

A Proposed Feasibility Study of Bison Quarantine Procedures

Keith Aune- Montana Department of Fish, Wildlife and Parks
Dr. Jack Rhyan-USDA/APHIS/Veterinary Services

“Every great achievement was once thought impossible”

Introduction

There has been a long history in North America of restoring wildlife populations by capturing animals from robust populations and transplanting them to new habitats or augmenting existing populations facing extinction. In the Greater Yellowstone Ecosystem, there is an extensive history of capturing, holding, transporting and relocating wildlife as a species conservation strategy. Yellowstone elk were routinely captured and widely distributed in the mid 1900's to successfully restore wild elk throughout North America. Bison and antelope have been captured and moved from Yellowstone to create or augment free-ranging populations elsewhere. Yellowstone has also been a recipient of such transplanted wildlife during restoration efforts including rocky mountain wolves from Canada and bison from Texas and northern Montana.

As it applies to the bison management dilemma surrounding Yellowstone National Park (YNP), there have been many discussions about quarantine procedures and using this growing population to establish other free-ranging bison herds. Several quarantine options have been considered, and USDA/APHIS has established and published a protocol that would apply to this situation (Interagency Bison Management Plan, Appendix B). Federal funding was appropriated for this activity but has not been expended. Despite frequent discussions of quarantine proposals and the disbursement of federal funding for this activity a specific plan has not been developed or approved.

Concurrent with the discussions about quarantine in the GYA, there have also been frequent discussions and meetings regarding bison conservation strategies in North America and the potential for restoring the species to grassland ecosystems. There currently is no unified conservation plan for bison in North America. The successful development of such a plan and subsequent implementation of a conservation strategy for plains bison is contingent upon reliable and suitable source stocks for restoration efforts. The World Conservation Union (IUCN)-Bison Specialist Group of North America recently supported a project to examine the status of bison, which presents several conservation recommendations (Boyd, 2003). This project outlines the current status of bison, offers guidance for the advancement of a conservation strategy and identifies the few free-ranging and genetically pure bison herds in North America suitable for restoration projects. According to this document, there are only about 8300 plains bison, classified as free-ranging and genetically pure, in 13 conservation herds and they present the best source stocks available for restoration efforts (Boyd 2003). Nearly 2/3 of these bison are from larger diseased herds, such as the Yellowstone and Grand Teton bison, while the remainder is found in small fragmented populations with limited potential as a reliable source for restoration efforts. The larger diseased conservation herds could become suitable source stock for conservation programs provided that disease free animals could be reliably filtered from the population. If animals can be declared disease free then bison from Yellowstone National Park

could serve as a reliable source of genetically pure bison to be reintroduced into historical habitats contributing to the continued conservation of this species.

Several factors support a decision to explore the feasibility for using YNP bison for conservation efforts. The Yellowstone National Park bison herd provides a very good genetically diverse source of bison that have been free ranging for many decades (Halbert 2003). Currently, the bison population in Yellowstone National Park is above the management trigger levels for aggressive removals and there are annual habitat and weather dependent movements of bison out of YNP causing conflict and concern in the states of Montana, Idaho and Wyoming (Plumb and Aune 2002). The major elements of this conflict include the presence of brucellosis, a nationally regulated disease, in YNP bison and managing the population size and distribution of Yellowstone bison. As we attempt to manage brucellosis, many bison are routinely hazed or captured, tested and slaughtered to minimize the risk of transmission to cattle. Despite the successful management of the risk for transmission of brucellosis there are no strategies in place to restrain the base population of bison in this conservation herd. The removal of bison through a valid quarantine program could provide one means of reducing population pressures resulting in the annual migrations of bison out of YNP.

We propose that it is possible that some bison migrating from YNP could be placed through a quarantine program to restrain population growth, conserve genetics and ultimately provide bison for restoration projects in other portions of North America. This selected removal program along with other population regulating tools such as a limited hunting program, as well as natural mortality, could operate in consort to remove an increment of bison from the herd to help maintain a relatively stable core population yet curb the frequent range expansions of bison in this confined ecosystem.

Prior to the development of a science-based quarantine program some preliminary research is needed to develop and test appropriate quarantine protocols and quantitatively evaluate the risks associated with quarantine programs. In this document we present a quarantine research proposal to scientifically evaluate the feasibility of using quarantine as a management tool in the Montana portion of the Greater Yellowstone Area (GYA) with minimum capital investment. This initial research will provide critical research information needed to further expand and fully develop a quarantine program designed to use animals from this robust Yellowstone bison population to create other free-ranging bison populations in North America. This adaptive research approach will require approval from many government regulators and will require cooperation among concerned Montana publics, various conservation groups, Native Americans, and state/federal government agencies.

Project Goal

There are three main project goals described below in this proposed feasibility study of bison quarantine.

1. Develop quarantine procedures, using the best available science and adaptive research strategies, that will allow bison from Yellowstone National Park to be accepted as free of brucellosis and suitable for the establishment of new public and Native American bison herds or to augment existing populations in North America.
2. To research the feasibility of a program to conserve genetics from free-ranging Yellowstone bison by the creation of additional conservation bison herds in other habitats in North America without transmitting brucellosis onto these landscapes.

3. To examine the feasibility of quarantine protocols and the reintroduction of bison to large grassland systems as a conservation strategy that may benefit the management of bison in the GYA where populations are expanding beyond social tolerance limits.

The overall project goals of this study are consistent with historical conservation strategies applied in wildlife restoration efforts throughout North America and previously validated for several species of ungulates (elk, bison and antelope) found within the Yellowstone Ecosystem. The proposed project could lead to the conservation of a genetically diverse bison population in which, to date, no cattle genes have been detected (Halbert 2003). In so doing it may lead to programs that might establish new bison herds of similar genetic composition to reinforce the long-term conservation of wild bison genes at locations beyond the borders of the Yellowstone Ecosystem. Recent work by Halbert (2003) has confirmed the diverse genetics of bison from YNP and present significant genetic concerns for many other Department of Interior bison herds. The bison processed through quarantine programs could be utilized for periodic introduction into existing public bison herds to immediately enhance management programs that selectively remove animals with domestic cattle genes and improve genetic diversity of those herds further ensuring conservation of this species.

