INTERAGENCY BISON MANAGEMENT PLAN

NATIONAL PARK SERVICE

USDA
ANIMAL AND PLANT
HEALTH INSPECTION
SERVICE

UDSA
FOREST SERVICE

MONTANA DEPARTMENT
OF LIVESTOCK

MONTANA FISH, WILDLIFE
& PARKS

Memorandum

December 17, 2008

To: Administrative Record

From: Partner Agencies, Interagency Bison Management Plan

Re: Adaptive Adjustments to the Interagency Bison Management Plan

The Interagency Bison Management Plan (IBMP) was signed in 2000 to coordinate bison management between the State of Montana and Yellowstone National Park. Five agencies are responsible for implementing the bison management plan – the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) and Forest Service; the Department of the Interior's National Park Service; and the State of Montana's Department of Fish, Wildlife, and Parks and Department of Livestock.

Under the IBMP, these agencies harness their respective skills and operational resources to work cooperatively within an adaptive management framework to conserve a wild, free-ranging bison population, while concurrently reducing the risk of brucellosis transmission from bison to cattle. Partner agencies anticipated future adjustments to the IBMP based on research, monitoring, and feedback from the implementation of a suite of conservation and risk management actions and are committed to the adaptive management framework of the IBMP. After eight years of experience in implementing the IBMP, it is timely to formally incorporate adaptive changes to the IBMP and its joint Operating Procedures. These changes do not increase the risk of transmission of brucellosis to cattle or diminish the conservation of wild, free-ranging bison.

In keeping with this adaptive management framework, the IBMP partner agencies have met several times in public venues since August 2008 to deliberate on recent recommendations by the U.S. Government Accountability Office (GAO), assess the effectiveness and outcomes of IBMP management activities (highlighting winter 2007-08), and develop and incorporate short and long-term adaptive management adjustments to the IBMP based on prevailing conditions. These adaptive management strategies will guide the Operating Procedures for the IBMP during winter 2008-09 and beyond.

The following premises are crucial to the adaptive management strategies now and into the future:

- Proposed changes to the IBMP will be based largely on new information, changing land ownership and use, and newly gained operational experience. However, these changes will be applied within the framework of the existing IBMP and will not alter the basic management direction or goals of the original plan.
- Monitoring, application of management thresholds, and adaptation will continue, with additional adaptive management strategies in the future.

In future adaptive changes, the partners will continue to adjust bison abundance and distribution on lands adjacent to Yellowstone National Park, as appropriate, based on evaluations of new conservation easements or land management strategies, reduced brucellosis prevalence in bison, new information or technology that reduces the risk of disease transmission, different funding available for maintaining separation of bison and cattle, or other changes in circumstances on the ground, experience on the ground, or new research. Future adaptations to the IBMP will require continued surveillance of bison and cattle, monitoring the effects and effectiveness of management actions, and new knowledge regarding vaccine efficacy, vaccine delivery methods, and disease diagnostics. Some of the targeted information to be gathered is as follows:

- Updated information on the relationships between bison management activities at the boundary of the park and the interaction between bison density and snow pack for the central and northern herds.
- Updated data on bison migration routes and timeframes for bison return to the park.
- Updated data on bison and cattle distributions to evaluate the effectiveness of management actions at maintaining spatial and temporal separation of cattle and bison.
- Updated data on the ability to keep bison within Zone 2.

The attached document incorporates adaptive adjustments to the IBMP that were agreed-upon by the partner agencies during August-December 2008 meetings. In addition to providing sound progress in implementing the IBMP, the adaptive changes were established to respond to recommendations from the GAO by creating measurable objectives for the plan and developing a specific monitoring program to assess important scientific and management questions. These adjustments were based on the adaptive management framework and principles outlined in the U.S. Department of Interior's technical guide on adaptive management (2007).

