development activities.

Alternative C – Lower Innoko–Yukon River Area: The Donlin Creek gold project is located 19 kilometers (12 miles) north of the Kuskokwim River and the community of Crooked Creek. The project would be accessed by road from Crooked Creek. The leased area includes 42 square miles of uplands located about 65 miles southeast of Shageluk, and 30–40 miles east of the expanse of potential wood bison habitat near the lower Innoko–Yukon River. The possibility of building a pipeline to transport liquefied propane from the Yukon River near Holy Cross to the mine site has been considered, but now appears to be unlikely. It is also possible that access roads could extend west and north of the mine in the future (M. McLean, DNR/Office of Habitat and Permitting, personal communication).

The proposed development of the Donlin Creek mine would not occur in or near the potential wood bison habitat in the lower Innoko–Yukon River area, and would have no foreseeable effect on bison. Similarly, bison would have no effect on the Donlin Creek gold project.

There is potential for additional mineral development in the Flat Mining District, north of Donlin Creek. If that were to occur there may be a need for a road to extend west to the Yukon River and that road might be located in possible wood bison habitat. It is unlikely that development in potential wood bison habitat would be extensive enough to adversely affect bison.

Economics. A preliminary economic cost–benefit analysis based on the Yukon Flats example was completed by Stephenson and Fix in 2005. This example can be generally extrapolated to all three potential wood bison restoration sites. Under one scenario (shown in Table 6), over a 25-year period wood bison restoration would bring an estimated \$10,283,500 in new money into the state. Additionally, it was estimated that \$3,533,500 would move within the state into the local region where restoration occurred (Table 6). This analysis was modeled primarily on the characteristics of a Yukon Flats restoration effort, and did not attempt to quantify indirect economic effects. It also did not attempt to estimate costs or benefits that would accompany long-term environmental research or monitoring. In the scenario illustrated below, it was assumed that an initial bison harvest occurred 13 years after release, and that over a 13-year period, 2,147 hunters harvested a total of 1,180 bison, with 484 being taken by local hunters, 445 by nonlocal residents and 251 by nonresident hunters.

In total, a project of this nature was estimated to generate about 12.5 to 13.8 million dollars in direct economic effects. The proposed action would require approximately \$2,117,000 for implementation and management costs (Table 7) over the same period. These costs would be offset by the estimated direct benefits over the 25-year period.

Construction of a temporary holding facility could temporarily increase employment levels in local villages. The facility would not affect community characteristics given its temporary nature. The proposed action would not affect public facilities, utilities, transportation systems, or services. Although not included in the analysis used in this example, local communities could derive additional economic benefits from contracting and forming local partnerships that would create opportunities for local participation in wood bison management and research.

TABLE 6 Estimated direct monetary effects from wood bison restoration

Activity	Calculation	Amount	Comments
<u>New money into Alaska:</u>			
Hide sales; assumes about half (500) are tanned or dried and sold and one-quarter are sold outside state; average price \$500	250×500	125,000	Sales of tanned or raw bison robes
Guiding and outfitting; 240 <u>nonresident</u> hunts @ \$15,000 each (guide fees plus local travel, equipment, expenses)	$240 \times 15,000$	3,600,000	
Nonresident tag fees	289×1000	289,000	
Nonresident drawing permit fees	$14,450 \times 10$	144,500	
Tourism; 50 ecotourists/year spending \$2,000 each	$50 \times 2,000 \times 25$	2,500,000	
Aerial sightseers, 400 nonresident/year @ 100	$400 \times 100 \times 25$	1,000,000	
Arts and crafts associated with wood bison; \$5,000/year out of state	$5,000 \times 25$	125,000	Sketches, paintings, beadwork, clothing and other items made from bison hide
Grants to Tribal Governments, Universities and agencies averaging 100,000/year	$100,000 \times 25$	2,500,000	For population, habitat, historical and environmental research, and cultural and educational activities (could offset other programs and not be additive)
Subtotal		10,283,500	
<u>New money into region or money moving within state:</u>			
Harvest of 1,180 bison over 25 years (beginning at low level in year 13; providing 590,000 lb of meat)	$1,180 \times 500 \times 6 \times 0.8$ minus \$1,180,000	1,652,000	Replacement value at \$6 per pound. Assumes that nonresident hunters would not realize a replacement benefit in terms of out-of-state food costs, but would donate meat to Alaskans; that 20% of the meat would have been obtained from other sources (replacement factor); and that the average cost of harvesting a bison is \$1,000
Access fees for nonlocal resident hunters using private land; (75% of 890 nonlocal hunters)	$667 \times \$500$	333,500	Includes both successful and unsuccessful hunters
Outfitting/transporting for nonlocal residents (i.e., air taxi, snowmachine and boat rental); 33% of 890 hunts = 295	$295 \times \$1,000$	295,000	Includes both successful and unsuccessful hunters
Lodging, food, fuel purchased in local communities; nonlocal resident hunters; (890 hunters spending an average of \$500 each)	890×500	445,000	Includes both successful and unsuccessful hunters
Hide sales; assumes about half are tanned or dried and sold and one-quarter are sold inside state	250×500	125,000	Sales of tanned or raw bison robes
Drawing permit fees; resident	$30,800 \times 10$	308,000	
Aerial sightseeing passengers, 100 residents/year @ 100	$100 \times 100 \times 25$	250,000	
Arts and crafts associated with wood bison; \$5,000/year in state	$5,000 \times 25$	125,000	Sketches, paintings, and beadwork, clothing and other items made from bison hide
Subtotal		3,533,500	
TOTAL		13,817,000	

TABLE 7 Estimated implementation and management costs that could be incurred by the State of Alaska and project contributors

Activity	Est. cost (\$)	Comments
Planning for Fort Yukon project and NEPA documents	55,000	Could be as high as \$100,000 depending on level of NEPA compliance needed
Implementation cost	162,000	Temporary holding facility, transporting bison, etc.
Personnel costs for implementation;	150,000	
Basic population monitoring – 30,000 annually (25 yr)	750,000	Postcalving and late winter surveys, periodic radiotracking
Personnel/Administrative 6 months salary, \$40,000/year	1,000,000	
Total	2,117,000	

Alternative A – Yukon Flats — Villages shown in Table 8 are potential locations for the initial temporary bison holding facility on the Yukon Flats. All villages shown in Table 8 have high poverty rates, ranging from 11.1 to 52.6%. The villages are predominantly Alaska Native but include a number of Caucasian residents. The average household income ranges from \$11,250 to \$28,750, with populations of between 28 and 84 individuals (Table 8). In view of the estimated direct economic effects associated with wood bison restoration, the average household income should increase and the percentage of individuals below the poverty level should decline.

TABLE 8 Economic profile for villages at potential release sites on the Yukon Flats

Village ^a	Population	% Individuals below poverty level	Race	Average household income (\$)	% Individuals not in labor force
Beaver	84	11.1	85.7% AK Native, 4.84% White	28,750	22.1
Birch Creek	28	37	100% AK Native	11,250	88.9
Chalkyitsik	83	52.6	97.6% AK Native, 2.4% White	16,250	63.8

^a Information obtained from U.S. Census Bureau, Census 2000.

Alternative B – Minto Flats — The village of Minto has a strong reliance on resources in the Minto Flats area, and is a potential location for a temporary bison holding facility that would be needed for a Minto Flats restoration project. Minto is a predominantly Alaska Native village, and has an average household income of \$21,250, with 26.4% of individuals below the poverty level (Table 9). The monetary effects expected for the Minto region would be similar to those estimated for the Yukon Flats, although they would likely be smaller because of the more limited amount of habitat and smaller bison population. As on the Yukon Flats, the average Minto

household income should increase and the percentage of individuals below the poverty level should decline as a result of a restoration effort.

TABLE 9 Economic profile for the village at the potential release site on Minto Flats

Village ^a	Population	% Individuals below poverty level	Race	Average household income (\$)	% Individuals not in labor force
Minto	258	26.4	91.9% AK Native, 7.8% White	21,250	60.3

^a Information obtained from U.S. Census Bureau, Census 2000.

Alternative C – Lower Innoko–Yukon Area — Two villages within the lower Innoko–Yukon River area are potential sites for a temporary bison holding facility. Shageluk and Holy Cross are predominantly Alaska Native villages, and have an average household income between \$21,875 and \$26,667, with between 16.2 and 45.6% of residents below the poverty level (Table 9). Because of the projected long-term monetary effects of wood bison restoration, the average household income in these communities should increase. As in other areas, the percentage of individuals below the poverty level should decline.

TABLE 10 Economic profile for villages at potential release sites in the lower Innoko–Yukon River area

Village ^a	Population	% Individuals below poverty level	Race	Average household income (\$)	% Individuals not in labor force
Shageluk	129	16.2	96.9% AK Native, 3.1% White	26,667	18.4
Holy Cross	227	45.6	96.5% AK Native, 3.5% White	21,875	52.7

^a Information obtained from U.S. Census Bureau, Census 2000.

SUMMARY OF CUMULATIVE IMPACTS

Because few, if any, adverse environmental impacts are expected at any of the individual sites, the anticipated level of cumulative effects, in particular those that might be regarded as negative, are very limited. The areas currently being considered for wood bison restoration include a small proportion of Interior Alaska (a total of a few thousand square miles), bison population sizes would be limited based on habitat and other considerations, and there would be ongoing population monitoring in place, along with mitigation measures if needed. Restoring wood bison populations in two or more areas would result in increased costs, as well as increased economic and ecological benefits. The cumulative effects can be summarized as follows:

Water Quality/Fisheries

As described above, wood bison are likely to have little effect on water quality or fisheries at any of the proposed sites, in part because of the large expanses of habitat available, low bison population densities, and the abundance of water sources. Potential effects would be extremely small and difficult to measure, and cumulative effects at two or more restoration sites would be minimal.

Vegetation

The beneficial effects of the resumption in use of meadow habitat by a grazing herbivore would be multiplied as a result of bison restoration in more than one area. The reduction in dead plant material and increased nutrient cycling would increase plant productivity and diversity over a larger area.

Waterfowl/Wildlife

The effects of wood bison restoration on waterfowl, furbearers, small birds and mammals, and on moose and other ungulates are predicted to range from nonexistent or minor to beneficial. No significant negative effects are expected, and there would likely be a mix of cumulative effects ranging from minor to beneficial.

Recreation and Hunting and Trapping

Opportunities for hunting, viewing, photography, tourism, culture and aesthetics would increase as a result of bison restoration at two or more locations. With increased opportunities for all users, there should be fewer conflicts over allocation of harvest, crowding or other social issues.

Cultural Resources

Because no impacts to historic properties are anticipated at any of the sites, there would be no cumulative impacts involved in restoring wood bison at two or three of the potential sites. In addition, further consultation with the State Historic Preservation Officer will occur prior to construction of any temporary facilities to ensure that cultural resources are not adversely affected.

