

Acceptability of Brucellosis Management Tools for Elk Among Montana Stakeholder Groups



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Brucellosis and Elk

Elk populations in southwest Montana near Yellowstone National Park (YNP) are infected with brucellosis, a bacterial disease introduced to these elk and bison (*Bison bison*) populations in the 1930s via European livestock. Acceptability among different stakeholder groups for elk (*Cervus canadensis*) management actions designed to reduce the risk of elk-livestock brucellosis transmission is not fully understood. Brucellosis is transmitted from elk to cattle through exposure to reproductive and birth tissues; the disease can cause cattle to abort their calves. Treatment of the disease in cattle populations has been largely successful, but eradication in wildlife populations has proven elusive. The area of highest concern for brucellosis in Montana is known as the Designated Surveillance Area (DSA; Figure 1) encompassing several elk management units north and west of YNP.

Stakeholder Input & Survey Overview

To develop elk and brucellosis management tools acceptable to a broad range of stakeholders, Montana Fish, Wildlife, and Parks (FWP) convened a statewide **Elk Management Guidelines in Areas with Brucellosis Working Group**. Deliberations of the working group produced several suggested management actions within the DSA and in more targeted geographic locations (i.e., specific valleys within the DSA). These actions included: limited fencing to prevent comingling of cattle and elk, hazing elk off private property, kill permits issued to landowners, disease management hunts (e.g., public hunting outside normal seasons), and others.

Input from hunters, landowners, cattle producers, and wildlife enthusiasts regarding the acceptability of these actions is essential to successful implementation of the working group recommendations. In addition, FWP seeks to understand the values, attitudes, and perspectives held by members of these constituent groups unable to participate in the working group or the subsequent public decision processes; both those who live within the DSA and more generally across Montana.

To this end, FWP and the University of Montana (UM) conducted a survey of stakeholders. The survey was developed during the summer of 2014 from working group input, previous scientific literature, and management tools proposed to the FWP Commission for adoption. The survey was finalized and administered in late summer and early fall of 2014. Response rate was 44% — a telephone non-response bias check was conducted after the survey and found no significant differences across key variables.

Ideally, brucellosis risk management tools will be acceptable to four specific

groups of stakeholders: hunters, landowners, cattle producers, and wildlife enthusiasts. The survey was stratified to sample each of these groups both inside and outside the DSA. Hunters ($n = 591$) were respondents who reported frequently hunting elk over the past 5 years. Landowners ($n = 316$) were respondents who owned at least 40 acres in Mont., but did not produce cattle. Cattle producers ($n = 281$) were landowners who indicated an active cattle operation on their property. Wildlife enthusiasts ($n = 274$) were respondents who reported frequently participating in a variety of wildlife viewing activities, but were not landowners, cattle producers, or hunters.



Figure 1: Designated Surveillance Area for brucellosis in Montana

Scenarios

Throughout the elk and brucellosis discussions it has been clear that acceptability of management tools often depends on the context. To tease apart some of these contextual variables, we developed six scenarios and asked stakeholders to rate the acceptability of several tools given each different context (Figure 2). All scenarios took place on a hypothetical ranch in an area where elk were known to have brucellosis. In some scenarios, the hypothetical ranch owner allowed public access for hunting – in other scenarios, public access was prohibited. In some scenarios, the elk population in the area was above the FWP management objective while in other scenarios, the elk population was below objective. Finally, in two scenarios, cattle on the ranch had been infected with brucellosis. These scenarios allowed us to understand how acceptability of various tools changed for some stakeholders in different situations.

Acceptability of Management Tools

Acceptability of different management tools was measured on a 7-point scale where 1 was “highly unacceptable” and 7 was “highly acceptable.” Acceptability varied across scenarios and among stakeholder groups. (Figure 3) The option to “take no action” was unacceptable for most people in most scenarios, although cattle producers were significantly more likely than other stakeholders to rate this option unacceptable across all scenarios. There was general agreement that monitoring the situation was an acceptable action, although cattle producers again were the most likely to rate this as unacceptable.