Jerry Diemer, Animal and Plant Health Inspection Service — Date 12-17-08

Joe Maurier, Montana Fish, Wildlife and Parks — Date 12/17/8

Mary Erickson, Gallatin National Forest — Date 12/17/08

Christian Mackay, Montana Department of Livestock — Date 12-17-08

Suzanne Lewis, Yellowstone National Park — Date 12.17.08

Goal #1: Increase tolerance for bison in Zone 2 outside the north and west boundaries of Yellowstone National Park (YNP) with no unacceptable consequences (e.g., transmission of brucellosis from bison to cattle, unacceptable impacts on public safety and private property).

Objective 1.1: Within timing and geographical considerations, allow bison within Zone 2 of the Hebgen and Gardiner basins to manage the risk of brucellosis transmission from bison to livestock and enhance wild bison conservation and hunting.

Specific guidance regarding the management of bachelor groups of bull bison is provided in Objective 1.2.

Management action 1.1.a—Consistent with the management responses outlined below, allow untested female bison (or mixed groups of males and females) to migrate onto and occupy the Horse Butte peninsula (between the Madison Arm of Hebgen Lake and Grayling Creek) and the Flats (the area east of South Fork Madison River, south of the Madison Arm, and west of Highway 191) each winter and spring in Zone 2 (subject to end-of-winter hazing described in Objective 3.2.c).

Monitoring metrics:

- Weekly surveys of the number and distribution of bison on Horse Butte, the Flats, crossing the Narrows, and going beyond the Madison Resort (Lead = Montana Department of Livestock (MDOL)).
- Annually document the number of bison using Zone 2 and the number and type of management activities needed to manage bison distribution (Lead = MDOL).
- Create a density curve of the threshold number of bison on Horse Butte that results in movements of bison to the South Fork Madison area. Use this information to modify or verify the limits set for bison counts at Madison Arm Resort that trigger management responses (Lead = MDOL).
- Determine natural routes and timeframes (in the absence of hazing) for bison migration back into the park (Lead = National Park Service (NPS)). Use this information to evaluate the effectiveness of management responses for bison tolerance in Zone 2 (Lead = MDOL).

Management responses:

- Groups (≥1 animal) of female/mixed bison will not be allowed in the following areas at any time of year: north of the Narrows; west of Corey Springs; or south and west of the Zone 2 boundary. Bison attempting to enter these areas will be hazed to the Horse Butte peninsula, other available habitat, captured, or if necessary, lethally removed.
- During the period from November 15 through April 15, up to 30 female bison (or a mixed group of 30 males and females) will be allowed in Zone 2 on the Madison Arm. After April 15, up to 30 female/mixed group bison will be allowed east of the Madison Arm Resort. After May 15, no female/mixed group bison will be allowed on the Madison Arm.
    - If female/mixed group bison exceed 30 animals or breach the Zone 2 perimeter on the South Fork two or more times before April 15, then this will trigger management actions to reduce risk that may include hazing, capture, testing, or lethal removal at the discretion of the State Veterinarian.
    - If female/mixed group bison exceed 30 animals or breach the Madison Arm Resort two or more times between April 15 and May 15, then this will trigger management actions to reduce risk that may include hazing, capture, testing, or lethal removal at the discretion of the State Veterinarian.
- Allow up to 40 female bison (or a mixed group of 40 males and females) north of Duck Creek and east of Corey Springs during November 15 through May 15 before management actions are instituted. The number of bison tolerated in this area may be adjusted at the discretion of the State Veterinarian based on bison behavior, environmental conditions, and other considerations.
    - If female/mixed group bison breach the perimeter described above two or more times before May 15, then this will trigger management actions to reduce risk that may include hazing, testing, or lethal removal at the discretion of the State Veterinarian.

- If female/mixed group bison cross the Narrows two or more times before May 1, then this will trigger management actions to reduce risk that may include hazing, testing, or lethal removal at the discretion of the State Veterinarian. After May 1, any crossing may trigger management action.

