ELK MANAGEMENT GUIDELINES IN AREAS WITH BRUCELLOSIS WORKING GROUP, PRESENTED TO FWP COMMISSION NOVEMBER 8, 2012

INTRODUCTION

Brucellosis results from infection with the *Brucella abortus* bacteria and is known to exist in wild bison and elk and occasionally domestic livestock within the Greater Yellowstone Area (GYA). Brucellosis was first detected in wildlife in the early 1900's and likely introduced to wildlife by contact with infected livestock. Eradication efforts have largely eliminated brucellosis in livestock within the contiguous United States leaving wildlife in the GYA as the last known brucellosis reservoir in the United States. Recent livestock cases in the GYA have been linked to transmission from wildlife, with elk being the most likely source.

Brucellosis is a concern and financial burden to livestock producers. The disease, which is transmitted primarily through contact with infected birth or abortion material, causes abortions in cattle. In 2007 Montana had its first case of brucellosis in cattle since gaining its brucellosis-free status in 1985. Montana lost its brucellosis-free status in 2008 when a second cattle case was detected and regained its class-free status in 2009. Since 2007 there have been five cases of brucellosis in domestic livestock in Montana, including three in cattle and two in domestic bison. Idaho and Wyoming have also experienced livestock brucellosis and an apparent increase in seropositive elk in the past five years.

Changes in USDA-APHIS rules regarding brucellosis in livestock reduced the likelihood of entire states losing brucellosis-free status because of isolated livestock cases, but put increased focus on areas where brucellosis is known to exist in wildlife. As a result, the Montana Board of Livestock established a designated surveillance area (DSA) in 2010, which requires increased cattle testing and vaccination efforts by producers within the DSA (Montana Dept. of Livestock, 2010). The DSA boundary has since been twice expanded by the Montana Board of Livestock based upon new elk brucellosis surveillance information.

Within Montana, surveillance efforts using blood tests to determine exposure rates (seroprevalence) to *B. abortus* in elk began in the late 1980's. Seroprevalence estimates for GYA elk from the late 1980's and early 1990's were below 2%. Surveillance conducted within the last 10-15 years revealed what appeared to be increasing seroprevalence in some elk populations (Anderson and Williams 2008, Anderson et. al. 2009, Anderson et. al. 2010). Recent testing also detected brucellosis in elk populations where it had not previously been found. It is unclear if this is due to changes in the geographical distribution of the disease or increased sampling efforts in these areas. To date, brucellosis has only been detected in elk populations of southwestern Montana, and the increase in brucellosis seroprevalence in some areas has not appeared to prevent elk population growth in the region.

In response to the apparent increased seroprevalence, recent livestock infections, establishment of the DSA and abundant debate between and within livestock and wildlife interests, in fall 2011 the FWP Commission endorsed the concept of a citizen working group to explore elk management guidelines in areas with Brucellosis. A call for interest listing desired qualifications and diversity was made with over 40 applicants ultimately responding. Twelve individuals were selected with representation from livestock and wildlife interests in and out of the DSA and GYA. The group

met monthly starting in January 2012 with the sixth and final meeting in June. All meetings were held in Bozeman with opportunities for public attendance and comment available at all meetings.

The specific objective of this working group was to identify and propose elk management guidelines in areas with brucellosis, for consideration by the FWP Commission as official policy. These guidelines, if endorsed by the FWP Director and Commission, will serve to help focus future elk management in areas with brucellosis.

This summary generally describes this working group's efforts and products to that end. This document does not summarize the process or results in detail, and is meant to provide the FWP Commission with a general sense of the process and knowledge of the working group recommendations before they are more formally presented to the FWP Commission with action required in fall 2012. The rationale for this preliminary presentation is to provide the FWP Commission with advance knowledge prior to the ensuing public process to adopt elk management guidelines. The public process will be similar to that used for other products to include adoption of hunting regulations and species management plans. A more detailed presentation of the working group's process and results, including the rationale behind the preferred alternative, will be provided to the FWP Commission later in the fall of 2012. The public will have the opportunity to comment at the fall meeting and during the subsequent comment period.

