Fall Creek Elk Herd Unit (E103)
Brucellosis Management Action Plan
Final Draft- 5 June 2006

A. Introduction

The Fall Creek Elk Herd Unit (EHU) includes Elk Hunt Areas 84 and 85 and encompasses 686 square miles (mi^2) in Teton, Sublette, and Lincoln Counties. Land ownership is distributed between U.S. Forest Service (USFS [91%]), private (6%), Bureau of Land Management (BLM [3%]), and Wyoming Game and Fish Department (WGFD [1%]) (Figure 1).

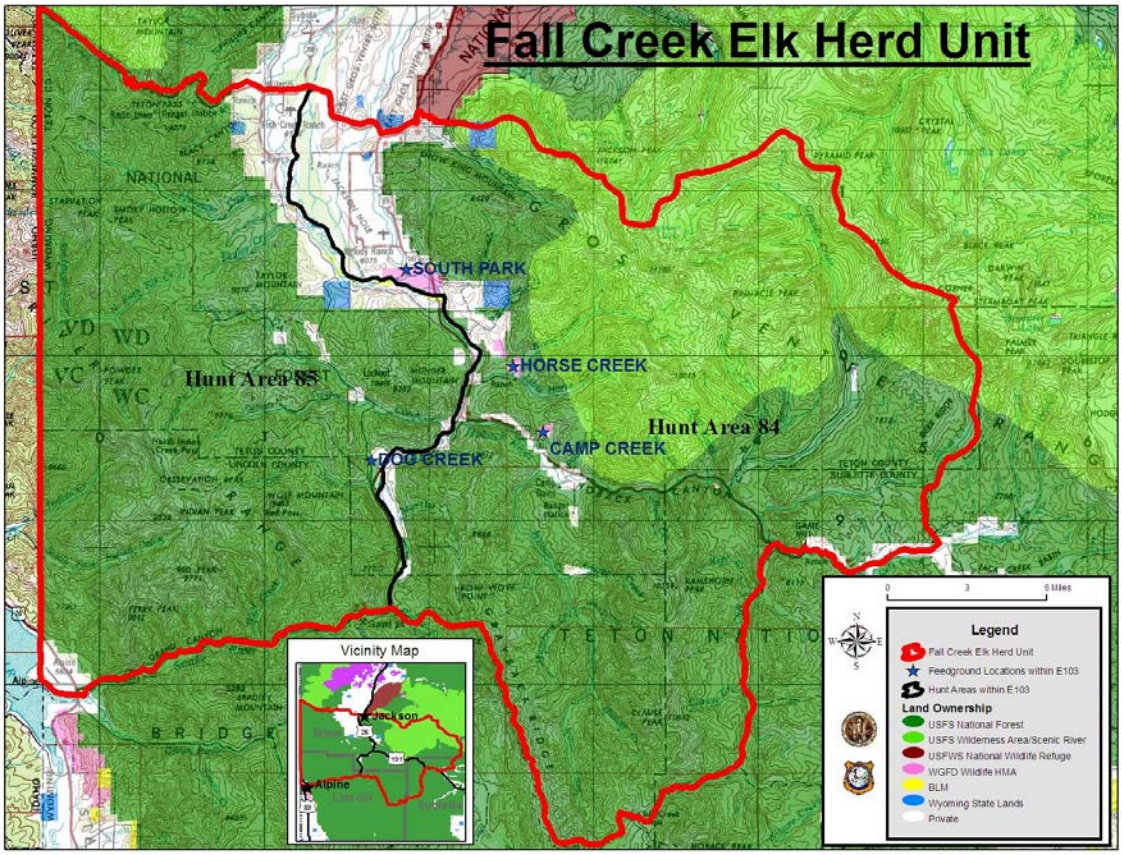


Figure 1. Land ownership, feedground locations, and Hunt Areas within the Fall Creek EHU.

Approximately 582 mi^2, or 85% of total occupied elk habitat is designated spring, summer, and fall range. Included in this is approximately 68 mi^2 considered parturition range. There are 61 mi^2 (9%) designated crucial winter range, and 41 mi^2 (6%) are considered winter yearlong range (Figure 2).

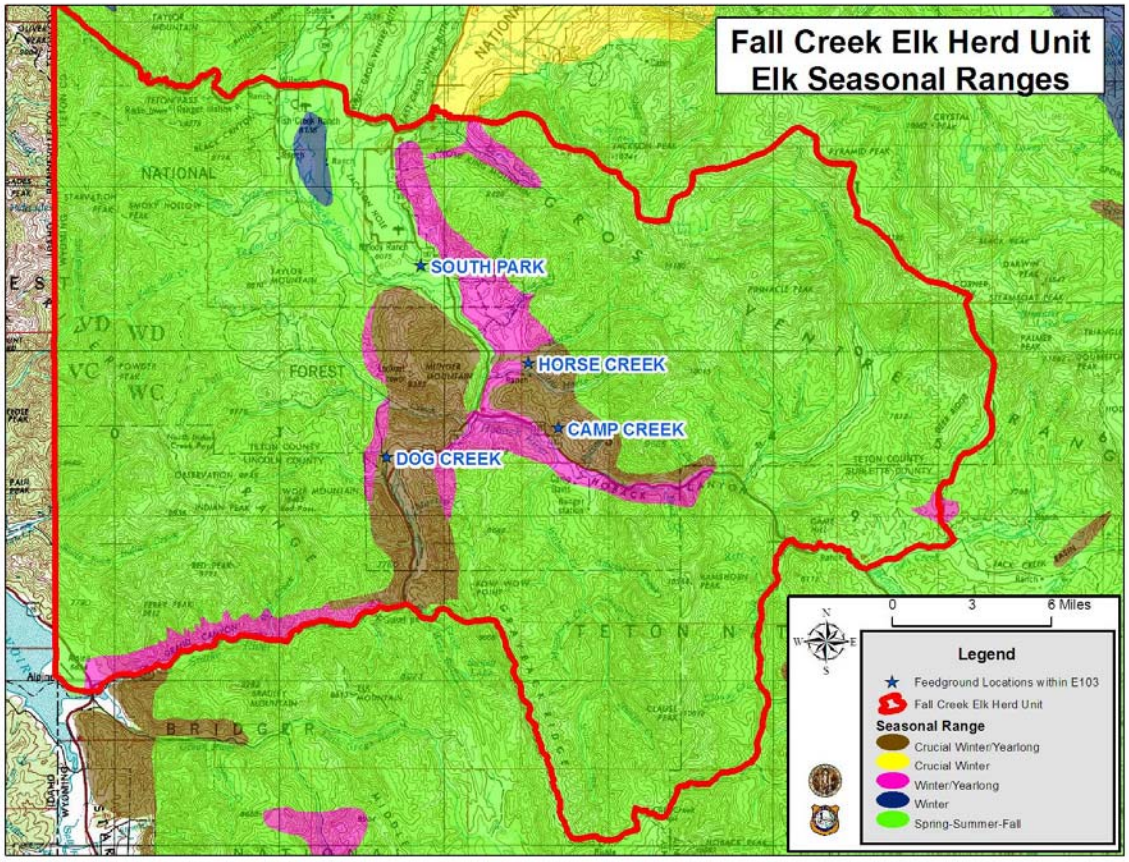


Figure 2. Feedground locations and current seasonal elk ranges within the Fall Creek EHU.

The primary land uses in the Fall Creek EHU include livestock grazing, timber harvest, and recreation (camping, horseback riding, hunting, and fishing). Access to hunting areas is primarily limited to hiking and horseback. The number of roads is limited and much of the area is designated as roadless, wilderness, or wilderness study area. Apart from the highways in the Snake River and Hoback canyons, Cliff Creek, Granite Creek, and the Munger Mountain-Mosquito Creek area are the only areas accessible by roads. The USFS Bridger-Teton National Forest (BTNF) land east of the Snake River from Snow King Mountain south to Poison Creek is closed to all human presence from December 1 - April 30. Also, the southern end of Munger Mountain (west of Hoback Junction to the Dog Creek feedground) and the WGFD Wildlife Habitat Management Areas (WHMA) are closed to all human presence from December 1 - April 30 (Figure 3). Four feedgrounds are located within the Fall Creek EHU: South Park, Dog Creek, Camp Creek, and Horse Creek. These feedgrounds were established primarily to reduce depredation to privately-owned stored hay, minimize risk of interspecific co-mingling of elk and livestock, and reduce winter mortality.

This Brucellosis Management Action Plan (BMAP) was prepared to develop strategies for dealing with brucellosis issues in the Fall Creek EHU. Appendix 1 includes data and information relevant to understanding, formulating, and implementing the plan.

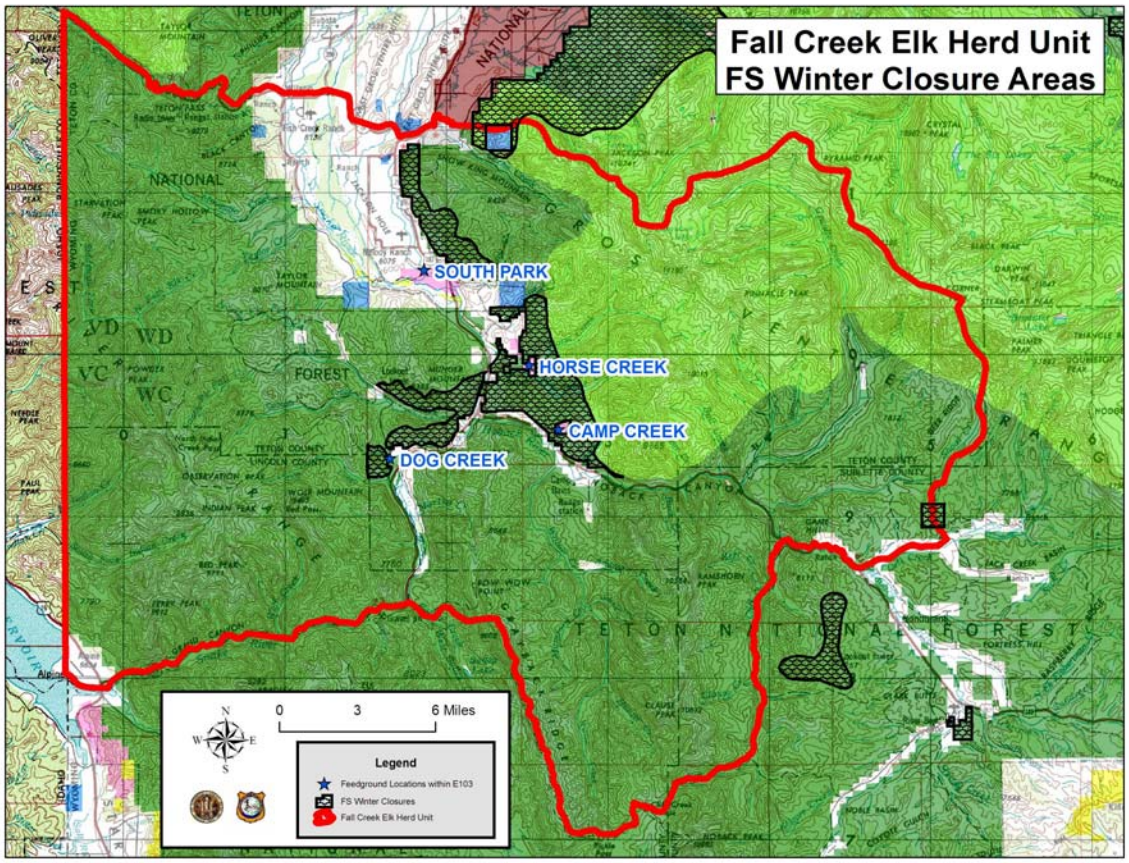


Figure 3. Bridger-Teton National Forest winter closure areas within the Fall Creek EHU.

B. Brucellosis Management Options

The WGFD currently employs several methods to minimize intraspecific transmission of brucellosis among elk. Elk feeders are encouraged to feed hay on clean snow when possible to reduce inadvertent ingestion of contaminated feed and exudates. Elk are ballistically vaccinated with Strain 19 on 21 of 22 state feedgrounds, including all four within this EHU, and currently on the National Elk Refuge (NER) to reduce abortion events. Attempts have been made to reduce the duration of the feeding season on each feedground. However, damage and elk/livestock co-mingling concerns typically determine the duration of feeding on many feedgrounds.

Damage and livestock-elk co-mingling concerns contribute to increased risk of intraspecific disease transmission among elk. In most circumstances, elk are not tolerated consuming private crops and co-mingling with cattle. Strategies to hold elk on artificial feed longer and hazing elk to feedgrounds are often employed to minimize these conflicts. These practices increase the chance an aborted fetus contaminated with *Brucella* will be contacted by elk wintering on feedgrounds, thus increasing exposure rates among elk.

Feedground management should continue to include the aforementioned methods currently utilized to minimize disease transmission. However, given current brucellosis seroprevalence rates for elk on feedgrounds and the recent brucellosis occurrences in cattle, these methods alone may not be sufficient to reduce incidence of the disease in elk to acceptable levels and prevent future interspecific transmissions. Alternative management options should be evaluated.

The intent of this document is to summarize existing data associated with elk and brucellosis management in the Fall Creek EHU, incorporate feedback from land management agencies and livestock producers, and develop a list of management actions that could reduce brucellosis prevalence in elk and the risk of interspecific transmission from elk to cattle; and indicate how each management option will be applied in the Fall Creek EHU. This plan is adaptive, and periodic revisions will occur to address new disease management tools or technologies and to update information.

To reduce prevalence of brucellosis in elk on feedgrounds, given current technologies and efficacy of vaccines, feeding durations would have to be decreased or ceased, if possible, during periods of high transmission risk. Reduced feeding durations would increase co-mingling if implemented abruptly, but substantial reductions in elk numbers through hunting prior to initiating the option could reduce these situations. Each feedground is unique and was established to address a site-specific management problem. Thus, each feedground will potentially require a different approach if reducing the duration of feeding and/or eliminating feeding are to be pursued as viable options. Some feedgrounds may have no alternative options to supplemental feeding and/or no option to reduce the feeding duration given current herd objectives and other conditions. To reduce the risk of interspecific transmission, cattle and elk need to be separated both temporally and spatially during the risk period. Livestock producers may have the potential to alter management to maintain this separation. As with feedgrounds, each producer and their operation are unique and what may work on one ranch may not work on another.

Listed below are potential options for managing brucellosis on the four feedgrounds in the Fall Creek EHU. A discussion of each follows, respectively. Short-term objectives of these options are to reduce co-mingling of elk and cattle and the prevalence of brucellosis in elk. Long-term objectives include eliminating the reservoir of brucellosis in wildlife in the Greater Yellowstone Area (GYA) if determined to be technically feasible, maintain livestock producer viability, reduce/eliminate dependence of elk on supplemental feed, maintain established elk herd unit objectives, improve range health, and maximize benefits to all wildlife. The Wyoming Game and Fish Commission (WGFC) will require support from various constituencies (agriculture, land management agencies, sportspersons, etc.) prior to pursuing these options, and several options will require decisions from entities other than the WGFC.

1. Relocating feedgrounds to lower elevation sites with increased geographic area for elk to disperse and increased distance from winter cattle operations.
2. Elimination of feedgrounds.
3. Reducing numbers of elk on the feedgrounds through increased harvest.
4. Reducing numbers of susceptible cattle and stored crops in areas around feedgrounds during winter, or implementing changes in cattle operations by providing incentives to producers.

5. Elk-proof fencing of feedgrounds or private lands to prevent elk from drifting onto private land and reduce commingling.
6. Elimination of seropositive elk on feedgrounds through test and removal program.
7. Extensive habitat enhancement projects in suitable winter range areas near feedgrounds where the potential of commingling with livestock is minimal.
8. Acquisition of native winter range through fee-title purchase, conservation easements, or other methods.
9. Strain 19 elk vaccination.

C. Discussion of Options

1. Feedground Relocation

Feedground relocation options are very limited in the Fall Creek EHU. The feedgrounds in this herd unit are located on or near existing native winter ranges. Migration opportunities out of the area are minimal to non-existent. There is not an available site where interspecific disease transmission possibilities could be improved by moving a feedground.

Opportunities for reducing intraspecific disease transmission exist. Moving the feeding site at Dog Creek from the Pritchard Pond area to the Dog Creek Ranch property offers a much larger feeding site, which reduces the density of elk while on feed lines. Elk at the Horse Creek site have occasionally been fed on the bench north of the feedground. This alternative site is part of the WGFC-owned WHMA; thus this would only be a slight relocation. Feeding here would reduce the density of elk while on feedlines, but would also move the elk to a location where damage might be more likely to occur, depending on the presence of neighboring livestock. There is vacant space (private property) across the highway from the Camp Creek feedground on Bryan Flats. If elk were fed here, it would reduce the number of elk at the Horse Creek and Camp Creek feedgrounds.

Pros:

- may contribute to lower brucellosis prevalence
- elk would have increased area to disperse
- elk could be fed on larger areas and in more sanitary conditions
- elk numbers could be maintained at or near current levels
- fewer elk on or near the highway (Bryan Flats)
- move the elk away from the USFS residences, Pritchard Pond, and the Fall Creek road (Gill property)

Cons

- brucellosis prevalence may persist
- damage problems may increase (Horse Creek bench)
- might require funds for erection of new structures, fences, roads, etc.
- difficulty would be experienced during initial habituation of elk to the new site
- localized damage to vegetation

2. Feedground Elimination

This option, given current conditions and herd objectives, is probably unfeasible for feedgrounds in the Fall Creek EHU. However, if current conditions and herd objectives change, through implementation of one or more of options 3, 4, 6, 7, and 8, this option may become more realistic. The WGFC has the authority to make this decision.

Pros:

- would reduce the risk of intraspecific transmission of brucellosis and other density-dependent diseases
- would facilitate efforts to eliminate brucellosis in elk in the Fall Creek EHU
- would reduce feedground and vaccination expenses to the WGFD

Cons

- would increase the risk of property damage and interspecific transmission of brucellosis to livestock if implemented abruptly with current numbers of elk and /or prior to elimination of brucellosis in elk
- would increase elk winter mortality
- would lower the number of elk that could be maintained in the Fall Creek EHU
- would reduce income to the WGFD due to reduced license sales
- would reduce hunter opportunity
- may increase potential for vehicle-elk collisions

3. Elk Reduction

Reducing elk numbers on all feedgrounds in the Fall Creek EHU through liberalized hunting seasons could allow more flexibility to pursue options 2 and 6, and could lead to more favorable conditions for options 7 and 8. The WGFC has the authority to make this decision.