Resource Development

Because wood bison are adaptable, their presence is not likely to cause significant effects on other resource development projects. This would not change significantly if wood bison were restored in one, two or all three potential sites. The main concern expressed about adverse impacts to other resource development is the possibility of wood bison populations in Alaska becoming listed under the ESA. While this appears to be unlikely, an action to list wood bison in Alaska under the ESA could result in cumulative impacts to resource development from all sites where wood bison are restored. Even if a listing of wood bison were to occur, there are provisions in the act and FWS regulations and policies that could be applied to allow for both wood bison restoration and other developments to proceed.

Economics

Restoring bison in two or more locations would require a greater level of funding for implementation and management by the State of Alaska and project contributors. The estimated direct beneficial monetary effects would also increase, and could be approximately two or three times the level estimated for the Yukon Flats. Given the generally similar nature of implementation activities at the three locations, project costs and monetary benefits would be generally comparable.

CONCLUSIONS ON POTENTIAL ENVIRONMENTAL EFFECTS

A qualitative summary of the potential physical, biological, land use and economic impacts associated with Alternatives A, B, C, and D is provided in Table 11, based on the evaluation and analysis presented above. The environmental effects of restoration at the three alternative sites are similar. The Yukon Flats is the most favorable site overall because of the extensive high-quality habitat that could support a large herd of wood bison that could make a greater contribution to maintaining the genetic diversity of the subspecies. The lower Innoko–Yukon River area ranks second because of its large amount of habitat, but there continues to be some concern about the effect of spring floods in the lower Innoko drainage. The Minto Flats area might rank slightly lower than Alternative A and C, but only because it includes a relatively small amount of habitat and the population would probably have to be limited to about 500 animals. Larger populations could be supported in the other two areas. Table 11 does not include an analysis of the effects of restoring wood bison at all three potential sites. However, this would result in the greatest positive effect in terms of wood bison conservation, biological diversity, and socioeconomic benefits.

The analysis concludes that wood bison restoration would have no significant impact on resources at any of the potential restoration sites. Effects on other species and the environment would be nonexistent, minor, or beneficial. Beneficial socioeconomic effects would result on local, regional, and statewide levels.

TABLE 11 Summary of potential environmental effects of wood bison restoration for the four alternatives considered

Category	Alternative A – Yukon Flats ^a	Alternative B – Minto Flats ^a	Alternative C – Lower Innoko–Yukon River ^a	Alternative D – No action alternative
Habitat quality and quantity	excellent	good quality-limited quantity	good	n/a
Potential contribution to bison conservation	high	limited	high	none
Local public support	high in the past	unknown/developing	unknown/developing	low
Effect on water quality	minor	minor	minor	none
Effect on soil quality	beneficial	beneficial	beneficial	lost potential benefits
Effect of climate on bison	beneficial	beneficial	beneficial	n/a
Effect of floods on facilities	none	none	none	n/a
Potential effect of floods on bison and habitat	low	low	short term local effect	n/a
Effect on trap lines	minor	minor	minor	n/a
Effect on hunting activities	beneficial	beneficial	beneficial	lost potential benefits
Effect on fisheries	minor	minor	minor	n/a
Effect on vegetation	beneficial	beneficial	beneficial	lost potential benefits
Effect on endangered species	none	none	none	n/a
Effect on waterfowl	minor	minor	minor	n/a
Effect on moose	minor	minor	minor	n/a
Effect on caribou or Dall sheep	none	none	none	n/a
Effect on furbearers:	none	none	none	no effect
Effect on small birds/mammals	beneficial	beneficial	beneficial	lost potential benefits
Effect on predator/prey interactions	minor	minor	minor	none
Effect on agriculture	none	minor	none	none
Effect on resource development	none	none	none	none
Effect on air quality	minor	minor	minor	none
Effect on subsistence	beneficial	beneficial	beneficial	lost potential benefits
Economic effects	beneficial	beneficial	beneficial	lost potential benefits

^a Where predicted effects could be either nonexistent or minor, they have been classified as minor in this summary.

SECTION 6: ANALYSIS OF ENVIRONMENTAL REVIEW SCOPING LETTERS

Beginning in July 2005, Hunter Environmental Associates, Inc. sent scoping letters to governmental agencies, village corporations and village councils in the three areas being considered for wood bison restoration. The letters requested consultation and input on the permitting requirements for reestablishing a wood bison herd and the temporary facilities that would be required. HEA conducted follow-up consultation with some governmental agencies to clarify the request in the scoping letter and agency permitting requirements and policies. There was no large scale effort to solicit scoping comments from the general public and organizations with an interest in wood bison restoration. Instead, in summer 2005 the WBRAG meetings and *Wood Bison News* provided a forum for general public comment.

Representatives of some of the governmental agencies that participated in the WBRAG meetings provided written comments similar to information presented during the meetings. Some village council representatives in the Minto Flats and lower Yukon–Innoko River areas, where less information and discussion about wood bison restoration has occurred, seem to have interpreted the scoping letters to imply that the project was going to proceed quickly without much consultation with local residents, causing some people to indicate initially that they did not support the project. Follow-up letters were sent to the Minto and Manley Village Councils. The project was later discussed at the Minto–Nenana, Manley–Tanana–Rampart, and Grayling–Anvik–Shageluk–Holy Cross Fish and Game advisory committee meetings and each committee voted to support the project. In contrast, no responses were received from individual village councils on the Yukon Flats, perhaps because they have expressed support for wood bison restoration numerous times over the last 15 years and may not have felt the need to add to their existing record of support. CATG provided a detailed letter that clearly articulates support for wood bison restoration on the Yukon Flats.

This analysis provides a summary of the substantive comments and/or concerns identified in the letters that were received and ADF&G’s responses to the issues raised. Appendix E includes a table showing the distribution of scoping letters, a sample of the HEA scoping letter and copies of all letters received. Section 7 of this report provides a description of all permitting requirements that have been identified through these scoping letters or elsewhere, as well as a more detailed analysis of some agency legal mandates and policy interpretations that may affect wood bison restoration.

ALASKA DEPARTMENT OF FISH AND GAME, DIVISION OF SPORT FISH

Division of Sport Fish is responsible for management of the MFSGR, in cooperation with DNR. The memorandum received from the Division of Sport Fish outlines the relevant goals and policies for the MFSGR. The MFSGR was established to ensure the protection and enhancement of habitat, conservation of fish and wildlife, and continuation of hunting, fishing, trapping, and other compatible uses. Management objectives provide for enhancement of hunting, fishing, and trapping opportunities when consistent with the conservation of fish and wildlife habitat and populations (ADF&G 1992). No permit from ADF&G is necessary if a temporary holding facility for wood bison is constructed outside of the MFSGR. A Land Use Permit will be required from DNR/Division of Mining, Land and Water, if a facility is constructed on state lands. Refuge policies require that “harmful” disturbance to fish and wildlife be minimized.

Permits for the project would include stipulations relating to monitoring and mitigating impacts. For example, MFSGR contains high quality waterfowl habitat and monitoring for potential impacts on waterfowl should be addressed. The memo concludes with the statement that “based on background research compiled by the Wood Bison Restoration Advisory Group the proposal appears to be compatible with the purposes for which the refuge was established.”

Response: DWC would work closely with the Division of Sport Fish and DNR, as well as Native landowners, to coordinate the development of a restoration effort in the Minto Flats area. Temporary facilities necessary to establish a herd would most likely be located on Hee-Yea-Lingde Corporation (Minto village corporation) lands. Whether required by permits or not, DWC will develop a monitoring and mitigation plan that would be based on advice from a variety of scientists and others with expertise in relevant fields. However, based on the knowledge of wood bison ecology and management, DWC foresees little potential for any harmful disturbance to fish and wildlife in the Minto Flats area, and agrees with the preliminary conclusion in the letter from Division of Sport Fish that wood bison restoration is compatible with refuge purposes.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION, ALASKA STATE VETERINARIANS OFFICE

The Office of the State Veterinarian has the responsibility to regulate the importation of animals into Alaska to prevent the introduction and spread of infectious and contagious diseases. Dr. Robert Gerlach provided information on diseases of concern at the April 2005 WBRAG meeting. In his letter he outlines the disease testing and health certification requirements in the Alaska Animal Health Regulations (18 AAC 36.005–36.930) and discusses the procedures necessary for restoring wood bison in the wild. He recommends that wood bison stock brought into Alaska be confined for an extended period to allow for repeated examination and diagnostic testing.

Response: ADF&G will continue to work closely with the state veterinarian to complete disease testing of wood bison stock in Canada and meet health certification requirements prior to import, and to conduct additional testing after the animals are in Alaska to ensure animal health prior to release into the wild. In addition, ADF&G is developing a cooperative agreement with AWCC to create a bison holding and handling facility that can be used to monitor wood bison health status prior to release. Section 7 provides additional details on disease testing and animal health certification procedures.

ALASKA DEPARTMENT OF NATURAL RESOURCES, OFFICE OF HABITAT MANAGEMENT AND PERMITTING

The Office of Habitat and Management Permitting (OHMP) has the specific statutory responsibility for protecting freshwater anadromous fish habitat (Anadromous Fish Act, [AS 41.14.870](#)) and providing free passage for anadromous and resident fish in freshwater bodies (Fish Way Act [AS 41.14.840](#)). In addition to permitting duties, OHMP coordinates with other agencies during plan reviews to provide expertise for protecting important fish and wildlife habitat throughout the state.

Their letter indicates “OHMP supports the proposed reintroduction and believes it will increase habitat and ecosystem diversity while providing enhanced socioeconomic benefits.” After reviewing the project description they indicated that all practicable measures to reduce wetland

and habitat impacts have been incorporated and no permit authorizations from OHMP are required.

Response: None required.

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF AGRICULTURE

The Division of Agriculture has no specific concerns or permitting jurisdiction over any of the proposed release sites for wood bison. However, the division would be concerned about bringing any animals into the state, for the purpose of creating a wild population, if they posed a threat to other wildlife and/or livestock on any of the alternative site locations. Their letter provides a reminder of the need to work with the Alaska State Veterinarian's Office.

Response: None required.

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF PARKS AND OUTDOOR RECREATION

Since the proposed restoration sites do not involve any units of the state park system, DNR/Division of Parks and Outdoor Recreation chose not to be involved in this process.

Response: None required.

ALASKA DEPARTMENT OF NATURAL RESOURCES, OFFICE OF HISTORY AND ARCHEOLOGY

Under the National Historic Preservation Act the State Historic Preservation Officer is responsible for participating in the review of federal, state, and local undertakings that may affect historic properties (Section 106 review).

Two letters were received from the Office of History and Archeology. The final letter indicates that although there are no reported archeological sites or areas of medium to high archaeological potential in areas where remote temporary holding facilities might be located, it would be advisable to consult with this office once the exact location for a facility has been selected. The State Historic Preservation Officer concurs with ADF&G's preliminary finding of No Historic Properties Affected.

Response: ADF&G will, as requested, consult with the Office of History and Archeology before initiating construction of a temporary facility at any of the potential restoration areas in order to confirm that the project will not affect listed cultural sites.

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

The Alaska Department of Transportation and Public Facilities had no objections to the proposal and stated that no permitting will be required provided there are no improvements made within a road right-of-way.

