

Technical Peer Review of Reintroducing Wood Bison to the Upper Yukon Valley, Alaska

3 August 1998

Mr. Roger Post, President

Alaska Chapter TWS

Dear Mr. Post:

The purpose of this letter is to transmit the final report of the Alaska Chapter, TWS, *ad hoc* Review Committee on Reintroduction of Wood Bison to the Yukon Flats. The committee members and their specialties include:

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Alaska Chapter of The Wildlife Society

Technical Peer Review of

Reintroducing Wood Bison to the Upper Yukon Valley, Alaska: A Feasibility Assessment.
Alaska Department of Fish and Game, Division of Wildlife Conservation, June 1994.

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3 August 1998

Alaska Chapter of The Wildlife Society Technical Peer Review of Reintroducing Wood Bison to the Upper Yukon Valley, Alaska: A Feasibility Assessment.

B. Griffith, R. T. Bowyer, J. S. Sedinger, P. Morrow, G. Bucaria, and R. Post.

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Introduction:

Our charge was to provide an unbiased peer review of technical information pertinent to the wood bison (*Bison bison athabasca*) reintroduction planning effort led by Alaska Department of Fish and Game (ADF&G), Division of Wildlife Conservation, and to evaluate the ADF&G feasibility assessment for reintroduction of wood bison to the Upper Yukon Valley, Alaska, relative to The Wildlife Society (TWS) policies and positions regarding translocation of wildlife. We were also charged to identify issues that may need clarification, reassessment, or additional

planning efforts for the potential reintroduction of wood bison.

We provide our comments below in an Executive Summary and in specific response to the seven questions provided in our initial instructions.

Executive Summary:

The majority of available archaeological and oral history information indicates that wood bison were present in eastern Alaska at some time within the past 500 years and it is biologically defensible to consider them an extirpated indigenous species of the Yukon Flats. 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.

We compared the feasibility assessment to re-introduction guidelines promulgated by IUCN, Species Survival Commission, Re-introduction Specialist Group (Appendix I), and found that the feasibility assessment is consistent with the spirit and intent of the IUCN position statements and re-introduction guidelines. In reference to the IUCN guidelines, we suggest the formal implementation of an interdisciplinary team that includes representatives from all affected user groups and government agencies for any further planning efforts. We further suggest that this team: 1) conduct formal population and habitat viability analyses focusing especially on explicit population goals and the potential effects of climate change on habitat availability for bison, 2) quantitatively assess the contribution of an additional population of wood bison to species viability, 3) establish explicit short- and long-term indicators of success or failure of the reintroduction and outline management actions to be taken if these indicators are not met, 4) design an experimental assessment of the effects of bison release on waterfowl habitat and production, and 5) design an explicit post-release monitoring protocol that is cast in an hypothesis testing framework.

Response to Questions:

1. Does the majority of available information indicate that wood bison were present in eastern Alaska at some time within the last 500 years?

Yes. The archaeological evidence (Guthrie, 1968, 1990; ADF&G 1994) demonstrates the presence of recent bison in eastern Alaska with radio-carbon dates ranging 470-4495 years before present. Further, the record of oral history (Stephenson et al. draft manuscript) leads to the conclusion that wood bison were present in eastern interior Alaska within the past 500 years. Although some of the oral historical data are contradictory or inconclusive, there also is convincing evidence to support the conclusion that bison were present within the past 500 years. In particular, there are data unambiguously associated with wood bison (and not muskoxen), such as knowledge of how bison behave when attacked by wolves, and detailed descriptions by men of the design and use of pre-firearm hunting technology. Also, some general support for the accuracy of the oral historical record is in informant descriptions of the animals themselves, and of climatic changes in the area over the past several decades. Similar convincing accounts have been collected in the Yukon (and are supported by written accounts; Lotenberg 1996). Additionally, there have been sightings of bison in both Canada and eastern interior Alaska (near Eagle, early 20th century) within contemporary times (Lotenberg 1996; ADF&G1994) which

indicates the potential for natural reoccupation of Alaskan ranges.

Contradictory data from oral history include descriptions of hunters being treed by animals identified by one person as bison and another as muskoxen. The linguistic data shows confusion between bison and muskoxen at one point, as well. Linguistic data are, however, simply somewhat inconclusive, and should not be taken as negative evidence. Also, that Native terms exist for these animals does not indicate their depth of presence in the area, although it suggests a knowledge of them. More linguistic research would help to determine whether the terms are recent, and how widely cognate terms are distributed; this information could be more conclusive. Dates of 200 - 600 years that are mentioned by informants should not be taken literally; however, bison were known recently enough for information to be passed on by oral tradition. In conjunction with the radiometric data from Alaska and Canada, this information provides convincing evidence of the presence of bison during the period in question.

