Range Use in the East Kootenay

By Timothy J. Ross and Brian M. Wikeem

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PART 1. A Brief History

Ponderosa Pine and Interior Douglas-fir forests cover nearly 250,000 ha in the Rocky Mountain Trench and side-valleys between the U.S. border and Golden. Typically, grasses such as rough fescue, Idaho fescue, bluebunch wheatgrass, Richardson's needlegrass; and numerous forbs and shrubs dominate undisturbed drier parts of these forests and open grassland, while pinegrass often occupies wetter areas in the Douglas-fir zone. These species are also important forages for wildlife and cattle; especially on spring, fall and winter ranges.

Cattle, mule deer, whitetail deer, and elk have shared open forests and grasslands throughout most of the Trench for more than a century. Although cattle and wildlife are usually separated when most elk and deer migrate from the valley bottom in spring, some deer and "homesteader" elk live in the Trench year-round and regularly use private hayfields and pastures for forage.

Spatial overlap of ungulate populations has been a long-standing issue in the East Kootenay, however, numerous historical factors have influenced the present composition of plant communities in the Trench and the availability of forage for livestock and wildlife. This article is the first in a three part series describing the historical context of grazing and other disturbances in the Trench, development of the ranching industry, and conflicts and resolutions that have developed over time.

Vegetation Development Since Glaciation

Most of the Trench was drier than present during the early post-glacial period which began about 13,000 years ago. Grasslands dominated the landscape as pioneering plants colonized openings in the post-glacial ice. Pollen cores from Bluebird Lake southwest of Canal Flats, for example, indicate that sagebrush was an important part of the vegetation up to about 6600 years ago. Many of the current plant species originated from the

sagebrush steppe south of the glacial boundary in Washington, Idaho and Montana. Others immigrated through ice-free corridors in the foothills east of the Rocky Mountains. Vegetation has changed gradually from a pine-birch forest during the cool and moister period from 6600 to 3200, to the present plant communities dominated by larch/Douglas-fir/lodgepole "parkland" mixed with grassland openings.

Significant changes in fauna have also occurred since glaciation. The fossil record indicates that now-extinct mega-fauna, including mammoths, horses, burros, camels, musk oxen and two species of bison were present west of the Rockies. Archeologist Wayne Choquette recovered bison bones from two sites in the Trench dating from 8,000 to 100 years ago, which indicates that bison were west of the continental divide in recent history. Dr. Rexford Daubenmire, professor emeritus from Washington State University, reported that bison only became extinct early in the 19th century.

Pre-European Fire

Historically, lightening-caused fires were common in Ponderosa Pine and Interior Douglas-fir forests. Low-intensity ground fires, returning at 5-50 year intervals, maintained these forest types as a mosaic of grassland, open forest, and dense forest in the Trench.

Aboriginal fires also contributed to shaping and maintaining plant communities in the Trench historically. Evidence from the Flathead region in Montana indicates that the introduction of horses considerably intensified native burning, especially as horse herds became larger. Although the Kootenay Indians respected fire, early narratives suggest that they deliberately set forest fires to create horse pasture.

Historical Horses

Some scientists believe that horses were present west of the Rockies by 1680 and introduced to the Flatheads and Nez Perce between 1720 and 1730. The Kootenay Indians definitely had horses by 1792. Peter Fidler, Hudson Bay Company surveyor, met Kootenay Indians in the Alberta foothills in 1792 who were trading horses with the Peigans but the size of horse populations in the Trench from 1800 to 1900 is not known. James Hector of the Palliser Expedition encountered Kootenays near Columbia Lake in 1859 and reported, "They had a band of about 500 horses…" By the 1880s, the natives at Joseph's Prairie (Cranbrook) had nearly 2,000 horses and 500 head of cattle, and natives on both sides of the International Boundary Line were pasturing 5000 horses on the Tobacco Plains. It is difficult to determine the extent and magnitude of ecological change attributable to horses in the Trench but historical numbers suggest they could have had an early impact on the range resource.

Discovery of Gold

Gold was discovered at Wild Horse Creek near Cranbrook in 1863 and by 1865, up to 8,000 miners were working in the district. In 1865, about 100 sheep were imported from Washington State to feed the miners. Later cattle were driven from Utah, Idaho, and Washington State to Wild Horse Creek during 1866-1867.

Okanagan and Similkameen beef was also driven over the old Dewdney Trail to the new gold fields after the collapse of the Cariboo mining boom in 1865. Other cattle were driven from Argenta on Kootenay Lake to Windermere over the "Beef Trail" through

Earl Gray Pass. In addition to cattle drives, all merchandise was packed into the area by mule and horse trains that were pastured on East Kootenay ranges during, and between, trips.

Railway Building and Fires

More horses and cattle were moved into the East Kootenay between 1897 and 1915 for construction of the Canadian Pacific Railroad (CPR) through the Crows Nest Pass. More than 5,000 men and about 1,000 teams of horses were employed on the railroad. Shops in Cranbrook, Fernie, and Moyie handled from 300 to 400 cattle a month, mostly herded from Alberta, to feed the railway crews.

The Kootenay Central Branch of the CPR reached Bull River in 1911. By then, over 200,000 railway ties had been milled for construction of the line further north. Although Bull River was the center of operations for tie production, logging extended further north to Skookumchuck Prairie and beyond, and logs were boomed down the Kootenay River for processing at the Bull River mill.