The proposed study, as presented here, will test several key hypotheses that explore the feasibility of implementing quarantine procedures that meet and exceed the existing approved quarantine standards established by USDA/APHIS. Results from this research could lead to the development and implementation of improved quarantine standards and will allow a careful analysis of the risks associated with utilizing improved test protocols. This research project will provide precise risk assessment data to guide conservation decisions that could lead to the introduction of bison onto new landscapes without the risk of introducing brucellosis.

Proposal Review Process

To assure that the research goals and basic theory behind this research project were legitimate a draft concept proposal was presented, reviewed and eventually approved by the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) and the U. S. Animal Health Association-Committee on Brucellosis (Appendix A). In addition, Montana Fish, Wildlife and Parks, Montana Department of Livestock and USDA/APHIS Veterinary Services have reviewed the draft research proposals. These animal health groups and government agencies recommended continued development of this concept into a research project of quarantine protocols and requested the project team to report results annually to ensure good scientific scrutiny throughout project development and implementation. The Interagency Tribal Bison Cooperative was also consulted, provided proposal review, and offered support to assure Native American participation in the project.

Additional, reviews will be conducted by the National Park Service and a Research Permit will be necessary to continue the project. In addition, NEPA compliance documents will be prepared to assure appropriate State/Federal compliance with all laws, rules and regulations.

Project Objectives and Developmental Concepts

- 1) This research project will develop a quarantine protocol using an adaptive process by gradually phasing in evaluations during each procedural step until bison are qualified for release.
 - a. The three-phased program will include:
 - i. A Selection Process-This will include the retention of up to 100 calves for 1 year at the Brogan Bison Facility leased by USDA/APHIS. These calves will have been born the previous June and captured during the winter period (typically Jan-April) after migrating toward the YNP boundary. Approximately ½ of these animals will be euthanized at the end of phase I and cultured for brucellosis to determine the likelihood of latent expression of this disease.
 - ii. A Maintenance and Breeding Process- This will involve the continued quarantine of the bison through their second birthday at a facility on Dome Mountain Wildlife Management Area currently administered by the Montana Department of Fish, Wildlife and Parks. Breeding of these 2-year old female bison will be accomplished using existing or previously quarantined Yellowstone bull bison during the late summer (August-September). Breeding activity will be carefully monitored and mating will be constructed to maximize genetic diversity.
 - iii. Calving Phase-Providing that a degree of success is achieved in early phases, pregnant 3-year old bison will be moved to a third facility if available or cycled back to the Brogan Facility to complete their first calving.
 - b. This sequence of quarantine phases, if completed, could generate an original population of disease-free animals and a calf crop for a potential soft release project. This sequential protocol will be executed a second time to complete the feasibility study. Following the approval of the second batch of bison as disease free and suitable for release studies a detailed review of procedures will be conducted and further quarantine plans will be considered based upon these review findings. Further NEPA analysis would be included in the decision process to develop an enhanced quarantine program.
- 2) This feasibility study will be conducted within the northern Yellowstone Ecosystem so there is no risk of transmitting brucellosis outside of the area where wildlife are currently infected. Locating the study facilities within the GYA will assure that if there were failures in the procedure, brucellosis would remain inside the GYA.
- 3) A detailed analysis and review of the quarantine procedures and testing protocols will be performed at the end of the feasibility study to provide explicit data for accurate risk assessment. These data can be used by animal health authorities to evaluate the risk of using bison from an infected herd to restore or augment populations at other locations.
- 4) The proposed research project will limit the initial capital investment in highly valued land and in permanent facilities during the research and development phase of the program by using existing facilities in the area and available state owned lands. Also the agencies will initiate capital investments in facility only after some demonstrable success in each preceding phase of the program. This arrangement will minimize the purchase of

limited and expensive equipment and land resources during the feasibility study. If failure is experienced and the procedures are not successful, then all lands utilized during the study will be returned to former uses and facilities will be removed. Any conservation land purchase could be utilized for wildlife habitat or exchanged, leased or traded for other important conservation projects.

- 5) The project will consider the ecological consequences of proposed actions to the landscapes affected and develop the appropriate environmental documentations.
 - a. Project design will minimize conflict with elk migrations and winter habitat by splitting the facility development in phases and minimizing the area of landscapes affected.
 - b. There will be mitigations of potential impacts to large carnivores in the area.
 - c. There will be weed control programs implemented within each facility and water quality considerations will be incorporated into operations and development plans.
- 6) The project is designed to remain consistent with the existing Interagency Bison Management Plan.
 - a. Population triggers established in the plan determine the availability of negative calves for quarantine procedures.
 - b. The program does not conflict with the potential to use habitats west of the Yellowstone River for wild free-ranging bison by concentrating quarantine activities to areas east of the Yellowstone River. This compartmentalization of various management activities benefits both programs.
- 7) Bison handling will be minimized and test groups will be pastured as much as possible on a limited land base to retain some natural foraging behaviors. Supplemental feeding will occur as necessary to maintain the health of the bison. The program intent is to avoid a feedlot management scenario and allow natural behaviors to be expressed within the constraints of the quarantine protocol.
- 8) The project provides an excellent opportunity to develop conservation education programs alongside the quarantine project by integrating a complimentary bison conservation message into operational programs of the project. An appropriate suite of conservation messages can be presented at each site from bison capture to release of healthy bison.
- 9) The project will allow cooperation with Native American bison restoration and conservation programs through coordination with the Interagency Tribal Bison Cooperative (appendix A). There will be potential to develop Native American student internships through the quarantine program, provide Tribal Nations educational opportunities at the various facilities, and assist Tribal governments in development of management programs for the restoration of wild bison.