Response: None required.

U.S. ARMY CORPS OF ENGINEERS (USACE)

The USACE regulates dredge and fill activities that take place in wetlands under Section 404 of the Clean Water Act. A USACE permit is required for any activity resulting in the mechanized land clearing or placement of fill in wetland areas.

Initially the USACE indicated that the project description did not have locations specific enough for them to determine if the project involved wetlands under their jurisdiction. When more detail was provided by HEA the USACE concluded that the proposed project would not require a Department of the Army permit. The USACE requests that, if the DWC alters the method, scope or location of the proposed activity, they should be contacted again to make another jurisdictional determination.

Response: If changes are made in the location, design or construction of temporary facilities, DWC will ask for additional review by USACE and apply for the appropriate permits, if necessary.

U.S. DEPARTMENT OF AGRICULTURE

As part of the Animal and Plant Health Inspection Services mission of protecting American agriculture, the USDA is charged with regulating the import and export of animals, animal products and biologics.

The scoping comments received from USDA noted the final rule by the Animal and Plant Health Inspection Services, published January 4, 2005, entitled "Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities." The current rule does not allow importation of breeding bovines (cattle or bison), sheep, or goats from Canada (Appendix E). However, a revised regulation that, with some modification, would allow the import of wood bison was proposed by USDA in January 2007. In addition, the existing regulation allows the Animal and Plant Health Inspection Services to make exceptions.

Response: ADF&G is aware of the regulations described, and the fact that importing wood bison stock into Alaska from Canada for breeding purposes will require either a change in the current bovine import regulations or obtaining an exemption. ADF&G will follow developments related to the changes in import regulations proposed in 2007, request that the proposed regulation be modified to specifically allow the import of bovines from Canada to Alaska, and if a suitable new regulation is not adopted will consider applying for a permit to import wood bison. ADF&G is aware of other USDA import requirements that are not mentioned in the USDA letter. These requirements will be met by following the appropriate disease testing protocols prior to import, and by coordinating disease testing with the Canadian Food Inspection Agency and Environment Canada, Parks Canada Agency, or the appropriate provincial or territorial government. Except for the federal regulation relating to BSE, it appears that federal import health certification requirements are similar to, and will be met, by satisfying the requirements of the State of Alaska.

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT

The letter from BLM outlines their policies and procedures related to the reintroduction of native species. The letter states "The State of Alaska, Department of Fish and Game has determined wood bison occurred historically in areas of Alaska which reintroduction has been proposed. BLM generally considers it the responsibility of the state wildlife management agency to determine most wildlife related actions such as species reintroductions."

While BLM generally regards wildlife management as primarily the responsibility of the state wildlife management agency, they are required to evaluate impacts on subsistence (Section 810

evaluation), and their policies require an amendment to their land use plan, if that plan does not address reestablishment of a population of wildlife within the planning area. The letter indicates that the only restoration site where a significant amount of BLM land occurs is the lower Innoko–Yukon River area. The current Management Framework Plan for that area does not address wood bison restoration; however, BLM is scheduled to begin preparing a Resource Management Plan for the area in 2008. BLM lands in the Minto area have been selected under the Alaska Native Claims Settlement Act and are scheduled to be conveyed in the next year. NEPA compliance would be required if holding facilities and supplemental feeding occurred on BLM lands, and BLM would be concerned about the possibility of introducing invasive plant species through supplemental feeding.

Response: ADF&G will work closely with BLM to coordinate any restoration activities in areas where wood bison might eventually occur on BLM lands, and provide information as needed to assist BLM in revising its management plans as necessary. Prior to release into the wild, wood bison stock would be fed certified weed-free hay to minimize the potential threat of introducing non-native plant species. Because of the pattern of landownership in the lower Innoko–Yukon River area and logistic considerations, a temporary holding facility on BLM lands would not be required. A release facility would be located on private lands near an airstrip at one of the local communities. As noted in the letter from BLM and in the section on NEPA regulations below, NEPA compliance would not be required. The information in this review could eventually be cited in BLM's revised 2008 Resource Management Plan for the lower Innoko–Yukon River area to help evaluate the possibility of bison eventually occurring on BLM lands.

U.S. FISH AND WILDLIFE SERVICE

The written response received from the former FWS Alaska Regional Director, states that “the Service would strongly prefer that the initial proposed wood bison introduction occur on the Minto or Innoko locations.” The letter also indicates that close monitoring of wood bison and other wildlife and habitats would provide important information that would help evaluate the appropriateness and desirability of reestablishing wood bison in other areas. Lastly, the letter states that the Alaska Region concurs with the view “that the listing of wood bison in Canada under the Endangered Species Act does not need to be modified to add an imported population of wood bison in Alaska as endangered or threatened. We intend to treat any wood bison imported into Alaska as a foreign listed species and have no intention of revising the list so that they are listed domestically.” More recently, the current Regional Director reaffirmed parts of the previous scoping letter and also further clarified the FWS position regarding wood bison restoration on the Yukon Flats. This letter states “While the Service prefers wood bison restoration in a sequential approach and learning from actions taken on Minto Flats before advancing to other areas, our concerns are *not* sufficient to object to your proposal to pursue reintroduction of wood bison onto *private lands* in the Yukon Flats...If you choose this approach, we will accept your offer to cooperatively develop management and development plans.” (Emphasis in original, see letter by FWS dated November 2, 2006 in Appendix E).

Although the matter was not included in their scoping comments, FWS has since noted that they will begin an update of the YFNWR Comprehensive Conservation Plan (CCP) in 2008. The topic of wood bison restoration on Yukon Flats will likely be discussed and further addressed in

that plan. The CCP for the Innoko NWR is currently being updated and wood bison restoration is being taken into consideration.

Response: If ADF&G proceeds with consideration of wood bison restoration on private lands on the Yukon Flats, we will continue to work with the FWS and public stakeholder groups with an interest in Alaska's wildlife and National Wildlife Refuge land management to evaluate wood bison restoration on the Yukon Flats. If a citizen's planning team recommends moving forward with wood bison restoration on private lands on the Yukon Flats, ADF&G will work with FWS to ensure the project is coordinated with refuge management activities. ADF&G will also participate in the process to update the YFNWR CCP and assist in providing information on wood bison restoration, as is currently being done with the update of the Innoko NWR CCP. More complete reviews of the issues that have been raised by FWS in the past and discussion of pertinent FWS legal mandates and policies is included in Section 7 of this report.

COUNCIL OF ATHABASCAN TRIBAL GOVERNMENTS

CATG is the regional, consortium government and nonprofit service provider representing tribes in the upper Yukon River area. Their letter articulates the support for wood bison restoration on Yukon Flats by CATG and their member tribes and notes their Board of Directors has designated the project as a high priority for their Natural Resources Department. They cite a variety of reasons for the project being a high priority including:

- ◆ A more reliable and diverse supply of subsistence foods for local communities.
- ◆ Wood bison have been of great spiritual, cultural and historical significance to the people of Yukon Flats.
- ◆ The project has international significance and would help to secure the long-term survival of wood bison.
- ◆ Restoration of wood bison would help to enhance the biological and habitat diversity within the Yukon Flats.
- ◆ Wood bison restoration would encourage development of local economies based upon renewable resources.
- ◆ The project allows for a unique and historical partnership among entities with different backgrounds and philosophies to work towards the common goal of wood bison restoration.

The letter goes on to state that local communities on the Yukon Flats are interested in working as partners to establish temporary holding facilities on their lands. They support the recommendations of the WBRAG to move forward expeditiously in developing wood bison restoration programs in all three areas. The letter indicates they would oppose any effort to remove or postpone consideration of the Yukon Flats site and "think it would be unfair considering the effort our elders, tribal governments and other residents have made to build the restoration effort, the fact that Yukon Flats has a much lower moose population than the other

areas, and also because the amount of high quality wood bison habitat is superior to the other areas.”

Response: ADF&G recognizes the long-standing interest and active participation of CATG in wood bison restoration on Yukon Flats. ADF&G intends to work closely with CATG, local tribal governments and others in any additional wood bison planning and implementation activities for the Yukon Flats.

DELOY GES, INC.

Deloy Ges, Inc. is the village corporation for Anvik in the lower Yukon–Innoko River area. Their letter states they support the reintroduction of wood bison into their area and have no issues at this time with wood bison grazing on their land.

Response: none required.

DELOYCHEET, INC.

Deloycheet, Inc. is the village corporation for Holy Cross on the lower Yukon–Innoko River area. An email received from Deloycheet representatives indicates they are interested in the wood bison reintroduction project and that more information and continued dialog would benefit their corporation and people in the region.

Response: Deloycheet and all the village corporations in areas proposed for wood bison restoration will be provided copies of this ER. If the project proceeds to site-specific planning in their area there will be several additional opportunities for dialog. If their lands were proposed as a location for construction of a temporary holding facility for wood bison, ADF&G would seek to develop a cooperative agreement with Deloycheet.

HOLY CROSS TRIBAL COUNCIL

A letter was received from the Holy Cross Tribal Administrator expressing concerns about the possible wood bison restoration project. The main concern identified was the need for input from community members since the project would affect the entire community. They requested a copy of the report on the environmental impact on the area used for the project.

Response: The Holy Cross Tribal Council will be provided with a copy of this report and there will be several additional opportunities for community input before any actions would be taken to restore wood bison in the lower Innoko–Yukon River area. After this letter was received, ADF&G staff provided an informational presentation on wood bison at the Grayling–Anvik–Shageluk–Holy Cross Advisory Committee and the committee unanimously endorsed the project. ADF&G recognizes that further efforts to discuss the wood bison restoration project with residents of local communities are needed.

MINTO, NENANA, AND MANLEY HOT SPRINGS VILLAGE COUNCILS

ADF&G received telephone calls and/or emails from representatives of the Minto, Manley Hot Springs, and Nenana Village Councils requesting more information and expressing interest, or in the case of Manley Hot Springs and Nenana, expressing concerns about wood bison restoration. An initial email from the Manley Hot Springs Tribal Council stated that the council had voted “no” on the project because there were too many questions. They wanted to know what kind of

hunting regulations would be used, if the landowners all agreed, what kind of affects there would be on vegetation and animals and what subsistence hunting rights there would be. They indicated more studies are needed to answer these questions.

Response: As mentioned in the introduction to this section, some village councils may have been surprised by the direct request in the scoping letters for comments about permitting wood bison restoration facilities near their communities, when they had little prior opportunity to learn about the project and discuss issues of concern. The Minto, Nenana, and Manley Village Councils will be provided with a copy of this report and there will be several additional opportunities for community input before any actions would be taken to restore wood bison in the Minto Flats area. After this letter was received ADF&G staff provided an informational presentation on wood bison at the Minto–Nenana and Tanana–Manley–Rampart advisory committees and both committees unanimously endorsed the project. ADF&G recognizes that further efforts to discuss the wood bison restoration project with residents of local communities are needed.