Pros:

- may contribute to lower brucellosis prevalence
- would increase hunting opportunities in the short term
- would increase license revenues in the short term
- would decrease elk densities on feedgrounds
- potentially reduce conflicts on private lands
- would reduce costs of supplemental feeding and vaccination

Cons:

- the response of seroprevalence of brucellosis in elk when populations are reduced is unknown, yet it is unlikely to reduce incidence to an acceptable level assuming the remaining elk are still fed.
- damage to private crops may still continue as hunter harvest is random and does not select for “problem” elk
- the general public may be unwilling to accept large reductions in elk numbers
- success might be limited to hunter efficiency
- would result in loss of hunting opportunities in the long term
- would reduce license revenue in the long term (might be offset by reduced management costs)

The pros and cons of reducing the number of elk that reside yearlong in the Snake River bottom and on the private property near the South Park feedground differ greatly from those presented above for feedgrounds in the Fall Creek EHU. These elk offer virtually no hunting opportunities; yet contribute to disease and damage problems, plus increased management costs. The elimination/reduction of this segment of the Fall Creek elk herd would be desirable in most aspects.

4. Cattle Producer Change of Operation

This is an option high-risk and other producers in the Fall Creek EHU could implement to minimize/eliminate brucellosis risks to their herd. Brucellosis transmission potential within cattle and testing requirements associated with cow/calf operations would be eliminated if all cattle operations were yearlings, spayed heifers, and/or steers. Conversion to yearlings would also eliminate the need of storing most hay crops and winter feeding, reducing winter elk conflicts. The opportunity for disease transmission is also greatly reduced if cattle and elk do not co-mingle between February and 15 June. Implementing facets of this option would require changes by the producer and possibly a favorable decision by the USFS to alter grazing permits.

Evaluation and implementation of the alternatives in this option are totally under the jurisdiction of individual livestock operators, Wyoming Livestock Board (WLB), Wyoming State Veterinarian (WSV), and Animal and Plant Health Inspection Service (APHIS). Discussion and recommendations pertaining to this option should be contained in Individual Ranch Herd Plans for each livestock operation.

5. Fencing

Elk-proof fencing of feedgrounds may contain most elk within a given area, and fencing of winter cattle feedlines could prevent elk from co-mingling with cattle. This would require favorable decisions by the landowner (private and/or state/federal).

Pros:

- may reduce damage problems and complaints
- may reduce risk of elk-cattle brucellosis transmission
- may be successful in fencing off stored hay and small-scale issues

Cons:

- costs may be prohibitive
- congregating all or most of the elk within the fence may be unfeasible
- long lengths of fencing could impede movements of other wildlife
- does not address seroprevalence of brucellosis in elk
- some producers may be unwilling to erect fences
- may require federal agency cooperation and potential National Environmental Policy Act (NEPA) compliance

Opportunities for fencing are limited in the Fall Creek EHU and the only possibilities exist at South Park. About one mile of fence separates the South Park feedground and the private property north of the feedground. Two situations allow co-mingling: 1) elk can leave the feedground and walk around the ends of the fence, 2)

migrating elk can approach from the north side of the fence and then cannot readily access the feedground.

6. Elk Test and Removal

This may be a future option, but will not be considered until results of the Pinedale EHU test and removal pilot project have been evaluated. This option could eliminate a percentage of the seropositive animals on a feedground. The number of aborted fetuses and associated fetal fluids contaminated with *Brucella* bacteria may be decreased. The WGFC has the authority to make this decision.

Pros:

- may reduce brucellosis prevalence in elk
- may reduce elk numbers to more efficiently pursue options 2,6,7, and 8.
- may increase the tolerance of elk on private lands if brucellosis prevalence is decreased
- would allow hand vaccination of all animals caught and worked in the trap

Cons:

- would require the erection of large traps on feedgrounds capable of working many animals with large holding pens, entailing substantial fiscal and personnel resources
- must be implemented on all feedgrounds for numerous years to minimize possibility of future increases in brucellosis prevalence.
- the general public may not support such an operation due to decreased elk numbers
- does not address other potential diseases on feedgrounds
- not all seropositive animals may be infected

The rates of both intra- and interspecific brucellosis transmission may decrease on all feedgrounds within the Fall Creek EHU given implementation of this option.

7. Habitat Enhancement

These projects may reduce the time elk spend on feedgrounds. Decision authority is with the USFS for most areas. Affected permittee consultation and cooperation is also necessary. USFS personnel have indicated there may be opportunities for aspen/sagebrush treatments throughout the Fall Creek EHU. Habitat enhancement options may continue to arise, and WGFD will continue close involvement with USFS to pursue habitat enhancement options. In addition to habitat on USFS lands, WGFD could explore options to increase palatability of forage on feedgrounds owned by WGFC in the Fall Creek EHU. Increased forage quality in the fall may entice elk onto the feedgrounds and away from damage situations, without an earlier initiation of feeding. This option may be best used in conjunction with options 2,3, and 8 to achieve maximum success.

Pros:

- could reduce feeding duration and brucellosis prevalence
- would benefit many species of wildlife and, in some instances, cattle

Cons:

- may have limited effectiveness in reducing dependency on supplemental feed in years of average or greater snow accumulations that make forage unavailable.
- elk may not be tolerated on treatment areas when in close proximity to livestock
- requires changes in post-treatment wildlife and livestock management within the treatment area to ensure treatment effectiveness
- might increase likelihood of invasive species establishment
- would require approval of federal agencies for federal land, private landowners for private land, and the State Land Board for state land projects

8. Acquisition/Conservation Easements

This option secures habitat for a myriad of wildlife species. With adequate intact, healthy, and accessible elk winter habitat available, elk feeding may be reduced in the Fall Creek EHU. The buying or long-term leasing of land to be managed commensurate with wildlife benefits is an option that can be used to maintain stability and health of all wildlife populations. Decision authority is with the private landowner.

Pros:

- secures habitat for all wildlife
- long-term solution
- helps secure future revenues for the WGFD
- may facilitate options 2 and 7
- could reduce brucellosis prevalence in elk
- agreeable among landowners and agencies

Cons:

- expensive
- limited availability of lands with high potential for wintering elk or connecting to existing or potential elk winter ranges
- requires landowner willingness

Disease transmission risk on most feedgrounds in the Fall Creek EHU may be decreased by managing lands adjacent to, or connected with, areas used by wintering elk.

9. Continuation of Strain 19 Elk Vaccination Program

The WGFD initiated this program in 1985 on Greys River feedground, and has vaccinated around 66,000 elk to date on 22 state operated feedgrounds and the NER. Elk cows and calves are vaccinated the first two years, then calves only thereafter assuming adequate coverage is maintained. Dell Creek feedground serves as a control population (i.e. no vaccination) to assess effectiveness of the vaccination program in reducing brucellosis seroprevalence in elk (see Appendix: section D).

Controlled studies with captive elk indicated Strain 19 elk vaccinates were around 30% less likely to abort than unvaccinated control animals after being challenged with *B. abortus* strain 2308 (69% abortion rate in non-vaccinated elk and 40% in vaccinates) (Thorne et al., 1981). Brucellosis seroprevalence data from Dell Creek and Greys River feedground elk indicate no significant difference. Protection from *Brucella* induced

abortions afforded by Strain 19 vaccination may not be sufficient to effectively reduce seroprevalence in elk on feedgrounds. This may be due to the potential for numerous elk to come into contact with a single infected fetus aborted on a feedground, and the potential that the infectious dose may overwhelm antibody protection. The decision authority lies with the WGFC.

Pros:

- may be reducing total number of *Brucella* induced and infected elk fetuses aborted on feedgrounds
- tools for administering vaccine have already been developed and are in place

Cons:

- expensive and requires substantial fiscal and personnel resources
- has not shown to reduce seroprevalence in elk on feedgrounds
- elk must be concentrated on feedgrounds to ensure delivery is feasible

D. Coordination Meetings

Personnel from WGFD, the Jackson Ranger District of the BTNF, and APHIS met on December 6, 2005 to discuss alternative management options to elk feedgrounds and brucellosis management in the Fall Creek EHU. Several other personal communications have been held between WGFD and USFS personnel in the Jackson Ranger District of the BTNF.

No additional suggestions were made for feedground re-location sites. It was agreed that feeding elk on the private property adjacent to Dog Creek feedground would be beneficial. No suggestions were made for feedground elimination within the Fall Creek EHU, but a suggestion was made that a contingency plan be developed in the case feedground closure became necessary. Because elk herd population objectives are set by the WGFC, USFS and APHIS personnel had no comments or suggestions regarding the size of elk populations. Construction of additional elk fence was not considered beneficial, although it could be used as a management tool on a small scale (stackyard fencing, etc.). Habitat treatments to native transitional and elk winter ranges should continue. USFS personnel indicated continued willingness to pursue habitat treatment options that would reduce elk dependency on supplemental feed and increase use of native range. These discussions are ongoing; WGFD Terrestrial Habitat and Brucellosis-Feedground-Habitat (BFH) Biologists are actively delineating areas for treatment. USFS and WGFD personnel meet regularly to coordinate habitat enhancement and monitoring projects.

A meeting was held December 15th, 2005 to discuss brucellosis management options with the producers in the Fall Creek EHU. Nine interested producers, a representative from APHIS, and representatives from WGFD attended. Each option was discussed and a general consensus on acceptable management actions pertaining to seven of the options were developed. Development of specific management actions for each livestock operation was left for APHIS, the State Veterinarian, and producers to develop in the Individual Ranch Herd Plans.

E. Proposed Management Actions

1. Feedground Relocation

Feeding on the private property adjacent to Dog Creek feedground is beneficial, and WGFD will continue working with the landowner to allow this. WGFD also will continue to assess opportunities for feeding on the bench north of the current Horse Creek feedground site. The main benefits of this move would be spatially expanding the feeding area and feeding on dry upland. The determining factor associated with this move would be the potential for damage to nearby private property with horses. WGFD will continue to determine opportunities for moving the Camp Creek feedground and evaluating the potential outcomes of such a move.

2. Feedground Elimination

The WGFD will not pursue this option in the near future given existing elk brucellosis seroprevalence rates and public demand for continued high elk numbers.

3. Elk Reduction

The WGFD will continue to manage for current Commission established elk herd unit population objectives. Elk herd unit reviews occur every 5 years. Elk herd unit management, including population objectives for the Fall Creek EHU, have been under review and discussed at a public meeting in April 2006. Following public input, the WGFD presented recommended herd unit population objectives to the WGFC for their consideration and action. The WGFD will design harvest strategies to ensure elk populations are maintained at established herd unit objectives.

4. Cattle Producer Change of Operation

The WGFD will encourage any cattle producer to change portions of their operations that decrease the risk of interspecific disease transmission.

5. Fencing

WGFD will pursue this option as opportunities arise to reduce elk movements onto private property, while still allowing for migrations of other species.

6. Elk Test and Removal/Spay

The WGFD will follow the recommendations of Governor Freudenthal's Brucellosis Coordination Team (BCT) and carry out a 5-year pilot test and slaughter project on the three feedgrounds in the Pinedale EHU. Following the 5-year pilot project the WGFD will evaluate the technique and determine if this management option warrants further consideration and possible expansion into other herd units.

7. Habitat Enhancement

The WGFD will continue to coordinate with private and federal land managers and livestock permittees to develop and implement habitat improvements that may reduce elk dependency on supplemental feed.

8. Acquisition/Conservation Easements

The WGFD will continue to pursue this option as opportunities, funding, and willing landowners arise.

9. Vaccination of Elk Calves

The WGFD will continue the ballistic Strain 19 elk vaccination program to determine efficacy of the program in reducing brucellosis seroprevalence in elk on feedgrounds.

F. Best Management Practices

In addition to the above options and commensurate with their short- and long-term goals, the following best management practices should be considered for elk feedground and livestock management. Some may be currently employed, and should be maintained. Others may or may not be viable options for individual feedgrounds and livestock producers.

Feedground Management

1. Encourage feeders to feed on clean snow; maximize opportunities for frequent feed line change.
2. Encourage feeders to separate elk feeding and bedding areas by feeding elk as far as possible from bedding and loafing areas.
3. Insist feeders remove any aborted fetus encountered and either notify or give to a regional WGFD employee for testing as soon as possible.
4. Minimize feeding duration to maximum extent possible.
5. Implement large-scale habitat treatments near feedgrounds.
6. Maintain ballistic Strain 19 elk vaccination program.
7. Prevent elk/cattle co-mingling.

G. Additional Actions

Brucellosis Surveillance

The WGFD currently traps and tests elk for exposure to brucellosis on 4 to 6 feedgrounds annually. This practice should continue on as many feedgrounds as possible annually to assess efficacy of the Strain 19 vaccination program and monitor incidence of the disease. Additionally, statewide surveillance for brucellosis in elk will be continued.

Information and Education

BFH and other WGFD personnel regularly inform and educate various public factions about wildlife diseases, including brucellosis. Educational outreach has included group presentations, news releases, interpretive signs at feedgrounds and crucial winter ranges, and various brochures and publications. The importance of quality wildlife habitat and the substantial role fire plays in natural ecosystems are also stressed during public forums. WGFD field staff make numerous private landowner contacts regarding habitat improvement projects, wildlife-friendly management techniques, or ways to

prevent co-mingling of elk and livestock. Additional efforts are focused on area school groups and events such as the WGFD's annual Hunting and Fishing Expo to inform children and their parents on the vaccination program and brucellosis management.

These efforts should be continued to inform the public of the WGFD's role in brucellosis management and relay consequences of the disease to the State's economy. Additionally, should any of the aforementioned options be officially adopted, Information & Education efforts should focus on why the option(s) was (were) pursued and what benefits may be realized. The public should be made aware of any proactive management embarked upon by the WGFD, and their interests in the actions should be heard.

Progress Reporting

Efforts associated with this plan and/or the Wyoming Governor's Brucellosis Task Force will be summarized and reported on an annual basis.

Research

Sound management of disease in elk on feedgrounds and the risk of transmission from elk to cattle necessitates accurate and reliable data to facilitate decisions. Most research concerning brucellosis, feedground elk, and feedground management has focused on elk vaccination. Many aspects of feedground elk ecology, brucellosis transmission and pathology, and feedground management have not been investigated. Potential research topics that could assist in management decisions are listed below.

1. Relationship of seropositive vs. culture positive, and strain of *Brucella*, in feedground elk.
2. Characteristics of scavenging of aborted fetuses on feedgrounds.
3. Feedground elk parturition habitat site characteristics and proximity to cattle.
4. Effects of habitat improvement projects near feedgrounds on minimizing feedground dependence of elk (i.e. distribution, dispersal, length of feeding season, brucellosis seroprevalence).
5. Disease/parasite presence (other than brucellosis) in elk on feedgrounds and the relationship with *Brucella* immune response.
6. Relationship of coyote densities and scavenging rates on feedgrounds.
7. Abortion and viable birth rates, and temporal and spatial distribution of abortions and births, in seropositive feedground elk.
8. Relationship of brucellosis seroprevalence and feeding duration.
9. Impacts of wolves on distribution of elk using feedgrounds.

Literature Cited

Thorne, E.T., T.J. Walthall, and H.A. Dawson. 1981. Vaccination of elk with strain 19 *Brucella abortus*. Proceedings of the United States Animal Health Association 85: 359-374.

Appendix 1

A. Historical Elk Herd Management

Elk Management History

Since the 1940s WGFD has experimented with various strategies to reduce or eliminate elk dependence on feedgrounds in the Jackson/Pinedale Region (JPR). In the early 1990s, criteria were developed that directed elk feedground management, particularly the beginning and ending dates for feeding. These criteria were based on promoting elk to free range on native habitats. These management plans were implemented during the winter of 1994-95. Conflicts developed and in 1997 the WGFD Director instructed the Department to discontinue the use of the feedground management plans and returned decision-making authority to the Regional Wildlife Supervisor.

Historically, the Fall Creek EHU has been managed for the recreation of the general public and for hunting outfitters from the Jackson Hole area. The general elk-hunting season, during which antlered elk are harvested, has ranged from an average length of 61 days (1976-1983) to 52 days (1984-1991). Since 1992, the general elk-hunting season has been 36 days in length.

The longer hunting seasons were popular with the hunting public, notably outfitters. In 1992 elk-hunting seasons were reduced in length to reduce hunting during the rut in order to improve bull: 100 cow ratios. This change increased bull: 100 cow ratios from 14:100 to 20:100. Average post-season counts also showed an increase from 272 antlered elk to 586 antlered elk.

Since 1989, hunting seasons have been designed to reduce this herd toward a postseason population objective of 4,392 elk. Hunting seasons over the last five years have generally been successful at reducing the elk population to within +/- 10% of the objective. This reduction has occurred through general license any/antlered elk hunting and the issuance of limited quota antlerless elk licenses. A late-season hunt has been in place since 1997 in an attempt to reduce chronic elk damage on private property along the Snake River bottomlands in Hunt Area 84.

Recreation on USFS lands in the Fall Creek EHU has increased dramatically since the mid 1990s. Horses, hikers, mountain bikers, off-road vehicles, and snowmobilers occur in this area throughout the year. While these forms of recreation are highly valued in the Jackson Hole area, some have expressed concern that recreation has inhibited big game species ability to use critical winter and parturition ranges. Some areas that are of concern regarding elk movement, distribution and calving are Munger Mountain, Game Creek, Fall Creek, and the Snake River Canyon. Former WGFD warden, Doug Crawford, noted that increased use of Munger Mountain by dirt bikes, four-wheelers, and mountain bikes negatively affected elk distribution in this area. Hunters have complained that high levels of recreation have compromised hunting in the area. Historically, Munger Mountain was used by elk as both winter range as well as for parturition. Recently, elk have used this area much less.

Native Big Game Range History

The importance of big game winter range was recognized in the early 1900s. On October 31, 1918 District Forester Kneipp requested to the Forester in Washington that three areas be designated as "Restricted Elk Areas". Two of these three areas are in the Fall Creek EHU (Figure 4). In 1922, the three areas were formally set aside and to date are being managed, with a few exceptions, as restricted big game winter range. The conditions associated with these areas were as follows. Elk Restricted Area No. 2: "All domestic stock should be excluded from that part of the Forest bounded on the west by the Forest boundary, on the east by the summit of the ridge which terminates in that is known as Sheep Mountain, on the north by the Gros Ventre River, and on the south by Game Creek". Elk Restricted Area No. 3: "A gross acreage of 60,160 acres, of which 47,360 acres lie east of the Snake River and 12,800 acres west of the Snake River running south from Game Creek and up the Hoback River". It was recommended that no change or reduction be made in the number of stock authorized to graze here during the spring and summer months; if any conflict occurred between cattle and elk it was in the late fall.

