CONFLICT RESOLUTION BY ADAPTIVE MANAGEMENT: MOVING ELK WHERE THEY WANT TO GO

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Abstract: Elk conflicts in the western United States have been increasing due to several long term changes in land use. The Dry Beaver – Ladd Canyon Elk Enhancement project was designed to alleviate elk problems by using adaptive management strategies on a large scale. A combination of road closures, prescribed burning, fertilizing and salting was used to attract elk private land to public lands during the summer months. Thirty-one adult cow elk were monitored from 1993-98 to determine project effectiveness. We affected 48% of the radiocollared elk to migrate onto public land summer range for at least a portion of the time from June through September. We believe that this multi-faceted approach to land management will be useful in addressing similar conflicts in different areas.

Key Words: conflict, elk, habitat, migration, summer range

Over the past 50 years, rocky mountain elk (Cervus elaphus nelsoni) helped define a way of life in northeast Oregon. From the early 1900's when elk were virtually extirpated up to the mid-1990s when herds were near all-time highs, these animals have sparked controversial discussions and decisions on many levels. The controversy exists because changes occurred in land use, both on private and public land. Much of the low elevation, sagebrush/grassland elk winter range was converted to agricultural or urban uses. Summer range on public land was altered by demands for timber, road building and recreation. Elk began to spend more time on private land as security on higher elevation USFS land was being lost. Expanding elk populations also added to increasing conflicts on winter range that was privately owned and grazed by domestic livestock.

Traditional use patterns for elk in the Starkey Wildlife Management Unit (WMU) was to migrate up to high elevation summer range in early summer and return to lower elevation winter range in late fall. Between 1970 and 1990, migration patterns for elk in the Starkey WMU area changed dramatically. Van Dyke and Kemp (data on file at Oregon Dept. Fish and Wildlife office, LaGrande) found 12 of 18 of radio-collared cows never migrated from low elevation, winter range on private land to high elevation, summer range on public land from 1988 - 1990. Limited hunting on the private lands allowed the non-migratory population to increase at a faster rate than hunted populations on public lands. Also, during severe winters 6 of 18 of radio-collared cows migrated 40 km west across the Blue Mountains into lower elevations of the Ukiah WMU. In some instances, these animals caused serious agricultural damage to winter wheat fields on private ranches in the area.

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Several land management practices may have brought about this change in migration patterns. The major influence causing the shift to private lands was thought to be the security offered on private lands, where access was tightly controlled, coupled with the high level of vehicle use on the USFS lands. Effects of roads on elk distribution have been well documented (Perry and Overly 1977, Lyon and Ward 1982, Lyon 1983, Wisdom 1998, Rowland et al 2000). While most privately owned, low elevation, winter range had little or no public access, public lands had been through a period of extensive road building and, subsequently, an increase in year round forest activities. Prior to 1994, open road densities on public land were >2.2 km/km², while densities on private land were <0.3 km/km² (T. Thomas, US Forest Serv., La Grande personal communication). Logging, mushroom picking, all terrain vehicle use, woodcutting, and other recreational activities contributed to an exceptionally high activity level on public land during the critical spring and early summer calving period. From the early 1980s until 1994 open road densities on USFS and private land were similar from late October to mid November during bull elk hunting seasons when 2 cooperative road closures limited the open road density on USFS to <0.6 km/km².

Lack of salt could be another possible factor influencing elk to change migration patterns. Salt has long been used to attract and redistribute elk in forage areas (Skovlin 1982). We observed elk using salt sites on nearby private lands in the spring and early fall when forage was green. There was no active grazing allotment on 60% of the summer range on public land for over 20 years prior to 1990; therefore, no salt sites were available at the higher elevations. Conversely, during this same period, all private lands were grazed, and salt was routinely put out for livestock. The decrease in the number of elk following spring green up onto USFS summer range may have been influenced by the lack of salt at higher elevations. However, this was untested.