SECTION 7: PERMITTING REQUIREMENTS AND ENVIRONMENTAL AND WILDLIFE LAW AND POLICY REVIEW

This section summarizes the basic permitting requirements for wood bison restoration and provides a detailed review of federal and state environmental laws and policies that must be considered as part of the wood bison restoration project. Issues related to pertinent laws and policies that are reviewed in this section include: 1) ESA considerations, 2) ensuring wood bison restoration is done in compliance with NEPA, 3) a review of Alaska National Interest Lands Conservation Act and an analysis of the issues raised by FWS regarding the possibility that the presence of wood bison on refuge lands (Yukon Flats) might not be compatible with FWS policies, 4) the need for wood bison restoration programs that might involve BLM lands to be addressed in their land use plans, 5) completion of the review of wood bison restoration under the ADF&G Wildlife Transplant Policy, and 6) Animal Health Certification by the Alaska State Veterinarian and USDA.

The Native village corporations that responded to scoping letters did not mention specific land use permitting requirements for possible wood bison restoration activities on their lands. Nonetheless, as further planning and consultation occurs, ADF&G intends to comply with all private land use permitting requirements and hopes to establish formal agreements with private landowners regarding activities related to wood bison restoration and/or long-term management activities that would occur on privately owned lands.

PERMITTING REQUIREMENTS

CITES Export Permit

The State of Alaska will be required to obtain an export permit from the Canadian Wildlife Service because wood bison are listed on Appendix II, Convention in International Trade in Endangered Species and Wild Flora and Fauna (CITES). There should be no difficulty in obtaining the CITES Export Permit. ADF&G will apply for a CITES Export Permit a few months before an export of wood bison from Canada is expected to occur.

Endangered Species Import Permit

Wood bison are classified as “threatened” on Canada’s list of species at risk, having been downlisted from endangered status in 1988. However, because they are currently classified as “endangered”... “in Canada” on the U.S. Endangered Species list, the state must apply to FWS for an Endangered Species Import Permit, which would allow the importation of wood bison stock in connection with restoration efforts. This requires a finding that the activity would enhance the survival of the species in the wild. It may also require some level of NEPA documentation. ADF&G submitted an application for an ESA Import Permit in March 2007.

DWC Animal Welfare Policy/Assurance of Animal Care

All management actions and research involving handling live animals must undergo review as per the DWC Animal Welfare Policy. An “Animal Care and Use Committee Assurance of Animal Care Form” must be completed and submitted to the Animal Care Use Committee at least six weeks prior to the date that wood bison would be transported from Canada to Alaska and any other activities involving the handling of live animals. This application was submitted in 2006 and has been approved by the committee.

State Historic Preservation Office Consultation

HEA submitted A Cultural Resource Section 106 consultation request to the State Historic Preservation Officer on behalf of ADF&G. Based on their review of the proposed project and site locations, the State Historic Preservation Officer concurs with the preliminary finding of “No Historic Properties Affected.” ADF&G will consult with the Office of History and Archeology before initiating construction of temporary facilities at a specific site in any of the potential restoration areas as requested to confirm that the project will not affect listed cultural sites.

Alaska Division of Mining, Land, and Water Land Use Permit

If there is a need for construction of any temporary facilities for wood bison restoration on state lands, whether on the MFSGR or elsewhere, a state Land Use Permit would be required. Because temporary facilities would likely be located on Native corporation land near a village, a state Land Use Permit is not likely to be needed. If state lands were used for construction of temporary holding facilities significant problems obtaining a permit are not expected because any facilities would be temporary and not cause any permanent environmental effects. If a state Land Use Permit does become necessary, ADF&G will submit an application for the permit with sufficient lead time to allow processing before any activities occur on state land.

Alaska Department of Environmental Conservation Air Quality Permit

Section 5 includes an evaluation of potential air quality permitting requirements. In terms of effects on air quality, a Record of Non-Applicability has been deemed unnecessary based on emissions calculated for chainsaws, generators, or other equipment that might be needed during construction of a temporary holding facility (R. Gesin, DEC, personal communication 2005). None of the proposed alternative site locations are within nonattainment zones for hazardous air pollutants. Based on this analysis, an air quality permit from DEC is not required.

U.S. Army Corps of Engineers, Section 404 Wetlands Permit

Initially, the USACE Regulatory Office indicated that the current proposed actions and alternative sites are not specific enough to conduct a jurisdictional determination. Later, based on additional information provided by HEA, the USACE indicated that the proposed project would not require a Department of Army permit, even for work conducted in wetlands. The project does not entail the use of mechanized land clearing equipment and the following precautions have been incorporated in attempt to minimize fill material in a navigable waterway.

- ◆ Placement of cement blocks to support a 24 feet × 24 feet floating floor on which hay would be stored would be placed during winter and removed by June 15.
- ◆ Fencing pile placement is linear.
- ◆ A mobile camper would be used to house personnel.

Once a specific campsite has been selected and a construction method is chosen, ADF&G will consult with the USACE again to determine whether a Department of Army permit is needed and/or to conduct a jurisdictional determination for the site(s).

ENVIRONMENTAL AND WILDLIFE LAW AND POLICY REVIEW*Endangered Species Act*

Wood bison are currently listed as a “threatened” species under Canada’s Species at Risk Act, which is similar to the U.S. ESA. The Committee on the Status of Endangered Wildlife in Canada downlisted wood bison from “endangered” to “threatened” status in 1988 because Canadian populations of wood bison were recovering. The U.S. Endangered Species list (which includes both foreign and domestic species) currently lists wood bison as endangered “in Canada.” The FWS is considering a proposal to revise the status of wood bison under the ESA to threatened “in Canada,” which would correspond to their current legal status in Canada.

In October 2004, in response to an inquiry from the Commissioner of the ADF&G, the Director of the FWS determined that, if wood bison are restored to Alaska, they would not need to be listed domestically under the ESA (Appendix B). Wood bison brought into Alaska would be treated as a foreign listed species, which means that federal permits would be required for import and export as long as the species remains listed in Canada. As noted in Section 2, wood bison in Alaska would have the same legal status as other resident wildlife, although depending on their status as a foreign listed species (whether they are still listed as endangered or threatened in Canada), it is possible that federal approval of some type may be required in order for a harvest to take place. However, it is still unclear whether federal authorization would be required. FWS indicates they have not previously encountered a similar situation. It is hoped that future discussions with FWS will lead to the development of an efficient authorization process if one is required. If wood bison are downlisted to threatened status “in Canada,” an action likely to occur by the time a harvest of Alaska wood bison would be proposed, obtaining any needed federal authorization to harvest wood bison and/or export trophies should be less difficult. Even if their status under the ESA is not revised, FWS indicates that, if federal authorization is required, provisions can be made to allow harvests that are necessary for herd management. Sections 3 and 7 provide more information on ESA considerations.

Restoring wood bison to Alaska would help to secure the future of the species and, as such, is consistent with the purposes of the ESA. There would be no additional conservation benefit from listing wood bison under the ESA and such an action would likely delay or preclude wood bison restoration. As discussed in Section 3, there are still concerns about potential listing of wood bison under the ESA, due in part, to the provision of the Act that allows the public to file a petition for listing. If a third party filed a petition to list wood bison in Alaska under the ESA, a review of the criteria for listing a species under the ESA suggests that listing would not be warranted. An analysis of the listing criteria as they would apply to wood bison in Alaska follows:

Section 4 (a) of the ESA states “The Secretary shall by regulation promulgated with subsection (b) determine whether any species is an endangered species or a threatened species because of any of the following factors:

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

Discussion: This is not a significant factor in Alaska and northern Canada, but loss of habitat has constrained recovery in the southern part of the species original range in Canada. Although part of the original range of wood bison in Alaska is unavailable because of the presence of introduced plains bison populations, substantial unoccupied high-quality habitat continues to exist. Even if large scale oil development were to occur on Yukon Flats, it would be unlikely to reduce the suitability of this habitat, or the total potential wood bison habitat in Alaska, to a significant degree.

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

Discussion: Wood bison are not currently threatened by overutilization. Although the species was extirpated from Alaska, in part, because of unregulated hunting, reintroduced herds would be protected until they reached a level that could support a closely regulated harvest. It is extremely unlikely that overutilization would be a threat in the future.

(C) Disease or predation;

Discussion: The occurrence of cattle diseases (bovine tuberculosis and brucellosis) is an important factor constraining progress in wood bison conservation in part of their original range in Canada. These diseases are not known to occur in Alaska, and the remote areas where wood bison would be restored are specifically intended to provide a safeguard against exposure to disease. This is one of the key conservation benefits underlying the proposal. There is no indication that wood bison were threatened by disease in Alaska prior to their disappearance, and it is unlikely this would occur in the future. Disease prevention and safeguards would be addressed in both a management plan and in protocols governing importation. Bison populations have historically been subject to predation, primarily by wolves. Healthy bison populations, including initially small founding populations used to reestablish wild herds are not known to be threatened by predation, which is notably rare in populations of 500 or less bison (Gates et al. 2001).

(D) The inadequacy of existing regulatory mechanisms;

Discussion: Regulatory mechanisms would be similar to those used by state and federal agencies to establish and enforce harvest regulations and manage wildlife habitat elsewhere in Alaska. This regulatory regime has been effective in successfully implementing a number of similar reintroductions, and in managing other wildlife populations.

(E) Other natural or manmade factors affecting the species' continued existence.

Discussion: It is difficult to foresee other factors that would negatively affect wood bison in Alaska. Habitat limitations and disease are the major factors constraining the reestablishment of wood bison in parts of their original range in Canada. The Alaska restoration program is specifically intended to restore disease-free wood bison populations in additional parts of their former range, thereby improving the outlook for the long-term existence of disease-free herds and increasing the number of free-ranging bison in herds that are subject to natural selection.

ADF&G has consulted with FWS and others to consider any options that might be available to lessen the chance of wood bison being listed under the ESA. One option considered is developing a "management or conservation plan" that meets the requirements of FWS "Policy for Evaluation of Conservation Efforts When Making Listing Decisions." This policy may be used to "guide the development of conservation efforts that sufficiently improve a species' status so as to make listing the species as threatened or endangered unnecessary." In addition, consideration has been given to the FWS "Interagency Cooperative Policy Regarding the Role of State Agencies in Endangered Species Act Activities" which specifies that FWS utilize the expertise "...of the states in implementing prelisting stabilization actions...to alleviate threats so that the priority is reduced or listing as endangered or threatened is not warranted...". FWS has also developed "No Surprises" agreements that are intended to give private landowners and others a greater level of assurance that changes in ESA policies or interpretations will not restrict other land uses.

FWS ESA staff has recommended that using these policies might be counter-productive because they are intended to apply to species either listed or that have a high potential for listing under the ESA. FWS has already decided that listing is not necessary or desirable. The only mechanism identified that might give complete assurance that wood bison will not be listed under the ESA is congressional action to exempt wood bison in Alaska from listing.