Facility Development Plan

Detailed facility development and management plans will be completed for each phase of the research before operations begin. These plans will outline various aspects of management including supplemental feeding and nutrition monitoring, herd health assessment, animal welfare considerations, range resource management, bison handling procedures, a weed management

program, isolation and decontamination procedures for any potential brucellosis exposure events, facility maintenance plans, animal monitoring procedures, carnivore intrusion response protocols, animal escape response protocols, and animal/human emergency protocols. Various animal experts will be consulted during the development of these management plans.

I Phase 1 Facility (See attached map and Photos)

The Brogan Bison Research Facility near Corwin Springs encloses 400 acres of grassland including several lower sorting pens and a large upper pasture (see attached photo).

Facility development needs:

- 1) Develop a double fence and improve containment capabilities.
- 2) Upgrade the original fence and add interior high tensile in portions and exterior electric fence for predator defense.
- 3) Develop cross fencing as necessary to manage bison distribution and keep test groups separated.
- 4) Improve the handling equipment inside the facility.

Initial program will begin fall-winter (2004-2005) prior to the introduction of the first group of up to 100 calves into 2-4 sorting pens-separated in lower portions of the facility.

II Phase 2 Facility

This facility design will begin immediately upon completion of the environmental analysis and site construction will begin at summer-fall 2005. The site will be developed and constructed on about 400-500 acres of sagebrush-grassland and hay-meadow within the Dome Mountain Wildlife Management Area administrated by the Montana Department of Fish, Wildlife and Parks (See attached photos).

Facility Development Needs

- 1) Game proof fence construction around the grazing lands.
Use high tensile fence interior with 8 foot Interlock fencing exterior with additional electric fence perimeter at low heights for predator defense.
- 2) Develop cross fencing to support 4 pastures with internal fence dividers to manage the distribution of bison and keep test groups separated.
- 3) Construct semi-portable handling facilities placed on the lower portions of the hay-meadows.
- 4) Water well will be developed at a suitable location within the complex.
- 5) Power supply will need to be upgraded and electrical systems installed to support the facility operations.

Yearling bison from the Phase I facility will be moved to Phase II in November-December before heavy winter-feeding begins. Bison will be maintained in this facility until end completion of the second year of phase II. Many bison will be mature enough to be breed as 2 year olds because of the high nutritional plane within captivity. A specific breeding program will be incorporated to assure maximum genetic diversity is retained in the test groups. In the late fall-early winter bison will be checked for pregnancy, tested, and sorted by pregnancy status. Pregnant bison will be advanced to the Phase III facility and non-pregnant female bison will be retained in the Phase II facility.

III Phase 3 Facility-Operation Contingencies A and B

Contingency A-Two Facility Operation

Upon development and completion of Phase I and II facilities this contingent plan would rotate the pregnant bison after Phase II (Dome Mountain) back into the Phase I facility. This would result in the operation and maintenance of Dome Mountain as a holding facility for 2-3 year old bison during breeding for 2-3 years. All calving bison would be returned to the Brogan Facility for calving during the last two years of the project. The Brogan facility would be modified to include calving paddocks after the second Phase I group has graduated the system.

Contingency B-Three Facility Operation

Pending the purchase of a suitable third property a Phase III site will be constructed to accommodate calving operations. A small paddock area with separate holding pens for calving bison will be developed on portions of the property. Bison will be allowed to free range until just before calving and then will be brought into the paddocks in small test groups until calving is completed. They will then be placed back out into the larger pastures if they present no evidence of brucellosis during the calving event. The facility will be designed to maximize sorting capability and gently handle bison mothers. Several experts will be consulted in developing an efficient animal handling and pasture design.

Facility Development Needs

- 1) New fence construction around grazing lands.
 - a. Install an exterior 8-foot Interlock fence with electric fence perimeter at low heights for predator defense.
- 2) Develop interior high tensile fencing for up to 8 pastures.
- 3) Develop cross fencing to manage the distribution of bison and keep test groups separated.
- 4) Needs a complete well designed and constructed handling facility
- 5) Pending property features-water and power development may be necessary

Phase III facility design and planning begins after the initiation of Phase II operations. Facility construction begins after bison yearlings have been successfully transferred into Phase II facility and most remain test negative.

Hypothesis Testing

The general goal of hypothesis testing during each phase is to progressively determine if quarantine procedures result in a reasonable probability of success and that most, if not all, of the bison processed through each phase of quarantine research will remain negative and eventually meet the USDA/APHIS requirements for quarantine of Yellowstone Bison. Our objective is to be 95% certain that at the end of phase I not more than 5% of the quarantine bison would demonstrate latent infection and to demonstrate a high degree

of confidence that the proposed protocol can graduate the majority of the Yellowstone Bison submitted to all three phases of the protocol.

Phase I: This phase of the research project will evaluate the risk of disease expression in winter calves from Yellowstone Park who may have been exposed to brucellosis early in life or at birth. The research project will determine if there is a reasonable probability that most, if not all of the bison held in quarantine will remain sero-negative and are culture negative. Results from Phase I will determine if research can proceed to Phase II and III.

H^o There is a 95% certainty that not more than 5% of the bison submitted to quarantine procedures will express latent infection. There is reasonable confidence that the procedures for testing and selecting sero-negative animals will be sufficient to advance the majority of winter calves from Yellowstone Park to Phase II and III of this research project based upon serologic testing and culture evidence obtained during Phase I.

Phase II/III: This phase of the research project will evaluate the likelihood that latent disease expression will be demonstrated during the first pregnancy or calving. Phase I animals remaining test negative will be advanced through Phase II (breeding) and Phase III (calving) quarantine protocols to determine if and how often brucellosis is expressed during the stress of pregnancy.