2. If wood bison were present in eastern Alaska in the past, is it biologically defensible to consider them an extirpated (by environmental variation and/or man) indigenous species of the Yukon Flats?

Yes. Because compelling archaeological data and the preponderance of oral historical evidence indicates presence of recent bison in eastern Alaska within the past 500 years, wood bison were an indigenous (native) species that has been extirpated in Alaska. The archaeological record and current existence of recovering populations of wood bison in Canada demonstrate that wood bison were and are native to North America; wood bison are not an exotic species.

Because detailed records of the extirpation of wood bison were not kept, the relative importance of various causes of the extirpation can not be explicitly determined. The most likely cause of the extirpation is the combined action of: 1) declining suitable habitat as the extent of meadows declined (Lotenberg 1996) and the extent of spruce forest increased during the past 10,000 years, and 2) unregulated hunting of reduced and restricted populations of wood bison by indigenous peoples.

Bison were an important subsistence species for indigenous peoples and they were successful hunters who had developed specific technologies for hunting bison (Stephenson et al., draft ms; Lotenberg 1996). The ability of indigenous peoples to find individuals of a declining bison population would have been facilitated by 1) restriction of bison to river flood plain areas where suitable meadow habitat remained available, and 2) indigenous peoples consistent occupation of these flood plain areas where they had access to alternative prey (e.g. salmon). Because the final stages of any local extirpation are hastened by stochastic demographic events (loss of individuals with high reproductive potential; Lande 1988), hunting of adult wood bison (which have high reproductive value) by indigenous peoples most likely quickened the local extirpation of wood bison. That wood bison currently are recovering in Canada (recent downlisting from CITES Appendix I to Appendix II) in fragmented habitat similar to that along the Yukon River flood plain in Alaska, with protection from hunting by humans but in the presence of nonhuman predation, further suggests that hunting by humans probably was a contributing factor to local extirpation of wood bison in eastern Alaska.

3. *Would reintroduction of wood bison contradict policies of The Wildlife Society at the national, section, or chapter level?*

Strictly, no. This is because The Wildlife Society (TWS) has no specific policy relating to translocations in general (Thomas Franklin, pers. comm.). National TWS policy statements that may have some applicability to the issue include: 1) Threatened and Endangered Species, 2) Conserving Biological Diversity, 3) Reintroduction of Wolves, 4) Livestock Grazing on Federal Rangelands in the Western U. S., and 5) Alterations of Stream, Riparian, and Wetland Habitats (Appendix I).

We find no contradiction of these five TWS policy statements in the feasibility assessment or habitat inventory prepared by ADF&G for the potential reintroduction of wood bison to the Upper Yukon Valley.

The International Union for the Conservation of Nature and Natural Resources (IUCN) is currently the only known comprehensive source of a position statement on the translocation of living organisms. The IUCN, Species Survival Commission (SSC), Re-introduction specialist Group (RSG) is the best comprehensive source of guidelines for re-introductions (Appendix I). These guidelines are intended to act as a guide for procedures useful to re-introduction programmes and do not represent an inflexible code of conduct (IUCN 1998). Because the preponderance of existing archaeological and oral history evidence indicates that eastern Alaska was historical range of wood bison, and because unregulated hunting by humans almost certainly contributed to the local extirpation of wood bison in Alaska, the Committee considers wood bison to be a re-introduction as defined by IUCN.

The IUCN, SSC, states that a re-introduction should consist of: 1) a feasibility study, 2) a preparation phase, 3) a release phase, and 4) a follow-up phase. The Committee takes a liberal interpretation of the feasibility study and below applies the criteria of the IUCN/SSC Guidelines for Re-introductions to the existing reintroduction planning effort of ADF&G in regard to a potential re-introduction of wood bison to the Upper Yukon River. The Committee recognizes that if the proposed re-introduction is to go forward, additional planning and evaluation documents (e.g. Environmental Assessment or Environmental Impact Statement) will be prepared.