ADF&G intends to continue consultations with FWS, Doyon and others, to try and provide all possible assurances that wood bison restoration will not impact other resource development activities due to some involvement of the ESA in the future. Conceptually, ADF&G would support congressional action to exempt wood bison populations in Alaska from the ESA if there is sufficient public support and it can be accomplished in a way that is not viewed as undermining the ability of the ESA to protect other species of plants or animals in cases where application of the provisions of the ESA will benefit the species. At the same time, ADF&G views the FWS policy decision that wood bison brought into Alaska do not need to be listed domestically under the ESA to be well founded and defensible. The department does not consider congressional action to resolve concerns about the ESA to be an essential requirement for moving forward with wood bison restoration in Alaska.

National Environmental Policy Act

NEPA compliance can be required when a project involves the use of federal money or federal land, constitutes a major federal action, or requires a federal permit. Even if NEPA compliance were not required, conducting this environmental review is beneficial. As NEPA intends, an Environmental Assessment (EA) can serve as a neutral planning document that anticipates and analyzes any significant impacts, permitting issues, and possible mitigations for those impacts. It also serves as a compilation of information from public meetings and correspondence. All this information helps serve as the basis for making wise decisions about wood bison restoration and, if a decision is made to proceed, define what is necessary to move forward with the project with minimal or no adverse environmental impacts.

Obtaining an ESA Import Permit from the FWS may require a NEPA evaluation. Use of federal funds for planning and evaluation of wood bison restoration is excluded from NEPA requirements. If federal funds were used to physically implement wood bison restoration a NEPA review might be required (e.g., if Pitman–Robertson funds disbursed by FWS were used for transplanting wood bison to the wild), although the reintroduction of native species into suitable habitat within their historic range, where no or negligible environmental disturbances are anticipated, is categorically excluded from NEPA as discussed below.

If a project includes a federal action that requires a review under the NEPA process, and a “categorical exclusion” cannot be applied, an EA is required. If this results in a 'Finding of No Significant Impact,' then no further action is required. If potentially significant environmental impacts are identified in an EA or there is significant public controversy about a project, an Environmental Impact Statement may be required.

NEPA allows “categorical exclusions” for specific actions that do not require application of the full NEPA environmental review process. Each federal agency has its own specific list of categorical exclusions, and “exceptions” which preclude the use of a categorical exclusion. If one or more of the exceptions apply, then the proposed action cannot be categorically excluded.

Much of the information in this report (Section 5 in particular) is patterned after an EA that might be prepared to fulfill NEPA requirements. If wood bison restoration moves forward to the point where NEPA compliance is required, much of the information in this report can be used to develop an EA, in cooperation with the appropriate federal agency. In view of the minor and generally beneficial environmental effects of wood bison and the biological monitoring that would occur, it appears that a Finding of No Significant Impact decision may be a likely outcome of an EA. Therefore, it does not appear that wood bison restoration would constitute a major federal action that would require an Environmental Impact Statement. More detail on the specific NEPA regulations that apply to FWS and BLM, including categorical exclusions, are reviewed below.

BLM NEPA Requirements. There do not appear to be any BLM or Department of Interior categorical exclusions that would apply to wood bison restoration if it were implemented on BLM land (see BLM Manual 516 DM 2.3A(3) and 516 DM 2, Appendix 1, 3/8/04). Therefore, if temporary holding facilities for wood bison were constructed on BLM land, an EA would be required. However, if bison were reintroduced on private or state land (which is likely) where

they might eventually roam onto BLM land, it does not appear that NEPA compliance would be required.

FWS NEPA Requirements. The proposed wood bison restoration effort appears to be categorically excluded (see FWS Departmental Manual 516 DM 6, Appendix 1, 1/16/97 and Department of Interior regulations 516 DM 2, Appendix 1 and 2, 3/8/04). Categorical exclusion B(6) in 516 DM 6 Appendix 1 states:

“B(6) The reintroduction or supplementation (e.g., stocking) of native, formerly native, or established species into suitable habitat within their historic or established range, where no or negligible environmental disturbances are anticipated.”

There are two exceptions to categorical exclusion B6 that could potentially apply to wood bison restoration on FWS lands (see Department Manual in 516 DM 2, Appendix 2, 9/26/84). Section 2.2 is quoted below and does not appear to apply to the wood bison restoration project.

“2.2 Have significant impacts on such unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers, sole or principal drinking water aquifers, prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); or ecologically significant or critical areas, including those listed on the Department's National Register of Natural Landmarks.”

Exception 2.2 indicates that if the project would have any significant impacts to the listed resources or features the categorical exclusion B(6) would not apply and an EA would have to be prepared. As summarized in Table 1, other sections of this report, and scoping comments from other agencies it does not appear that wood bison restoration would have a significant impact on resources at any of the potential restoration sites. Therefore, this exception would not apply, and categorical exclusion B(6) would exempt wood bison restoration on FWS lands from further NEPA documentation. As noted above, restoration efforts would most likely be implemented on nonfederal lands because of logistic considerations.

Exemption 2.8 involves potential adverse effects to threatened or endangered species or critical habitat and states:

“2.8 Have adverse effects on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species.”

There are no threatened or endangered species or designated critical habitats in Interior Alaska that could be affected by wood bison. FWS has indicated that should wood bison be restored to Alaska, the ESA would not need to be modified to add the imported population as endangered or threatened, and that FWS does not intend to revise the list to include domestic populations. The restoration would benefit wood bison conservation, and importing bison would have no impact on existing, free-ranging wood bison in the listed population in Canada because stock would be obtained from captive herds. It does not appear that exception 2.8 would apply since there would be no adverse effects on listed species.

If the use of federal funds, the ESA import permit application or other matters require NEPA documentation, ADF&G will work with FWS to complete the necessary EA. This ER was prepared in general conformance with NEPA regulations and could be easily modified to help satisfy those requirements.

Alaska Lands Act and FWS Refuge Management Policies

As previously noted, FWS legal and policy interpretations have had a significant influence on the wood bison restoration project over the years. The history of FWS involvement in considering wood bison restoration on Yukon Flats is reviewed below. This is followed by a review of FWS legal mandates and policies and a discussion of the main issues raised by FWS relative to the purposes of the YFNWR, and the FWS policy on maintaining the biological integrity and natural diversity of the refuge.

History of FWS Involvement in Wood Bison Restoration on Yukon Flats. When the concept of wood bison restoration was first considered on the Yukon Flats, the YFNWR cooperated with ADF&G to evaluate the proposal and consult with local residents. In 1997 the FWS Regional Director for Alaska informed ADF&G that FWS could not support the proposal to restore wood bison on Yukon Flats because of concerns about compatibility with the purposes of the refuge, based on their interpretation of provisions in the Alaska National Interest Lands Conservation Act.

In 2002, ADF&G renewed efforts to seek cooperation from FWS in restoring wood bison in Alaska. In July 2003, ADF&G and FWS completed a joint review of wood bison restoration in Alaska, with an emphasis on the Yukon Flats (Appendix A, Gardner and DeGange 2003). The review concluded that wood bison would be compatible with other Alaskan wildlife, including other big game and waterfowl, and that significant environmental problems are unlikely. Despite these joint conclusions, the FWS did not rescind their 1997 decision to withdraw support for the proposal to restore wood bison on Yukon Flats.

In 2004 DWC staff met with FWS Office of Endangered Species staff to discuss how wood bison brought into Alaska would be classified under the ESA. Subsequently, the Commissioner of ADF&G wrote to the Director of the FWS to request clarification of FWS's view on the status that wood bison brought into Alaska would have under the ESA. The FWS Director responded with a letter indicating that wood bison would be classified as a foreign listed species, that animals brought into Alaska do not need to be listed under the ESA, and that FWS has no intention of modifying the ESA to list domestic populations of wood bison (Appendix B). This policy determination has been quite helpful but, as noted in Section 3, has not resolved all concerns related to the ESA.

During the WBRAG meetings in 2005 the YFNWR Manager restated his position that wood bison restoration is not compatible with the refuge purposes or FWS policy on maintaining the biological integrity of refuges. He emphasized his view that wood bison should not be considered part of the natural biological diversity of the refuge because the existing information is insufficient to conclude that humans contributed to the disappearance of wood bison.

The scoping comments received from FWS in September 2005 when this ER was initiated indicate FWS would strongly prefer that the initial proposed wood bison introduction occur on the Minto or Innoko locations and that the FWS Alaska Regional Director reiterated that an imported population of wood bison in Alaska does not need to be listed as endangered or threatened under the ESA.

In August 2006 the Commissioner of ADF&G wrote to the Director of the Alaska Region of the FWS asking them to reevaluate their position on wood bison restoration on the Yukon Flats and consider rescinding the 1997 letter stating they would no longer cooperate in the project. The FWS Regional Director responded stating “While the Service prefers wood bison restoration in a sequential approach and learning from actions taken on Minto Flats before advancing to other areas, our concerns are not sufficient to object to your proposal to pursue reintroduction of wood bison onto *private lands* in the Yukon Flats...” (Emphasis in original, see letter by FWS dated November 2, 2006 in Appendix E). The FWS understands that if wood bison are restored on private lands in the Yukon Flats, the animals will eventually occur on refuge lands. While the FWS recently stated they do not object to the proposal to restore wood bison on private lands in the Yukon Flats, a discussion of these issues will help the reader understand FWS policies, the relevant historical and biological information, and the extent to which issues have been addressed.

Two key issues raised in the past by FWS and discussed in this section of the ER are:

1. Whether restored populations of wood bison should be considered part of the “natural diversity” of wildlife in the YFNWR, and;
2. Potential for unintended adverse ecological consequences from wood bison restoration and the need for monitoring the effects of wood bison at other sites before proceeding with wood bison restoration on refuge lands.

Overview of FWS Legal Mandates and Policies. The purposes of the YFNWR, as defined in Sec. 302 of Alaska National Interest Lands Conservation Act, are to:

(i) 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 (including participation in coordinated ecological studies and management of the Porcupine and Fortymile caribou herds) and salmon [*emphasis added*];

(ii) Fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats;

(iii) Provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and

(iv) Ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge.

The FWS policy on Biological Integrity, Diversity and Environmental Health of the National Wildlife Refuge System (2001), adopted under the authority of the Refuge Administration Act, states that the Service intends to manage refuges to restore or maintain composition, structure and functioning of ecosystems comparable to historic conditions. These are defined as conditions that “were present prior to human related changes to the landscape.” Native species are defined as those “that other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.” “The highest measure of biological integrity, diversity, and environmental health is viewed as those intact and self-sustaining habitats and wildlife populations that existed during historic conditions.” The policy states “where practical, we support the reintroduction of extirpated native species. We consider such reintroductions in the context of surrounding landscapes. We do not introduce species on refuges outside their historic range or introduce species if we determine they were naturally extirpated.”

Other organizations have similar definitions which recognize that extirpation by humans is one element that makes a given translocation of wildlife a reintroduction, rather than an introduction. For example, the IUCN Position Statement on Translocation of Living Organisms defines reintroductions as “the intentional movement of an organism into a part of its native range from which it has disappeared or become extirpated in historic times as a result of human activities or natural catastrophe.”