H^o There is a 99% certainty that not more than 1% of the sero-negative female bison advancing from Phase I research procedures will express brucellosis infection during calving or pregnancy as measured by sero-conversion or culture of birth fluids or tissues.

H^o There is a very high likelihood that latent infection in exposed late-winter calf bison extracted from YNP will be detected through the rigorous quarantine procedures implemented during this research project.

Research Procedures

- 1) The quarantine feasibility study procedures will include processing two groups of bison calves through the quarantine facilities in 4 or 5 years
 - a. Initial capture and testing operations will select up to 100 negative calves out of Duck Creek and/or Gardiner capture facilities during winter operations.
 - b. All calves will be tagged for identification, tested and held in field capture facilities until the FP and Card serologic tests are completed (1day)
- 2) Negative bison will be assembled in a holding pasture at the Brogan Bison Facility-Phase I.
 - a. After the final assembly, bison will be retested using the test panel described below and sorted into two groups of 40- 50 bison. All suspect or positive animals will be removed after full panel testing.
 1. The test panel will include -Card, BAPA, Standard Plate, Standard Tube, CF, Rivanol, PCFIA, and FP. Additional tests, such as PCR, may be added as they become available.
 2. Blood samples will be collected and sent to NVSL for culture.

- b. Two groups of test animals, negative on the full panel testing protocol, will be placed into a three pasture rotation system using 2 irrigated lower pastures and one large upper pastures through the spring, summer and fall.
 - c. Following a fall gather, a sample of sero-negative bison will be randomly selected from each of the two groups in proportionate sex ratios. Selected bison will be euthanized and submitted to detailed tissue sampling and culture. The sample rate will assure a 95% probability that an infection rate of 5% would be detected. Tissues will be sampled according to protocols established by Rhyan et al (2001). Specific target tissues will be submitted to culture while other tissues will be sampled but frozen at -70° F. for follow-up culture upon evidence of latent infection in the group or an individual. Target tissues submitted to culture will include whole blood, mammary gland, reproductive organs, and retropharyngeal, supra mammary, and iliac lymph nodes.
 - d. If culture results fail to detect a significant prevalence of infection (5% or more) and predicts a reasonable chance for quarantine success during subsequent phases then all remaining bison (approximately half) will be tested and blood cultured prior to graduation to Phase II and III procedures.
 - e. The Phase I facility will be cleared in late summer, rested and then prepared for set number two of up to 100 calves. The grazing process outlined above is repeated again in year two.
- 3) Following the final testing at the end of Phase I and the removal of any positives, the test groups will be moved into Phase II in November-early December. Hay fields at Dome Mountain will be harvested prior to introductions to the new facility.
- a. Bison will be sorted into four test groups of 10-20 depending upon the number of bison available from Phase I and fed through winter and summer.
 - b. Group separation would be maintained throughout Phase II.
 - c. Breeding would be allowed in late summer-early fall using the young bulls or introduced Yellowstone bulls retained by USDA from the Idaho facility.
 - d. Bison would be re-tested in late November and sorted by pregnancy status.
 - 1) Non-pregnant cows would be retained in Phase II and a few bulls from set 1 would also be retained in Phase II. These females would be bred the next year. These animals will provide benefits in herd management during the second year because they will be familiar with the settings.
 - 2) Pregnant cows and some bulls would advance to Phase III.
 - e. The Phase II facility would be prepared for set number two from Phase I.
- 4) Pregnant bison will be introduced into the Phase III calving facility in November-Early December.
- a. Pregnant bison will be initially sorted into groups of 10-20 in large open pens in the company of a few bulls.
 - b. Bison will acclimate through the winter- December-February.
 - c. In February bison will again be sorted into smaller test groups of 5-8.
 - 1. Bulls will be separated from cows during calving.
 - 2. Pregnant cow groups are sorted into calving paddocks.

- a. Pregnancy and calving progress will be monitored with vaginal implants and intense observation.
 - b. Bison cows and calves will be tested within 5-days of calving or abortion as per the USDA/APHIS quarantine protocol presented in Appendix B. Milk and blood samples will be submitted to culture.
 - c. Calves are allowed to mature in paddocks until they are ready for open pastures at about 2 months of age.
 - d. All test negative cows with viable calves will be sorted back into field pastures until late fall or early winter.
 - 1) Bulls will be with these pasture groups to breed cows that cycle back in summer-late fall.
 - 2) Bison in test groups serologically negative on all tests and demonstrating one successful calving are finally sorted and grouped for soft release.
- 5) At the end of Phase III exposed test groups (groups in which one or more animals become positive by serologic test or culture) are sorted and submitted to the following protocol:
 - a. Negatives in that exposed group will be placed back through another breeding/testing cycle and will remain an isolated test group to avoid exposure to incoming test groups.
 - b. Positive animals will be sent to slaughter or research.
- 6) At the end of Phase III clean test groups (groups without exposure as evidenced by serologic testing and culture) will be sorted and prepared for restoration projects.
 - a. Reintroduce selected animals and calves meeting quarantine standards no later than December to allow acclimation at the release site. Many if not all of these may be pregnant.
 - b. Phase III facility is prepared for set number two.
 - c. Selected clean bulls from group one may be held for breeding in set two of this process.
- 7) At the end of the research study a final review panel will evaluate protocols then recommend quarantine procedures for program operations using data from this feasibility research.
 - a. Complete a study report and conduct a peer reviewed risk assessment of quarantine procedures by the USDA/CEAH section.
 - b. Develop and adopt new or improved strategies for quarantine procedures suitable for future implementation of quarantine programs.
 - c. In the event of failure reconsider further investments in capital.
 - 1. Complete failure may result in a decision to remove facilities and abandon quarantine efforts
 - 2. Partial failure may result in modification of procedures and a second study effort
 - d. Conduct a cost/benefit analysis of the procedures and estimate the funding needs for an interagency quarantine program implementation or a complete de-mobilization of the program.