In 1934 the Munger Mountain Fire burned approximately 16,800 acres and created many acres of healthy aspen stands which have been used heavily by elk for calving and winter range. Fire has played an important role in plant succession in the Fall Creek EHU. Roughly 34,500 acres are reported to have burned in wildfires since 1930 (Figure 5).

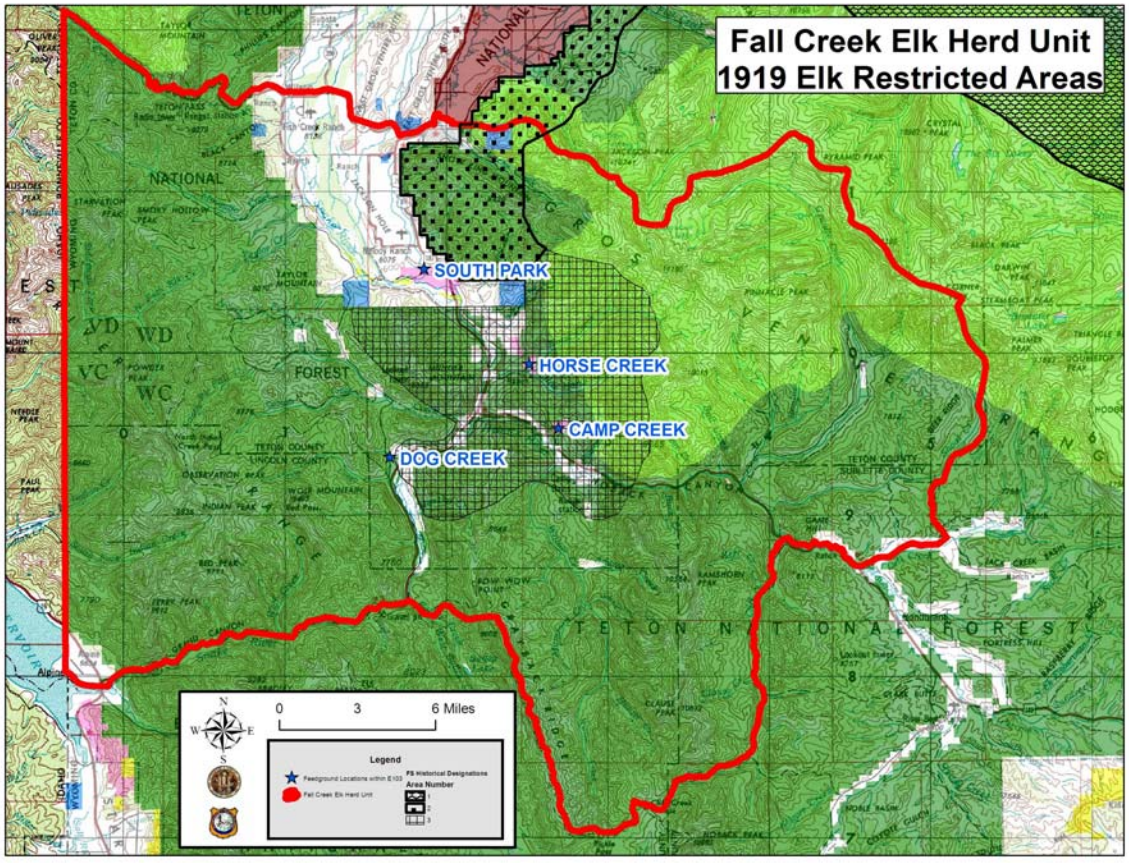


Figure 4. Restricted elk areas in the Fall Creek EHU identified in 1919.

Despite the many acres burned by fires, the number of elk wintering off feedgrounds has decreased markedly since 1935. Between 1935 and 1956, the number of elk wintering off feedgrounds in the Fall Creek EHU varied from 915 to 4,453, with an average of 2,316 elk (Table 1). During this period, the proportion of elk fed varied from 18 to 73 percent of the herd (average of 42 percent). Most of these elk were on or adjacent to undeveloped property in private ownership. As these properties were developed, the tolerance for elk on private property decreased. This indirectly reduced the number that could free range on public land without causing conflicts. Since 1988, approximately 90%-98% of all elk in the Fall Creek EHU during the annual winter trend counts were observed on feedgrounds (Table 2). The number of elk wintering off feedgrounds has continued to decrease during this period (Table 1, Figure 6). Concomitant with the declining numbers of elk wintering off feedgrounds has been the rapid development of private property in Teton County. Indicative of this development is the number of new housing starts (2,711) in Teton County between 1989-2004 (Figure 6).

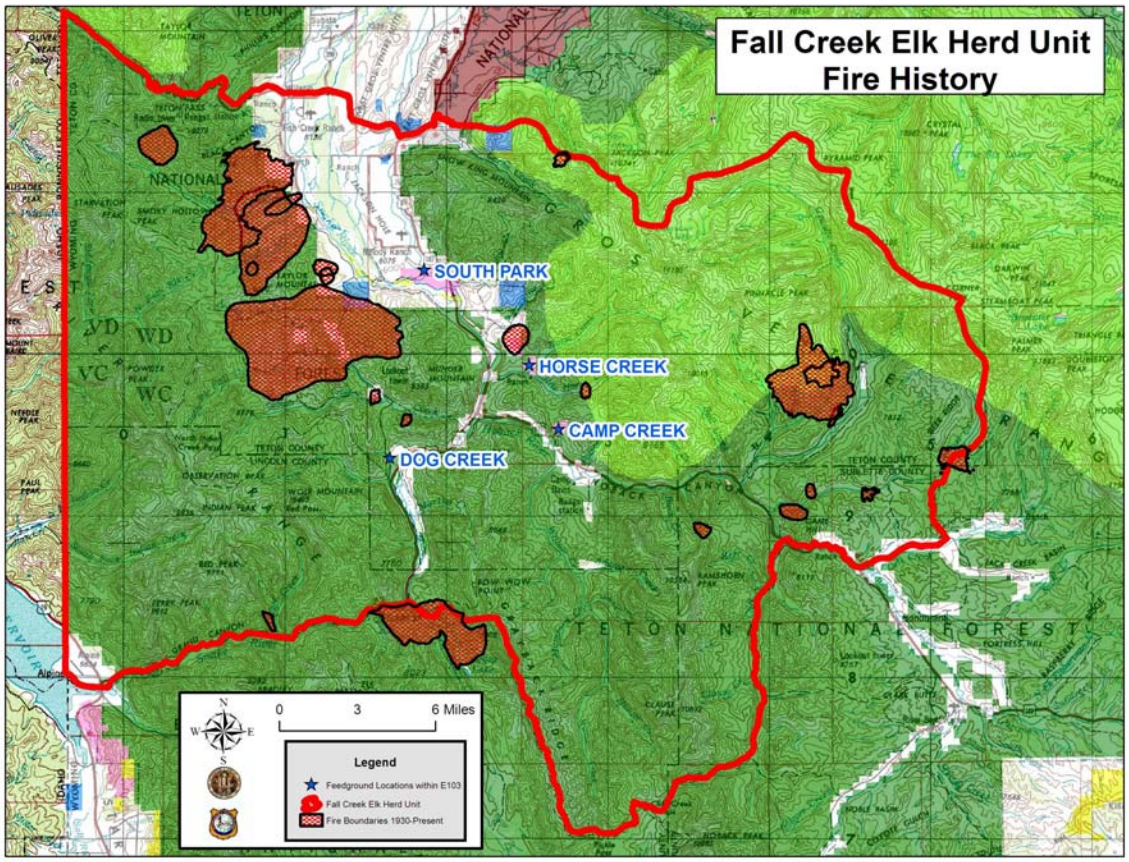


Figure 5. Wildfire history in the Fall Creek EHU.

Table 1. Number of elk counted on feedgrounds and on native range in the Fall Creek EHU, 1935-1956.

Year	# Fed	# on Native Range	Total	% Fed
1935	1,667	3,378	5,045	33
1938	975	4,453	5,428	18
1941	1,099	3,226	4,325	25
1945	880	2,048	2,928	30
1949	2,950	1,096	4,046	73
1952	2,278	1,543	3,821	60
1954	1,271	1,482	2,753	46
1955	696	2,703	3,399	20
1956	2,324	915	3,239	72

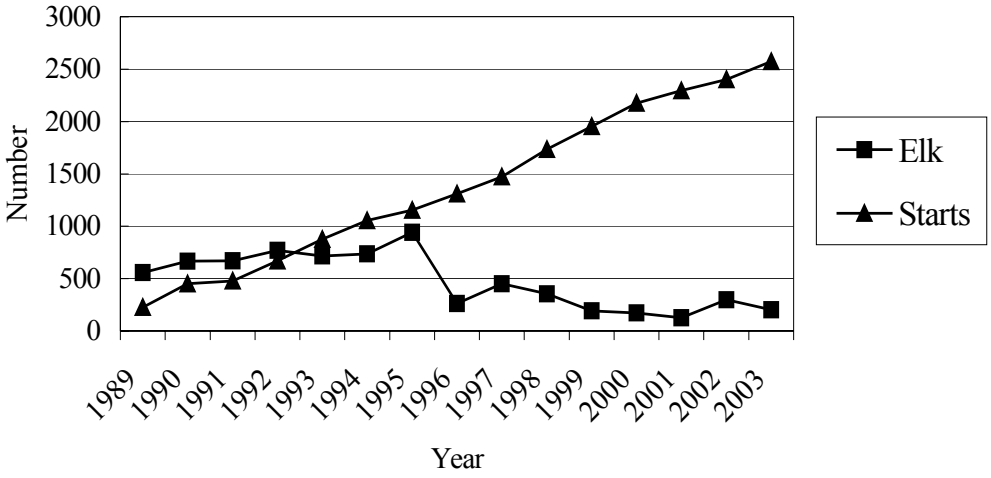


Figure 6. A comparison (trend lines) of the number of elk wintering off feedgrounds in the Fall Creek EHU with the cumulative number of new housing starts in Teton County.

Feedground History

Elk have probably been eating hay in this EHU since the first ranches were established in the late 1800s. Ranches were homesteaded in areas that had previously served as game winter ranges and conflicts between elk and agricultural interests occurred from the beginning. A common practice, before the establishment of elk feedgrounds, was for cattlemen to feed hay at two different sites. One of these was for elk and the other was for livestock. This was an effort to keep elk off cattle feedlines and away from haystacks. This type of operation would have been the first intentional feeding of elk and probably occurred in the late 1800s.

Four feedgrounds are currently located within the Fall Creek EHU: South Park, Horse Creek, Camp Creek, and Dog Creek. Information on exact feeding locations, dates, and number of elk fed in the early days of elk feeding is sporadic and incomplete. It appears that elk were fed at several sites, beginning at the present location of the Town of Jackson, south to the lower Hoback Canyon and Snake River Canyon. Approximately 600 elk were fed 4 miles south of Jackson in 1912. In 1919-20, elk damage was reported at 10 different sites in the Jackson area. During the winters 1931-32 and 1932-33, 542 elk and 890 elk, respectively, were fed on Hog Island on the “Grismer Feedground”.

Following this, elk were fed at the present South Park location. About 1,200 elk were fed south of Jackson on 3 feedgrounds in 1937.

The Wyoming Game and Fish Commission (WGFC) made purchases for the South Park feedground and adjacent winter range from 1939 to 1958. In 1941 a buck and pole fence was constructed to keep cattle off the South Park feedground, but did not keep elk on the feedground. In 1947, a request was made to construct an elk-proof fence at South Park to keep elk from raiding haystacks and feedlots; the fence was completed in 1949. Additional adjacent lands that had been leased from the BLM for several years were deeded to the WGFC in 2001.

It is not known when elk were first fed at Horse Creek. Records indicate that 137 elk were fed at Horse Creek during the winter of 1931-32. The exact location of this site is unknown, but elk have been fed at no less than 3 locations in the Horse Creek area (present site, one mile below the present site, and on the bench to the north of the present site). Early reports indicate that 348 elk were fed "at Horse Creek" in 1933. The Department purchased the present site in 1967.

The time and circumstances surrounding the feeding of elk in the Hoback is unclear. Reports from 1927-28 stated that an ideal location for a feedground would be in the lower southern part of Teton County to care for the Hoback elk. The reports inferred that elk may have been fed, but this could have also been the Horse Creek location. The lower Hoback was specifically mentioned in a 1937-38 report that depicted hay being stored at a Willow Creek site. The first reports of elk numbers on feed are from 1951, which indicated that 200 elk were fed at Bryan Flats. The Camp Creek property was purchased in 1958 and the feedground was moved to its present location.
Interviews from "old timers" and Department records indicate that feeding at Dog Creek probably started in 1947-48.

Conflict Issues

In 1994-95, WGFD attempted to decrease the time elk were fed by delaying feeding. Complaints from the public about increased elk/motor vehicle accidents were partially responsible in prompting the Chief Game Warden to order feedgrounds be put in operation in the Fall Creek EHU. Data provided by the Wyoming Department of Transportation (WYDOT) show the increase in vehicle/elk collisions during the winter months associated with the delayed onset of feeding in the winter of 1994-95 (Figure 7).

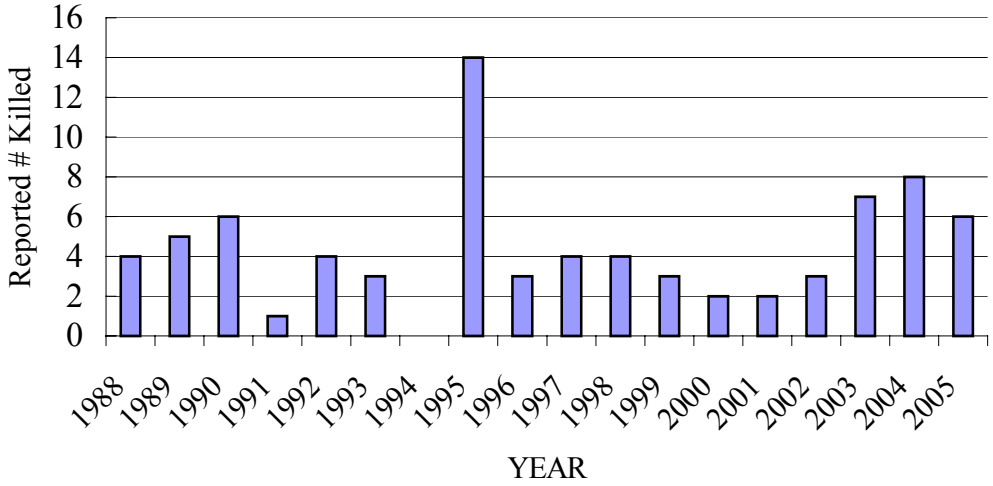


Figure 7. Number of elk killed by vehicles on migration routes and winter ranges near Fall Creek EHU feedgrounds.

WGFD paid damage claims in 16 of 19 years between 1986 and 2004 in the Fall Creek EHU (Figure 8). The amount spent on damage claims does not include money spent by the Department in attempts to prevent damage and administering damage claims. Money spent on claims is typically about 1/3 of the overall cost of the damage program. The number of claims per year varied from 0 to 4. Claims were for elk damage during the winter, during the growing season, and for damages to livestock fencing caused by elk.

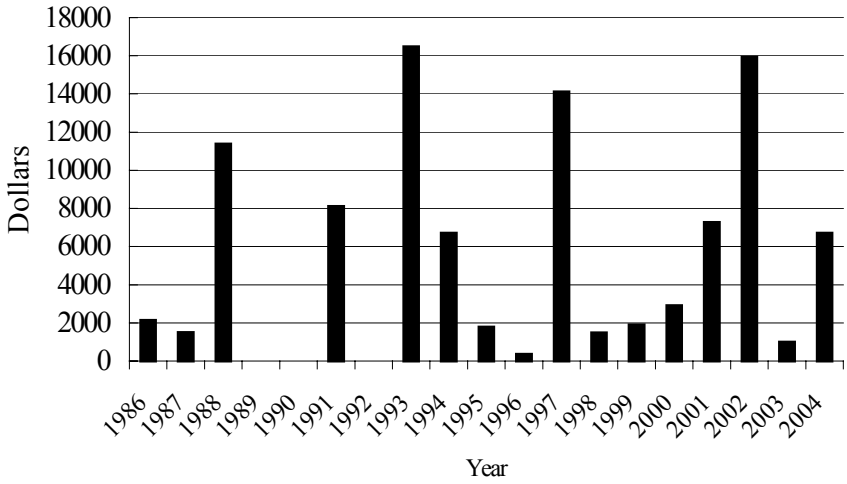


Figure 8. The amount spent on damage claims in the Fall Creek EHU since 1986.

B. Current Elk Herd Management

Current management of elk in the Fall Creek EHU involves efforts to keep the bull: 100 cow ratio at or above 20 bulls: 100 cows, the total population at the desired objective (4,392 elk post season), feedground elk numbers at or below the quotas established by the WGFC, and minimize damage/co-mingling.

A special management concern has developed over the last six years in the Snake River bottomlands between Wilson and South Park. Elk numbers have been increasing on private lands in this area. Approximately 250-400 elk reside on these private lands. Key landowners have been reluctant to allow hunting and efforts to harvest and/or displace elk from these areas have not been successful. Without the opportunity to design a hunting season for this population, elk numbers and/or conflicts will likely continue to increase. The potential for damage to private property and co-mingling with livestock will increase. Also most, if not all, of the elk that summer in these areas move to the South Park feedground in winter. These elk are a cost to the WGFD and probably contribute significantly to the co-mingling problems that have occurred during the winter months.