According to the FWS policy cited above, Native species are defined as those “that other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.” (*emphasis added*). Recent correspondence from the FWS states “Information exists to support the environmental review’s conclusion that the Yukon Flats was within the wood bison’s historic range” (Appendix B, letter from Thomas Melius, November 2006). They also state that the cause of extirpation is less clear and that this remains the primary basis for FWS’s position.

Natural Wildlife Diversity and the Causes of Wood Bison Extirpation in Alaska. FWS policy defines “natural diversity” as “the number and relative abundance of indigenous species which would occur without human interference.” The causes for the disappearance of wood bison from Alaska are an important issue in determining whether they should be considered part of the natural diversity of wildlife under FWS policy. If the cause of wood bison extirpation in Alaska was solely a loss of habitat through natural processes, then it would not be appropriate to consider them part of the natural wildlife diversity and restore them to parts of their original range on refuge lands. However, if humans played a significant role in the extirpation of wood bison from Alaska, then it would be appropriate to consider them part of the natural diversity of wildlife and restore them.

Peer reviewed and published scientific literature indicates that humans played a role in the extirpation of wood bison from the Yukon Flats and elsewhere in Interior Alaska, and from adjacent parts of Canada (Stephenson et al. 2001). This conclusion was supported by a technical review conducted by *The Wildlife Society*–Alaska Chapter, which stated “the most likely cause of the extirpation of wood bison was the combined action of declining suitable habitat and unregulated hunting of declining and restricted populations of bison by indigenous peoples” (Griffith et al. 1998). It was also supported by a joint review of the published historical information conducted by FWS and ADF&G (Gardner and DeGange 2003, Appendix A) which

concluded that: 1) wood bison were the last bison subspecies that occurred in Alaska, 2) wood bison persisted in Alaska into the 19th century, 3) wood bison were once an important subsistence resource, 4) the most likely factors causing the extirpation of wood bison from Alaska were habitat changes and harvest and that significant environmental problems are unlikely (emphasis added, see Appendix A).

The study conducted by Stephenson et al. (2001) includes a detailed evaluation of the potential role of predation, hunting, habitat availability, and climate in the decline and disappearance of wood bison. Noting that bison persisted in Alaska for a few hundred thousand years despite dramatic fluctuations in environmental conditions, the study concludes:

The available information supports the conclusion that geographical isolation and hunting were factors that acted in combination and led to the extirpation of wood bison. The discontinuous nature of late Holocene habitat probably played an important, albeit indirect, role while hunting is the most likely proximate factor that reduced numbers and prevented the recovery of subpopulations or recolonization of suitable habitat. Bison have recently prospered in suitable habitat in Yukon and other parts of northwestern Canada, and in Alaska, and we now know that additional suitable habitat exists in Alaska. The recent expansion of wood bison populations demonstrates that earlier declines, and the extirpation of bison in various regions, were not caused solely by changes in habitat.

Some of the factors that led to this conclusion include: 1) the expansion of forests and tundra during the last several thousand years, which limited the best bison habitat to low elevation areas adjacent to major rivers, where human activity was also concentrated; 2) bison populations were isolated from each other, with no refugia from hunting; 3) changes in hunting technology, including the development of archery, during the last few thousand years would have increased the efficiency of hunters; 4) hunters would select for female and juvenile bison and sometimes kill more than one bison in an encounter; 5) alternative big game resources were scarce, and hunting pressure would have been relatively high, even when bison became scarce, because of the high return for the effort; and 6) there is no indication of severe weather or other environmental events that would have extirpated bison over a large region in Alaska and northwest Canada, and no way to explain the disappearance of bison unless hunting was a factor. It is clear that substantial amounts of suitable wood bison habitat continue to exist on Yukon Flats, and may expand in the future as a result of global climate change. There would be no point in pursuing restoration if suitable habitat had dramatically declined or completely disappeared.

Bison are widely regarded as a keystone North American herbivore by wildlife ecologists and biologists (e.g., Knapp et al. 1999; Gates et al. 2001), and wood bison restoration in areas from which the species has been extirpated has been recognized as a “valid intervention,” that is “necessary...to maintain the integrity of the ecosystem, particularly to repair past disturbance” (Arcese and Sinclair 1997). In this case the “disturbance” is the disappearance of a large herbivore due, in part, to unregulated hunting.

A number of conservation and wildlife management authorities and organizations recognize, either explicitly or implicitly, that wood bison are an extirpated indigenous species, that humans likely played a role in their disappearance, and that they are part of the natural diversity of the

Yukon Flats and other areas in Interior and Southcentral Alaska. These include *The Wildlife Society*–Alaska Chapter (Griffith et al. 1998), the Alaska Department of Fish and Game (Appendix F), the International Union for the Conservation of Nature (IUCN)/SSC-Bison Specialist Group-North America and Canada’s National Recovery Team for the Wood Bison (Gates et al. 2001). Wood bison restoration in Alaska is consistent with the IUCN Position Statement on the Translocation of Living Organisms and IUCN Guidelines for Re-Introductions, which ADF&G has used to evaluate and guide restoration planning.

Potential for Unintended Consequences and Need for Monitoring at Other Sites Prior to Restoring Wood Bison on Refuge Lands. Bison have a demonstrated ability to thrive in northern habitats, and their effects on the environment are predictable and well documented based on experience with other northern bison populations, including plains bison herds that have existed in Alaska since the 1920s. As detailed in this review, there is no reason to anticipate significant adverse effects on other wildlife and the environment. To the contrary, the scientific evidence indicates these effects will be neutral or positive. Wood bison were restored in Yukon beginning in the 1980s, and currently number nearly 800 animals. Thomas Jung, a wildlife biologist and wood bison manager with the Yukon Department of the Environment attended the June 2005 WRAG meeting and explained the significant benefits of wood bison in the Yukon (Appendix D). The herd has prospered in a generally mountainous area that offers limited grazing habitat compared to potential sites in Alaska, and no substantial adverse impacts to other species of wildlife have been observed.

After reviewing the historical and ecological information about wood bison the WRAG recommended that ADF&G pursue wood bison restoration at three sites, including the Yukon Flats. In making their recommendations the group considered the issues identified by FWS, but nonetheless recommended that the Yukon Flats continue to be considered as a potential release site. The group also concluded that restoration initiatives should not be delayed until monitoring of an initial restoration was completed, as reflected in the following recommendation:

“Independent of whichever site is implemented first, knowledge gained from restoring wood bison at the first site should be used to benefit restoration planning and monitoring at the other potential release sites. There should be no fixed time required to wait for the results of studies at one site before proceeding with wood bison releases at the other sites.”

An appropriate level of biological monitoring will accompany each wood bison restoration effort. However, as has been the case with a wide variety of other wildlife restoration efforts in North America (i.e., caribou and muskoxen in Alaska; wolves, elk, and wild turkeys in the lower 48), the restoration of a species to other parts of its original range should not be pursued in piecemeal fashion, with each restoration effort being delayed until the results of a previous effort had been studied for years or decades. The ecological effects of wood bison will be essentially undetectable until populations increase to a few hundred animals or more. This means it would be a decade or more before useful biological information would be available in any case.

Given the large amount of available scientific information and experience in managing bison populations ADF&G believes it is unnecessary, and would be inefficient, to approach wood

bison restoration as a series of individual experiments. Such an approach would retard progress in making a major step forward in wildlife conservation. It would also substantially increase costs and create logistic problems associated with maintaining the appropriate number of wood bison in captivity for a decade or more, or going through the difficult process of maintaining infrastructure and importing additional animals again after a period of years.

Conclusions. ADF&G believes Alaska's wood bison restoration effort is consistent with Division of Refuges guidelines, with their stated definitions of "natural diversity" and "biological integrity," and with established and accepted conservation and restoration principles. The department also recognizes that, while designed to address important biological considerations that the FWS is legally mandated to follow, these policies are subject to interpretation. The record of public comment on wood bison restoration on Yukon Flats will be available for consideration by the FWS and could be used when interpreting and applying these policies.

In addition, ADF&G believes that implementing wood bison restoration on private lands adjacent to refuge lands on the Yukon Flats, and the future presence of wood bison on refuge land in this area, would be consistent with the Master Memorandum of Understanding between ADF&G and FWS. This agreement includes the following: "The Department and the Service mutually agree...1) To coordinate planning for management of fish and wildlife resources on Service lands so that conflicts arising from differing legal mandates, objectives, and policies either do not arise or are minimized"... the Service recognizes "the Department as the agency with the primary responsibility to manage fish and resident wildlife within the state of Alaska..." and ADF&G agrees "...to manage fish and resident wildlife populations in their natural species diversity on Service lands."

BLM Land Use Planning Requirements

As noted in the review of the scoping letter received from the State Director of BLM the only restoration site where a significant amount of BLM lands occur is the lower Innoko–Yukon River area. BLM Manual 1745 requires BLM to amend its land use plan, if that plan does not address reestablishment of a population of wildlife in the planning area. The current Management Framework Plan for that area does not address wood bison restoration; however, BLM is scheduled to begin preparing a Resource Management Plan for the area in 2008 with a completion date of 2010. Unless ADF&G can work with BLM to amend the current Management Framework Plan, this could cause a delay in efforts to restore wood bison in the lower Innoko–Yukon River area.

ADF&G Wildlife Transplant Policy

The WTP requires that the Commissioner determine that it is in the best interest of the state to transplant a species of wildlife in Alaska. ADF&G has worked toward meeting the requirements of the WTP and will complete all necessary steps before implementing a wood bison restoration project.

As explained in Section 2, in August 2006 the department initiated an evaluation of the proposal to restore wood bison according to the process required in DWC's WTP. The DWC Director approved a WTP Scoping Report, issued a finding regarding the legal and management status of wood bison in Alaska and directed staff to establish a WTP Review Committee for the project.

The primary duty of the review committee, as defined in the WTP, is to determine whether wood bison restoration is likely to effect a significant reduction in the range, distribution, habitat, or preexisting human use of other species.

In January 2007 the committee agreed that wood bison restoration is not likely to effect a significant reduction in the range, distribution, habitat, or preexisting human use of other species. The finding on the status of wood bison in Alaska and the Findings of the Wood Bison Restoration Wildlife Transplant Policy Review Committee are included in Appendix F. Public comment is being sought on the findings of this committee as part of the review of this ER. Following the review the committee will consider any comments received and then submit their final recommendations to the Director. If the Director approves the proposed transplant, DWC staff will prepare a detailed transplant plan and itemized budget to be submitted to the Commissioner for final approval.

State Veterinarian and USDA, Animal Health Certification

The diseases of greatest concern in bison conservation are bovine tuberculosis, bovine brucellosis, and anthrax (Gates et al. 2001). Serologic and empirical evidence indicates that neither bovine brucellosis nor tuberculosis is present in Alaska. There are also no records of anthrax in Alaska. Wood bison are not known to harbor parasites that could adversely affect Alaskan wildlife. There is little reason to expect that wood bison might contract a pathogenic disease endemic to Alaska wildlife (ADF&G 1994). *Brucella suis* biovar IV is serologically evident in various caribou herds and sometimes in other ungulates (Zarnke 1991). However, this disease does not appear to be pathogenic in bison, and is not a disease risk (Bevins et al. 1996).