Release Site Selection and Soft Release Research Process

Establishing Release Criteria

- 1) Early in this quarantine feasibility study project, an interagency/tribal panel would establish socio-economic and biological criteria for identifying and selecting suitable release sites.
 - a. Bison would only be released into suitable habitats and within the historical range of plains bison in North America.
 - b. Social and economic considerations for evaluating restoration projects would be defined by the panel.
 - c. Biological and conservation criteria would be defined for restoration proposals.

Distribution Process for Public Herds

- 2) Project proposals for public herds would be solicited indicating the required criteria for a project as established by the panel. Projects will be considered in suitable states or provinces of Canada, United States or Mexico.
- 3) The selection and approval process for release sites on public lands would be completed before bison reach Phase III so that field preparations can begin at the selected release sites.
 - a. Project proposals would be evaluated and ranked according to the established criteria.
 - i. Proposals would be graded based on the overall conservation value of the project, socio-economic and biological criteria, and established funding support.
 - ii. The panel would prioritize public sites to receive bison qualified for release.
 - b. NEPA and/or state environmental analysis or tribal consultation will be required prior to implementing restoration projects to be sure affected publics are included in the decision process.
 - c. Agency agreements will be developed and signed by appropriate authorities involved in the restoration projects.

Distribution Process for Tribal Lands

- 4) An ITBC distribution center could be developed on suitable tribal lands by cooperating Native American members of the Inter-Tribal Bison Cooperative for the purpose of holding and sorting disease-free YNP bison designated for restoration projects on Tribal Lands.
 - a. Upon successful completion of the quarantine feasibility study and during the development and implementation of an interagency quarantine project, ITBC will facilitate the necessary Tribal decision processes and oversee the final distribution and transfer of qualified YNP quarantined bison to various tribal restoration sites.
 - b. ITBC in cooperation with USDA/APHIS will establish the appropriate disease monitoring during any subsequent phases of the release and restoration process and will assure that bison are not used for commercial purposes.

Soft Release Standards for Release Sites

- 5) Soft release facilities at each reintroduction site will be constructed to meet secure containment criteria.
- a. Restoration programs will use a fence design that offers suitable containment but can be removed after the initial acclimation and testing period.
 - b. Bred cows, new calves and bulls from the release group will be introduced into the area in early winter if possible to allow acclimation to home site.
 - c. Bison will be maintained within acclimation pen through that first winter to establish a home tendency.
 - i. The program will allow a second calving to be completed and will monitor calving bison including the use of vaginal implants to quickly detect successful birth and/or any abortion events.
 - ii. All bison will be tested one last time following calving and before the final removal of fencing.
 - iii. Some individual bison will be radio monitored for management purposes and restoration programs will monitor calving annually for up to 5 years in follow-up surveillance programs for each restored conservation herd.

Schedule and Budget

Phase 1 Facility- Development schedule and operations budget

Upgrade Brogan Facility	
Fencing-Summer/Fall 2004	\$100,000.00
Upgrade Handling Facility—Aug-Dec 2004	100,000.00
Lease 2004	60,000.00
Pilot Study group 1	
Capture, test, and ship calves-Jan.-Apr. 2005.	5,000.00
Facility Operations	40,000.00
Lease 2005	60,000.00
Pilot Study group 2	
Capture, test, and ship calves-Jan.-Apr. 2006	5,000.00
Facility Operations	40,000.00
Lease 2006	60,000.00
Personnel	<u>90,000.00</u>
	\$560,000.00

Phase 2 Facility: Development schedule and operations budget

Develop a bison facility in Dome Mtn.-Aug.-Oct. 2005		\$600,000.00
Pilot Study group 1		
Yearlings ship, sort and test-December 2005		5,000.00
Facility Operations		20,000.00
Pilot Study group 2		
Yearling ship, sort and test-December 2006		5,000.00
Facility Operations		20,000.00
Bison conservation education program		10,000.00
Personnel		<u>50,000.00</u>
		\$760,000.00

Phase 3 Facility: Development schedule and operations budget		
Develop Calving Facility (New Phase III Facility Option)		\$600,000.00
Pilot Study group 1		
2 Year olds-ship and test-December 2005		5,000.00
Facility Operations		60,000.00
Lease 2005		75,000.00
Pilot Study group 2		
2 Year olds-ship and test-December 2006		5,000.00
Facility Operations		60,000.00
Lease 2006		75,000.00
Personnel		90,000.00
		<u>\$970,000.00</u>
Quarantine EA		<u>\$70,000.00</u>
TOTAL OPERATIONS		\$2,360,000.00
Possible acquisition	Up To	\$2,000,000.00
GRAND TOTAL (with acquisition)		\$4,360,000.00

Potential Challenges and Problems

The proposed research project will face some challenges and unexpected problems. The following list briefly describes some of the more significant challenges that we anticipate for the proposed action. Many, if not all of these challenges, could be satisfactorily mitigated by adjustments in operational methods, agency rules and government regulations or with a thorough environmental analysis of the proposed action.

- 1) The purchase of a property for a phase III facility is not assured and a search for potential conservation partnerships is ongoing. Cooperating with a conservation buyer has many advantages including the integration of another conservation partner into the overall program. A contingent plan to perform the study with 2 facilities will meet our needs but will not provide the maximum flexibility in animal management.
- 2) There is uncertainty that all animals or animal groups would qualify for release under the quarantine research proposed. Latent infection has been reported in some cattle herds suggesting that for some animals brucellosis may remain undetected until the first pregnancy or some other stress results in the expression of disease. Latent expression is possible in a very small fraction of test animals. Early detection, step-wise risk evaluations and rigorous screening protocols are expected to sort out suspects or positives enabling the vast majority of animals to qualify for release.
- 3) Based upon the estimates for the research project, without land acquisition, it would cost about \$29,500 per bison pair (calf to producing mother with calf) or \$13,111.00 per individual bison (includes calf production expected from each quarantine group and bulls). This is substantially higher than the value of bison in commercial markets. However, the reward of conserving unique genetics, the benefits of alleviating social conflict, and the expense of managing an unregulated population of bison in the GYA must be weighed against this cost.