Figure 2: Scenarios

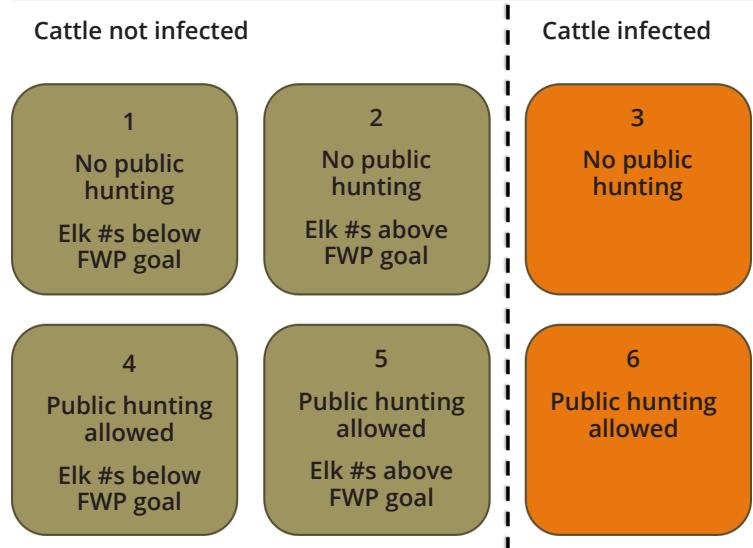
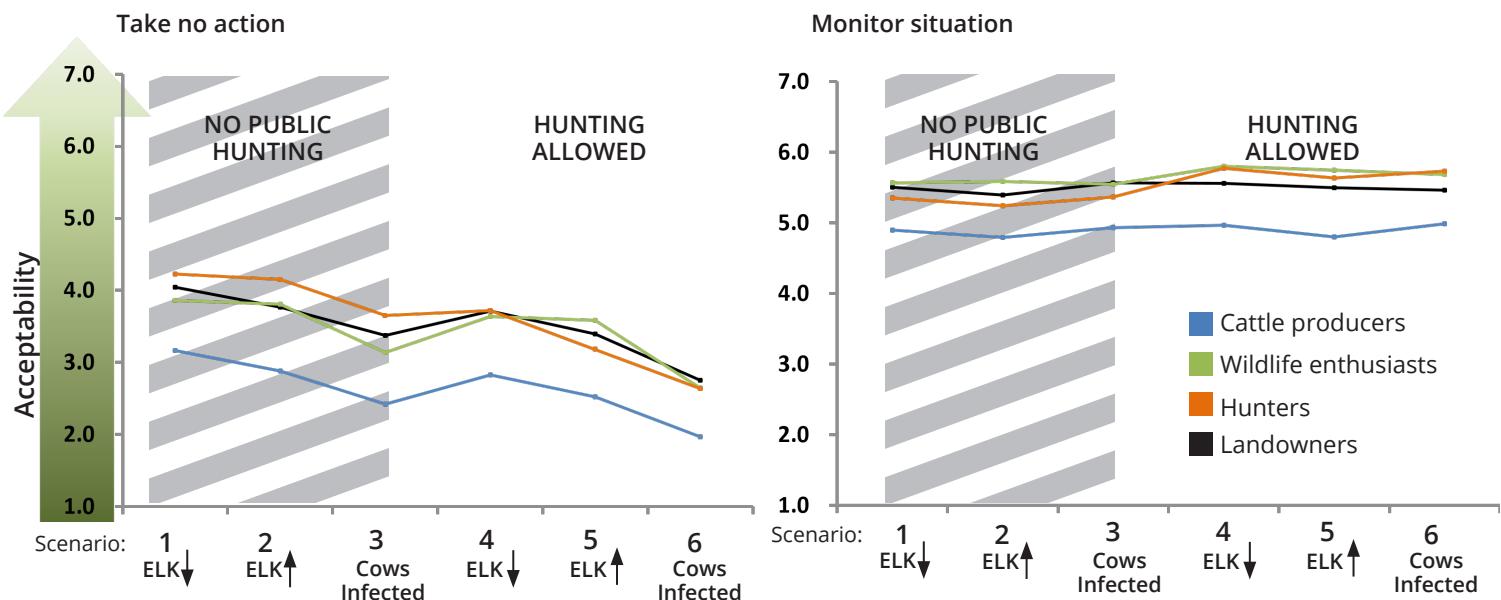