Management action 1.1.b—Consistent with the management responses outlined below, use adaptive management to gain management experience regarding how bison use Zone 2 in the Gardiner basin, and provide space/habitat for bison in cattle-free areas.

Monitoring metrics:

- Weekly survey of the number and distribution of bison in the Eagle Creek/Bear Creek area and the Gardiner basin (Lead inside YNP = NPS; Lead outside YNP = MDOL with Montana Fish, Wildlife, and Parks (MFWP)).
- Annually document the numbers and dates that bison attempt to exit Zone 2 by passing through Yankee Jim Canyon, west up Mol Heron Creek canyon, or to the east side of the Yellowstone River and north of Little Trail Creek (Lead = MDOL/MFWP).
- Annually document the number of bison using Zone 2 and the number of management activities needed to manage bison distribution (Lead = MDOL/MFWP).
- Annually collect data to update the relationships between bison management at the Stephens Creek facility and the interaction between bison density and snow pack in the central and northern herds (Lead = NPS).
- Annually collect data to determine natural migration routes and timeframes (in the absence of hazing) for bison migration out of and back into the park (Lead inside YNP = NPS; Lead outside YNP = MDOL/MFWP).

Management responses

- Use the Stephens Creek facility to provide 25 bison for adaptive management use of Zone 2, including adult females testing negative for brucellosis exposure and fitted with telemetry devices, per the IBMP ROD, as well as associated calves and young bulls. The number of bison tolerated in this zone may be adjusted, per the IBMP ROD, at the discretion of the State Veterinarian based on bison behavior and group composition, environmental conditions, and other considerations.
- Other female/mixed groups of bison that migrate outside YNP and west of the Yellowstone River will trigger management actions to reduce risk that may include hazing to available habitat inside the park or in the Eagle Creek/Bear Creek area, capture, testing, or lethal removal at the discretion of the State Veterinarian.
- Bison will not be allowed in Zone 3 any time of year. Bison entering Zone 3 will trigger management actions to reduce risk that may include hazing to available habitat within Zone 2, the Eagle Creek/Bear Creek area, or the park, increased monitoring, capture, or lethal removal at the discretion of the State Veterinarian.
- Regardless of testing status, bison will be allowed year-round in the Eagle Creek/Bear Creek area.
- Adaptive adjustments to monitoring metrics and management responses will be made prior to subsequent winters based on new information obtained through surveillance, the effects of management actions on the conservation of bison, and the effectiveness of management actions at maintaining spatial and temporal separation of cattle and bison and retaining bison within Zone 2.

Management Action 1.1.c—Use research findings on bison birth synchrony and fetal and shed *Brucella abortus* field viability and persistence to inform adaptive management.

Monitoring metric:

- Complete research reports and attempt to publish findings in a peer-reviewed, scientific journal (Lead = MFWP/NPS).

Management response:

- Adapt temporal and spatial separation guidelines during spring and summer based on research findings.

Objective 1.2: Manage bull bison to reflect their lower risk of transmission of brucellosis to cattle.

Management Action 1.2.a—Allow bachelor groups of bull bison to occupy suitable habitat areas outside the west boundary of YNP in the portion of Zone 2 south of Duck Creek each year within the parameters of conflict management.

Monitoring metrics:

- Weekly counts and locations of bull bison in Zone 2 (Lead = MDOL/MFWP).
- Document threats to human safety and property damage (Lead = MFWP/MDOL).

Management responses:

- Avoid hazing or removing bull bison unless they are breaching the agreed-upon perimeter or pose an imminent threat to livestock co-mingling, human safety, or property damage.
- If there is a threat of livestock co-mingling, human safety, or property damage, or a group (≥1 animal) of bull bison attempt to travel beyond the perimeter of Zone 2, then the bull bison will initially be hazed from area of conflict.
- If bull bison actually co-mingle with cattle, then they mayl be lethally removed and additional management actions may be taken by the State Veterinarian to reduce the risk of further commingling by other bull bison, including capture, hazing, or lethal removal.