- 4) There are several animal welfare considerations when wild free-ranging bison are captured and then placed into a fenced facility. The capture, transport and handling of bison must be conducted with the utmost care to minimize trauma and will require special methods to minimize injury or death. There are some publics who will not endorse using traditional domestic animal handling and husbandry practices on wild bison despite the long history of successfully employing these tools and the ultimate conservation mission of this program. Most wild bison herds in the U.S. and Canada originated from animal management programs or ranched herds where similar handling processes were employed.
- 5) The proposed pilot program would result in the temporary loss of some habitat for other wildlife such as mule deer and elk. There will be habitat allocated to bison that had not been allocated under previous management plans. This may require modifications or adjustments in management programs by the affected land management agencies. Activities associated with this quarantine research project may temporarily influence wildlife use of these landscapes but impacts can be mitigated by the management agencies.
- 6) The proposed research project may result in some conflict among various agencies and challenge traditional agency missions. The project may have implications for multiple land use in the Gardiner Basin and Paradise Valley. Some conflicts may develop between recreationists, hunters, and other land uses requiring mitigations or additional rule making to minimize conflicts. Examples might possibly include rerouting of trails, limiting access of antler hunters, and restricting some hunting activities surrounding administrative (quarantine) sites.
- 7) Finding government agencies, tribal governments, and conservation partners willing to accept bison released from this quarantine research project is likely but not certain. We believe that the Yellowstone bison will be well received as a potential source to restock native bison ranges throughout suitable habitats in North America. Potential areas for restoration activity are discussed in Boyd (2003) and indicated by the Intertribal Bison Cooperative (Appendix A). A complete inventory of potential areas has not been accomplished but is recommended by the IUCN Bison Specialist Group of North America.
- 8) At each release site there will be significant costs associated with the proposal and development of soft release efforts as a result of this research and there is some risk that these efforts might not be successful. Each receiving agency, organization, or Tribal Nation will need to make significant commitments to develop a suitable release plan, provide environmental analysis of the project, allocate funding and manpower to monitor the projects and implement those restoration plans. However, we view this phase as a logical extension of the feasibility study and if possible needs to be explored to fully evaluate the success of the proposed quarantine protocol.

Conclusion

A unified North American conservation strategy for wild plains bison has never been developed despite a century of conflict, demonstrable public concern and intense social-political debate over restoring and conserving wild free-ranging bison. Although bison conservation was conceived and initiated by notable characters in history, who presented a new model of wildlife conservation to the world, the mission was never fully completed. Many reasons can be offered to explain why the states, federal government, conservation groups or Native Americans failed to combine resources behind this keystone herbivore. However, given recent socio-biological concerns over an expanding bison population in Yellowstone National Park, the need for alternative economies in financially depressed plains states/provinces, and heightened interest in preserving ecological processes on large grassland landscapes, it seems inconceivable that we would not reconsider this task of restoring bison to suitable grassland ecosystems. It seems plausible that at least some bison from a genetically suitable source, such as Yellowstone National Park, should be made available to finish the original conservation mission instigated over 100 years ago. Although challenges will persist, we believe that this quarantine feasibility research project will identify any significant obstacles, design the necessary mitigating protocols and eventually overcome these challenges through a well-designed adaptive research process. We propose that this quarantine feasibility project could instigate new opportunities for wild bison conservation by emulating previously successful conservation strategies used to restore many other species since the turn of the century. With collaborative funding, strong conservation partnerships, constructive science, and renewed enthusiasm we can meet this conservation challenge and establish new free-ranging bison herds in North America.

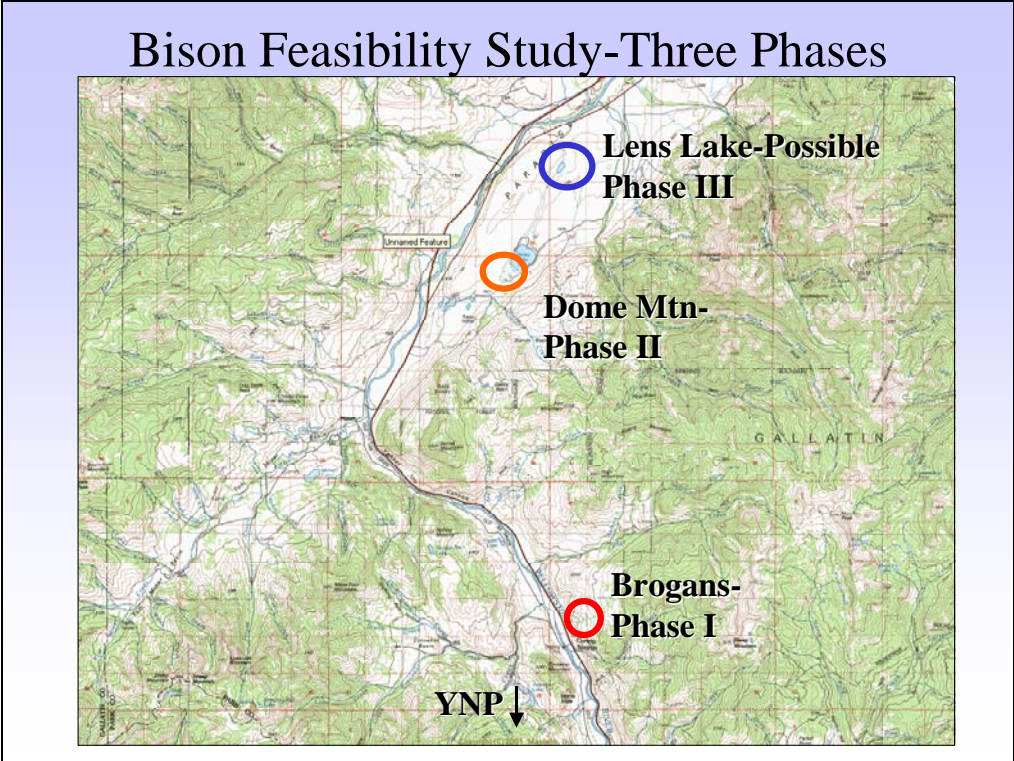


Figure 1. Map showing the relative position of quarantine facilities North of YNP.