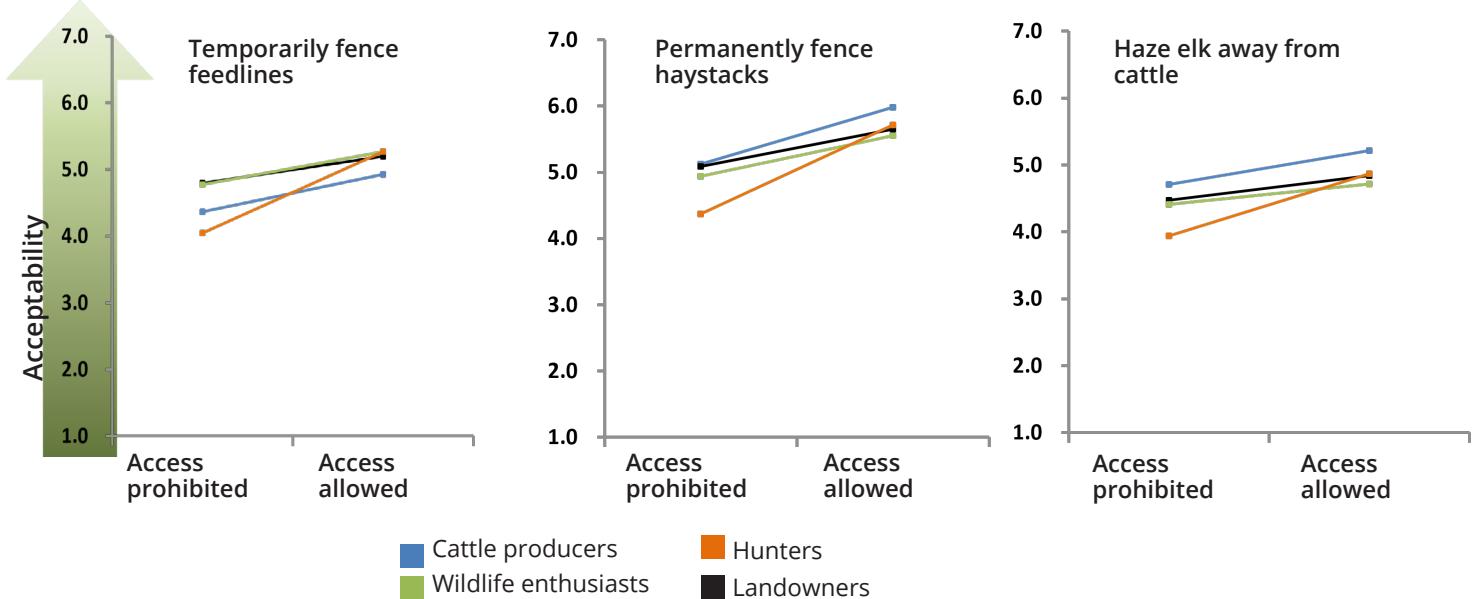
Figure 3: Acceptability of Management Tools



Impact of Hunting Access

Across stakeholder groups, people found brucellosis management tools substantially more acceptable when public access for hunting was provided. (Figure 4) This was true for most proposed management tools, including: permanently fencing haystacks and temporarily fencing feed lines or pastures to prevent elk from co-mingling with cattle; allowing a limited number of hunters to harvest some elk to move elk away from cattle (during the traditional late hunting period of Jan. 15 to Feb. 15 and after Feb. 15, during the brucellosis risk period); hazing elk; and providing a small number of kill permits to the ranch owner to harvest and move some elk away from cattle (again, during the traditional late hunting period of Jan. 15 to Feb. 15 and after Feb. 15, during the brucellosis risk period).