As noted above, the state Division of Agriculture indicates they have no specific concerns or permitting jurisdiction over any of the proposed release sites for the wood bison. Except for the federal regulation relating to BSE, USDA import health certification requirements are similar to, and will be met by satisfying the requirements of the State of Alaska.

The procedures that must be followed to allow importation of animals into Alaska to prevent the introduction and spread of infectious and contagious diseases were outlined by the Alaska State Veterinarian. The Alaska Animal Health Regulations (18 AAC 36.005 – 36.930) include the following measures:

(a) Cattle and bison imported into the state must be accompanied by a permit and health certificate which, for cattle or bison over six months of age, must include certification that within 30 days before importation the cattle or bison tested negative to the following tests at laboratories approved by the USDA to conduct such tests:

- ◆ a brucellosis test unless the animal is under 18 months of age and has been officially vaccinated and permanently identified as an official brucellosis vaccinee;
- ◆ an anaplasmosis test; and
- ◆ a blue tongue test.

(b) Cattle or bison over 6 months of age must be negative to a tuberculin test within 30 days before importation.

(c) The health certificate required by (a) of this section must indicate that the animals are free of ectoparasites or have been dipped or sprayed within 10 days before importation with an insecticide approved by the USDA.

(d) Cattle and bison imported into Alaska are subject to being retested 30 to 120 days after their arrival in the state at the discretion of the state veterinarian. Imported cattle or bison must be kept isolated from resident livestock until the retests are concluded or the state veterinarian has approved release of the animals.

The Alaska State Veterinarian notes that “these regulations specifically deal with domestic livestock that will be confined to a premise and easily controlled with regular oversight and opportunity for repeated examination and sampling. These wood bison pose a greater risk since the goal is to release them to the wild where they will be free-ranging and interact with other wildlife species. These wood bison should be confined for an extended period of time to allow adequate time for repeated examination and additional diagnostic testing.” Diagnostic tests include:

- ◆ Examination for external and internal parasites (treatment for parasites may be indicated),
- ◆ Tests for viral respiratory disease (Infectious Bovine Rhinotracheitis, Bovine Viral Diarrhea, Bovine Respiratory Syncytial Virus),
- ◆ Tests for bacterial diseases (Leptospirosis, Anthrax, Mycobacterium avium paratuberculosis, also known as Johne’s disease).

Dr. Gerlach also notes that testing for Johne’s disease presents some unique diagnostic challenges in bison. Testing requirements for Johne’s disease may seem arduous but the goal is to protect the wildlife resources of the state. Johne’s disease already occurs in livestock in Alaska (R. Gerlach, unpublished data).

Disease testing and health certification requirements established by the State of Alaska, USDA, and Canadian Food Inspection Agency would be followed (ADF&G 1994), which will minimize the possibility of introducing wildlife diseases in Alaska through importation of wood bison from Canada. The effectiveness of this overall approach has been demonstrated with the establishment of six wild and several captive disease-free wood bison herds in Canada. ADF&G staff is working with the state veterinarian and veterinarians in Canada to develop Johne’s disease testing protocols for EINP wood bison and has worked with wildlife veterinarians in the Yukon Department of Environment to test wood bison stock that might also be imported into Alaska. Before any wood bison are imported into Alaska for eventual release to the wild, ADF&G will work with the Alaska State Veterinarian and others to define testing and handling procedures that will be used to eliminate or minimize disease threats to other wildlife or domestic animals. Wood bison management plans can outline steps that would be taken in the unlikely event of an outbreak of a serious disease in free-ranging populations, including provisions that would allow removal of a population as a last resort.

SECTION 8: CONCLUSIONS AND PROPOSED DECISIONS

CONCLUSIONS

ADF&G concludes that wood bison restoration in Alaska can be accomplished with minimal or no negative environmental impacts, and that wood bison restoration can enhance the diversity of Alaska's wildlife resources and could provide significant benefits to people. Wood bison restoration in Alaska would make a significant contribution to international efforts to conserve wood bison and would help fulfill key goals in Canada's Wood Bison Recovery Plan. No negative effects on moose, waterfowl or other wildlife are anticipated, particularly with biological monitoring and control of wood bison herd size. Because few, if any, adverse environmental impacts are expected at any of the individual sites, the anticipated level of cumulative negative effects is very limited. Bison population sizes would be limited based on habitat and other considerations, and populations would be monitored and mitigation measures that can be applied, if needed.

Most of the permitting requirements for the project can be met without a great deal of difficulty. However, at the same time, some significant legal and policy issues must be adequately addressed before wood bison restoration can proceed. A number of factors should be considered when evaluating the three potential wood bison restoration sites. No one site is most favorable relative to all the factors. Key considerations include:

- ◆ Suitability of habitat for wood bison.
- ◆ Extent of suitable habitat and size of herd that could be supported. Larger herds can make a greater contribution to maintaining genetic diversity and the evolutionary future of wood bison.
- ◆ Abundance of other wildlife species and relative need to enhance the wildlife resources in the area.
- ◆ Proximity to domestic cattle or plains bison.
- ◆ Extent of public consultation and support in the specific areas.
- ◆ Legal mandates and policies of land managing agencies and their willingness to support restoration.
- ◆ Other existing or potential resource developments or land uses that may affect wood bison or be affected by them.
- ◆ The presence of state or federal lands and the associated differences in how subsistence and nonsubsistence harvest of wood bison might be managed.
- ◆ Logistic requirements and cost of transportation and biological monitoring.

Alternative A – Yukon Flats

Because the Yukon Flats has been considered as a potential site for wood bison restoration for nearly 15 years, the level of biological information and public consultation exceeds that in the other two, more recently identified areas. With its extensive high quality bison habitat and record of public awareness and support, the Yukon Flats is the most attractive site for an initial restoration location. Because the Yukon Flats could support a relatively large herd of up to 2,000 wood bison or more it could also make a relatively large contribution to maintaining the genetic diversity of the subspecies. There are no cattle or domestic plains bison on the Yukon Flats that might interbreed or be a source of disease.

The moose population on Yukon Flats is one of the lowest in the state and subsistence resources and other hunting opportunities are limited compared to the other two sites. The Yukon Flats also has the most limited potential for an increase in the moose population due to constraints on predator control on FWS lands. The Yukon Flats includes some state land (primarily below the ordinary high water line of navigable waters), but most potential wood bison habitat is found on private or federal public lands. It is likely that a wood bison harvest on federal lands would be controlled by both state hunting regulations and federal subsistence hunting regulations. It would be important to define the number of wood bison necessary for subsistence and how large the herd would have to be to provide nonsubsistence hunting opportunities and to ensure that opportunities for wood bison harvest are available to a diversity of wildlife users.

While there are many factors that favor the Yukon Flats as the best initial wood bison restoration site, the FWS prefers that the Yukon Flats not be the initial location for wood bison restoration. In addition, there is significant interest in oil and gas development on the Yukon Flats and concerns about possible restrictions on development that might result from a possible future connection between wood bison and the ESA. Even though there has been a strong record of support for wood bison restoration from village councils and CATG in the past, additional consultation with local residents should occur to determine the current level of support.

Alternative B – Minto Flats

ADF&G's wood bison habitat assessment concluded that Minto Flats could support a population of 500 wood bison, which is sufficient to meet the recommendations of Canada's Wood Bison Recovery Team. From a long-term perspective, it would be desirable to maintain larger herds to achieve greater genetic diversity. Minto Flats supports a relatively abundant moose population that provides for subsistence and general hunting opportunities. Some people have suggested that Minto Flats is already a relatively productive ecosystem and has less need for wood bison than does the Yukon Flats. Oil and gas exploration is planned or is occurring on the Minto Flats and the area south of the Tanana River and, as in the case of the Yukon Flats, there is concern about potential restrictions on oil development as a result of the ESA. There has been less consultation with local residents in the Minto Flats area than on the Yukon Flats and some comments received during the scoping process for this ER included concerns about wood bison restoration. However, Fish and Game advisory committees in the Minto Flats area voted to support wood bison restoration after more information was presented, and they had an opportunity to ask questions and more fully discuss the project. Nonetheless, more consultation is needed to determine the level of local support for the project.

Minto Flats is the only site where there would be road access to a temporary wood bison holding facility. This could make the site more cost-effective. Road access might also make biological monitoring more cost-effective, however much of the work would likely involve aircraft and occur in remote areas. Minto Flats is predominately state and private land and future harvest would be regulated by the Alaska Board of Game. There are no conflicts between the management purposes of the MFSGR and restoration of wood bison.

Alternative C – Lower Innoko–Yukon River

The lower Innoko–Yukon River area was found to have suitable habitat and forage to support 400 or more wood bison. The habitat assessment identified concerns about short-term flooding and occasional deep snow and recommended further study to determine if wood bison would have access to sufficient forage before allowing the population to increase to more than 500. It appears that suitable wood bison habitat extends further up both the Innoko and Yukon River valleys, suggesting a larger number of bison could be supported in this region. Moose are relatively abundant in Game Management Unit (GMU) 21E compared to the Yukon Flats, however in GMU 21A the moose population appears to be significantly lower than in GMU 21E. A recent moose management plan developed for the area identified concerns about a possible decline in the moose population and increasing predation on moose. Logistically, the lower Innoko–Yukon is the furthest from the road system and might entail the highest cost for restoring and monitoring a wood bison population. At this time there is no active exploration for oil and gas in this area and there may be less concern about potential effects of the ESA on resource development activities. The local Fish and Game advisory committee for the area has voted to support wood bison restoration. However, as for the Minto Flats, there is a need to further discuss wood bison restoration with local residents to better gauge local public support for the project. There is a mixed pattern of landownership in the lower Innoko–Yukon River area, with roughly equal proportions of private and BLM land and a small amount of state land, primarily below the ordinary high water mark of navigable rivers. The Innoko NWR lies just to the north of the identified potential wood bison habitat area. It is possible that wood bison would occur on refuge lands and this may result in some of the same concerns being expressed by the FWS as has been the case with the Yukon Flats. BLM has indicated that wood bison restoration should be included in the land use plan for this area. A new Resource Management Plan for the area is scheduled to be started in 2008 and completed in 2010. This could delay wood bison restoration in this area, unless planning for a project on private lands can proceed, with the project being addressed in BLM management plans later. However, it does not appear that a restoration effort can be implemented at any site until 2010 or later.

All three sites considered in the ER are suitable for wood bison restoration. The environmental effects of restoration at the three alternative sites are similar. However, the three areas differ in terms of habitat potential, long-term conservation benefits, current levels of public awareness and support, and potential difficulties related to federal policies. Overall, Alternative A, the Yukon Flats ranks most favorably, except for the FWS preference that Yukon Flats not be the initial location for wood bison restoration. Implementing wood bison restoration on more than one of the potential sites would result in the greatest positive effect in terms of wood bison conservation, biological diversity, and socioeconomic benefits.