Snow depth appears to be a major factor in the number of elk attending feedgrounds in the Fall Creek EHU. The number of elk on feed has ranged from zero, during the light snow winter of 1976-77, to a high of 4,890 elk in 1987-88 (Tables 2, 5-8). Since 1988, approximately 2%-10% of all elk counted during the annual trend count are documented on native ranges (included in these elk are 100-200 elk that were fed annually on a private feedground between 1988 and 1995) (Table 2). Some elk utilize the native winter ranges that are located on land managed by the Forest Service. These vary in number, depending on winter snow conditions and temperatures. Free-ranging elk in Hunt Area 84 can be observed east of the Snake River and south of Jackson from Leek's Canyon to the mouth of the Hoback Canyon near Poison Creek. This area includes Game Creek, Porcupine Creek, Horsethief Canyon, Big Horse Creek and Little Horse Creek. Elk will sometimes winter in Willow Creek from Mumford Creek north to Sourdough Creek, depending on winter severity. The largest number of elk that winter on native range is in the area from Bailey Creek north to Sawpit Creek. The highest number of elk counted on this native range is typically between Martin Creek and Sawpit Creek, east of the Dog Creek feedground. Free-ranging elk can be observed in Hunt Area 85 on the south end of Munger Mountain near Hoback Junction, on the south exposures in Fall Creek, and in Cole Canyon west of the Snake River Bridge. Very few elk (<15) are documented in the Snake River Canyon from Dog Creek west to Alpine Junction.

Population Estimate

The postseason population objective for this herd is 4,392 elk. Since 1988, counts have usually been within 150 elk of this objective (Table 2). On four occasions, elk numbers have exceeded the population objective by more than 10%. The highest count (5,368 elk) occurred in 1988 and the lowest count in 1997 (3,931 elk).

Table 2. Number of elk counted on feedgrounds and on native range during annual herd unit trend counts for the Fall Creek EHU, 1988-2005. The post-season population objective is 4,392 elk.

Year	Feedground	Native Range	Year	Feedground	Native range
1988**	4878	478	1997	3481	450
1989**	4006	556	1998	3859	355
1990**	3687	665	1999	3844	192
1991**	4168	668	2000	4160	172
1992**	4281	768*	2001	4768	125
1993**	3548	715	2002	4087	299
1994**	3561	735	2003	4965	203
1995**	3528	940	2004	4293	401
1996	4116	262	2005	4993	192
			1988-2005Ave	4123	454
			Overall %	90%	10%

* Elk survey conducted in December when elk were utilizing native winter range and prior to initiation of feeding.

** 1988-1995 Number of elk counted on native winter range include 100-200 elk being fed annually on Les Lavenstein's property in HA85 at Cole Canyon.

Trend Count and Herd Composition

Total elk numbers in the Fall Creek EHU have declined slightly since 1988 (Figure 9). This appears to be the result of a decline in the number of elk wintering off feedgrounds. Since 1987 there has been an upward trend in elk numbers and in the number of elk attending feedgrounds (Table 2 and Figure 9). An average of 4,123 elk have attended feedgrounds in the Fall Creek EHU since 1988. The highest feedground attendance was in 1988 (4,878 elk) and the lowest occurred in 1997 (3,481 elk). An average of 424 elk have wintered off Department feedgrounds since 1988, with a high of 940 elk in 1995 and a low of 125 elk in 2001.

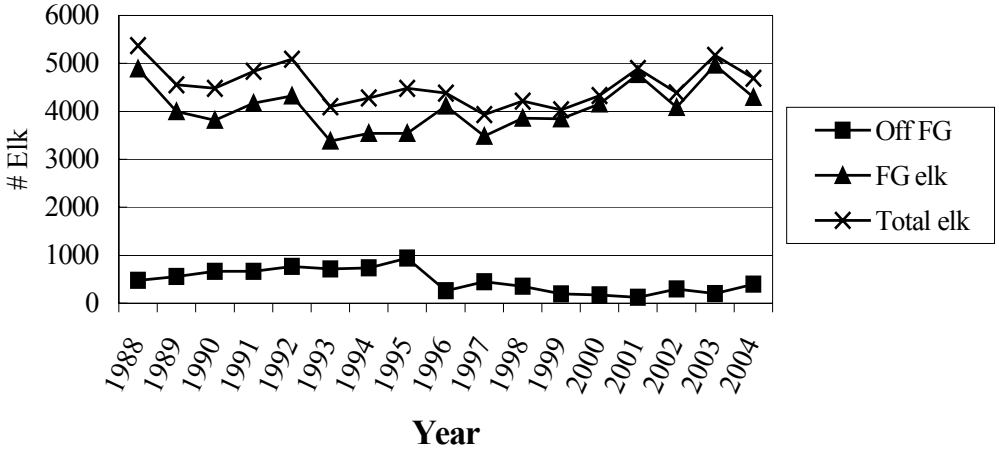


Figure 9. Trends in elk numbers on and off Fall Creek EHU feedgrounds since 1988.

Age and sex classifications observed during post-season counts are shown in Figure 11 and Table 3. Since 1996 the average number of elk counted on post-season counts has been 4,448 (Figure 10). The ability to maintain the population within 10% of the objective is a function of maintaining hunting pressure on the antlerless segment of the population. The lowest number of elk counted during this 9-year period was 3,931 elk in 1997. The highest elk count was 5,168 elk in 2003.

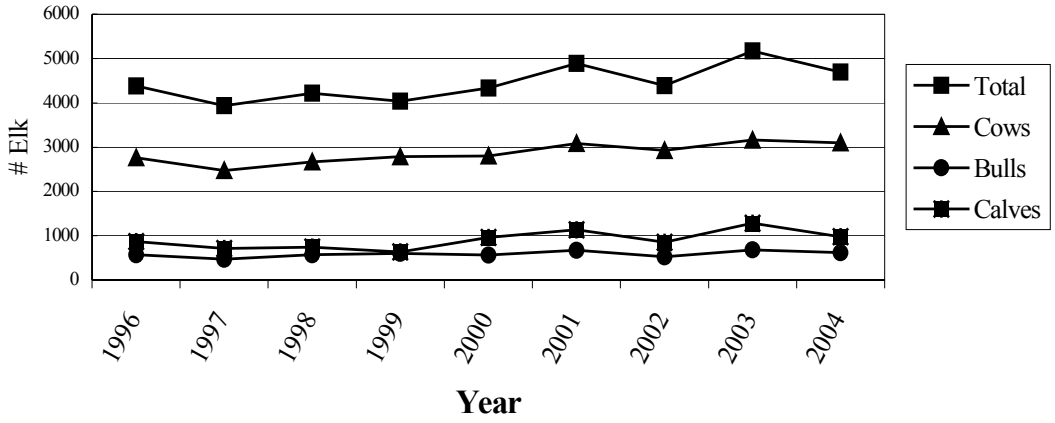


Figure 10. Herd composition trends in the Fall Creek EHU since 1996.

From 2000-2004 the postseason total bull: 100 cow ratio has averaged 20 bulls: 100 cows (Figure 11). Prior to 1992 the bull: cow ratio ranged from 8-11 total bulls: 100 cows. The total bull: cow ratio increased to 18-22 total bulls: 100 cows subsequent to the shortening of the general hunting seasons from a 52-day (or greater) general hunting season to a 36-day season in 1992. The same increasing trends in the ratios of branch-antlered bulls: 100 cows and yearling bulls: 100 cows have been evident since the shortening of the season in 1992. The calf: 100 cow ratio has averaged 34 calves: 100 cows during the last 5 years. The lowest observed calf: cow ratio was 29 calves: 100 cows in 2002, but this was followed by the highest observed ratio of 40 calves: 100 cows in 2003. The number of calves counted during postseason surveys during this 2-year period increased from 850 calves in 2002 to 1,136 calves in 2003.

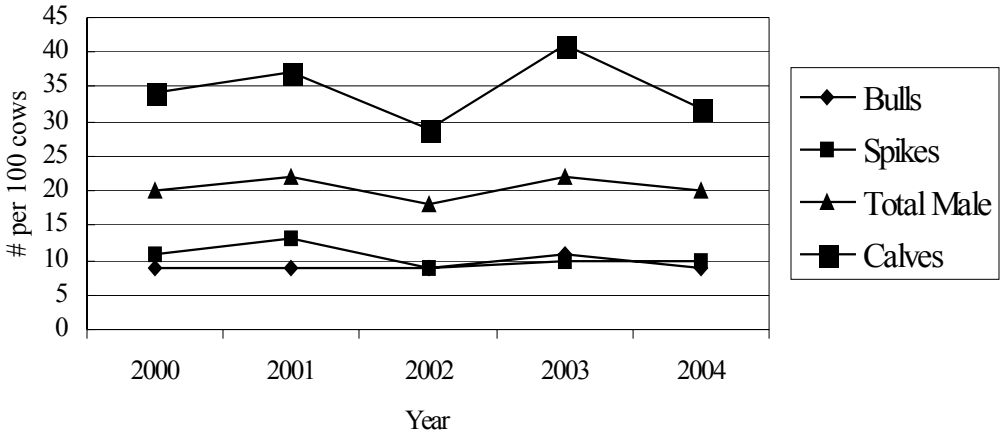


Figure 11. Number of mature bulls, spike bulls, and calves per 100 cows in the Fall Creek EHU.

Harvest

An average of 807 elk were harvested each hunting season from 2000-2004 (Figure 12). The highest number of animals harvested during this period was 1,188 elk in 2004. The lowest number of elk harvested was 644 animals in 2002. Antlerless and antlered harvest typically comprises 48% and 52% of the total annual harvest, respectively. The relatively high percentage of antlered elk in the harvest is a function of high recruitment of calves and yearling bulls into the yearling and 2+ age classes. The percentage of branch-antlered bulls harvested each year averages 75% of the total antlered harvest, with only 25% of antlered animals harvested being yearlings. Hunting seasons have been effective in reducing the population when it exceeds 10% of the objective by focusing harvest on the antlerless segment of the population with general any elk, additional cow/calf licenses, and November antlerless hunting.

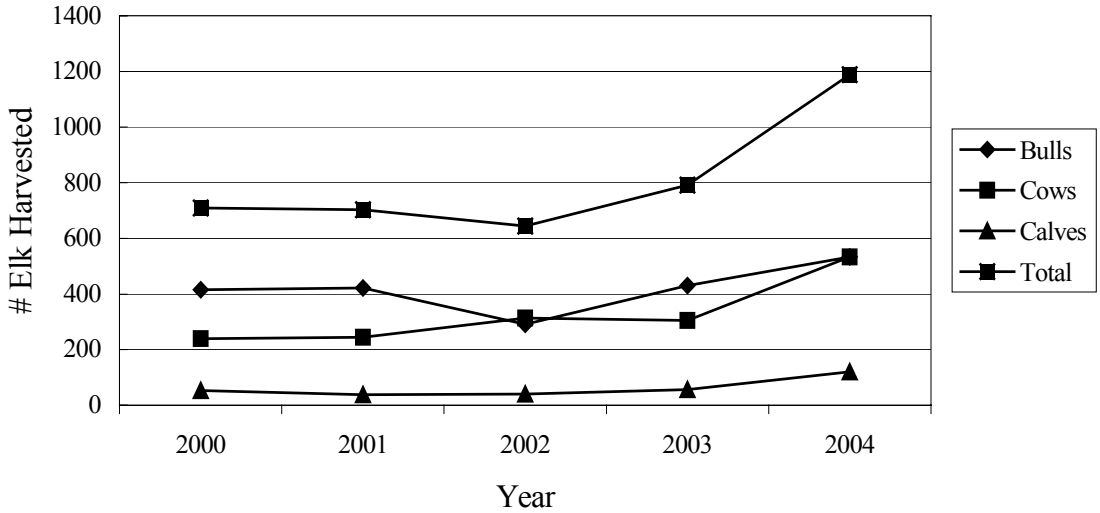


Figure 12. Elk harvest in the Fall Creek EHU since 2000.

Table 3. Fall Creek EHU postseason classifications, 2000-2005.

	Yrlng	Adult	Total				#:100 Females			
2000	Males	Males	Males	Females	Calf	Total	YM	AM	TotM	Juv
84 HCFG*	123	139	262	726	212	1,200				
84 CCFG*	60	11	71	690	239	1,000				
84 SPFG*	63	48	111	744	257	1,112				
84 NR*	6	5	11	16	19	46				
85 DCFG*	47	48	95	563	190	848				
85 NR	9	4	13	64	44(5)	126				
TOTAL	308	255	563	2,803	961(5)	4,332	11	9	20	34
2001										
84 HCFG	116	136	252	925	237	1,414				
84 CCFG	78	14	92	647	337	1,076				
84 SPFG	83	67	150	822	266	1,238				
84 NR	10	1	11	22	13	46				
85 DCFG	86	59	145	634	261	1,040				
85 NR	15	11	26	29	22(2)	79				
TOTAL	388	288	676	3,079	1,136(2)	4,893	13	9	22	37
2002										
84 HCFG	41	90	131	590	174	895				
84 CCFG	103	32	135	962	195	1,292				
84 SPFG	46	51	97	748	238	1,083				
84 NR	19	43	62	16	4(84)	166				
85 DCFG	45	43	88	539	190	817				
85 NR	00	09	09	67	49(8)	133				
TOTAL	263	259	522	2,922	850(92)	4,386	9	9	18	29
2003										
84 HCFG	66	121	187	808	351	1,346				
84 CCFG	73	45	118	673	213	1,004				
84 SPFG	72	100	172	892	337	1,401				
84 NR	19	21	40	44	17 (36)	137				
85 DCFG	80	65	145	711	358	1,214				
85 NR	14	3	17	29	5 (15)	66				
TOTAL	324	355	679	3,157	1,136(51)	5,168	10	11	21	40
2004										
84 HCFG	73	81	154	694	218	1,066				
84 CCFG	71	68	139	895	212	1,246				
84 SPGF	77	76	153	811	236	1,200				
84 NR	24	12	36	96	89	221				
85 DCFG	52	36	88	528	165	781				
85 NR	25	20	45	77	58	180				
TOTAL	322	293	615	3,101	978	4,694	10	9	20	31
2005										
84 HCFG	136	123	259	1,163	307	1,729				
84 CCFG	52	75	127	502	224	853				
84 SPGF	85	101	186	843	275	1,304				
84 NR	7	14	21	25	39(1)	86				
85 DCFG	73	66	139	708	260	1,107				
85 NR	9	12	21	63	22	106				
TOTAL	362	391	753	3,304	1,127(1)	5,185	11	12	23	34

*Feedground acronyms: HCFG= Horse Creek, CCFG= Camp Creek, SPFG= South Park, NR= native range, DCFG= Dog Creek.

Hunter Success

Since the 2000 hunting season, hunters have averaged 37% success while spending an average of 16 days/harvest (Figure 13). The highest success and lowest number of days/harvest were recorded in 2004 (49% success; 12 days/harvest). The high success in 2004 is reflective of a liberal hunting-season structure (i.e.- November antlerless elk hunts, additional cow/calf licenses) that was designed to lower the elk population following a high elk trend count in 2003. Harvest statistics prior to 2004

illustrate that the elk population was being managed at or near the objective with success rates and days/harvest remaining consistent. From 2000-2003, hunter success averaged 34%, while days/harvest averaged 17 days for each elk harvested.

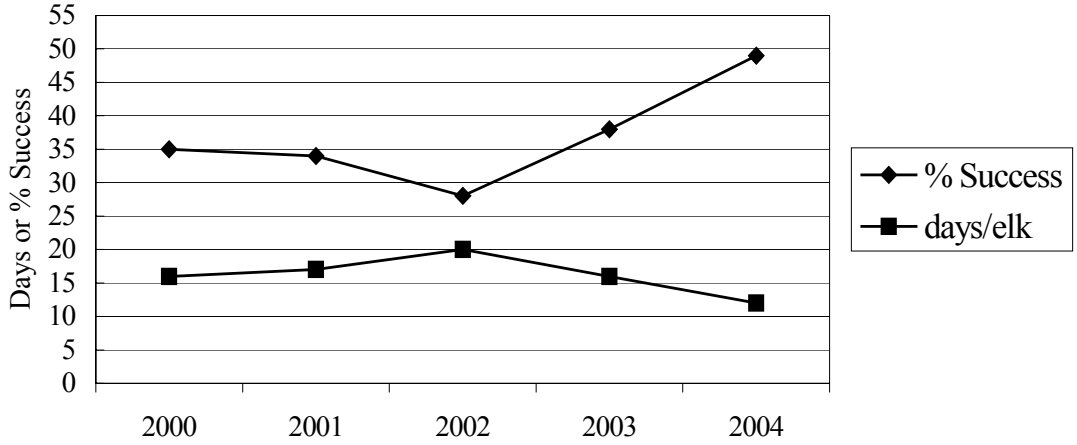


Figure 13. Hunter success and number of days needed per harvest for the Fall Creek EHU since 2000.

Ear Tag Returns

From 1979-2001, a total of 868 elk were tagged on the Dog Creek, Horse Creek and Camp Creek feedgrounds as part of an effort to monitor brucellosis seroprevalence and assess herd unit interchange. During the same period, 173 tagged elk (20% of those tagged) have been reported as hunter harvested. The majority (77%, n=134)) of the tagged elk in the Fall Creek EHU were harvested within the existing herd unit boundary (Table 4). A total of 23 elk (13% of the total tag returns) were harvested in the Afton EHU, primarily in the Little Greys River watershed. The remaining animals were harvested in Idaho, or in the Jackson, Hoback, Pinedale, or Piney elk herds, indicating extant, but limited herd unit interchange.

Table 4. Harvest location of elk tagged in the Fall Creek EHU, 1979-2001.

Location of Harvest	Number of Tagged Elk Harvested	Percent of Tag Returns	Percent of All Tagged Elk
Fall Creek Herd	134	77%	15%
Afton Herd	23	13%	3%
State of Idaho	9	5%	1%
Jackson Herd	3	2%	0.003%
Hoback Herd	2	1%	0.002%
Pinedale Herd	1	0.006%	0.001%
Piney Herd	1	0.006%	0.001%
Total	N=173	100%	n=868

Tag return data indicate little movement by elk beyond the Fall Creek EHU. During the 22-year period, individual elk have traveled into adjacent herd units, primarily the

Afton EHU. Movements into the Afton elk herd are typically associated with areas at the boundary between the two herds. These locations are the headwaters of Little Greys River and Bailey Creek, Grayback Ridge, and from Bull Hollow to Cow Camp Creek. Movement of elk into other adjacent elk herds has been negligible.

Conflict Issues

The four Fall Creek feedgrounds are each located near or adjacent to developed areas (highways, homes, etc.). This development has constricted much of the available native elk winter range in the Fall Creek EHU. Most feedground management decisions in this EHU are based on reducing human/livestock conflicts with elk.