The Committee finds that the planning effort of ADF&G is consistent with the spirit of the IUCN/SSC Position Statement on the Translocation of Living Organisms and essentially compatible with the IUCN/SSC/RSG Re-introduction Guidelines. Many issues that should be part of an initial feasibility assessment have been addressed by ADF&G. For example, the ADF&G planning effort is compatible with the Aims and Objectives of Re-introduction section of the guidelines, an explicit feasibility document has been prepared, a good faith effort to assess habitat suitability has been made, a source of disease-free stock has been identified, potential interactions with other species have been addressed, initial steps toward gaining the support of government agencies and assessing the attitudes of local residents have been made, and transport plans have been addressed. However, the ADF&G planning effort focuses primarily on positive attributes of the potential re-introduction and some items in the 4) Pre-project Activities, 5) Planning, Preparation, and Release Stages, and 6) Post-release Activities sections of the IUCN/SSC/RSG re-introduction guidelines have not been explicitly addressed.

We specifically address areas of the IUCN/SSC/RSG guidelines below that are not clearly met in the existing re-introduction planning documents that we have received. What follows is intended to suggest additional issues that should be addressed, covered in more detail, or instigated if planning efforts for the potential re-introduction of wood bison to Alaska are continued. The potential re-introduction of wood bison to Alaska has precedent-setting implications in that the wood bison is considered to be globally threatened (CITES Appendix II) yet has no legal status in the United States because none currently exist there. We believe the re-introduction effort would be well served if further planning was conducted in a manner that satisfied as many relevant and reasonable guidelines as possible.

The Committee suggests the following enhancements to the ADF&G planning effort and specifically references these recommendations to sections of the IUCN/SSC/RSG Re-introduction Guidelines:

3. MULTI-DISCIPLINARY APPROACH - Establish a formal multi-disciplinary team for subsequent planning and document preparation. The team should include representatives from all groups perceived to ultimately have a vested interest in the outcome of the potential re-introduction and include local communities, federal land-management agencies, the environmental community, ADF&G, and academia. A formally designated and neutral facilitator may enhance effectiveness of the team. The team should include, but not be limited to, persons with expertise in waterfowl and waterfowl habitat, ungulates and their habitat requirements and effects on their habitats, predator-prey interactions, disease issues, habitat monitoring, subsistence and local cultural traditions, and population and habitat viability analysis.

4. PRE-PROJECT ACTIVITIES:

4a(i). Feasibility and background research - Conduct a formal and explicit quantitative Population and Habitat Viability Analysis that can be used to guide long-term population management. From this exercise, document at least the 1) re-introduction strategy in terms of number and sex and age composition of animals to be released, 2) the time schedule for the releases, 3) expected growth in various components of the population through time, 4) expected harvest levels attainable through time, 5) strategies and actions for maintaining population at goal level, and 6) potential effects of continued global warming on habitat suitability and expected population trend.

4a(iii). Choice of release site and type - Formally and quantitatively evaluate (through meta-population viability analysis) the contribution that an additional population in Yukon Flats would provide to viability of wood bison as a species. The results should be expressed in terms of a specified percentage change in wood bison viability over a specified time frame and include measures of uncertainty.

4a(iv). Evaluation of re-introduction site - Using most current local information and global change models, assess the potential change in habitat in the release area that may accompany predicted continued global and local warming. Assess, quantitatively if possible, how any predicted habitat change may affect habitat suitability for bison and the interaction between bison and waterfowl habitats. Incorporate this information in 4a(i) as noted above. Because climate caused reduction in the extent of meadow habitat was likely one of the factors involved in the initial extirpation of wood bison from Alaska, it would be prudent to ascertain whether

most climate models predict further reduction in the amount of meadow habitat. Reintroduction strategies under predictions of increasing or decreasing amounts of meadow habitat should be presented.

Document the current legal status of wood bison from a native lands, state, national, and international perspectives relative to the re-introduction planning effort. Explicitly address how the current and potentially changing legal status of the wood bison may affect management actions and management authority over re-introduced bison.

4a(v). Availability of suitable release stock - A disease-free source of release stock has been identified, but there should be explicit identification of: 1) the protocols for veterinary screening of release stock, 2) handling and transport procedures, 3) quarantine procedures that may be deemed necessary, and 4) procedures for handling or disposal of animals that may become injured or diseased at any time during the re-introduction.

4b. SOCIO-ECONOMIC AND LEGAL REQUIREMENTS -

Conduct a formal assessment of the costs and benefits (economic and cultural) of the potential re-introduction to the local human population.

Identify the procedures that will be implemented to assure that illegal harvest will not jeopardize the success of the re-introduction.

Obtain full written permission of all relevant government agencies and local communities for the re-introduction.

Specifically identify procedures that will be used to deal with problem wood bison and procedures that will be used to educate the public regarding the behavior of released bison and relevant safety concerns.