PROCESS

The brucellosis issue is marked by a considerable amount of technical material, scientific uncertainty, potential for subjective, value-based input and judgment, a wide variation in individuals' understanding of the issue, and a lengthy history of contentious debate. FWP made the decision to initiate this working group effort with detailed research and management presentations from state and federal agencies from Montana, Idaho, Wyoming, and Yellowstone National Park. Structured Decision Making (SDM) was used to facilitate and guide this working group's efforts. SDM is merely the formalized application of common sense to decision-making and is designed to improve the quality, efficacy and transparency of difficult decisions. There are five steps arranged in iterative sequence: defining the PROBLEM (or ISSUE STATEMENT), identifying OBJECTIVES that would characterize successful resolution of the problem, developing management ALTERNATIVES to meeting those objectives, identifying CONSEQUENCES for each of the alternatives, and evaluating TRADE-OFFS among the alternatives. In this evaluation, it is not so much what participants "like" but rather which alternative(s) are predicted to perform best relative to meeting stated objectives.

With the recognized capacity of SDM to help guide complex deliberations, FWP thought SDM a fitting approach to this topic and effort. Dr. Mike Mitchell from the Montana Wildlife Cooperative Research Unit led this facilitation effort. Personnel from FWP and Montana Department of Livestock (DoL) provided technical assistance. The SDM steps were accomplished using both full group discussion and break-out groups. Public attendance and comment was relatively limited, in part perhaps because of the understanding that any final product would enjoy the opportunity for broad public review and comment thru Commission process.

PROBLEM (ISSUE) STATEMENT

Despite explicit and continued efforts to create a very brief problem or issue statement, the working group ultimately came to consensus on the following comprehensive statement defining the brucellosis issue in Montana elk. It is the product of both break-out sessions and editing efforts made by the entire group.

Brucellosis is a contagious bacterial disease that affects livestock, elk and bison in the GYA. It is a federally and internationally regulated disease. In recent years, brucellosis has been found in livestock herds in southcentral and southwest Montana, and evidence indicates elk are the likely source.

Brucellosis itself, as well as the requirements of brucellosis disease regulations, threaten the viability of the livestock industry in this area and landowner tolerance of elk because of the increased direct and indirect costs associated with repeated testing, possible quarantine, and changes in land use resulting from disease regulation. In addition, while a large portion of Montana's economy derives from major exports of livestock, brucellosis results in limitations on marketing options (stigma associated with cattle produced on the DSA), as well as the ability to transport/export into and out of the DSA and the state of Montana. This is especially true because the prevalence of brucellosis in the elk population seems to be increasing.

Management tools developed by the FWP Commission will be subject to considerable uncertainty due to 1) the multiple agencies, jurisdictions, and various interest groups involved in management of brucellosis, 2) incomplete understanding of the distribution of Brucella in elk populations, and 3) incomplete understanding of how elk movements, behavior, and seroprevalence contribute to possible transmission of brucellosis.

Maintaining the viability of the livestock industry as well as livestock owners' tolerance of elk populations in this area is important; elk populations benefit from a viable livestock industry because significant elk habitat and hunter harvest opportunity occur on private lands. Tools for reducing the prevalence of brucellosis in elk could not only reduce the risk of transmissions to cattle, but could also help restore traditional movements and distributions of elk. Eradication of brucellosis in elk is not currently feasible; management tools need to be endorsed by the FWP Commission that will reduce and if possible eventually eliminate the risk of transmission between elk and livestock, in a manner that considers the interests of livestock owners, landowners, wildlife enthusiasts, recreationalists and hunting groups.

OBJECTIVES

The working group made considerable effort to reach consensus on objectives for elk management in areas with brucellosis. Initially, the group reached consensus on a "working" list of objectives. Over the course of discussions that included break-out and whole group efforts, the working group ultimately reorganized this list to include over-arching strategic objectives, fundamental objectives, and means objectives. Strategic objectives

are defined as those to which FWP and the FWP Commission can only contribute to through participation in large or larger jurisdictions by other entities. The group recognized that decisions and actions by FWP might help to meet these strategic objectives, but neither the FWP Commission, nor any other single agency or entity, has sole decision-making authority for meeting these objectives. Fundamental objectives are defined as the core objectives within the purview of FWP and the FWP Commission that, if met, define successful elk management relative to the brucellosis issue. Means objectives are recognized as possible methods, ways, or actions that could be used to meet fundamental objectives. The working group came to consensus on the objectives listed below. Fundamental objectives are in **bold**.