Damage concerns resulting from elk tend to occur at two general locations (South Park area and Horse Creek) on most years. WGFD has constructed elk fences at these locations to separate the elk and livestock feeding operations. However, elk can walk around the ends of these fences, and migrating elk coming to the feedgrounds can approach from the backside of the fences. Elk jumps have been constructed that allow elk to move to the feedground from the opposite side of the fence. During periods of light snow pack, elk at South Park tend to wander off the feedground. Also, it appears that the increased frequency of elk wandering off the South Park feedground during the winter may be associated with the increasing size of the herd that resides during the remainder of the year on private property near the feedground. These elk are familiar with the route around the end of the fence and can easily move off the feedground each day and co-mingle with livestock north of the feedground. The likelihood of elk co-mingling with livestock or causing damage can increase when elk on the feedground are disturbed.

While migrating to and from the Dog Creek, South Park, and Camp Creek feedgrounds, most elk must cross private property and highways. Elk on the highway at Dog Creek cause the most concern. A significant portion of the Dog Creek elk must cross the highway to reach the feedground and vehicle/elk accidents occur each year. Occasionally, vehicle/elk accidents occur when South Park and Camp Creek elk migrate to the feedgrounds. Another issue has been elk emigration from South Park and Camp Creek when the forage on the feedgrounds has been utilized, but supplemental feeding has not yet been initiated.

Large predators occasionally complicate feedground management of Horse Creek and Camp Creek. Wolves and/or mountain lions will occasionally cause elk movements between these feedgrounds. This makes planning for hay storage more difficult.

C. Current Feedground Management

Supplemental winter forage is provided at 4 feedgrounds in the Fall Creek EHU. Three of the feedgrounds are located in Hunt Area 84 (South Park, Horse Creek, and Camp Creek) and one is located in Hunt Area 85 (Dog Creek). Data illustrating feedground parameters for these feedgrounds since 1975-76 are shown in Tables 5-8.

Management of each of these feedgrounds is primarily based on reducing elk-human conflicts and maintaining WGFC elk population objectives. Feeding elk at specific sites is also a proven method of managing interspecific transmission of brucellosis by separating elk from livestock and most conflict issues. The four

feedgrounds in this EHU are located adjacent to private property and dwellings. Segments of elk migrations to three of the feedgrounds cross highways. Native winter ranges available to these elk have highways that either run through or are adjacent to 3 of the 4 feedgrounds. Two feedgrounds have domestic livestock feeding operations immediately adjacent to them and livestock are occasionally fed near a third feedground. Feedgrounds are used to mitigate many of the conflicts. Elk surveys, trends, and the professional judgment of wildlife managers indicate that elk numbers would have to be reduced 90%, or more, if feedgrounds were discontinued in the Fall Creek EHU.

In 1987, the WGFC established the following upper limits for the number of elk to receive supplemental feed at each feedground: Horse Creek 1,250 elk; Camp Creek 900 elk; South Park 1,000 elk; Dog Creek 800 elk. These total to 3,960 elk; the prior ceiling was 3,768. The most elk fed in any year was in 1988-89, when 4,890 animals were on the 4 feedgrounds.

The number of elk fed in the Fall Creek EHU increase rapidly in the early winter and decrease rapidly in the spring (Figure 14). This is because of the abundant forage on the WHMAs and adjacent USFS lands (Figure 1). Most of the elk are either on or near the feedgrounds when feeding is initiated and numbers build rapidly once hay is provided. The number of elk free ranging increase rapidly after April 1 because the elk readily move to native ranges away from conflict issues as the snow cover diminishes and spring "green-up" occurs.

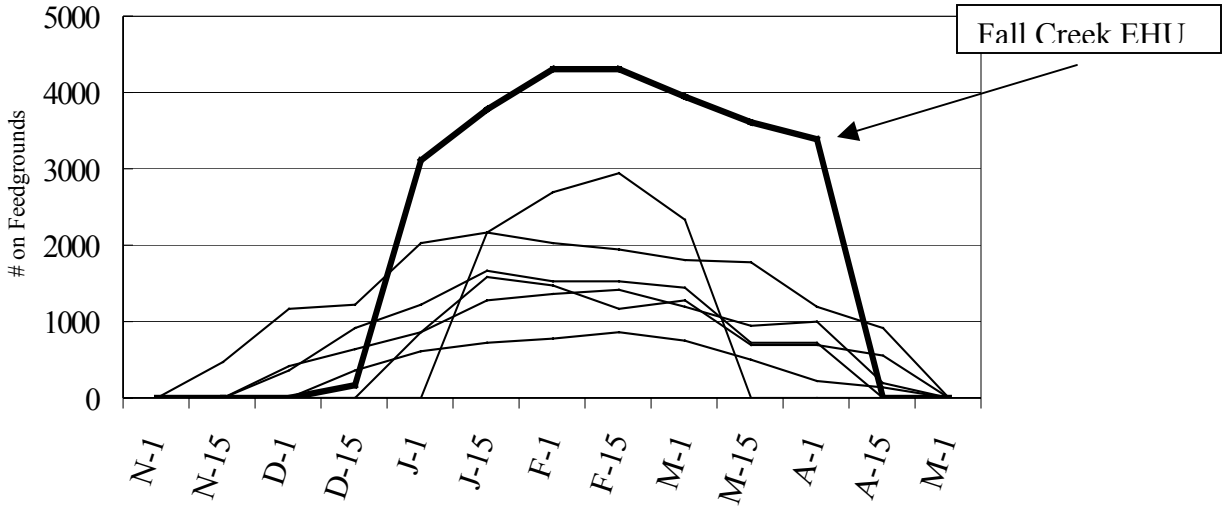


Figure 14. Feeding season length and the number of elk on feedgrounds, for the Fall Creek EHU and the other herd units in the JPR during the winter of 2004-05.

Elk fences exist at Horse Creek and South Park. These fences are relatively short in length, but provide a barrier between elk and livestock feeding operations. Elk can move around the end of the fences if not fed or if shallow snow depths do not discourage elk movements. Elk jumps have been established at 3 locations (two at South Park and one at Horse Creek) to allow elk to move onto the feedgrounds if they are on the side of the fence where livestock are present.

Wolves have had little effect on feedground management in this EHU, except during the winter of 2001-02. During that winter, wolves killed 14 elk at the Horse Creek and Camp Creek feedgrounds. Wolf activity on the feedgrounds caused additional movements of elk between these feedgrounds, which complicated efforts to manage hay supplies. Efforts were made to haze elk from Horse Creek feedground to Camp Creek when it appeared that a hay shortage was developing at Horse Creek. Wolves have never been reported at the Dog Creek and South Park feedgrounds.

The initiation of feeding at each of these feedgrounds is driven by conflict mitigation. Feeding at South Park results primarily from reducing co-mingling and damage. The presence of elk on the highway is also of concern. The presence of foraging elk on or near the highway at Dog Creek triggers feeding at this location most years. Occasionally, livestock are kept across the Snake River from the Dog Creek feedground, which creates co-mingling concerns. Two feeding sites exist at Dog Creek. One is a large pasture on private land, which allows the elk to be maintained away from the highway and private dwellings. When this site is not available, the elk are fed at a location that is adjacent to the highway and near an administrative site where Forest Service employees are housed. Feeding at Horse and Camp Creek generally begins for one of two reasons: elk on the highway near the Hoback River, or elk on those dwellings adjacent to the Horse Creek feedground and feeding on horse feedlines.

About 30% of all the elk fed in the JPR were in this EHU during the winter of 2004-05 (4,293 out of 14,402), which is typical of most years. About 25% of all elk in the JPR are fed in the Fall Creek EHU. About 27% of the total cost for feeding elk occurs in this herd unit. The cost per elk fed in 2004-05 ($49.89) was lower for feedgrounds in this EHU than all others except for the Gros Ventre feedgrounds.

Pasteurella and necrotic stomatitis seem to appear more frequently at these feedgrounds than other feedgrounds. In the past, some relatively large (relative to other feedgrounds) die-offs have occurred at these feedgrounds (Tables 5-8) and many of these deaths have been attributed to these pathological conditions.

Feeding-season lengths tend to reflect snow conditions from year to year. During the very mild winter of 1976-77, elk were not fed at any feedground in the Fall Creek EHU (Tables 5-8). During the mild winter of 1980-81, the number of elk fed and the length of the feeding season were greatly reduced. The average length of the feeding season for these feedgrounds is 115 days, which is 12 days less than the average of all feedgrounds in the JPR.

Table 5. Number of elk counted during classification surveys, amount of hay fed, length of feeding season, number of elk found dead, and cost of feed per elk on the South Park feedground since 1975-76.

Year	# Elk	Tons	Days	# Dead	Cost/Elk	Tons/Elk
1975-76	700	564	149	2	46	0.81
1976-77	0	0	0	0	0	0
1977-78	1150	569	136	4	21	0.49
1978-79	1200	672	130	15	26	0.56
1979-80	900	333	104	6	24	0.37
1980-81	600	110	62	0	15	0.18
1981-82	780	378	136	3	38	0.48
1982-83	675	306	128	5	39	0.45
1983-84	918	557	142	7	48	0.61
1984-85	896	511	130	0	46	0.57
1985-86	1002	662	139	3	52	0.66
1986-87	1185	680	136	4	46	0.57
1987-88	966	466	114	5	39	0.48
1988-89	1575	902	148	38	54	0.57
1989-90	909	322	100	3	39	0.35
1990-91	800	323	112	3	40	0.4
1991-92	1033	467	107	4	41	0.45
1992-93	1200	556	127	8	45	0.46
1993-94	1024	361	112	0	32	0.35
1994-95	1155	494	128	4	40	0.43
1995-96	1117	465	100	4	40	0.42
1996-97	1372	692	135	18	53	0.5
1997-98	1080	418	125	7	55	0.41
1998-99	886	314	108	8	39	0.35
1999-00	988	323	91	6	34	0.33
2000-01	1112	448	105	2	42	0.4
2001-02	1238	552	123	8	59	0.45
2002-03	1083	286	104	10	32	0.26
2003-04	1401	650	127	18	56	0.46
2004-05	1200	508	118	10	48	0.42
30 Year Ave	1004	463	116	7	40	0.44

Table 6. Number of elk counted during classification surveys, amount of hay fed, length of feeding season, number of elk found dead, and cost of feed per elk on the Horse Creek feedground since 1975-76.

Year	# Elk	Tons	Days	Dead	Cost/Elk	Tons/Elk
1975-76	700	450	139	6	29	0.64
1976-77	0	0	0	0	0	0
1977-78	1170	659	122	9	32	0.56
1978-79	959	493	141	16	31	0.51
1979-80	1250	445	104	6	22	0.36
1980-81	496	73	59	1	12	0.15
1981-82	722	499	132	8	44	0.69
1982-83	925	458	123	4	38	0.49
1983-84	880	617	136	13	54	0.7
1984-85	1393	633	127	18	36	0.45
1985-86	1550	885	146	18	45	0.57
1986-87	879	393	111	4	36	0.44
1987-88	940	464	103	5	39	0.49
1988-89	1287	833	148	17	54	0.64
1989-90	1155	454	107	6	41	0.39
1990-91	1194	494	112	2	38	0.41
1991-92	1005	401	109	5	36	0.39
1992-93	1179	539	125	9	43	0.46
1993-94	712	139	56	0	18	0.2
1994-95	1033	423	106	10	36	0.41
1995-96	1104	397	94	3	38	0.36
1996-97	1330	793	135	12	57	0.6
1997-98	1505	609	104	13	47	0.42
1998-99	1587	625	117	13	42	0.39
1999-00	1321	517	111	3	41	0.39
2000-01	1200	673	109	6	56	0.56
2001-02	1414	716	138	17	68	0.51
2002-03	895	529	114	8	78	0.59
2003-04	1346	778	100	8	60	0.58
2004-05	1066	540	107	8	55	0.51
30 Year Ave	1073	518	111	8	41	0.46

Table 7. Number of elk counted during classification surveys, amount of hay fed, length of feeding season, number of elk found dead, and cost of feed per elk on the Camp Creek feedground since 1975-76.

Year	# Elk	Tons	Days	Dead	Cost/Elk	Tons/Elk
1975-76	1025	491	130	1	28	0.48
1976-77	0	0	0	0	0	0
1977-78	500	218	117	2	28	0.44
1978-79	854	525	137	11	37	0.61
1979-80	615	302	106	6	32	0.49
1980-81	625	121	63	3	16	0.19
1981-82	686	399	134	8	45	0.58
1982-83	510	199	120	0	35	0.39
1983-84	815	575	136	10	57	0.7
1984-85	787	510	138	9	53	0.65
1985-86	651	531	134	8	65	0.81
1986-87	770	381	123	9	42	0.49
1987-88	1073	467	113	4	35	0.44
1988-89	960	584	145	10	53	0.61
1989-90	935	393	108	4	44	0.42
1990-91	950	379	115	7	37	0.4
1991-92	1180	371	110	3	29	0.31
1992-93	957	474	124	34	48	0.5
1993-94	1000	119	54	0	11	0.12
1994-95	600	273	105	5	45	0.46
1995-96	582	270	93	1	47	0.46
1996-97	582	261	136	3	53	0.45
1997-98	485	200	96	9	76	0.53
1998-99	516	334	104	8	72	0.64
1999-00	650	256	106	0	43	0.39
2000-01	1000	429	101	1	45	0.43
2001-02	1076	530	143	31	67	0.49
2002-03	1292	408	125	3	39	0.32
2003-04	1004	490	139	11	58	0.49
2004-05	1246	475	126	10	45	0.38
30 Year Ave	798	366	113	7	43	0.46

Table 8. Number of elk counted during classification surveys, amount of hay fed, length of feeding season, number of elk found dead, and cost of feed per elk on the Dog Creek feedground since 1975-76.

Year	# Elk	Tons	Days	# Dead	Cost/Elk	Tons/Elk
1975-76	750	452	135	23	35	0.6
1976-77	0	0	0	0	0	0
1977-78	734	400	123	10	32	0.54
1978-79	670	454	139	22	41	0.68
1979-80	750	302	103	2	26	0.4
1980-81	500	184	120	6	30	0.37
1981-82	600	408	150	4	51	0.68
1982-83	588	329	130	4	45	0.56
1983-84	815	575	145	10	57	0.71
1984-85	787	510	138	9	53	0.65
1985-86	1020	619	139	13	49	0.61
1986-87	746	402	113	1	44	0.54
1987-88	910	596	111	9	50	0.65
1988-89	1068	754	156	15	57	0.71
1989-90	1000	430	118	7	45	0.43
1990-91	873	399	105	5	42	0.46
1991-92	950	500	116	2	47	0.53
1992-93	985	506	128	24	48	0.51
1993-94	650	229	108	1	32	0.35
1994-95	756	378	116	4	47	0.5
1995-96	742	260	90	5	35	0.35
1996-97	788	371	130	22	53	0.47
1997-98	623	311	119	7	66	0.5
1998-99	870	364	116	6	42	0.42
1999-00	885	460	119	0	51	0.52
2000-01	848	421	114	4	54	0.5
2001-02	1040	547	132	12	73	0.53
2002-03	817	318	111	7	47	0.39
2003-04	1214	652	141	16	59	0.54
2004-05	781	362	105	7	55	0.46
30 Year Ave	792	416	119	9	46	0.51

Feedground Operational Goals

The first formal feedground management plans were prepared in the early 1990s. Criteria directing the specific management of feedgrounds were incorporated into the plans. Conflicts developed and on April 2, 1997 the Department's Director issued a statement identifying goals of feedground management:

1. "To provide nutritional supplement to wintering elk that frequent elk feedgrounds
2. To prevent where possible, the co-mingling of elk on cattle and horse feedlines
3. To control brucellosis within elk on feedgrounds by vaccination
4. To minimize other damage conflicts on private lands

Until further notice, these will serve as the goals that drive the management of feedgrounds." This directive still serves as the basis for most feedground decisions.

These directives do not differ greatly from the Region's pre-existing long-term goals. Present elk management goals reflect history, as conditions that led to feeding are more prevalent today. Feeding helps in managing conflict with agriculture, both in preventing depredation to stored hay and feedlines. Preventing co-mingling with livestock is a more recent concern, and with greatly expanded rural/residential developments, feeding supplements winter diets, minimizing starvation. Concurrently, while accomplishing these objectives, efforts are made to look for opportunities to minimize the dependency of elk on supplemental feed.

Several feedground management decisions must be made annually on each feedground. Depending on the situation, some of these may be implemented and others may not. Some are in direct opposition with others and decisions depend on individual situations. The following are issues that should be considered at each feedground.

1. Can the dependency of elk on supplemental feed be reduced? Even though other issues may be given preference, reducing the dependency on feedgrounds should be considered when making all decisions regarding the operation of the feedgrounds. Reducing the length of the feeding season may reduce the spread of disease and will reduce feeding costs.
2. Does the feedground assist in preventing damage/co-mingling? Feeding elk is an effective method of keeping elk from private property.
3. What can be done to keep feedground operating costs as low as possible? The amount of hay fed (influenced primarily by amount fed daily and the length of the feeding season) represents most of the cost to the feedground program. Any reduction in the amount of hay fed decreases the cost of the program.
4. How to feed in a manner that provides the most sanitary conditions? This usually involves keeping the feedgrounds as large as possible and feeding on fresh snow as much as possible.
5. Attempt to feed just enough to keep the elk in good body condition, but not low enough to compromise damage concerns. This level of feeding is less than what the elk can and will consume if offered more. Feeding should not be adjusted to attempt to keep old and/or crippled elk alive. A good rule of thumb is to feed enough to keep calves healthy for the first part of the winter, and then feed enough to keep pregnant cows in good nutritional condition during the later part of the winter. It is these two age groups (calves on the feedground and those that will be born in the spring) that are most susceptible to reduced nutrient intake.

6. Attempt to feed at rate that will satisfy the elk's appetite when the potential damage problems exist. This feeding rate is basically feeding "all they will eat" and is in excess of the physiological need of the animals, but the additional feed will keep the elk from wandering in search of more food (thus reducing the possibility of causing damage).

Feedground Operational Plans

Following the termination of the original feedground management plans in 1997 regional wildlife management personnel developed and adopted management plans in 2001 that allowed more flexibility in addressing co-mingling/damage issues. These plans need to be modified to incorporate the brucellosis management strategies included in the main body of this document.