Management Action 1.2.b—Allow bachelor groups of bull bison to occupy suitable habitat areas in Zone 2 outside the north boundary of YNP within the following parameters of conflict management.

Monitoring metrics:

- Weekly counts and locations of bull bison in Zone 2 (Lead = MDOL/MFWP).
- Document threats to human safety and property damage (Lead = MFWP/MDOL).
- Annually document the numbers and dates that bull bison attempt to exit Zone 2 by passing through Yankee Jim Canyon, west up Mol Heron Creek canyon, or to the east side of the Yellowstone River and north of Little Trail Creek (Lead = MDOL/MFWP).

Management responses:

- Avoid hazing or removing bull bison from Zone 2 during November through April each year unless they are breaching the agreed-upon perimeter or pose an imminent threat to livestock co-mingling, human safety, or property damage.
- Regardless of testing status, bull bison will be allowed year-round in the Eagle Creek/Bear Creek area.
- Bull bison will not be allowed in Zone 3 any time of year. Bull bison entering Zone 3 will trigger management actions to reduce risk that may include hazing to available habitat within Zone 2, the Eagle Creek/Bear Creek area, or the park, increased monitoring, or removal at the discretion of the State Veterinarian.
    - If a group of bull bison progresses beyond Yankee Jim Canyon, then they may be lethally removed at the discretion of the State Veterinarian.
    - If groups of bull bison progress beyond Yankee Jim Canyon two or more times, then additional management actions may be taken by the State Veterinarian to reduce the risk of future incidents by other bull bison, including capture, hazing, or lethal removal.
    - If a group of bull bison crosses the Yellowstone River to the east side into Zone 3, then they may be lethally removed at the discretion of the State Veterinarian.
    - If groups of bull bison cross the Yellowstone River to the east side into Zone 3 two or more times, then additional management actions may be taken by the State Veterinarian to reduce the risk of future incidents by other bull bison, including capture, hazing, or lethal removal.
- If bull bison actually co-mingle with cattle, then they may be lethally removed and additional management actions may be taken by the State Veterinarian to reduce the risk of further commingling by other bull bison, including capture, hazing, or lethal removal.
- Adaptive adjustments to monitoring metrics and management responses will be made prior to subsequent winters based on new information obtained through surveillance, the effects of management actions on the conservation of bison, and the effectiveness of management actions at maintaining spatial and temporal separation of cattle and bison and retaining bull bison within the agreed-upon perimeter of Zone 2.

Objective 1.3: Reduce conflict between landowners, livestock operators, and bison outside YNP via permit management, improved relations, education, and incentives.

Management Action 1.3.a—Work with private land owners and livestock producers and operators to provide conflict-free habitat in the Hebgen and Gardiner basins.

Monitoring metric:

- Create an annual record of the: 1) number of acres made available to bison from conservation easements (Lead = MFWP); 2) locations, numbers, types, and turn-out/off dates for cattle grazed on private land in the Hebgen and Gardiner basins (Lead = MDOL); and 3) extent of fencing erected to separate bison from livestock (Lead = MDOL).

Management response:

- Implement site-specific brucellosis risk management plans for livestock that may include stocking less-brucellosis susceptible cattle (e.g., steers), brucellosis testing and vaccination, fencing for livestock, and adjustments of turnout dates, when necessary, to ensure temporal separation. As available, financial incentives (working with government and non-government partners) may be provided for altering the timing of cattle operations to ensure temporal separation.
- Evaluate where additional habitat is available for bison commensurate with land management and ownership changes.

Management Action 1.3.b—Work with landowners who have human safety and property damage concerns, as well as those who favor increased tolerance for bison, to provide conflict-free habitat in the Hebgen and Gardiner basins.

Monitoring metrics:

- Annually document the numbers, timing, and types of reported incidents for human safety and property damage related to bison (Lead = MFWP with support from MDOL).
- Annually document the numbers and types of actions taken to provide conflict-free habitat bison (Lead = MFWP with support from MDOL).