Biologists from ODFW were limited in management options to control elk populations once elk became permanent residents on private land. Hunting opportunities in the Starkey Unit were increased in an attempt to reduce the elk population to the management objective of 5,300 elk. Most private lands had little public access during hunting seasons. Many ranches were fee hunted and managed for bull elk hunting. Lack of antlerless elk harvest allowed resident elk populations on private land to increase. To maintain the Starkey elk population at management objective levels, elk hunting opportunities on public lands were increased. As a result, the number of antlerless elk harvested on private land was low, while the harvest on public land was disproportionately high. (L. Erickson, unpublished data, data on file at Oregon Dept. Fish and Wildlife office, LaGrande). This harvest imbalance heightened land use conflicts and presented a management dilemma to ODFW biologists.

These challenges prompted state wildlife managers, federal land managers and the private interests to develop unique approaches for resolving some of the land use/elk management conflicts. In 1991 the Blue Mountains Elk Initiative (BMEI) was chartered by 21 organizations. The main goal of the BMEI was to improve elk management and elk habitat in the Blue Mountains of Oregon and Washington. A common problem for the Blue Mountains was the conflict created when elk moved off public lands and took up residence on private lands. One project selected for funding was the Dry Beaver - Ladd Canyon Elk Enhancement Project (DBLC), which was a multi-year, multi-phase project done on a landscape scale.
Our primary goal was to redistribute elk during the summer. We judged our ability to affect elk distribution by whether at least 60% of elk spending the summer on private land winter range moved to summer range on public land for at least half of the summer months (June through September). Our secondary goal was to develop adaptive management strategies to address conflict areas, which would increase the possibility of success and could be used as a template throughout the western states.

PROJECT AREA
The study area was situated in the Blue Mountains of northeast Oregon. Elevations range from 840 to 2640 m with a mean elevation of 1440 m. Approximately 60% of the area was mixed conifer stands of Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), western larch (*Larix occidentalis*), lodgepole pine (*Pinus contorta*), ponderosa pine (*Pinus ponderosa*), and Englemann spruce (*Picea engelmannii*). Ponderosa pine predominated at low elevations, Douglas-fir at mid-elevations, and lodgepole pine and Englemann spruce at high elevations. Approximately 40% of the area was bunchgrass rangeland.

The DBLC area lies in the center of the Starkey Wildlife Management Unit (1,194 km²). During the early 1990s the DBLC project area was home to 3,500-4,000 of the estimated 6,500 elk in the unit. The Starkey Unit accounted for 10% of all Rocky Mountain bull elk harvested and hunter recreation days in Oregon. DBLC included a 26,305 ha low elevation, winter range (several private land ownerships) and a 22,258 ha high elevation, summer range (primarily public land managed by the LaGrande Ranger District of the Wallowa-Whitman National Forest, United States Forest Service).

METHODS
We identified several management options to meet our goal. Implementation of these strategies began in the fall 93.

Access management
We set a goal to limit the open road density at <0.62 km/km², comparable to the private land road density. We also requested an area closure for the project so that cross-country travel by motor vehicles was prohibited. The physical barriers were put in place starting in fall 1994. A year round, area closure prohibiting all motorized vehicle travel within USFS lands of DBLC (except on designated open roads) was implemented in spring 1995.

Roads were closed by earthen berms, locked gates, or obliteration. Portal entry signs were installed at 6 main access points providing motor vehicle entry into DBLC. Maps and brochures explaining DBLC were made available at portal signs and at ODFW and USFS offices. "Road Closure Violation" report forms were also included in the brochure. The area vehicle closure was extensively monitored by patrolling during spring, summer and fall of 1995-97 to determine closure effectiveness.

Forage enhancement
Another phase of DBLC was large-scale forage enhancement treatments. We believed that forage quantity was not likely to be a limiting factor (over half of the USFS land was not under a grazing allotment), but also felt that any forage enhancement would begin attracting elk to public land. We used prescribed burning and fertilizing (27-12-0-4 was applied at a rate of 112 kg/ha) as forage treatments, since both have been documented to improve food availability for elk (Lyon and Ward 1982).
Salt sites
We established 26 salt sites on USFS summer range, and 136 kg of mineral salt were
stocked at each site during each spring and fall starting fall 1993. Sites were monitored twice
each spring and once during the fall. Additional salt was provided as needed to assure
continuous availability at each site. As elk began to heavily use sites adjacent to private lands,
sites were relocated at higher elevations farther from the private/public land boundary fence to
draw elk further onto summer range.