STRATEGIC OBJECTIVE: Maintain state wide brucellosis-free status for Montana.

STRATEGIC OBJECTIVE: Contain, reduce, and eventually eliminate the DSA.

STRATEGIC OBJECTIVE: Minimize impacts of brucellosis in wildlife to livestock producers in the DSA.

STRATEGIC OBJECTIVE: Improve research/monitoring and understanding of Brucella abortus biology and behavior to increase efficacy of management.

STRATEGIC OBJECTIVE: Maximize coordination among all stakeholders, agencies and jurisdictions dealing with brucellosis reduction in and around the Greater Yellowstone area.

FUNDAMENTAL OBJECTIVE: Minimize transmission.

MEANS OBJECTIVE: Develop more effective Brucella abortus vaccine and vaccination protocols.

MEANS OBJECTIVE: Contain, reduce, and eventually eliminate Brucellosis.

MEANS OBJECTIVE: Minimize seroprevalence in elk in each wintering elk herd within the DSA (measure seroprevalence).

MEANS OBJECTIVE: Reduce harboring (instances of relatively little or reduced human disturbance that may result in concentrations of elk).

FUNDAMENTAL OBJECTIVE: Maximize acceptability of elk management tools and populations in the DSA for:

Sportspersons (measure with satisfaction survey),

Wildlife enthusiasts (measure with satisfaction survey),

Landowners (measure with satisfaction survey), and

Livestock producers (measure with satisfaction survey).

MEANS OBJECTIVE: Economic (minimize regulations/regulation changes on restriction of current export of MT cattle (consultation between Department of Livestock & FWP).

MEANS OBJECTIVE: Logistical (minimize # livestock tested annually as a percent of total population in DSA).

MEANS OBJECTIVE: Cultural (stigma) (minimize difference between market price ($/head) between comparable cattle originating inside DSA and outside DSA).

FUNDAMENTAL OBJECTIVE: Maximize cost effectiveness.

ALTERNATIVES, CONSEQUENCES AND TRADE-OFFS

Alternative actions are evaluated based upon how successfully they fulfill fundamental objectives. Alternatives were grouped into "status quo", "additional management of elk distribution" and "new management of disease in elk," with the latter two alternatives considered as actions that would be taken in addition to continuing the status quo elk management in areas with brucellosis. Also considered were "no elk management specific to brucellosis" (i.e., ceasing status quo efforts relative to brucellosis in elk) and "extreme management" (i.e., management actions with unknown potential to be effective but that are not politically, financially, or logistically viable). Overall, the alternative with consequences that best addressed the fundamental objectives was "additional management of elk distribution" (Figure 1). This "additional management of elk distribution" alternative is shaded in gray below. "Status quo" had moderate support on par with "new management of disease in elk"; "no elk management specific to brucellosis" and "extreme management" had little support (Figure 1). The group recognized that "new management of disease in elk" had elements to potentially bring into further consideration and application only after/if elements of "additional management of elk distribution" were exhausted. In terms of trade-offs, "additional management of elk distribution" performed strongly for all fundamental objectives except for minimizing costs to FWP, where performance was moderate. "Status quo" performed only moderately for minimizing disease transmission and maximizing acceptability to livestock producers, but performed well for other fundamental objectives. "New management of disease in elk" had the strongest performance for minimizing disease transmission and maximizing acceptability to livestock producers but weak performance for minimizing costs. "No elk management specific to brucellosis" performed poorly for minimizing disease transmission and maximizing acceptability to livestock producers, strongly for minimizing costs, and moderately for all other objectives. "Extreme management" performed moderately well for minimizing disease transmission and maximizing acceptability to livestock producers, but very poorly for all other objectives.