Currently, free-ranging wood bison are found only in Canada where there are six, healthy free-ranging herds including about 4,000 animals. Opportunities for further expansion in numbers or range are constrained by human developments and some herds are threatened with the possibility of being infected with cattle diseases. The existence of wood bison infected with bovine tuberculosis and brucellosis in the Wood Buffalo National Park area is an important factor preventing the expansion of healthy populations in a large part of the original range of wood bison in Canada (Gates et al. 2001).

Restoring additional populations in Alaska would be a major step forward and would dramatically improve the outlook for the long-term survival for the species by increasing the number of animals in large, free-ranging herds subject to natural selection and providing a safe haven from the threat of livestock diseases. Wood bison restoration also represents an opportunity to reestablish a key grazing herbivore at a time when global climate change is likely to increase the amount of grazing habitat over the long term (Starfield and Chapin 1996; Chapin and Starfield 1997).

PROPOSED DECISION TO PROCEED WITH WOOD BISON RESTORATION IN ALASKA

ADF&G will proceed with efforts to restore wood bison in Alaska and continue to consider all three of the potential restoration sites identified in this ER. The department will work to initiate site-specific planning efforts for both the Yukon Flats and Minto Flats locations while at the same time increasing efforts to discuss wood bison restoration with residents of the lower Innoko–Yukon River area and evaluate local support for the project. Table 12 provides a graphic representation of the approximate timeline for several of the main actions needed to proceed with wood bison restoration in Alaska.

Seeking to restore wood bison almost simultaneously on the Yukon Flats and Minto Flats is an approach that has the potential to provide the most benefits for various wildlife user groups in the shortest period of time. This approach has the advantage of pursuing restoration in one area that is predominately federal and private lands (Yukon Flats) and another that is predominately state and private lands (Minto Flats). In all areas where wood bison restoration is pursued there will be a need to develop general harvest management plans that will describe how both subsistence and nonsubsistence harvest opportunities will be provided in the future. The Minto Flats site is an area where harvest is regulated by the Alaska Board of Game which is responsible for providing both subsistence and nonsubsistence hunting opportunities. Minto Flats would also provide a road accessible area where there could be greater opportunities for people to view and photograph wood bison, although bison may not remain close to road accessible areas.

As has been stated previously, even if ADF&G reaches a final decision to proceed with wood bison restoration in Alaska, there are several significant challenges that must be overcome and there is no guarantee of success at any of the alternative sites. USDA import regulations will have to change, or a permit obtained, to allow importation of wood bison stock from Canada. ADF&G may be able to undertake a genetic management program using artificial insemination on the wood bison already at AWCC. However, relying on this approach to produce sufficient stock would delay restoration in the wild for several years, and it is not a good alternative to obtaining additional stock from Canada. It would, however, be a worthwhile adjunct to a genetic management program if suitable genetic material can be obtained and used to augment genetic

diversity. Disease testing protocols must also be met before wood bison are released into the wild.

Because of the more advanced consideration of wood bison restoration on Yukon Flats, the Yukon Flats location should be the first place to attempt a site-specific planning process. This would also be consistent with ADF&G's commitment to pursue wood bison restoration on the Yukon Flats, which has developed through 15 years of biological research and public consultation and the partnership with the CATG and local communities.

If planning is initiated for the Yukon Flats site and a planning team recommends proceeding with wood bison restoration in that location, several issues must be resolved before implementation could occur. For example, concerns about wood bison being listed under the ESA must be reasonably addressed. Concerns about the ESA could also affect project implementation at the Minto Flats site and possibly the lower Innoko–Yukon River site in the future. Changing circumstances could make it feasible to restore wood bison at the lower Innoko–Yukon site before the other two locations. Therefore, ADF&G will remain flexible and take advantage of opportunities to restore wood bison in any of the three areas as they arise.

Because wood bison restoration in Alaska is an outstanding opportunity for wildlife conservation, and is the focus of broad public support, ADF&G proposes to continue the effort and seek to achieve the following goal:

“Restore wood bison populations to portions of their former habitat in Alaska so 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 animal.”

Central to proceeding with the wood bison restoration program, ADF&G is committed to:

- ◆ Following the disease testing and health certification requirements established by the Alaska State Veterinarian and USDA.
- ◆ Conducting area-specific planning efforts to provide additional opportunity for public review and comment and close involvement of local residents and other wildlife users.
- ◆ Conducting a biological research and monitoring program to monitor restored herds of wood bison and evaluate potential wildlife and ecological impacts. The program will be as comprehensive as possible but must also be cost-effective and affordable.
- ◆ Continuing to work with FWS and others to address issues related to the U.S. Endangered Species Act in a manner that ensures that wood bison restoration in Alaska does not limit opportunities for future uses and enjoyment of wood bison, or other resource development activities.
- ◆ Working with all wildlife users and within the state and federal regulatory programs to ensure that future harvest opportunities for wood bison will be shared in a reasonable manner.
- ◆ Working in partnership with other public agencies and nongovernmental organizations to seek sufficient funding to implement wood bison restoration.

TABLE 12 Approximate timeline for major activities required for wood bison restoration in Alaska

Activity	Prior to Oct 2006	Nov -Dec 2006	Jan-Feb 2007	Mar -Apr 2007	May -Jun 2007	Jul-Aug 2007	Sep-Oct 2007	Nov -Dec 2007	Jan-Feb 2008	Mar -Apr 2008	May -Jun 2008	Jul-Aug 2008	Sep-Oct 2008	Nov -Dec 2008	Jan-Feb 2009	Mar -Apr 2009	May -Jun 2009	
Phase I planning.	█																	
Complete the first site-specific implementation and management plan.						█												
Seek revision of USDA regulations to allow wood bison import to Alaska.	█																	
Disease testing and health certification to bring wood bison into Alaska.	█																	
Transport wood bison from Canada to temporary holding facility (AWCC).									█									
Disease testing and health certification prior to releasing wood bison.*										█								

Activity	Prior to Oct 2006	Nov -Dec 2006	Jan-Feb 2007	Mar -Apr 2007	May -Jun 2007	Jul-Aug 2007	Sep-Oct 2007	Nov -Dec 2007	Jan-Feb 2008	Mar -Apr 2008	May -Jun 2008	Jul-Aug 2008	Sep-Oct 2008	Nov -Dec 2008	Jan-Feb 2009	Mar -Apr 2009	May -Jun 2009		
Complete requirements for permits, landowner approvals and cooperative agreements.																			
Initiate baseline biological monitoring program.																			
Target date for initial wood bison release*																			

* This date depends on the length of time that will be required for wood bison to be held in a temporary holding facility for completion of disease testing and health certification. It now appears likely that the earliest date wood bison could be released to the wild would be in spring 2010. Disease testing would continue, as needed, until wood bison stock is approved for release to the wild.

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PROPOSED VISION FOR THE FUTURE OF WOOD BISON IN ALASKA

Wild, free-ranging wood bison again occupy suitable habitat and we continue to make significant contributions to international wood bison conservation. Wood bison are again an integral part of Alaska's natural wildlife diversity, can be enjoyed by Alaskans and visitors to the state, and also provide local and statewide economic benefits.

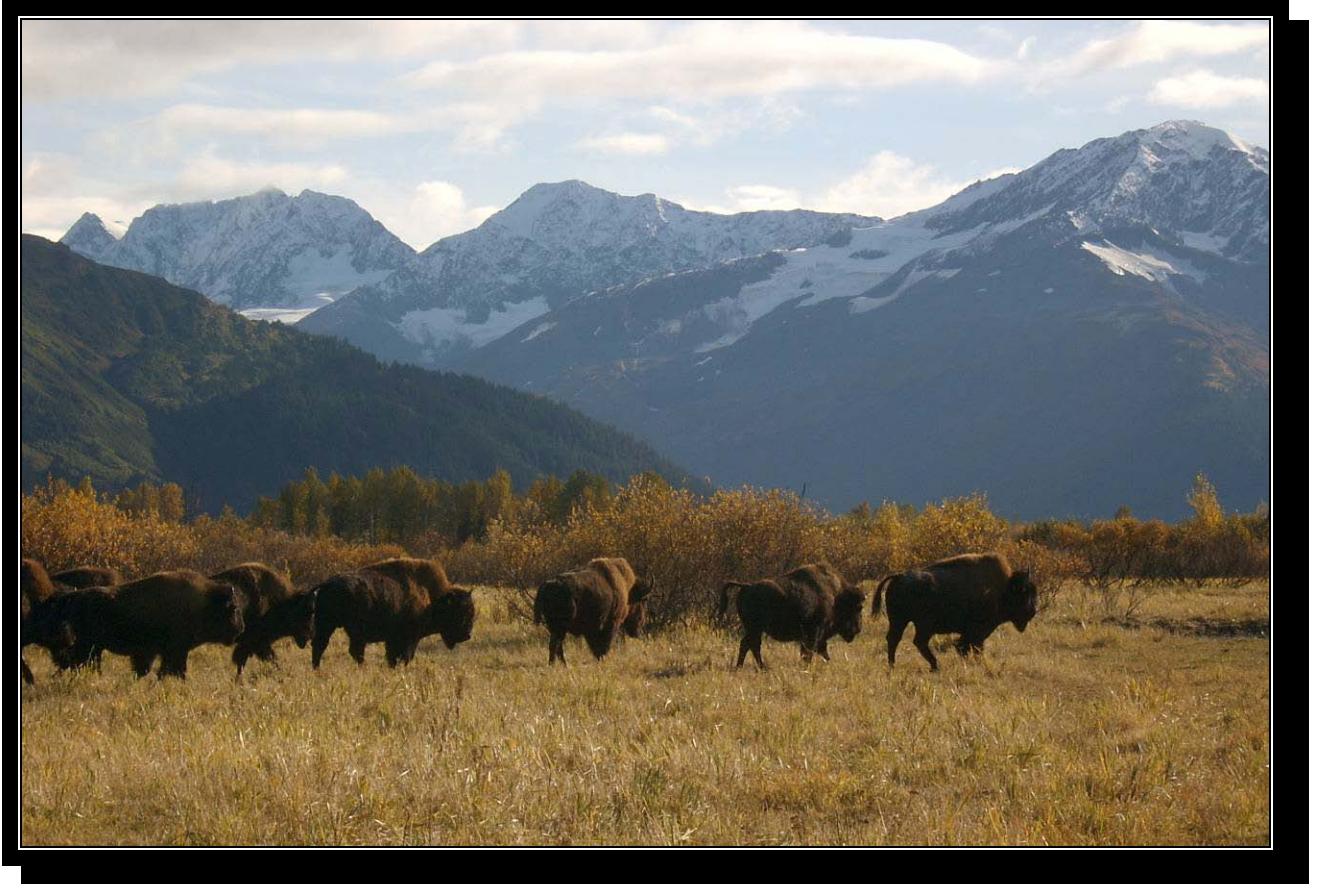


Photo by Alaska Wildlife Conservation Center

Wood bison at the Alaska Wildlife Conservation Center, Portage, Alaska.