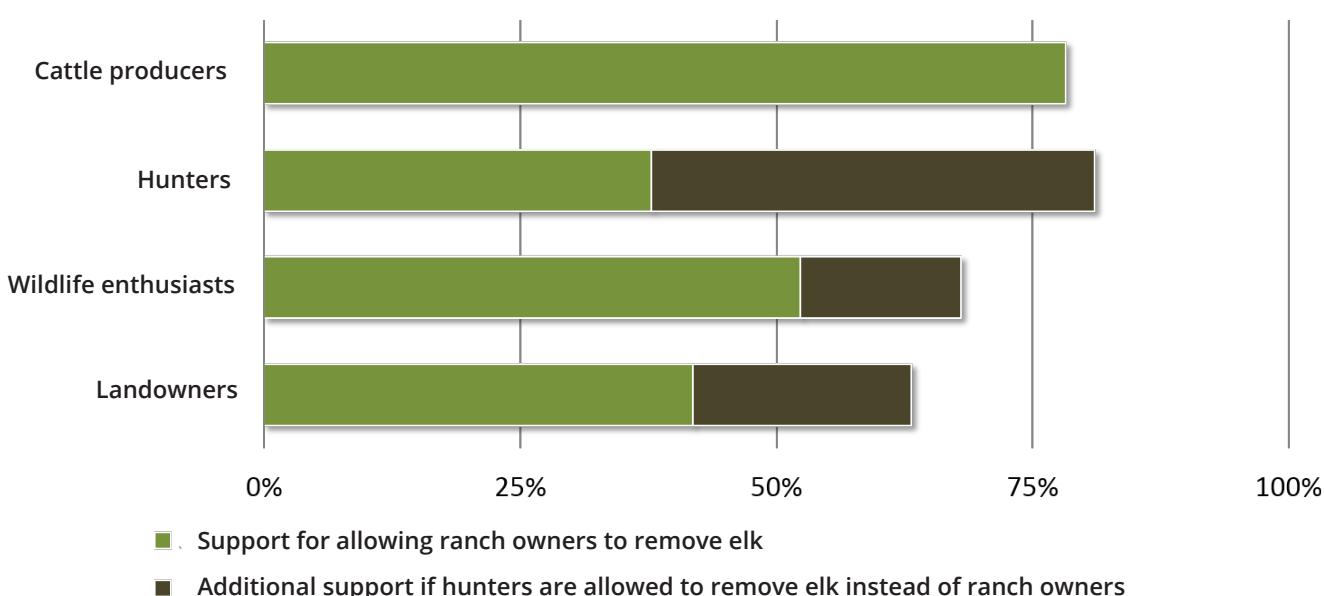
Figure 4: Impact of Hunting Access



Who should pull the trigger?

Stakeholder opinion about the lethal removal was influenced by who harvested elk. (Figure 5) For hunters and wildlife enthusiasts, allowing hunters to harvest elk was significantly more acceptable than providing kill permits to ranch owners. This was true across all scenarios and regardless of season. In most scenarios, landowners also found it significantly more acceptable for hunters to harvest elk than for ranch owners to be provided kill permits. This effect was more pronounced in the later season (Feb. 15 to June 15). Only cattle producers saw little difference between hunters harvesting elk and ranch owners harvesting elk.

Figure 5: Hunter or Landowner Harvest



Does Timing (Season) Matter?

Most respondents believed that lethal removal of elk was acceptable; only 18% of all stakeholders agreed or strongly agreed that elk should never be killed to protect cattle from brucellosis. (Figure 6) However, the season during which elk are killed mattered to many stakeholders. For example, about a third of all stakeholders agreed or strongly agreed that it is never ok to hunt elk after bulls have dropped their antlers. Similarly, over half of all stakeholders agreed or strongly agreed that it is never ok to hunt cow elk in the late winter or spring during the late stages of pregnancy.

Still, we found little change in acceptability of the lethal management tools when comparing the traditional late hunting season (Jan. 15 to Feb. 15) to the remainder

of the brucellosis risk period (Feb. 15 to June. 15). The two lethal tools proposed were (1) provide a small number of kill permits to the ranch owner to harvest and move some elk away from cattle, and (2) allow a limited number of hunters to harvest some elk to move elk away from cattle. Acceptability was not significantly related to seasonal timing. (Figure 7) This may indicate that the public who are against killing elk remained opposed to lethal tools regardless of season, and the public who are supportive of lethal removal remain so regardless of season. The slight decline in acceptability of lethal tools after Feb. 15 indicates that a minority of stakeholders are supportive of lethal means from Jan. 15 – Feb. 15 and then opposed after Feb. 15.