For any alternative, the working group recommends maintenance or development of local working groups to assist FWP with identification and implementation of specific management actions. Specific proposed management actions in the form of hunting season adjustments would likely be reviewed by the Commission during existing annual or biennial season setting efforts. Any Commission review of proposed habitat manipulations or experimental/research efforts specific to brucellosis may include additional MEPA analysis.

Table 1. Management alternatives considered by Elk Management Guidelines in Areas with Brucellosis Working Group, 2012.

No Elk Mgmt Specific to Brucellosis	***Status quo***	***Additional Management of Elk Distribution***	***New Management of Disease in Elk***	***Extreme Management***
• *Stop elk management activities related to brucellosis* • *Stop habitat management manipulations related to brucellosis (weed management, timber harvest, rest/rotation grazing, prescribed burn)*	• *Hunting* o *Manage to elk popn objective* o *Maintain current popn objectives* o *Continuation of current harvest opportunities* • *Habitat* o *Continue habitat management (weed management, timber harvest, rest/rotation grazing, prescribed burn)* o *Maintain Robb- Ledford as is* • *Containment* o *Continue hazing* o *Not controlling harboring* o *Maintain bison activities related to brucellosis* • *Research/education* o *Continue ongoing surveillance studies and hunter collection samples* o *Maintain working group* o *Maintain class B agent* o *Continue public relations* o *Continue ongoing projects in DSA*	• *Hunting* o *Reduce winter herd size/density* o *Develop adaptive hunting regulations* o *Develop late season hunts (beyond 15 Feb)* o *FWP use hunt coordinators for management hunts* o *Use season structure to address harboring* • *Habitat* o *Perform/suggest landscape alterations that will promote spatial and temporal separation of elk and livestock during critical brucellosis risk periods* o *Small, scattered manipulation (for example, high intensity/short duration livestock grazing of underused areas) of native vegetation on WMAs and public lands to attract/retain elk* o *Plantings* o *More rest/rotation grazing* o *Water development* • *Containment* o *In open elk winter range, reduce wolf/pack numbers* o *More intensive hazing of elk in high risk areas* o *Public funding for fencing cattle feeding areas* o *Decrease harboring* o *Elk-proof fencing for high-risk areas by locale* o *Purchase/lease more WMAs for purpose of spatial separation* o *Endorse development of collaborative incentives for harborers to allow access* • *Research/education* o *Increase monitoring of seropositive elk movements* o *Expand ongoing elk distribution research to DSA and contiguous areas* o *Educate harborers (neighbor, affected party, FWP/DOL contacts)* o *Delist B. abortus so vaccine can be researched* o *Expand ongoing seroprevalence research to DSA and contiguous areas*	• *Hunting* o *Lower population objectives for elk in areas of high risk* o *Reduce winter herd size/density* • *Habitat* o *Stop scavenger control* • *Containment* o *Test/slaughter by locale* o *Immunocontraception by locale* o *Increase testing of elk* o *Vaccinate seronegative wildlife* • *Research/education* o *Endorse research of more effective vaccine (prevention of disease) and delivery system for wildlife* o *Evaluate immunocontraception*	• *Depopulation of elk where risk of transmission from elk to cattle is high* • *Large-scale test/slaughter by state or tri-state region* • *Test/quarantine elk* • *Development of feed grounds* • *Large scale Elk-proof fencing for high-risk areas* • *Massive increase in research: distribution and movements of elk, disease dynamics/epidemiology* • *Department develop wildlife vaccine and remote delivery system* • *Explore satellite imagery to monitor wildlife movement* • *Investigate development of collaborative legislation that prohibits harboring* • *Investigate collaborative legislation that makes landowners accountable for disease consequences of harboring*

Table 2. Additional Elk Distribution Management Alternative ranked highest by Elk Management Guidelines in Areas with Brucellosis Working Group, 2012 (same as third column in Table 1 above).