5. PLANNING, PREPARATION AND RELEASE STAGES -

Establish and document explicit short- and long-term indicators of success or failure of the reintroduction (e.g. minimum and maximum population level acceptable, effects on habitat, effects on other species, and time frames for these assessments) and course of action to be taken if criteria are not met or if they are exceeded.

Establish protocols to ensure that detailed records of all phases of the re-introduction are kept and archived. Periodically, conduct an objective review of these records in relation to the re-introduction goals.

Explicitly identify the source of funds that will be use to conduct the re-introduction and ensure that these funds are adequate to conduct the re-introduction, conduct the pre- and post-release programs, and provide for unexpected contingencies that may arise.

Before re-introduction, establish an explicit post-release monitoring program that is designed as an experiment so the success or failure of the re-introduction can be adequately addressed. In particular, this program should include, but not be limited to: 1) annually monitoring the bison

population, recruitment, and the causes and magnitude of mortalities during the initial 5-10 years of the re-introduction, 2) explicitly documenting the habitat use of bison in relation to population growth or decline, 3) establishment of bison-proof exclosures, particularly in potential waterfowl nesting habitat, that can be routinely monitored to assess the effects of bison on the habitats, and 4) establishing *a priori* decision criteria that identify acceptable effects that bison may have on habitats of other species and specifying management actions that will be taken should unacceptable habitat effects occur.

6. POST-RELEASE ACTIVITIES -

Explicitly identify the demographic, ecological, and behavioral studies of released animals that will be undertaken and presents these studies in an hypothesis-testing format.

If performance objectives are not met or are exceeded, explicitly identify the protocols and procedures for revision, rescheduling, enhancement, or discontinuation of the re-introduction program.

4. Have biological issues associated with potential reintroduction of wood bison including disease, interspecific competition, range carrying capacity, and ecological interactions with other species (e.g. effects on predator populations with secondary effects on other ungulates, impacts on waterfowl nesting) been adequately addressed in planning documents provided to the Committee by ADF&G?

The feasibility assessment represents a good faith effort to address biological issues associated with the potential re-introduction. The issues of range carrying capacity, potential interspecific competition with other ungulates, and potential effects on waterfowl nesting and production represent areas that would benefit from additional consideration or clarification in further planning efforts.

Range carrying capacity - The relationship between estimated carrying capacity of the release area and wood bison population goals is not clearly identified. The habitat inventory suggests that the two study areas could support 2,000 bison, yet the feasibility study suggests that establishment of a population of 400-500 bison would be judged a success. It is not clear if bison population levels would be managed below estimated carrying capacity, or if populations would be allowed to grow to carrying capacity. These are substantially different scenarios with substantially different implications for potential effects of bison on vegetation communities, the habitats of waterfowl, and secondary effects on other ungulates. Any further planning should clearly address the relationship between habitat capability and population goals. Estimates of forage production and potential wood bison population size should be stochastically modeled in the population and habitat viability analysis suggested in response to Question 3, re-introduction guideline 4a(i) above.

The presentation of the habitat inventory procedures (Berger et al. 1995) is extremely difficult to follow and the inventory appears to use unprecedented methodology. Thus, it is difficult for the Committee to evaluate whether there is substantial bias in the estimated carrying capacity of 2,000 wood bison. Clarification of the habitat inventory procedures is essential for further reintroduction planning.

The rationale for estimating acreage of wet and dry meadows from percent cover of species, rather than directly from a classification of sampled meadows as wet or dry, should be presented. Extensive presentation of plant coverage estimation procedures and results leads the reader to assume that plant cover was used to estimate plant biomass, but it was not. There were no biomass estimates obtained in the study area. Rather, reported productivity of Canadian multi-species meadows was used to estimate plant biomass in single species wet or dry meadows in Alaska. Actual biomass estimates from Alaskan meadows in the release area are necessary for rigorous estimates of bison carrying capacity.

Potential interspecific competition with other ungulates - The importance to and use of willow by wood bison may be underestimated. Introduced populations of plains bison, which are typically grazers, make extensive use of willows in Alaska (Campbell and Hinkes 1983, Berger 1996). Moreover, moose populations in interior Alaska often are held at low densities by predation (Gasaway et al., 1992). Higher densities of moose potentially could experience competition from bison because moose may rely heavily on willow (Van Ballenberghe et al., 1989). Further planning efforts should address potential interactions between moose and bison, if moose populations should increase.