Figure 6: Timing of Management Action

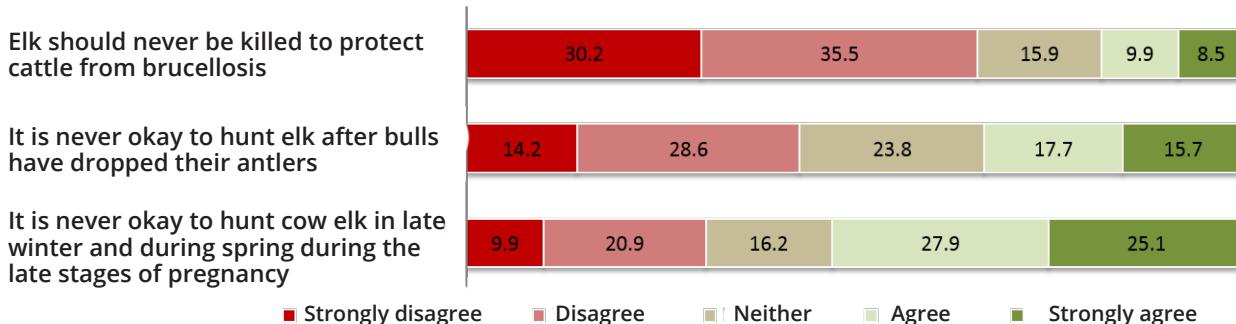
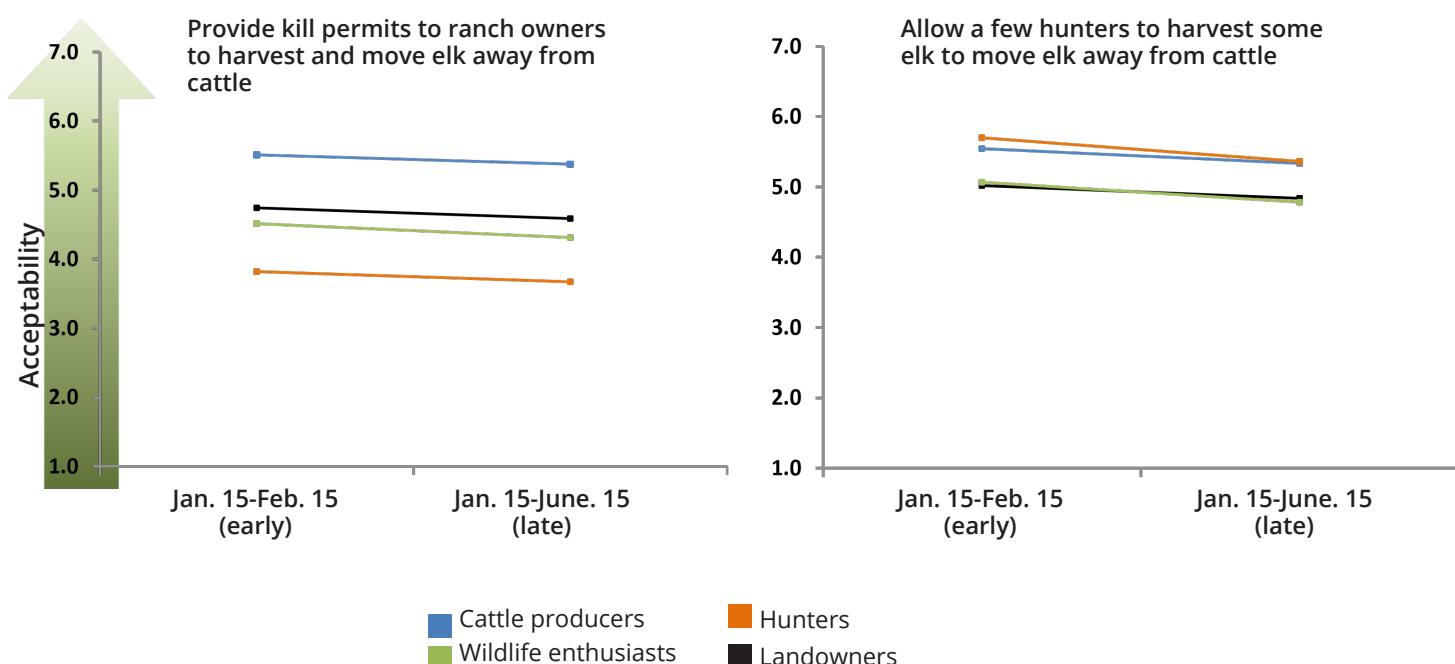