Monitoring elk distribution
We monitored elk migration from private land to public land during the summer (1993-97). Thirty adult cow elk were radio-collared on private land in late July 1993. We selected July
because we wanted to capture elk that did not complete a typical migration to public land in the
spring. We attempted to collar elk in the same proportion of the population (approximately 1%)
and monitor elk with the same methods as the 1988-90 Starkey telemetry project. Using a
Cessna 180 fixed-wing airplane equipped with 2 H-antennae and a II Morrow 820 GPS unit
(Salem, OR), we located elk usually every 2 weeks in the spring, summer, and fall. In winter elk
were located only once a month to determine if animals were migrating across the Blue
Mountains to the Ukiah WMU and to check for mortality signals. Radio-collars recovered
during hunting seasons were reapplied on other elk the following summer. Twelve collars were
re-applied on elk captured on low elevation, private land during late summer 1994-96.

We evaluated project success by documenting radio-collared elk moving onto public land
during June through September. Elk were categorized each summer as residents to private land
(<25% of locations on public land), transients (>25% and <50% of locations on public land), or
migrants to public lands (>50% of locations on public land). We only used animals that were
monitored for ≥3 years in the analysis (n=31).

RESULTS
Overall, telemetry data indicated DBLC strategies were effective in attracting elk onto
public land (Table 1). Only 19% of 31 collared elk were summer residents of private land as
compared to 67% found in the earlier Starkey telemetry project (VanDyke and Kemp 1988). The
percent of migrants to public lands increased between Starkey study and DBLC (22% and 29%
respectively). The number of transient elk increased dramatically during DBLC to 52% of 31
collared elk spending at least some of the summer on public land, compared to only 11% of 18
found to exhibit this movement during the Starkey telemetry project.

Road closure methods were modified as needed to obtain effective closure and increase
also made changes to the closure, mainly for timber harvest needs throughout DBLC. Public
land users were notified of these changes each year by project brochures and maps at each of the
6 portal signs.

Salt sites averaged heavy use (>136kg) in spring and moderate use (>68kg) in fall. All
sites had at least some elk use in both spring and fall. A problem in assessing elk use at some
sites occurred when trespass cattle were found using sites throughout the summer each year of
the project.

We treated a total of 961 ha with fire. The first 2 burns were done on traditional high elk
use areas. Adjacent areas were burned in later years. We fertilized 486 ha in fall 1994-95 in
areas of high and moderate elk use.
DISCUSSION

DBLC had a considerable influence on elk migration patterns, although we did not meet the original objective to influence 60% of the elk to spend the majority of the summer on public land. We were optimistic to expect elk to alter their movement patterns after only 4 years of vehicle access reductions. This elk population took over 20 years to change from an annual summer migration to 67% of the population not migrating at all. DBLC attempted to reverse the change and see traditional migration patterns re-established in 5 years.

Success may have been delayed due to 2 other factors. Three major timber sales scheduled for the DBLC area resulted in a high volume of administrative traffic on closed roads. This was administered by a road use permit system and was continued throughout the summer. Secondly, although the private landowners supported DBLC, project biologists were not allowed to use any methods on private land to discourage elk from staying there. Hazing elk on private land may have affected elk movement patterns and accelerated the re-establishment of traditional migration patterns. If the amount of administrative traffic was lowered or private landowners allowed ODFW to haze resident elk, there may have been a change in elk use patterns toward the USFS land earlier or a larger change observed.

We believe we will meet our objective over the next few years considering the positive change in the number of transient elk. Only 11% of the original Starkey study elk were found on public land for short periods of time. The resident elk (67% of the population) which spent all of their time on private land never ventured to the traditional habitat the public land offered. During DBLC resident elk numbers decreased to 19% and, subsequently, transient elk numbers increased to 52%. The transient elk, moving back and forth from the private and public lands, may begin to utilize the better forage and comparable solitude found on public land. Although transient elk did not spend the entire summer on public land, they could have encountered forage improvements, salt and the increased security offered by the motor vehicle closure within the DBLC project area. These attributes may lure them to spend the majority of the summer on high elevation USFS land. As these elk re-establish a more traditional migratory pattern to summer range on public land, they may be imprinting their calves to spend more time there as well. They may influence other elk to become transient or migrate to public land. This positive change may indicate that with more time, DBLC could succeed in creating the historical migration patterns this population once exhibited.