Additional Elk Distribution Management Alternative

• *Hunting*
  ○ *Reduce winter herd size/density*
  ○ *Develop adaptive hunting regulations*
  ○ *Develop late season hunts (beyond 15 Feb)*
  ○ *FWP use hunt coordinators for management hunts*
  ○ *Use season structure to address harboring*
• *Habitat*
  ○ *Perform/suggest landscape alterations that will promote spatial and temporal separation of elk and livestock during critical brucellosis risk periods*
  ○ *Small, scattered manipulation (for example, high intensity/short duration livestock grazing of underused areas) of native vegetation on WMAs and public lands to attract/retain elk*
  ○ *Plantings*
  ○ *More rest/rotation grazing*
  ○ *Water development*
• *Containment*
  ○ *In open (primarily non-timbered) elk winter range, reduce wolf/pack numbers*
  ○ *More intensive hazing of elk in high risk areas*
  ○ *Public funding for fencing cattle feeding areas*
  ○ *Decrease harboring*
  ○ *Elk-proof fencing for high-risk areas by locale*
  ○ *Purchase/lease more WMAs for purpose of spatial separation*
  ○ *Endorse development of collaborative incentives for harborers to allow access*
• *Research/education*
  ○ *Increase monitoring of seropositive elk movements*
  ○ *Expand ongoing elk distribution research to DSA and contiguous areas*
  ○ *Educate harborers (neighbor, affected party, FWP/DOL contacts)*
  ○ *Delist B. abortus so vaccine can be researched*
  ○ *Expand ongoing seroprevalence research to DSA and contiguous areas*

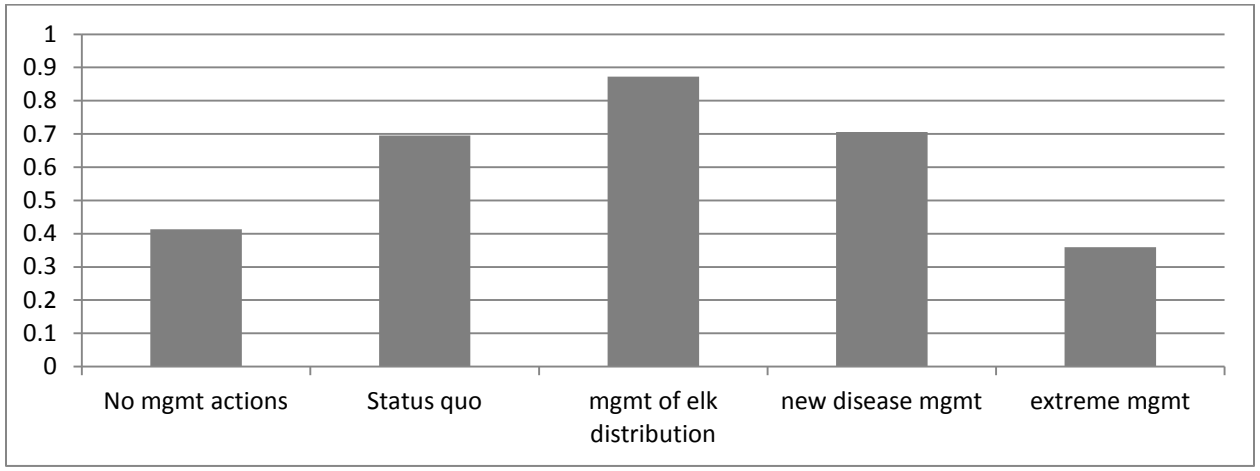

Figure 1. Decision support among alternatives (1= complete support, 0 = no support)

COMMON ELEMENTS FOR ALL ALTERNATIVES

- *Create or use existing (e.g., watershed groups, Madison Valley Group, etc.) local working groups for collaboration and implementation*
- *Develop information sheet/web site about brucellosis (how disease gets transferred; flow chart); update 2007 fact sheet*
- *Educate hunters/ranchers/landowners/general public about risk of brucellosis (risk to hunters and role hunters can play in limiting risk of transmission)—collaborative with DOL*
- *Research. monitor, or document the effects of implementing management actions on elk distribution, population sizes, or disease transmission*
- *Sportsmen to receive high priority for additional harvest*

DISCUSSION

Reflecting the diverse make-up of the working group that includes hunters, landowners and veterinarians, there was considerable discussion and debate throughout this process to include identification and selection of management alternatives. Initial options ranged from detailed specifics to general assignment of field staff to explore and identify site-specific actions. This complex circumstance was further fueled by uncertainties about the ability to accurately confirm brucellosis infections in elk and the magnitude of biological impacts to elk, an individual animal's potentially decreased ability to "shed" the bacteria as it ages, multiple jurisdictions across Idaho, Montana, Wyoming and Yellowstone National Park, identified

or theorized ecological connections across species (elk and bison) and within species in different locations (elk), and other "recent" variables that include changing landownership patterns, fire, weather and wolves.