Figure 7: Timing of Management Action Related to Season



Population Objective

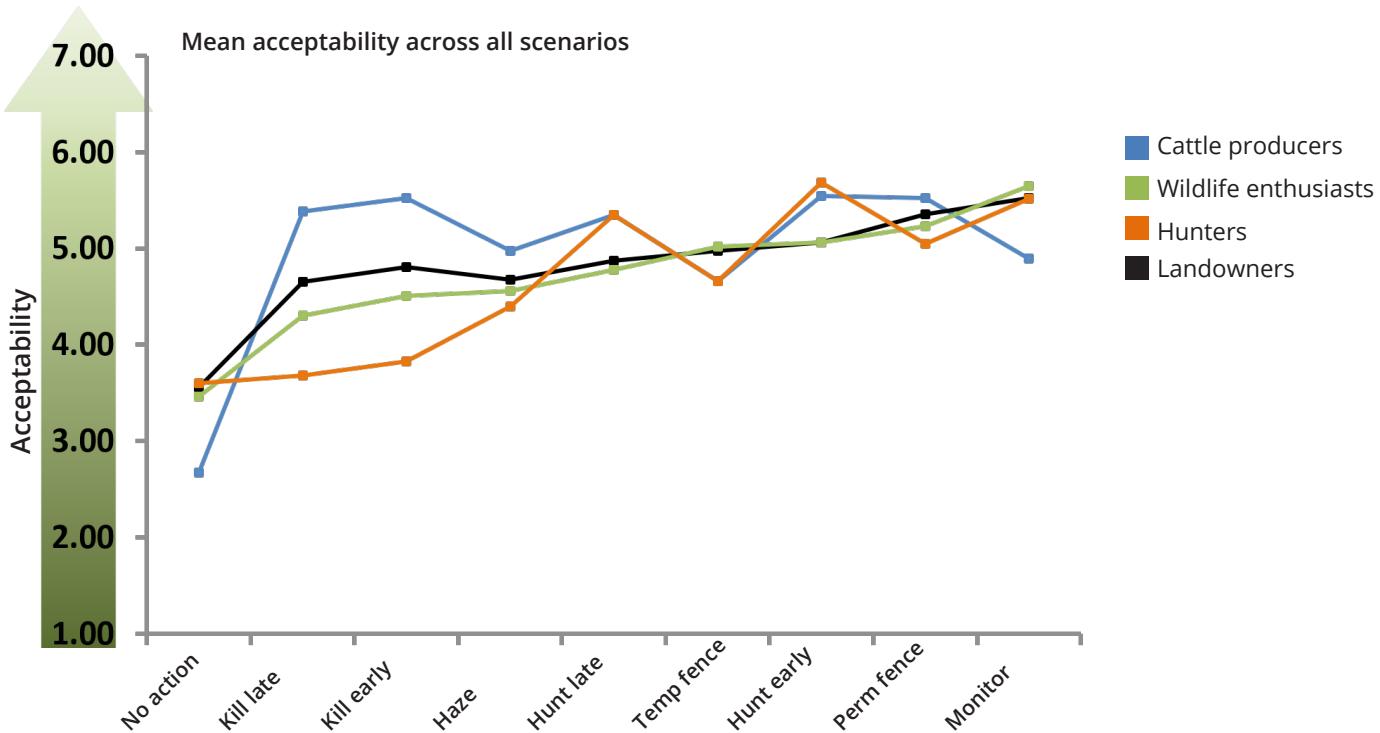
The size of the elk population affected acceptability only when public access for hunting was allowed. In scenarios where public access for hunting was prohibited, elk population status (i.e., above or below objective) had no significant effect on acceptability of management tools. Only in scenarios where public access for hunting was allowed did population status matter to stakeholders. When public access for hunting was allowed, acceptability was significantly higher for all stakeholder groups when elk populations were above objective than when elk populations were below objective. This was true for many tools included: providing kill permits (after Feb. 15) and for allowing hunters to harvest elk (during the traditional game damage season of Jan. 15 – Feb. 15, and after Feb. 15). Overall, population size relative to management objective had much less effect on acceptability than public access for hunting.

Similarities across groups

Generally, all stakeholders agreed that taking no action was unacceptable (Figure 8). Early season (Jan. 15 – Feb. 15) remedies were favored over late season tools (after Feb. 15). Hunting was much preferred over kill permits, except for cattle producers and some landowners. Permanent fencing of haystacks was preferred over temporary fencing of feedlines. Monitoring was seen as one of the most worthwhile actions by all except cattle producers.

Hunters and cattle producers disagreed in many places, however, both groups found hunting-based solutions acceptable. Acceptability is likely to be highest when public access for hunting is provided, elk populations are above objectives, hunting is used for lethal removal (instead of ranch owner kill permits), fencing dollars are spent on permanent solutions like haystacks (instead of temporary fencing of feedlines), and investments are made in monitoring. Conflict is more likely when kill permits are issued (especially after Feb. 15), hazing is conducted, or nothing is done to address the problem.