Management responses:

- If there is a human injury by bison, then this will trigger management actions to reduce the risk of future incidents that may include hazing, capture, or lethal removal.
- If annual property damage is excessive or unacceptable in frequency, impact, and/or cost, then this will trigger management actions to reduce the risk of future damage that may include hazing, capture, or lethal removal at the discretion of the Region 3 Supervisor of Montana Fish, Wildlife, and Parks.

Management Action 1.3.c—Annually, the Gallatin National Forest will ensure conflict-free habitat is available for bison and livestock grazing on public lands, as per management objectives of the Interagency Bison Management Plan (IBMP).

Monitoring metric:

- Annually track the status (e.g., number of acres, location, etc.) of active and inactive grazing allotments on public lands (Lead = U.S. Forest Service (USFS)).

Management response:

- Evaluate where additional habitat is available for bison commensurate with land management and ownership changes.

Goal #2: Conserve a wild, free-ranging bison population.

Objective 2.1: Manage the Yellowstone bison population to ensure the ecological function and role of bison in the Yellowstone area and to maintain genetic diversity for future adaptation.

Management action 2.1.a—Increase the understanding of bison population dynamics to inform adaptive management and reduce sharp increases and decreases in bison abundance.

Monitoring metrics:

- Conduct aerial and ground surveys to estimate the annual abundance of Yellowstone bison each summer (Lead = NPS).
- Document and evaluate relationships between bison migration to the boundary of YNP and bison abundance, population (or subpopulation) growth rates, and snow pack in the central and northern herds (Lead = NPS).
- Continue to obtain estimates of population abundance through the remainder of the year based on surveys, knowledge of management removals, and survival probabilities (Lead = NPS).
- Conduct an assessment of population range for Yellowstone bison that successfully addresses the goals of the IBMP by retaining genetic diversity and the ecological function and role of bison, while lessening the likelihood of large-scale migrations to the park boundary and remaining below the estimated carrying capacity of the park's forage base (Lead = NPS).

Management responses:

- If abundance estimates decrease to ≤2,300 bison, then the agencies will increase the implementation of non-lethal management measures.
- If abundance estimates decrease to ≤2,100 bison, then the agencies will cease lethal brucellosis risk management and hunting of bison and shift to non-lethal management measures.

Management action 2.1.b—Increase the understanding of genetics of Yellowstone bison to inform adaptive management.

Monitoring metric:

- Complete an assessment of the existing genetic diversity in Yellowstone bison and how the genetic integrity of Yellowstone bison may be affected by management removals (all sources combined) by October 2010 to estimate existing genetic diversity and substructure in the population (Lead = NPS).
- Conduct an assessment of the genetic diversity necessary to maintain a robust, wild, free-ranging population that is able to adapt to future conditions (Lead = NPS).

Management response:

- Define genetic diversity and integrity, and establish long-term objectives for conserving genetic integrity, including assessing hunting and risk management removal strategies that are compatible with conservation of genetic diversity.

Management action 2.1.c—Increase understanding of the ecological role of bison to inform adaptive management by commissioning a comprehensive review and assessment.

Monitoring metric:

- Develop and implement by October 2011 a joint research strategy agreed to by the interagency partners that focuses on understanding the role and function of bison for providing nutrient redistribution, prey and carrion, and microhabitats for other species (Lead = NPS).

Management response:

- Adapt the management responses in 2.1.a based on new monitoring, research, and management findings.

Objective 2.2: Minimize bison slaughter by employing alternative management techniques.

Management action 2.2.a—Use slaughter only when necessary; attempt to use other risk management tools first.

Monitoring metric:

- Annually document the number, age, sex, and sero-status of bison sent to slaughter (Lead = Animal and Plant Health Inspection Service (APHIS) with the MDOL).