The "no elk management specific to brucellosis" alternative reflects the perspective that brucellosis does not clearly, overtly or significantly impact elk at the population scale and so requires no management response. This does not accommodate the concern that landowner tolerance is critical for wildlife and associated public opportunities and that landowner tolerance can be negatively influenced by the presence of brucellosis infection risk to livestock.

In addition to being a specific alternative by itself, "status quo" also serves as a base layer to which all other alternatives except "no elk management specific to brucellosis" were individually added. "Status quo" does have some alignment with the position that brucellosis does not impact elk populations and addresses landowner concerns more than "no elk management specific to brucellosis". There is recognition that ongoing surveillance and hazing efforts have been positive additions to management as actions focused primarily on improved understanding of seroprevalence and seasonal elk movements and reduced commingling between livestock and elk. Status quo efforts have not included significant intentional efforts to specifically reduce seroprevalence in elk.

Ultimately "additional elk distribution management" had the strongest support relative to identified objectives. Based in part upon some working group members' long-time personal observations that now include concentrations of elk in places and times not previously seen, the group recognized distribution may be associated not only with increased elk-to-cattle transmission potential but also with increased elk-to-elk transmission (and increased seroprevalence) in elk. Adjustments to elk distribution may reduce the risk of commingling and breaking up large groups of elk can reduce elk-to-elk transmission opportunities and potentially brucellosis itself. Additionally, adjusted elk distribution could address game damage on private land and enhance public land hunting opportunities.

The "new management of disease in elk" alternative identifies several potential elk management actions that have no history of management application in Montana and are without confirmed effectiveness. While decreased elk population objectives and/or winter range densities have some history and realized success, immunocontraception (functional vaccination by preventing pregnancy and the associated births/abortions) and vaccination of seropositive elk with existing livestock vaccine represent significant logistical hurdles in free-ranging elk populations. Additionally, public support across all constituency groups was predicted to be limited. This said, the group recognized that localized application on small scales in experimental/research fashion may reveal some level of effectiveness at reducing seroprevalence. Consequently, the management actions within this alternative were not dismissed but rather are proposed for potential implementation only after/if "additional elk distribution management" efforts are exhausted and prove ineffective.

The "extreme management" alternative includes such actions as large-scale fencing, test and slaughter, and feed grounds and was predicted to suffer from very limited public support with no confirmed effectiveness and/or ability to perform or pay for implementation logistics. As such, the working group essentially dismissed this alternative.

"PARKING LOT"

The following items were identified at various points in the working group's efforts and may or may not be found in other specific parts of the working group's product. They are included here in their entirety to ensure a comprehensive presentation of the working group's effort. This list captures the advocacy for maintaining this specific working group in some capacity to monitor/assess implementation and effectiveness to include a meeting shortly after any final Commission adoption, and to require an annual report from FWP of relevant efforts and results.

Peer review of this process, decision, and recommendation (understandability, relevance)

Maximize utilization of hunter-collected samples through education

Public education (hunter Ed, press releases)

Update elk population objectives

Make known the economic impact of outfitting, hunting

Reassemble working group for triennial evaluation of implementation/success of group's recommendations, or at some other defined interval.

Annual report that summarizes implementation/progress.

Meeting of working group after Commission decision on group's recommendations.

Action items are not exhaustive, local working groups can be creative to meet local conditions; action items are in no particular order.

Summarize group's learning in a brochure/pamphlet/communications.

Ultimate presentation:

1) elk distribution top performer, in addition to status quo

2) prioritize elk distribution first, then new disease management

3) combined elk distribution and disease management is possible, particularly elk distribution management in combination with non-controversial items under new disease management

Literature Cited

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