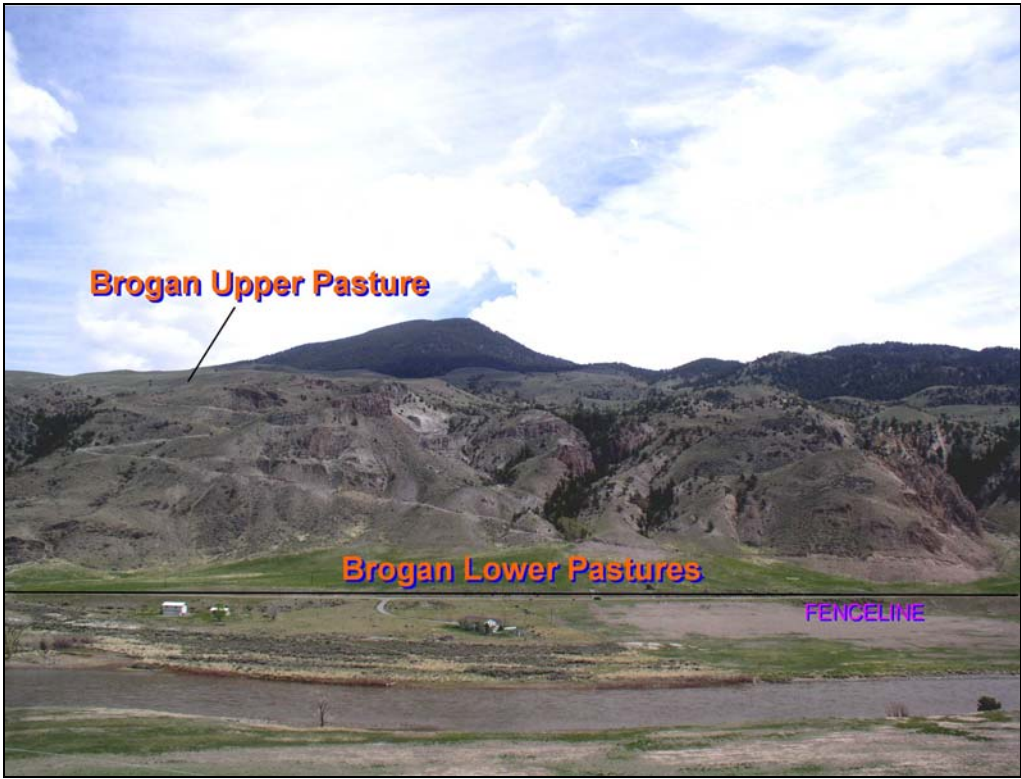


Figure 2. Phase 1 Facility-Brogan Bison Research Facility near Corwin Springs.