Management response:

- Consistent with the management responses in 2.1.a, increase the use of, and allocation of resources to, management actions (e.g., hazing to habitat, hunting, quarantine, and shipping eligible bison to alternate, isolated destinations) that reduce the number of bison sent to slaughter.

Management action 2.2.b—In Zone 2 lands adjacent to YNP, emphasize management of bison as wildlife and increase the use of state and treaty hunts to manage bison numbers and demographic rates, limit the risk of brucellosis transmission to cattle, and protect human safety and property.

Monitoring metric:

- Weekly and annual summaries of bison harvested by state and treaty hunters (Lead = MFWP).

Management response:

- Consistent with the management responses in 2.1.a, develop a hunting strategy annually by May that includes combined harvest thresholds with state and tribal hunters that manage bison abundance, especially in areas of high brucellosis transmission risk to cattle, while ensuring the conservation of population demographics and genetic integrity. That strategy might include, for example, a goal of increasing the hunt as a percent of overall yearly bison mortality.

Management action 2.2c—Complete the quarantine feasibility study and consider an operational quarantine facility to provide a source of live, disease-free bison for tribal governments and other requesting organizations.

Monitoring metrics:

- Annual summary of bison sent to quarantine and bison transported from quarantine to suitable restoration sites (Lead = MFWP/APHIS).
- Annual summaries from bison populations restored using quarantined Yellowstone bison, including numbers, demographic rates, and implemented risk management actions (Lead = MFWP/APHIS).
- Evaluate regulatory requirements and constraints for moving live bison, including adults, to suitable restoration sites (Lead = APHIS/MDOL).
- Conduct an assessment of the quarantine feasiblity study and offer recommendations regarding whether the quarantine of bison should become operational (Lead = MFWP/APHIS).
- Identify suitable release sites for brucellosis-free bison in quarantine, and solicit proposals from groups interested in restoring bison, through the Interagency/Tribal Bison Restoration Panel (Lead = MFWP/APHIS).

Management responses:

- Based on the National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA) processes, determine if operational quarantine of bison will be implemented to restore bison outside of YNP.
- Release brucellosis-free bison from quarantine to suitable sites recommended by the Interagency/Tribal Bison Restoration Panel.

Goal #3: Prevent the transmission of brucellosis from bison to cattle.

Objective 3.1: Reduce the risk of disease transmission through vaccination.

Management Action 3.1.a—Continue bison vaccination under prevailing authority.

Monitoring metrics:

- Document the number of eligible bison captured and vaccinated outside of the park (Lead = MDOL/APHIS).
- Implement the YNP Bison and Brucellosis Monitoring and Surveillance Plan (Lead = NPS).

Management response:

- Consistent with the management responses in 2.1.a, vaccinate and release eligible bison (i.e., calves, yearlings, non-pregnant females) captured near the boundary of YNP after state and treaty hunting seasons end each winter and spring.

Management Action 3.1.b—Complete EIS processes (MEPA/NEPA) for remote delivery vaccination of bison and use the outcomes to inform adaptive management.

Monitoring metric:

- Complete the NEPA process and reach a decision on whether remote delivery vaccination of bison can/will be employed inside YNP (Lead = NPS).

Management response:

- Based on the MEPA process, determine if remote delivery vaccination of bison can/will be employed outside of YNP (Lead = MDOL).

Management Action 3.1.c—Test and vaccinate cattle.

Monitoring metric:

- By May 1, determine and document the vaccination status of all cattle in or coming into the Hebgen and Gardiner basins (Lead = MDOL/APHIS).

Management responses:

- Vaccinate all calves, with booster vaccination of adults as deemed appropriate by the Montana State Veterinarian.
- Use existing regulations and provide incentives to ensure 100% of adult cattle in the Hebgen and Gardiner basins are calf hood and booster vaccinated.
- For Zone 2, vaccination is mandatory. If the vaccination status of adult cattle is not 100%, then undertake vaccination or other to-be-determined actions to achieve 100% status as determined by the Montana State Veterinarian.