Figure 8: How Stakeholders Agree

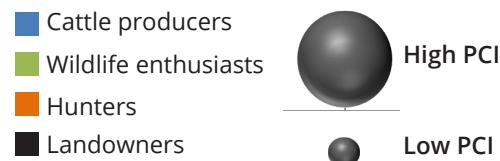
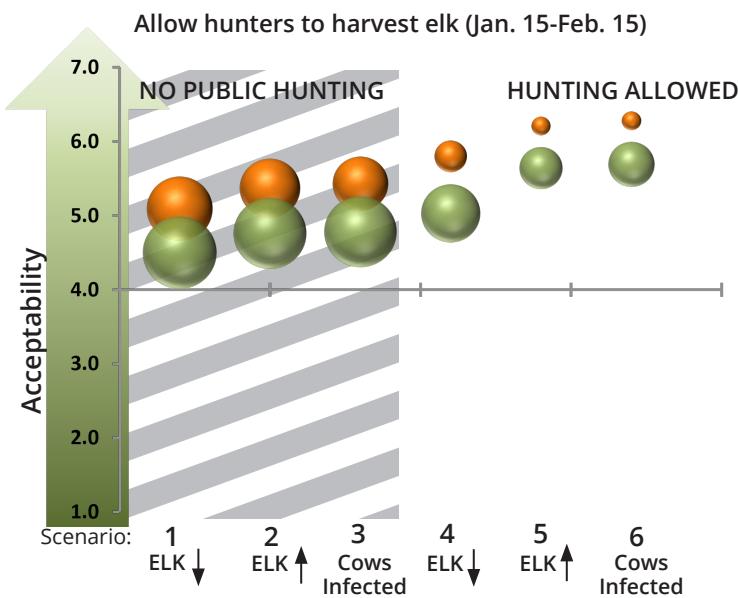


Differences within groups

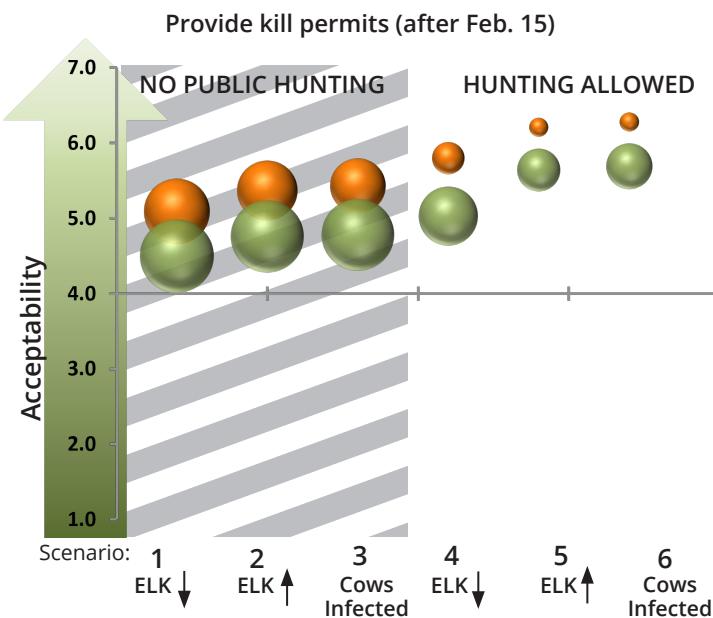
Not everyone within each stakeholder group was always in agreement. We used a tool called the Potential for Conflict Index (PCI) to analyze levels of agreement within each stakeholder group. In the graphs below, the vertical location of the bubble shows the average acceptability within a stakeholder group (the higher the bubble, the more acceptable the action); the size of the

bubble represents the amount of disagreement within the stakeholder group (the larger the bubble, the more disagreement within the stakeholder group). PCI values can range from 0.0 (total agreement) to 1.0 (complete disagreement). Even when mean acceptability was high, PCI values often showed substantial disagreement.

Figure 10: How Stakeholders Disagree



In some scenarios, acceptability of tools was high and conflict was low. For example, allowing hunters to harvest some elk from Jan. 15 to Feb. 15 was at its highest acceptability and potential for conflict was at its lowest when public access for hunting was provided and elk populations were above objective.



PCI also revealed that public access for hunting can reduce conflict among cattle producers. For example, cattle producers found it acceptable for FWP to fund permanent fencing for haystacks; however there was significantly less conflict among cattle producers when public access was provided.