South Park

The South Park Feedground is on about 1,200 acres of Game and Fish land (deeded and leased), which is nearly surrounded by private development (homes, highway, construction site, ranch, etc.). Most elk coming to/going from the feedground cross private property at some point. There is a cattle ranch adjacent to the feedground and the elk can easily co-mingle with cattle and/or cause damage. The Commission ceiling allows 1,010 elk.

Primary Management Issues

1. Keeping elk off cattle feedlines is the primary factor in the operation of this feedground. If cattle were not adjacent to the feedground, then the starting date for the feedground could possibly be delayed.

Secondary Management Issues.

1. Flat Creek runs through the feedground, which offers an opportunity for waterfowl hunting prior to elk feeding. Since there are limited places for waterfowl hunting in Teton County, it becomes important to allow as much access to the Unit as possible without hindering other management issues.
2. Prior to feeding, elk are encouraged to free range on the Unit. Care must be taken to prevent the elk from foraging along and near the highway.
3. Damage to standing/stored crops may occur in the spring of the year as the elk leave the feedground.

Management Suggestions/Criteria

1. Feeding should be initiated as soon as there is any indication that the elk may move around the end of the fence and co-mingle with livestock.
2. One of the migration routes to and from the feedground crosses the highway, which cannot be avoided. Considerable forage exists on the feedground for elk in the fall, which can be utilized before feeding begins. The feeding patterns of the elk (not the migrating elk) using this forage needs to be monitored because they sometimes move near the highway when forage on the Unit becomes limited, thus creating a potential traffic hazard. Feeding should be initiated if elk begin foraging near the highway.

3. Feeding needs to continue in the spring until sufficient green up is present to keep the elk from moving onto private property where forage is needed for spring grazing by cattle.

Horse Creek

This feedground is located in the Horse Creek drainage near the confluence of the Snake and Hoback Rivers. The site is on Department-owned property and is in an area where winters are relatively mild and capable of supporting big game animals during the winter months. When this property was purchased, the Department did not obtain legal access. Without legal access, the ability of the Department to utilize the unit to its optimum is often compromised.

Nearby private holdings, a highway, and the possibility of the elk moving to another feedground (either Camp Creek or South Park) often influence the initiation and termination of feeding at this location rather than the availability of native forage for elk. In both the fall and spring, some elk have a tendency to move off the feedground and native winter ranges onto private property while forage still exists on or near the feedground. This movement can put these elk in situations where conflicts with the private sector can result. Also, the Camp Creek feedground sets about 2 miles from the Horse Creek feedground and the South Park feedground is located about five miles away. Elk that would normally winter at Horse Creek can move to these feedgrounds if sufficient feed is not available at Horse Creek (either in the form of native forage or supplemental feed). The Commission ceiling allows 1,250 elk.

<u>Primary Management Issues</u>

1. The tolerance of elk on adjacent private property is low.
2. The desirable distribution of elk between Horse Creek and Camp Creek is approximately in the same proportion as the Commission quotas for these feedgrounds. The elk seem to prefer Horse Creek to Camp Creek and if the Camp Creek elk winter at Horse Creek, it can exceed the capacity of the feedground and the capability of one feeder.

<u>Secondary Management Issues</u>

1. Present access into the unit crosses many individual landowners. Care and courtesy must be exercised in order maintain the access.

<u>Management Suggestions/criteria</u>

1. Feeding at Horse Creek should begin one or two days after feeding is initiated at Camp Creek. This is an attempt to keep excessive numbers of elk from moving to Horse Creek.
2. Feeding should begin when elk move down drainage and begin either co-mingling with livestock and/or causing damage on private land. The elk may be hazed away from these private holding for a few days each winter, thus delaying feeding.
3. Elk can also move from the feedground into the Porcupine area, where they can cause damage or create a problem for horse owners on small acreages. This should be monitored and may be a consideration when deciding when to initiate feeding.

4. Feeding can be terminated when adequate residual/new growth forage exists to keep the elk from migrating to lower elevations (where they can cause damage problems). Feeding levels can be reduced in the late winter/early spring as areas bare off from snow cover to see how the elk react. If problems do not arise, feeding can be terminated.

Camp Creek

The Camp Creek feedground is on WGFC property and is located in the middle of the best winter range in the Hoback drainage. Commission quotas allow 900 elk on this feedground. Elk from both Camp Creek and the Horse Creek feedground utilize this area in the fall and spring. Elk moving into the area from Willow Creek move across the highway and onto the area surrounding the feedground

Primary Management Issues

1. After some use on this area, the elk then begin moving back down toward the highway or on to Horse Creek in search of food. It is not desirable to have the elk doing either of these.

Secondary Management issues

1. None

Management Suggestions/criteria

1. Feeding should begin at this feedground a day or two before feeding begins on Horse Creek in an effort to keep elk from leaving the area. Should the Camp Creek elk move to Horse Creek, the number fed at that feedground can reach about 2000 head. The workload associated with feeding this number of elk exceeds normal expectations for an elk feeder. Plus, the area at Horse Creek is not large enough to feed that number of elk in a sanitary manner.

2. Feeding should be done soon enough to minimize the number of elk that forage along the highway, thus creating a hazard to motorists. Elk migrating from Willow Creek will cross the highway, which cannot be prevented. However, once they move across the highway, they seem to feed on or near the feedground. As time passes, they will move farther and farther from the feedground and some will eventually begin feed adjacent to the highway, especially at night and in the early mornings. Once supplemental feeding begins, they will not venture next to the highway.

Dog Creek

Elk at this location can be fed at one of two sites. The preferred site is on private property, which offers a very large flat meadow for feeding. The other site is on USFS property, which sets in the cottonwood trees at the mouth of Dog Creek. This is a poor place to feed because of limited space, a small pond, and numerous trees. However, when arrangements to feed on the private property cannot be made, this site offers a place to feed. On two different occasions, WGFD biologists and USFS personnel have examined other locations as possible feeding sites. To date, nothing has resulted from these efforts

and the elk continue to be fed at the existing sites. Commission quotas allow 800 elk to be fed at this location.

Many of the elk that are fed at this feedground migrate from across the Snake River, and therefore, across Highway 89. Once the movement of elk across the river begins, elk commonly appear on or near the highway, especially at night and in the early morning. Each year elk will be hit on the highway by vehicles. Once supplemental feed is made available, the elk no longer forage along the highway. The highway has been widened in this area and made into 3 and 4 lanes. This may improve or it may worsen the problem of elk/vehicle collisions and only time will tell.

Primary Management Issues

1. The over-riding factor in initiating feeding and the level of feeding is the desire to keep elk off of the highway as much as possible. This feedground needs to be monitored closely during the fall migration either by observing tracks in the snow or checking elk locations in the evening, night, early morning time periods.
2. Efforts to keep a good working relationship with the land owner is important so that he will allow elk to be fed on the meadow. In the past, this has meant repairing fences in the spring after feeding has been completed, harrowing the meadow, and feeding in a different location each day to prevent manure from accumulating in any one spot.

Secondary Management Issues

1. The USFS has occupied homes that are adjacent to the horse corral. Also, the water used for drinking by the workhorses comes from an USFS outlet. It is important that the feeder be courteous to the people living in the homes.
2. The Feedground Management personnel need to keep close contact with the private landowner and the USFS in order to be knowledgeable of their concerns so feeding will be allowed to continue in the future.

Management Suggestions/criteria

1. Once the elk begin searching for food along the highway, feeding should be initiated. Feeding can be terminated earlier in the spring sooner than would be guessed (when judging from the amount of snow on nearby slopes). The elk do not forage along the highway in the spring as they do during the early winter.

D. Brucellosis Management Summary

The Wyoming Game & Fish Department (WGFD) developed an integrated program in an attempt to manage brucellosis in free-ranging elk associated with feedgrounds in the late 1980s. This approach, called the Brucellosis-Feedground-Habitat (BFH) Program, combines five ongoing management activities: feedground elk vaccination, feedground management, habitat enhancement, elk/cattle separation, and brucellosis education. Goals established in 1989 were: maintain spatial and/or temporal separation of elk and cattle during brucellosis transmission risk periods, reduce prevalence of brucellosis in elk through vaccination and habitat improvements, and to work with all affected interests in trying to eliminate brucellosis in the GYA.

To address these goals, BFH and other WGFD personnel conduct the following activities.

Vaccination

Elk were first vaccinated in the Fall Creek EHU on Camp and Horse Creek feedgrounds in 1989. Vaccination was initiated at the South Park and Dog Creek feedgrounds in 1990. Numbers vaccinated and percent coverage of number classified per feedground from 1998 to 2004 are listed in Table 9.

Table 9. 1998 – 2005 vaccination summary for Camp, Dog, and Horse Creek, and South Park feedground elk.

		Number Classified			Calves Vaccinated	
Year	Feedground	Calves	Females	Total Elk	Number	% of Classified
1998	South Park	192	711	1029	199	>100*
1998	Horse Creek	263	985	1450	284	>100
1998	Camp Creek	77	281	378	104	>100
1998	Dog Creek	122	429	623	134	>100
1999	South Park	160	620	886	192	>100
1999	Horse Creek	275	1047	1587	233	>100
1999	Camp Creek	93	394	516	171	>100
1999	Dog Creek	186	568	870	187	>100
2000	South Park	142	741	988	162	>100
2000	Horse Creek	189	837	1321	296	>100
2000	Camp Creek	65	536	650	48	74
2000	Dog Creek	175	602	885	208	>100
2001	South Park	257	744	1112	287	>100
2001	Horse Creek	212	726	1200	209	99
2001	Camp Creek	239	690	900	237	99
2001	Dog Creek	190	563	848	212	>100
2002	South Park	266	822	1238	261	98
2002	Horse Creek	237	925	1414	310	>100
2002	Camp Creek	337	647	1076	336	100
2002	Dog Creek	261	634	1040	259	99
2003	South Park	238	748	1083	264	>100
2003	Horse Creek	174	590	895	194	>100
2003	Camp Creek	195	962	1292	252	>100
2003	Dog Creek	190	539	817	211	>100
2004	South Park	337	892	1401	329	98
2004	Horse Creek	351	808	1356	363	>100
2004	Camp Creek	213	673	1004	208	98
2004	Dog Creek	358	711	1214	359	>100
2005	South Park	236	811	1200	258	>100
2005	Horse Creek	218	694	1066	228	>100
2005	Camp Creek	212	895	1246	227	>100
2005	Dog Creek	165	528	781	162	98
2006	South Park	275	843	1304	287	>100
2006	Horse Creek	307	1163	1729	314	>100
2006	Camp Creek	224	502	853	204	91
2006	Dog Creek	260	708	1107	255	98

* >100% coverage suggests some yearlings may have received S19

Serology

WGFD initiated brucellosis surveillance in elk on the Greys River feedground and National Elk Refuge in 1971 to monitor the distribution and prevalence of the disease. Currently, elk are trapped, bled, and tested on four to six feedgrounds annually. Several thousand (4,272) yearling and adult female elk trapped on 21 different feedgrounds have been tested to date. Elk on Dog Creek feedground were tested in 1987, and 1996-1998, and elk on Camp Creek were tested in 1989. Horse Creek feedground elk were tested in 1988 and 2000, and elk on South Park in 2003 and 2005 (Table 10).

Four tests are used to evaluate elk sera; the standard plate agglutination test (SPT), the buffered *Brucella* antigen rapid card test (BBA), the rivanol precipitation-plate agglutination test (RIV), and the complement fixation test (CF). Sera that either produce a reaction on two or more of the tests, or if the CF test alone shows a reaction at a dilution rate of 2+ 1:20 or higher, are considered positive. Once serostatus is determined using these criteria, another test dubbed cELISA (competitive enzyme-linked immunosorbent assay) is conducted on positive sera to differentiate between Strain 19 vaccine and field strain *Brucella abortus* titers. Seroprevalence only indicates the animal has been exposed to *Brucella* and has formed an antibody response, but does not determine presence (or infection) of *Brucella* within the animal.

Table 10. Number of yearling, adult, and total female, and % seroprevalence of elk tested on South Park and Horse, Camp, and Dog Creek feedgrounds as determined by 4 standard tests and cELISA.

		# Tested			% Seroprevalence	
Feedground	**Year**	**Yearling**	**Adult**	**Total**	**4 Standard**	**CELISA**
South Park	2003	12	30	42	29%	26%
	2005	1	1	2	0%	0%
	2006	1	1	2		
	Sum	13	31	44	27%	25%
Horse Creek	1988	4	24	28	32%	*
	2000	12	30	42	48%	19%
	Sum	16	54	70	41%	N/A
Camp Creek	1989	12	52	64	41%	*
Dog Creek	1987	0	1	1	0%	*
	1996	5	13	18	22%	13%
	1997	0	6	6	100%	33%
	1998	6	4	10	20%	44%
	Sum	11	24	35	34%	24%

*cELISA test not conducted

Dell Creek feedground is the only state-operated feedground where elk vaccination is not conducted. Distribution data of elk from this feedground suggest little interchange with surrounding feedgrounds, thus providing a good control to compare elk vaccination efficacy with other feedgrounds through serology. Brucellosis surveillance was initiated on Dell in 1989, and has since been conducted from 1998-2005. Serology

data using cELISA (Table 11) indicate brucellosis seroprevalence totals 30% (78 positives of 261 samples) on Dell Creek, and has fluctuated from 8% in 2004 to 50% in 1999. Total seroprevalence on South Park is 25% (11/44), 24% (7/29) on Dog Creek, and 19% (8/42) on Horse Creek. More data are needed on all feedgrounds in the Fall Creek EHU to more accurately assess efficacy of the strain-19 vaccination program.

Table 11. Yearly and total seroprevalence (%) as determined by the cELISA test on Dell, South Park, Dog Creek, and Horse Creek feedgrounds.

Year	Dell Cr.*	South Park	Dog Cr.	Horse Cr.
1996			13	
1997			33	
1998	26		43	
1999	50			
2000	45			19
2001	26			
2002	35			
2003	37	26		
2004	8			
2005	18	0		
2006	13			
Total	**29%**	**25%**	**24%**	**19%**

*Dell Cr. is a control and has never been vaccinated

Elk/Cattle Disease Transmission Reduction

Annually, WGFD personnel employ a variety of damage control techniques to keep elk and cattle separated temporally and spatially. The WGFD has a long-standing practice of providing game-proof fencing to private producers to prevent elk from depredating on privately owned stored hay crops and to discourage elk from frequenting cattle feeding areas. By preventing elk from establishing feeding patterns in cattle wintering areas, the potential for inter-species brucellosis transmission is diminished. Elk-proof fencing materials for haystacks have been provided to cattle producers in the JPR since 1992.

In some instances, elk are hazed away from cattle feeding sites. These animals are moved out of areas of conflict by the use of snowmobiles or aircraft to WGFD feedgrounds. When management actions fail to achieve desired results, special depredation hunting seasons are employed to remove problem animals.

Since 1999, BFH personnel have monitored areas where elk parturition and cattle turn-on dates overlap (Figure 15). During the elk calving period from late May to mid June there is a potential risk for brucellosis transmission to cattle on overlapping ranges. Twelve public-land grazing allotments in 3 counties have been identified as potential risk areas. Two of these allotments (Munger Mountain and Porcupine-Squaw Creek) are in the Fall Creek EHU. Neither of these allotments showed elk/cattle interaction from 1999-2003. Coordination and education efforts with land managers and grazing operators will be initiated to resolve elk/cattle interaction if and when conflict areas are identified.

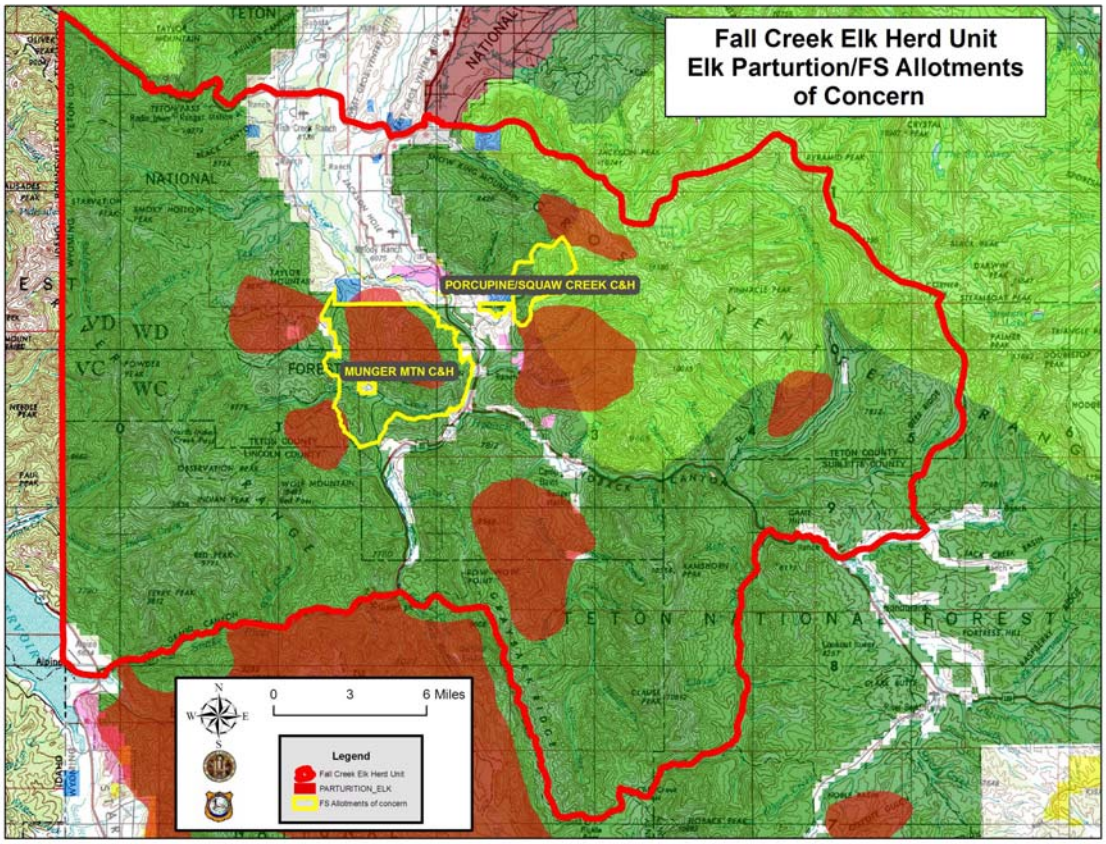


Figure 15. Elk parturition/cattle allotment turn-on (prior to June 15th) overlap areas in the Fall Creek EHU.