Objective 3.2: Prevent cattle/bison interactions, with an emphasis on the likely bison birthing and abortion period each year.

Management action 3.2.a—Use spatial and temporal separation and hazing to prevent cattle/bison interactions.

Monitoring metrics:

- Document the minimum temporal separation and space between bison and cattle during February through June (Lead = MDOL).
- Document the number of times bison are successfully or unsuccessfully moved to create separation in time and space from cattle (Lead = MDOL).

Management responses:

- As necessary, institute bison hazing, capture, or lethal removal to prevent bison from entering cattle-occupied properties.
- Adapt temporal separation guidelines for bison and cattle during spring and summer based on research findings from *Brucella abortus* persistence and viability research.
- Consistent with the management responses in 1.1.a, 1.1.b, and 2.1.a, any bison found within areas that will be occupied by cattle within 20 days will be hazed, captured, or lethally removed.

Management action 3.2.b—Evaluate the use of limited, strategically placed fencing when and where it could effectively create separation between domestic livestock and bison, and not create a major movement barrier to other wildlife.

Monitoring metrics:

- Document the number of additional acres of habitat made available for bison as a result of strategic fencing (Lead = MFWP/USFS/MDOL).
- Document fence damage or the number of times fencing fails to inhibit bison trespass on private property occupied by cattle (Lead = MDOL).

Management responses:

- Fencing to provide additional bison habitat will not create a movement barrier to other wildlife or detract from or preclude other land management priorities.
- Any incidence of fence failure requires that action be taken to repair and/or enhance the effectiveness of the fence.

Management Action 3.2.c—Haze bison from the Hebgen basin into YNP with a target date of May 15.

Monitoring metrics:

- Consistent with management action 1.1.a, assess the prevailing environmental conditions and reach consensus by May 13 on a step-wise, integrated plan for the end-of-winter return of bison into YNP from Zone 2 (Lead = MDOL/NPS).
- Annually document the timing of the end-of-winter return of bison into YNP, the number of bison returned, prevailing environmental conditions, and success or lack thereof of hazing bison and getting them to remain in the park (Lead = MDOL/NPS)

- Annually review and apply *Brucella abortus* persistence information, private land cattle turn-on dates, and applicable research results to determine the effects of haze-to-habitat actions on bison and their effectiveness at preventing the commingling of bison and cattle (Lead = MDOL).

Management responses:

- The actual beginning date for hazing bison will be consistent with the management responses in 1.1.a and based on weather (e.g., green-up, snow pack), cattle turn-out dates, and consideration of the natural migration by bison back into the park.
- Step-wise, coordinated, interagency hazing will be used, as needed, to minimize repeated hazing into situations where snow or other variables will prevent bison occupancy.

Management Action 3.2.d—Haze bison from the Gardiner basin into YNP with a target date of May 1.

Monitoring metrics:

- Consistent with management action 1.1.b, assess the prevailing environmental conditions and reach consensus by April 15 on a step-wise, integrated plan for the end-of-winter return of bison into YNP from Zone 2 (Lead = MDOL/NPS).
- Annually document the timing of the end-of-winter return of bison into YNP, the number of bison returned, prevailing environmental conditions, and success or lack thereof of hazing bison and getting them to remain in the park (Lead = MDOL/NPS)
- Annually review and apply *Brucella abortus* persistence information, private land cattle turn-on dates, and applicable research results to determine the effects of haze-to-habitat actions on bison and their effectiveness at preventing the commingling of bison and cattle (Lead = MDOL).

Management responses:

- The actual beginning date for hazing bison will be consistent with the management responses in 1.1.b and based on weather (e.g., green-up, snow pack), cattle turn-out dates, and consideration of the natural migration by bison back into the park.
- Step-wise, coordinated, interagency hazing will be used, as needed, to minimize repeated hazing into situations where snow or other variables will prevent bison occupancy.