Potential impacts on waterfowl nesting and production - The Committee believes that the assessment of potential effect of re-introduction of wood bison to the Upper Yukon River on waterfowl habitat relies too heavily on testimonials from persons who are not waterfowl specialists. Yukon Flats NWR is one of the preeminent waterfowl production refuges in the entire National Wildlife Refuge System. Recruitment of technical experts from an organization like Ducks Unlimited to the multi-disciplinary committee would greatly enhance the rigor and acceptability of assessment of potential effects on waterfowl and their habitat. As it stands, we believe that there could be substantial enhancement of the ADF&G planning document regarding the potential impacts of re-introduction of wood bison on nesting waterfowl and their habitats in the region.

Yukon Flats National Wildlife Refuge was established (and expanded under ANILCA) based primarily on its value for breeding waterfowl. Currently, Yukon Flats ranks either first or second among Alaska refuges in production of several important species of waterfowl. In particular, Yukon Flats ranks first in production of Canvasbacks, Lesser Scaup, Mallards, Northern Shovelers, and American Wigeon, and second in production of Northern Pintails (Hodges et al. 1996). Alaskan breeding areas are especially important for production of Lesser Scaup and Northern Pintails, particularly for the Pacific Flyway but also likely make significant contributions to the western population of Canvasbacks. Lesser Scaup have been declining continent wide (Caithamer and Dubovsky 1997) and in Alaska (Hodges et al. 1996), while Northern Pintails and Canvasbacks have generally not responded to improved water conditions in temperate breeding areas (Caithamer and Dubovsky 1997). Lesser Scaup, Canvasbacks and Northern Pintails, and Northern Shovelers are all meadow-nesting specialists in interior Alaska (Petrula 1994). Numbers of nests of these species declined in years when less meadow habitat was available on Minto Flats Alaska (Petrula 1994).

No data currently exist on effects of grazing bison on waterfowl nesting cover in taiga wet meadows. Observations that waterfowl and bison currently coexist provide no insight into what effects bison might have had on waterfowl populations that existed before bison introduction. Further, extrapolation of grazing effects from temperate areas (e.g., Kantrud 1986) is not

appropriate because positive benefits of grazing in these areas, when they occurred, were primarily associated with opening up marshes that had become choked with cattails or other emergent vegetation under stable hydrological regimes. These positive effects are principally associated with improving foraging conditions for ducks, not nesting habitat per se. Finally, Yukon flats currently represents a more important breeding area continentally than it did historically because of depletion of temperate nesting areas. Therefore, a more rigorous assessment of potential impacts of bison on waterfowl breeding habitat in this area should be conducted. This assessment should be presented in a testable hypothesis format. We recognize that background information applicable to this assessment is limited. Ultimately any short- or long-term effects of bison on waterfowl and their habitats in interior Alaska will have to be documented experimentally. In this case, protocols for controlling bison numbers or terminating the bison re-introduction if substantial adverse effects occur must be in place before the reintroduction.

5. Would potential reintroduction of wood bison to Yukon Flats hinder or benefit species conservation and biodiversity from international and national perspectives?

Wood Bison - The Committee can conceive of no way in which the proposed re-introduction would hinder the national or international conservation of wood bison. Assessment of quantitative benefits of the re-introduction to wood bison conservation would require a formal meta-population viability analysis as outlined above in response to Question #3, as specified in the recommendation regarding item 4a(iii) of the IUCN/SSC/RSG re-introduction guidelines. We predict that adding an additional population of wood bison would enhance long term conservation of wood bison. If the re-introduction of wood bison added a species to Alaska, without jeopardizing any other species, then biodiversity in Alaska would be increased.

Other Species - Ultimately, the question of hindering or benefitting conservation of other species can only be addressed by experimentally and quantitatively assessing the effect of re-introduced bison on other species and their habitats. In particular, the greatest concern is with waterfowl and their habitats. Because Yukon Flats NWR currently ranks first or second in Alaska in production of several waterfowl species, and because the refuge is currently more important than it was historically due to the loss of temperate nesting habitat, the relative importance of Yukon Flats to bison and waterfowl conservation should be addressed quantitatively. Data necessary for this analysis would require the experimental release of bison and rigorous documentation of bison effects on waterfowl habitat and production.

6. What gaps, including unaddressed potential impacts are present in the technical content of the planning documents provided to the Committee by ADF&G?

The Committee considers this question to be answered in comments relevant to the IUCN/SSC/RSG guidelines presented in response to question 3, above.

7. What actions are necessary by proponents of reintroduction of wood bison to the Yukon Flats, or by others, to fill gaps in the planning documents?

The Committee considers this question to be answered in comments relevant to the IUCN/SSC/RSG guidelines presented in response to question 3, above.

Respectfully submitted, 3 August 1998

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