E. Habitat Management Summary

A primary goal of the "Habitat" aspect of the BFH program is to enhance transitional and winter elk habitat to potentially minimize the transmission and prevalence of brucellosis in elk associated with feedgrounds. Manipulating the successional state of decadent vegetation can increase the production and palatability of grasses. If habitat improvements are completed near feedgrounds, or between summer range and feedgrounds, the enhanced forage quantity/quality may decrease the dependence of elk on artificial feed, snow conditions permitting. Reducing feeding duration and numbers of elk fed is especially important during the high transmission risk period (3rd trimester of pregnancy), and may decrease probability of intra-specific brucellosis transmission events. Habitat enhancement projects also create vegetative diversity, enhance declining aspen/mountain shrub communities, and improve range conditions for a myriad of species.

Habitat enhancement projects can be employed to mimic natural disturbances and restore habitat to a more properly functioning condition. BFH biologists work with WGFD habitat biologists and other agencies to implement habitat enhancement projects that improve elk transitional and winter ranges as well as habitat for many other wildlife species. WGFD employees cooperate with federal and private landowners in

identification of treatment areas, habitat inventory, solicitation of funding, public information and education activities, treatment implementation, and post-treatment monitoring.

Numerous habitat improvement techniques can be utilized to increase habitat quantity and quality for elk and other wildlife. These methods involve manipulating vegetation to create a mosaic of multi-aged plant communities across the landscape. The most commonly used habitat enhancement techniques include prescribed fire, fire-use fires, mechanical treatments, and herbicide application.

Several habitat enhancement projects have occurred within the Fall Creek EHU on elk winter and transitional ranges (Table 12; Figure 16). Treatments that target improvements to spring ranges and reduce the number of elk fed and dependency on feed during the 3rd trimester of pregnancy should theoretically reduce the risk of brucellosis transmission.

In addition to the implemented projects, WGFD habitat and BFH biologists have collaborated with USFS-BTNF personnel on numerous planned projects within the Fall Creek EHU, which have not been implemented to date. WGFD personnel will continue collaborations with USFS personnel in pursuing implementation of these projects.

Table 12. Habitat treatment projects conducted within the Fall Creek EHU since 1990, including habitat type and land ownership.

Prescribed Fire—1150 total acres treated at 2 locations
Beaver Mtn./Willow Cr.: 1000 acres of mixed conifer/aspen/sagebrush; USFS
Poison Creek: 150 acres of sagebrush; USFS
Mechanical (Cutting)—90 total acres treated at 1 location
Elk Ridge: 90 acres of aspen; USFS
Fire-Use Fires for Resource Benefit—56 total acres treated at 3 locations
Little Horse Creek: 5 acres of mixed conifer; USFS
Horse Creek: 1 acre of mixed conifer; USFS
Highland: 50 acres of mixed conifer; USFS
Total = 1296 acres treated at 6 locations

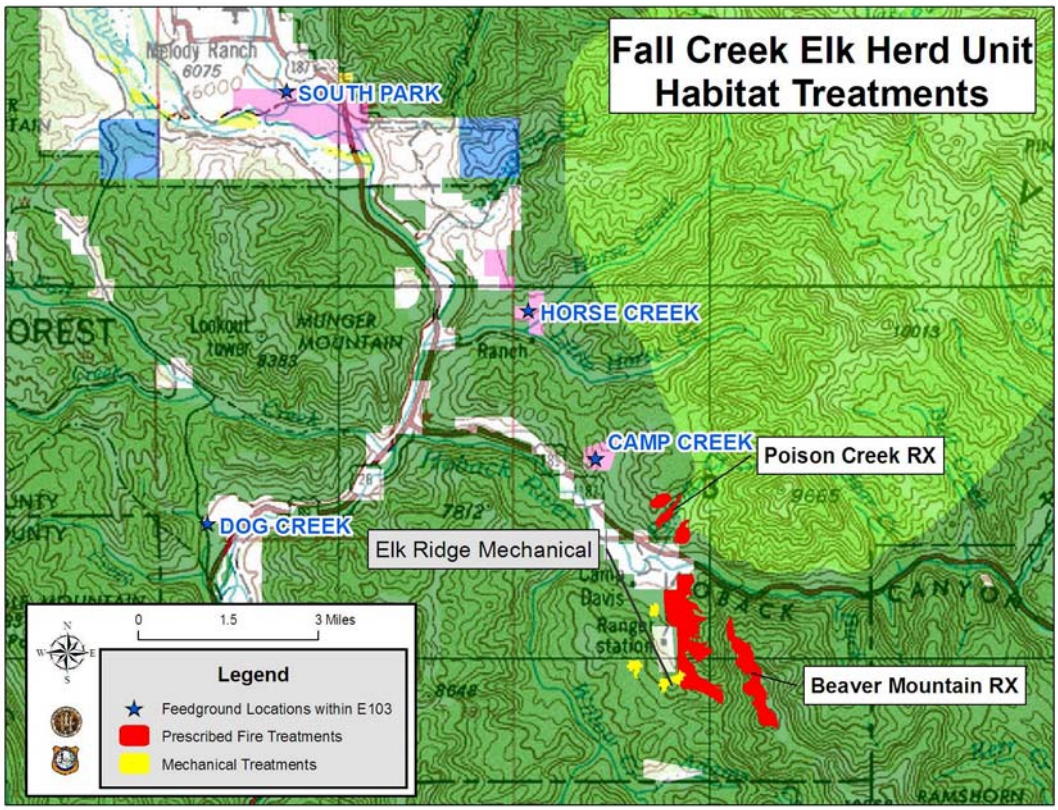


Figure 16. Habitat treatment projects (completed) in the Fall Creek EHU to enhance winter and transitional range.

Monitoring

BFH Project Biologists and Habitat Biologists conduct vegetation monitoring to evaluate success of treatments in meeting objectives, and gain knowledge useful in planning future projects. Permanent plots are established to collect various plant attributes to assess habitat quality and monitor vegetation response post-treatment. Ideally, data from a plot located in a treated area (i.e., prescribed fire, etc) are compared with data from an untreated ("control") area to detect vegetative changes. If a control plot is not established, data collected from the treated site during different years provide comparative information. Data collected from plots include one or several of the following: cover, shrub/tree density, shrub/tree structure, forage production, species diversity, and photographs. In addition to monitoring vegetation response, elk use patterns in relation to treatments are also monitored.

Prescribed Fire

The majority of the prescribed fire treatments were conducted during the early to mid 1990s within the Willow Creek and Poison Creek drainages. Approximately 1000 acres of mixed conifer/aspen/sagebrush were treated with spring and fall prescribed burns in the vicinity of Beaver Mountain (Figure 16). Generally, the treatments were successful in meeting objectives for decreased sagebrush density, enhanced aspen regeneration, and enhanced herbaceous productivity. However, conifer removal objectives were not met.

The Poison Creek prescribed fires were conducted during the spring of 1990, and were directed at decreasing sagebrush densities and increasing herbaceous productivity for ungulate transitional and winter ranges. Only 150 acres were treated due to the close proximity of the Gros Ventre Wilderness boundary.

The remainder of the proposed prescribed burns (i.e. Willow Creek Habitat Improvement and Snake River Canyon) have not been completed. A black-line was implemented at the top for Elk Ridge for the Willow Creek Habitat Improvement, but the project was never completed. Spring prescribed burns were conducted in association with the Snake River Canyon project, but objectives were not met due to cool burning conditions. The BTNF decided to re-scope the project for a fall burning prescription so that vegetation objectives could be met. The project has not been re-scoped to date.

Mechanical Cutting

Elk Ridge Mechanical

Aspen cutting and conifer thinning are treatments utilized to stimulate aspen regeneration. During 1993, four different sites within the Willow Creek drainage were identified and mechanically treated in cooperation with the Jackson District of the BTNF (Figure 16). Conifer removal only was applied on two sites and aspen cutting with conifer thinning was implemented on two other sites. Aspen regeneration for the four sites was measured using a shrub density belt.

Results: An initial flush of aspen suckers occurred post treatment within those sites where both aspen and conifers were removed. Mean sucker density increased 46X, from 145 stems/acre pre-treatment (1994), to 6,715 stems/acre post-treatment (1997) (Figure 17). As expected, stem density then decreased to 4,135 stems/acre six years post-treatment, 2000. This can be attributed to aspen's natural ability to self-thin after the initial flush of regeneration. The longer-term objective for successful aspen regeneration is to acquire 1,000 stems/acre at a height of 10 feet. A secondary objective is to attain one foot of growth/year on regenerating aspen stems. Stem density within conifer and aspen removal sites continues to exceed the objective. Sucker browse levels appeared to be light to moderate and the height objective will be monitored near the 10-yr. post-treatment time.

There is a significant difference in aspen sucker regeneration between the sites that were treated with conifer removal and sites that received both conifer and aspen removal (Figure 17). Mean sucker densities decreased from 2,214 suckers/acre pre-treatment to 1,597 suckers/acre post-treatment on the two sites where only the conifers were removed. A slight but insignificant increase in mean sucker density occurred between 1997 and 2000 within the conifer-only treatment sites. One of the conifer sites had an unexplained drop in aspen regeneration in 1997 (n=363) and then an increase in 2000 (n=799). This could be due to increase of nutrient availability with the gradual

decomposition of the downed trees. However, the other three sites did not display this same flush of nutrients.

Removal of both conifers and aspen best stimulates aspen regeneration through auxin reduction and provides less competition for sunlight, water and nutrients.

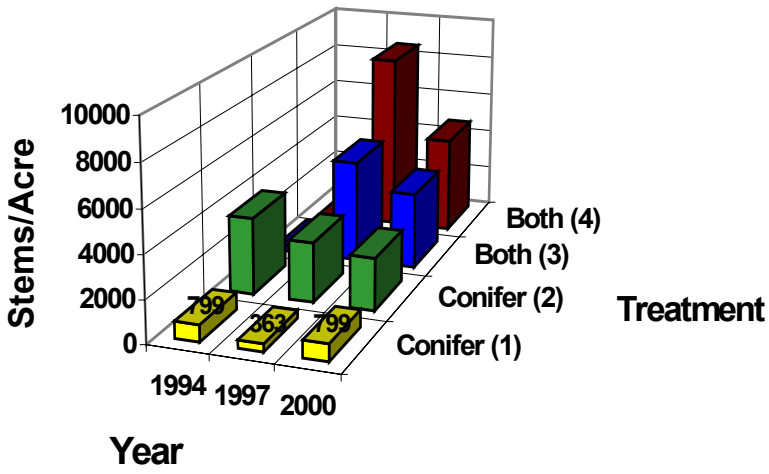


Figure 17. Mechanical aspen treatments conducted in the Willow Creek drainage, BTNF.

Proposed Projects

Snake River Canyon Prescribed Burns

During the early and mid 1990s WGFD BFH and Habitat personnel conducted general habitat inventories throughout much of the Snake River Canyon from Hoback Junction south to approximately the Wolf Creek drainage. Vegetative conditions generally consisted of advanced successional stages within all habitat/community types. Conifer species were invading and out-competing most mountain shrub and aspen types. Larger scale wildfires had not occurred within the area since the late 1870s. With advanced successional status, declines in transitional and winter range carrying capacity are generally observed.

Winter elk observations conducted within this section of the Snake River drainage indicate historic to present-day use (Figure 18). The 1955 flight was conducted during a relatively open winter while flights conducted from 1974-2003 were during winters of varying severity.

WYDOT, in an April 1994 meeting, requested WGFD to provide a list of mitigation projects to offset impacts resulting from reconstruction of the Snake River Canyon highway. Approximately 200 acres of uplands providing winter and transitional range for elk, mule deer, and moose would be impacted by the Snake River Canyon project. We recommended WYDOT offset habitat loses at a ratio of 2 acres of mitigation for every acre impacted (i.e. 400 acres), (Joe White memo, 10 June 1994).

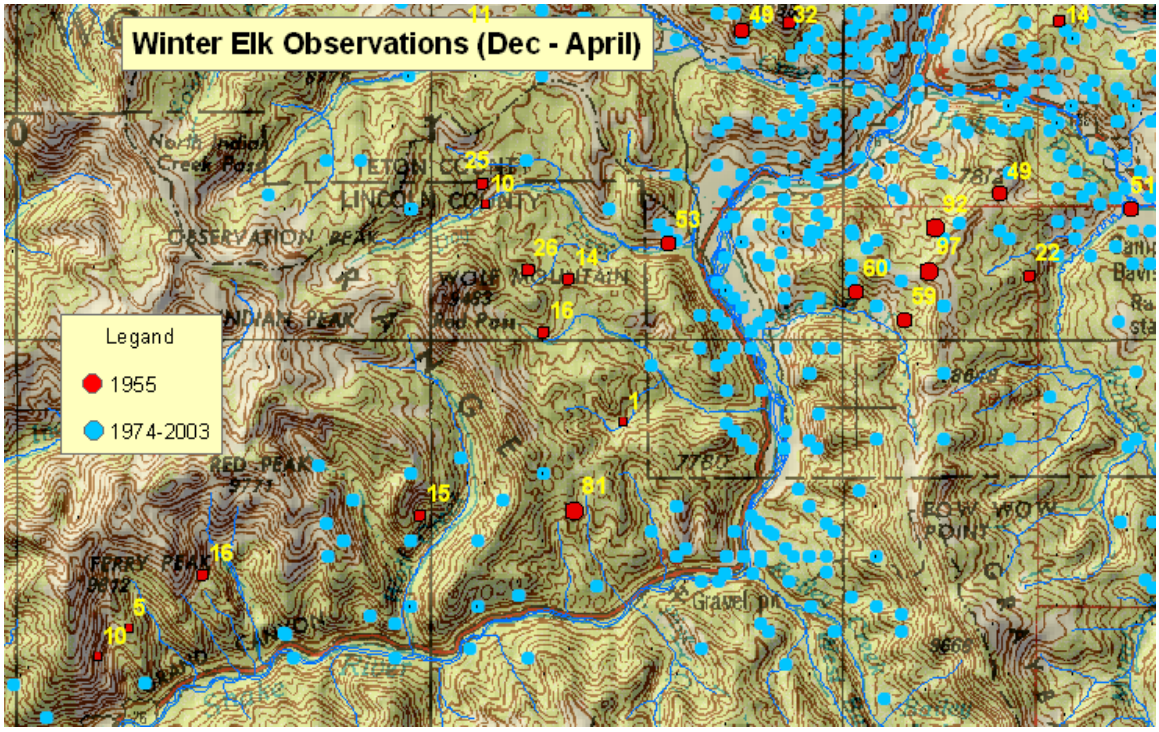


Figure 18. Winter elk locations within the Snake River Canyon area.

After reviewing vegetation conditions Chuck Jones, the FS District Ranger and WGFD biologists concluded that the opportunity existed to treat several thousand acres of mountain shrub, aspen and mixed conifer communities. Spring and fall prescribed fires were the preferred treatment tools. The cost of prescribed fires was estimated at $50.00/acre and WYDOT agreed to contribute $20,000 ($50.00/ac X 400 acres), towards initial treatments. Partnerships and cost sharing would be used to significantly increase the number of acres treated. "This proposal is consistent with the WGFD and APHIS program to reduce the incidence of brucellosis in elk through the Brucellosis-Feedground-Habitat (BFH) program. Treatment of habitat adjacent to the Dog Creek and South Park feedgrounds would hold elk longer on native winter range and/or attract elk to treated areas earlier in the spring following green-up and reduce the concentrations of elk around the feedgrounds" (White memo to WTD, 10 June 1994).

WGFD biologists identified approximately 12,000 acres for prescribed fire treatments. Further coordination between the FS and WGFD resulted in the identification of approximately 10,000 acres in the Snake Rive Canyon area (Figure 19). A decision memo was signed by Chuck Jones, FS District Ranger, on April 2, 1998 to conduct prescribed burns within the delineated areas over a four-year period beginning in the spring of 1998.

Prescribed burns conducted in the Snake River Canyon during the spring of 1998, did not meet objectives. It was agreed that these projects, with the addition of a Bailey Creek section, would be re-scoped by the Forest Service for potential fall burns. During the 1998 summer WGFD and USFS personnel used aerial photography and ground vegetation plots to inventory approximately 9,000 acres of elk, deer, and moose winter/transitional the Bailey Creek to Hoback Junction area. The Snake River Canyon

and Bailey Creek projects were never re-scoped for fall prescribed burn prescriptions, and thus were not completed. The projects are still considered viable and worthy of implementation.

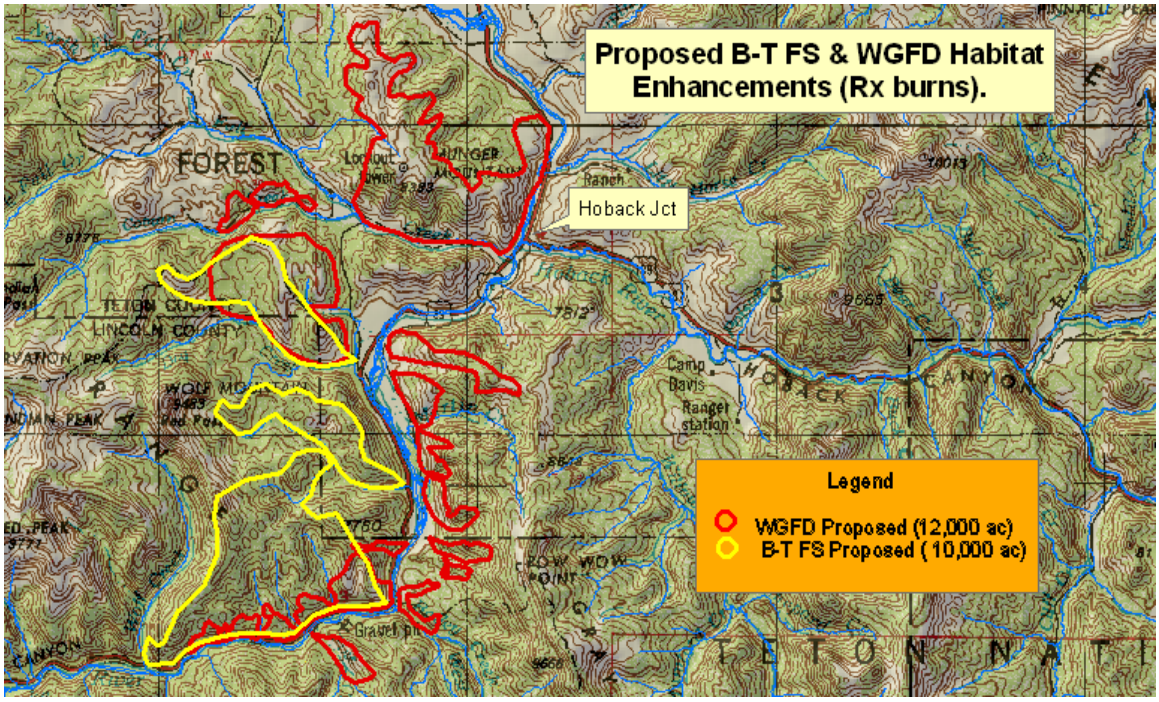


Figure 19. WGFD and USFS proposed prescribed burn projects.