An additional benefit was realized when more radio-collared elk began to move onto public lands during the rifle elk hunting seasons. As more elk were found to frequent public land, ODFW biologists began to increase hunting opportunity for antlerless elk. Antlerless tags were increased from 600 (4 hunt periods) in 1993 to a high of 3,100 tags (7 hunt periods) available in 1997. One new “private lands only” hunt was added to specifically target the elk herds found on private land in the DBLC area. Elk population estimates dropped from a high of 6900 in 1996 to 5700 in 1998. This was the management objective for the Starkey WMU.

From the results of DBLC, it is not unrealistic in future years to expect the DBLC project to meet the objective of redistributing 60% of the resident elk on private land to spend at least half the summer on public land. Cooperative efforts and large-scale habitat changes will continue to affect elk and their distribution throughout the area.
PROJECT GUIDELINES

The information obtained from DBLC can be used to address other elk and land use conflicts throughout the western United States. As one of the original 10 projects designated as National Demonstration Areas for the Seeking Common Ground Initiative, DBLC may be used by other agencies and private landowners as a template to solve similar problems. We believe the following guidelines will be helpful to future problem solvers.

1. Road Closures - Implementing the DBLC area motor vehicle closure on USFS land was the most difficult and time-consuming part of the project, but also the most essential. Three factors aided in implementation. First, the LaGrande Ranger District was simultaneously implementing their Access and Travel Management Plan. Secondly, public comments received over a 3 year period were overwhelmingly in support of the project (>95% favorable). Lastly, outside funding sources committed dollars to DBLC assuming an area vehicle closure would be implemented. The BMEI, ODFW, and Rocky Mountain Elk Foundation all made substantial monetary contributions early on in support of DBLC strategies. Also, the Seeking Common Ground Initiative chose DBLC as one of 10 National Demonstration Areas to identify methods which could help in the resolution of big game/livestock conflicts. This type of broad-based financial support enabled the LaGrande Ranger District to implement the area closure.

2. Coordination - The success of a large-scale project requires a major investment of agency cooperation and public education. We recommend designating one person to be responsible for project proposal deadlines, report writing, budget accountability and liaison for all cooperators. This gives all partners one main contact person who should be able to answer most questions. This is especially important when dealing with different fiscal years for agencies and organizations. Public education and involvement is best attained by each cooperator offering different venues for public contacts (i.e. newspaper articles, organizational newsletters, video productions, brochures, and field contacts with user groups).

3. Monitoring - Any funding source or partner willing to support a project such as this requires hard data to confirm project success. The biggest asset from our perspective was the ability to radio-collar elk and monitor their movement patterns. This data showed direct changes in elk migration patterns without having to assume improving security and forage would draw the elk onto the public land. A commitment from field personnel to make monitoring a priority in their work assignments is critical to obtain the necessary information.

4. Private landowner involvement - We believe success would be attained much quicker with the ability to implement strategies to influence elk to move off private lands. Although our project may succeed without the private landowner support we desired, initial project development should include cooperative involvement with private landowners.

ACKNOWLEDGEMENTS

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Our thanks also go to the Rocky Mountain Elk Foundation and the Seeking Common Ground Initiative. This project would not have been possible without their financial and political support.

LITERATURE CITED
Table 1. Change in elk distribution (June - September) following implementation of habitat improvement projects DBLC (1993-98) compared to the Starkey study (1988-91).

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<thead>
<tr>
<th></th>
<th>Private Land Residents</th>
<th>Transients</th>
<th>Public Land Migrants</th>
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<tbody>
<tr>
<td>DBLC (n=31)</td>
<td>6 (19%)</td>
<td>16 (52%)</td>
<td>9 (29%)</td>
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<tr>
<td>Starkey (n=18)</td>
<td>12 (67%)</td>
<td>2 (11%)</td>
<td>4 (22%)</td>
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