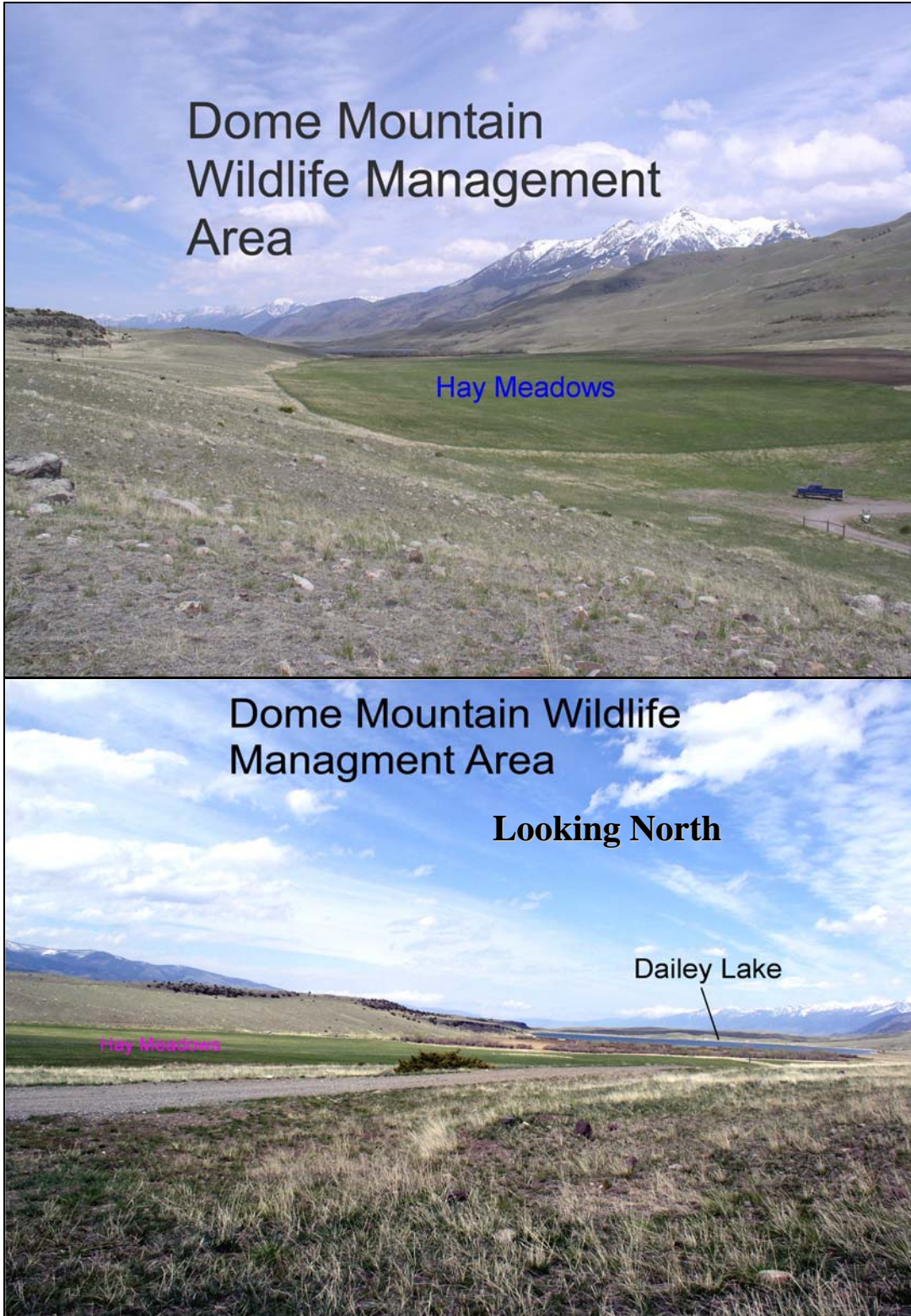
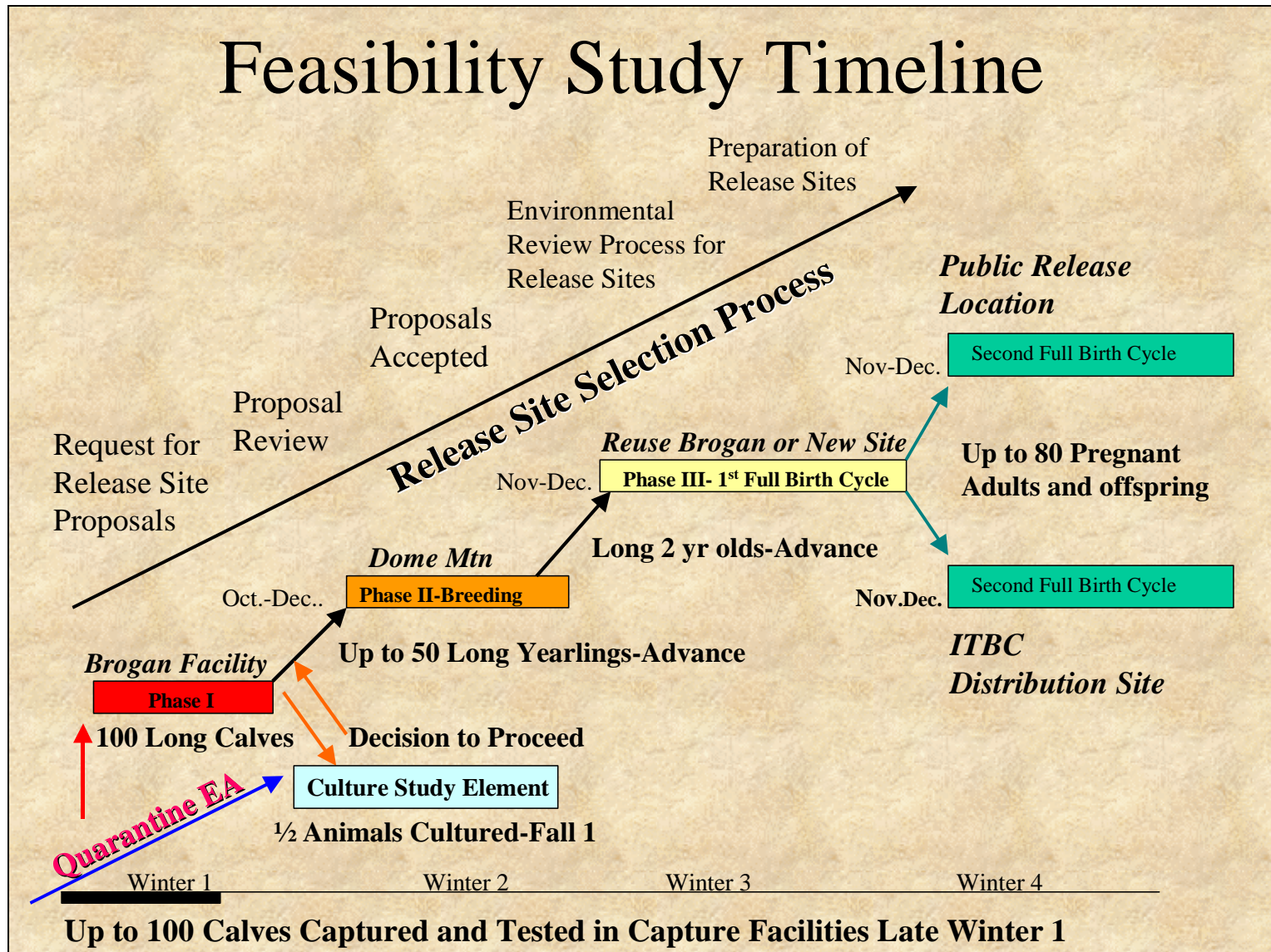


Figure 3. Potential Phase II site at Dome Mountain Wildlife Management Area

Feasibility Study Timeline



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Appendix A-Supportive Documents

**Written Letters of Support on file from:
USAHA Brucellosis Committee
Intertribal Bison Cooperative
Greater Yellowstone Brucellosis Committee
USDA/APHIS/Veterinary Services**