Willow Creek Prescribed Burn

The Willow Creek drainage supports important parturition, transitional, and winter range for elk. Ecological inventories indicated the drainage was successionally advanced and that natural or prescribed fires would enhance ecological conditions and elk habitat. WGFD and USFS personnel submitted and received approval for a Rocky Mountain Elk Foundation proposal ($24,343) in 1996 to treat approximately 2,300 acres on the east side of the lower reaches of the drainage (Figure 20). Plans called for treating an additional 3,300 acres on the west side of the drainage post-recovery of the east-side treatment. Project objectives were:

1. Enhance elk winter, transitional, and parturition range by increasing herbaceous plant production available for forage.
2. Increase the availability of early spring forage to draw elk away from the Camp Creek feedground as early as possible to reduce the risk of brucellosis transmission among elk.
3. Increase the successional diversity of shrub, aspen and conifer communities to enhance watershed functions and wildlife habitats.
4. Enhance moose winter range by regenerating riparian willow communities and other woody browse species.
5. Improve nesting habitat for songbirds by increasing the structural diversity of the vegetative communities in the project area.
6. Reduce fuel volumes in the area, thereby decreasing the impact of future uncontrolled wildfires.

7. Educate and inform the public of the significance of big game winter range and the role of fire in wildlife habitat management.

During the spring of 2000, approximately 500 acres, mostly sagebrush, were spring treated along one side of the burn unit to reduce fuels and the risk of escape during fall treatment. The fall treatments for the eastern portion have not been completed to date. Given the ecologically advanced status and the potential benefits to wildlife, managers should strive for implementation.

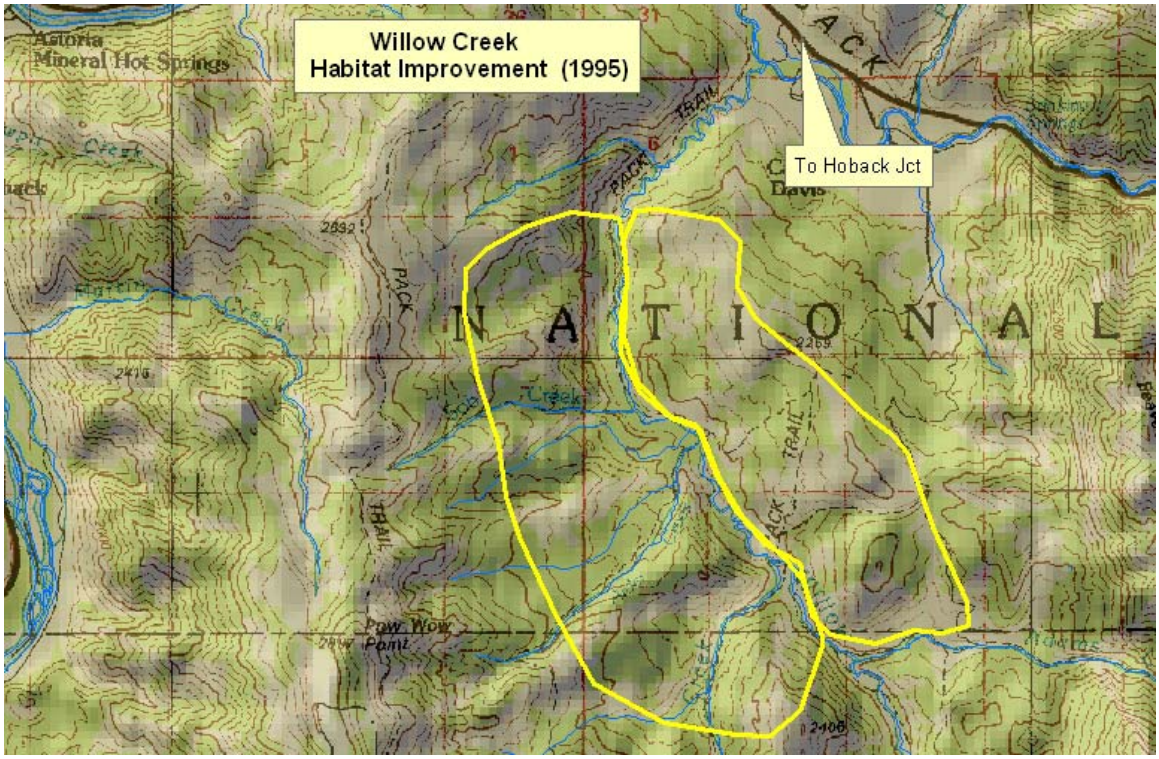


Figure 20. Areas proposed for prescribed burn treatments within the Willow Creek drainage. Treatments have not been implemented to date.

Jackson-Hoback Urban Interface

WGFD Habitat and BFH personnel, in cooperation with BTNF personnel installed numerous ecodata plots and conducted a general inventory of vegetation conditions within the Jackson-Hoback interface area during the 1997-98 field seasons. The project area is generally located from Jackson south to Hoback Junction, and east to Bull Creek encompassing approximately 25,000 acres (Figure 21). Most of the project area is within the 1918 USFS wildlife set-aside where livestock competition/ co-mingling has been significantly reduced as a result of limited livestock grazing.

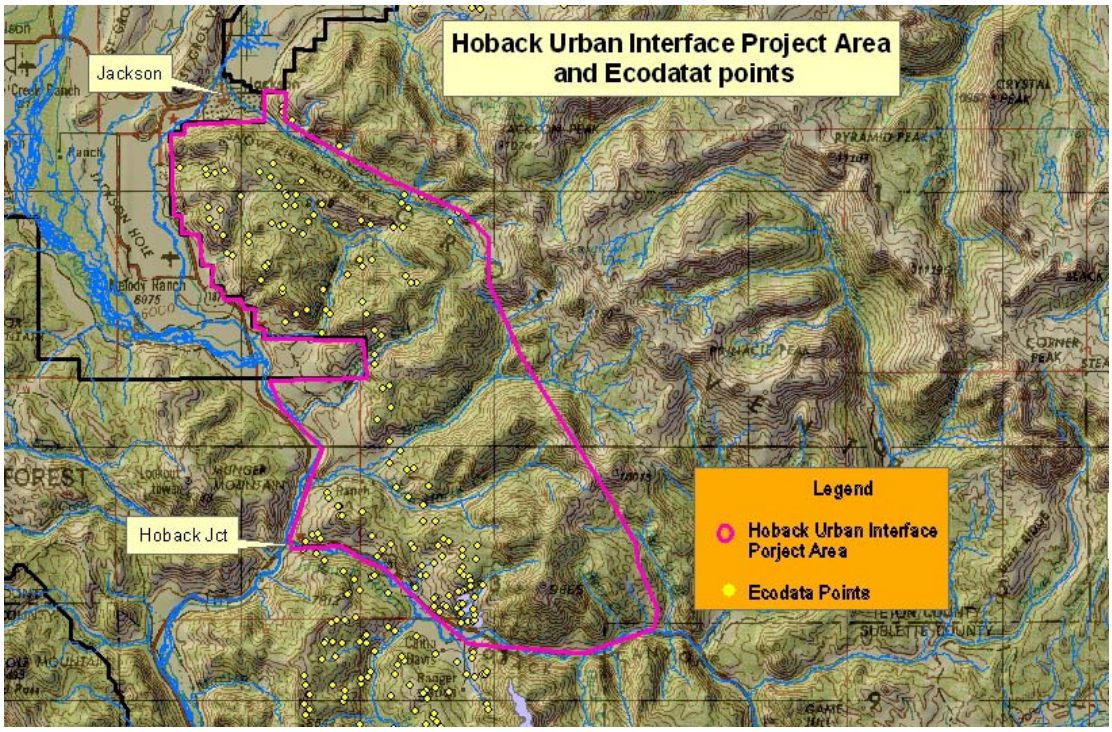


Figure 21. Jackson-Hoback Urban Interface Project area and associated ecodata points.

Due to the lack of successional diversity, advanced successional stages and the need to reduce fuel loads within this area, the BTNF began initial planning for prescribed burn treatments in the project area in 1999. Formal project proposals were never developed, thus treatments were never initiated. The project area has significant potential for habitat enhancements that would increase the carrying capacity for wintering ungulates as well as benefit transitional ranges. Moreover, livestock conflicts would be minimal due to the 1919 wildlife set aside (Figure 4). Thus, pursuit of future treatments within this area is strongly recommended.

Other vegetation monitoring in the Fall Creek EHU

Camp Creek and Horse Creek Production Monitoring

Herbaceous forage production has been measured for nine out of ten years on winter range transects associated with Camp Creek and Horse Creek feedgrounds. Transect sites are located on south facing slopes of historical winter ranges and in close proximity (within one mile) of the feedgrounds. Each transect is 100 yd long with production clipped at 20 sites using a 1.96 ft^2 frame. Two 1.96 ft^2 sampling frames were placed at increments of 30 ft starting at the 15 ft mark (i.e. 15, 45, 60…. 285). Production sampling is done in late September to October.

Forage production over the ten years of this monitoring has varied, likely due in part to ongoing drought conditions. In 2004 production was greater than production in 2003 on these sites; however, it is still lower than the eight-year average at Camp Creek and only 1% higher than the average at the Horse Creek monitoring site (Figure 22). The summer of 2004 was much wetter than the previous three to five years of drought, and in general forage production throughout the Jackson Hole area was greater than we have

seen in recent years. Future monitoring will show if the vegetation continues to rebound with another wet spring in 2005.

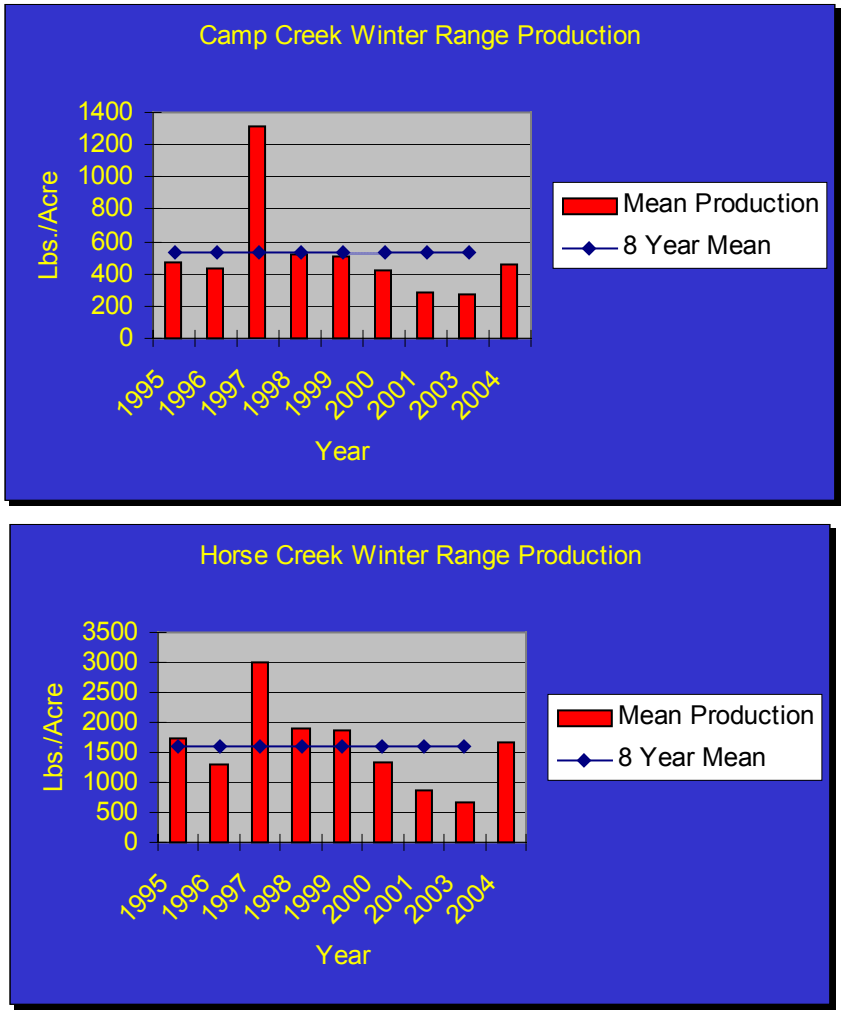


Figure 22. Mean herbaceous production 1995-2004, with the 8-year mean.

Winter Range Monitoring Adjacent to Elk Feedgrounds

The Jackson WGFD Habitat and BFH personnel and USFS Jackson Ranger District initiated a cooperative monitoring study in 1996 to evaluate the long- and short-term impacts of big game to the crucial winter range habitats located near feedgrounds. Specifically, the objectives of the study were to 1) determine the percent dormant-season browse utilization on key species of deciduous shrubs and aspen and 2) evaluate the relationship between browse utilization and proximity to the Horse Creek, Camp Creek, and Dog Creek feedgrounds.

The Ocular Estimate Method (See the USFS Rocky Mountain Research Station's Rangeland Analysis and Management Training Guide) is used to determine browse utilization. Sampling occurs on an annual basis in the middle of May before current leader growth becomes significant. Wildlife species associated with browse utilization are identified through counting and classifying pellet groups. Key browse species monitored are serviceberry (*Amelanchier alnifolia*), quaking aspen (*Populus*

tremuloides), chokecherry (*Prunus virginiana*), and antelope bitterbrush (*Purshia tridentata*).

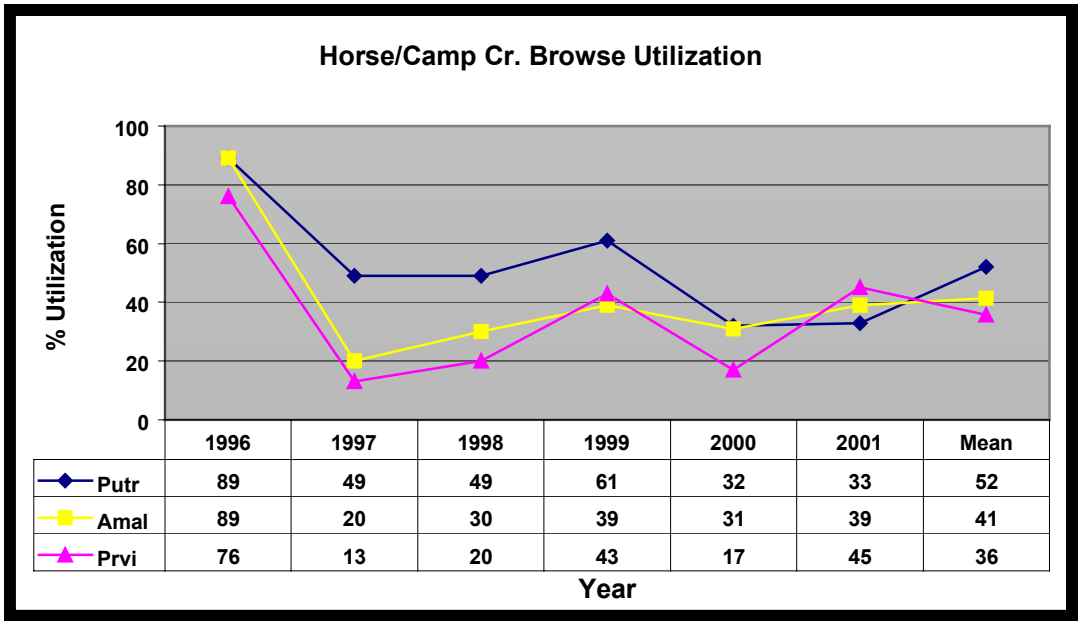
Results: In general, utilization levels were very high in 1996 (76-89%), and stabilized at lower levels (13-61%) in subsequent years (Figure 23). Utilization levels appeared to be influenced by early snow accumulations and initiation of supplemental elk feed on adjacent feedgrounds.

Decreased shrub utilization in 1997 and 1998 was probably a result of deep and persistent snow accumulation, making the plants unavailable and prompting initiation of the supplemental feeding program. Potential depredation concerns at the Horse Creek feedground continued to prompt supplemental feeding during the 2000-2001 winter with relatively light snow cover (4-6"). Potential elk-vehicle collisions at the Camp Creek feedground continue to prompt supplemental feeding in this area with relatively light snow cover (6-9"). Early initiation of the supplemental feeding program may have lured elk off adjacent winter ranges, resulting in reduced use of browse on adjacent winter ranges. Serviceberry use at the Dog Creek site is an exception. Although elk were in several of these areas in spring after feeding was stopped, they appear to have primarily foraged on greening herbaceous plants versus browse species.

Observations during 2001 indicated the majority of elk browsing occurred in late fall. Leader growth on mountain shrubs during the 2000 growing season was below average due to drought conditions, and browsing was moderate allowing some residual growth on most plants. Drought conditions made the bitterbrush and serviceberry plants appear shorter and more "clubbed" than the previous year.

Deer also used the browse, particularly at the Dog Creek site during late fall, winter, and early spring before moving to transitional habitats.

Utilization levels exceeding 30-35% will generally result in decreased shrub vigor and preclude seedling/sprout establishment. Utilization levels appeared to exceed this threshold from 1996-2001.



	1996	1997	1998	1999	2000	2001	Mean
Putr	89	49	49	61	32	33	52
Amal	89	20	30	39	31	39	41
Prvi	76	13	20	43	17	45	36

Figure 23. Percent utilization of antelope bitterbrush, serviceberry and chokecherry on winter ranges adjacent to the Horse Creek and Camp Creek feedgrounds, 1996-2001.