Both the direct effects of logging, and the fires that followed, contributed to opening up large areas of range for cattle, horses, and wildlife throughout the southern part of the Trench. Numerous large fires occurred between 1914 and 1931 as the litter of limbs, treetops and broadaxe chips dried and became extremely flammable. The last major fire in 1931, for example, burned about 81,000 ha (200,000 ac) of forestland alone.

Fire-suppression, which began in the Trench during the 1920s, has resulted in forest ingrowth and encroachment over the years. Consequently, many of the forests that regenerated from the early fires have become overstocked and stagnant instead of regulating themselves by "self-thinning", which has resulted in a significant reduction of open range for wildlife and livestock grazing.

PART 2. Building an Industry – Origins of Discontent

Domestic livestock have grazed East Kootenay rangelands since the Kootenay Indians fed their horses on native grasslands in the area but it wasn't until the mid-1800s that cattle began to come into the Trench. James Sinclair, leading a party of immigrants bound for Oregon, brought the first cattle to the Trench from Fort Garry (Winnipeg) in 1841. Travelling through Sinclair Pass (Radium Hot Springs), they descended the Cross and Kootenay rivers to Columbia Lake. A second group from Fort Garry brought cattle and horses in 1854 and they traded cattle for more horses with the Kootenay Indians at Canal Flats.

Although some land was pre-empted in the Trench by 1867, early settlement began in the 1880s when numerous ranches were established from Windermere to the U.S. border. Typically, ranches ran between 50 and 125 cattle but several ranchers had herds ranging from 200 to 300 head. James McKay, an early rancher near Windermere, had several hundred cattle by the late 1880s and over 1,000 in the early 1900s.

Not all ranches ran cattle in the beginning. Several early ranchers, such as A.B. Fenwick, grazed packhorses on their land instead of cattle. The number of pack animals living in the Trench at that time is unknown, but they were another grazing factor on local rangeland until the railroad was completed in the early 1900s.

From the late 1800s to the mid-1940s, livestock numbers gradually increased and up to 9000 beef cattle alone were using Crown range between 1945 and 1954. By 1956 the grasslands were overgrazed and a need for better management was recognized.

Wildlife

Historically, ungulate populations have probably varied, even before Europeans entered the Trench. Early accounts by explorer David Thompson, and by the Palliser Expedition, indicate that elk and deer were uncommon during the early- and mid-1800s, and both parties complained of food shortages to the point of near starvation. Similarly, the Kootenay made up to three trips annually to Alberta for buffalo meat because big game was scarce in the Trench.

Elk may have been historically abundant in the Trench. Both James Hector and Walter Moberly reported seeing large piles of elk antlers scattered over the country near Windermere between 1859 and 1866 but Hector commented further that he had "not seen a single track of elk…[and]...only a few of the smaller deer" in 1859.

Severe winters dramatically reduced elk populations throughout British Columbia in the mid- and late-1800s. From about 1900 to the 1950s, elk and deer populations began to increase, likely in response to the abundance of forage and new habitat created by the fires from 1914 to 1931.

Mule deer, and possibly whitetail deer, were apparently more abundant than elk when Europeans first arrived in the Trench. David Thompson mentions killing deer for meat from 1807 to 1811 more often than elk but he still complained that game was scarce. Although mule deer and whitetail deer were plentiful from the 1860s to the 1960s, populations of both species increased significantly during the 1940s and 1950s. Undoubtedly, these increases contributed to further pressures on the range resource.

Feral Horses

Feral horses have been in the Trench since at least 1800 and probably earlier. In 1809, David Thompson reported that he "spent time chasing after some of the feral horses that grazed the foothills above the lakes" [likely Lake Windermere and Columbia Lake]. According to the Kootenays, these horses once belonged to members of their tribe who died from smallpox in the 1780s.

During the 1940s and 1950s powered farm and logging equipment replaced most of the horses used by these industries and many horses were turned loose on the range. At the same time, ranchers were increasing their cattle herds, taking advantage of the abundant range created by fires. By then, it was apparent that range condition was deteriorating and the Forest Service decided to remove about 5,000 feral horses from the range. Roundup corrals were constructed and some horses were trapped and sold. Others were too wild and were shot on the range. By the early 1950s, most of the feral horses were gone, their place taken by domestic cattle and elk, and a new era in range relations in the East Kootenay began to unfold.

Forest Encroachment

Forest encroachment was recognized as a problem of provincial scope by 1918. In 1950, Dr. Ed Tisdale, the first range scientist with Agriculture Canada at Kamloops, reported "invasion of open or lightly timbered ranges by forest growth … is a significant

problem affecting forest range …with consequent reductions in grazing capacity and usefulness as early range …". Tisdale's comments appear prophetic in that forest succession in the Trench has been inexorable since the 1930s and open range has declined dramatically.

A repeat air photo study that was conducted in 1998 at one range unit in the Cranbrook Forest District confirmed that grassland and open forest had decreased by nearly 50% between 1958 and 1994. If this rate of decline is applied to the entire Ponderosa Pine and Interior Douglas-fir zones in the Trench, nearly 1500 ha of grassland and open forest could be lost annually. Consequently, ungulates will be confined to the remaining open areas, which ultimately will result in deterioration of range condition.

The Conflict

A series of wildlife, soil, and range surveys in the 1950s concluded that grasslands in the Trench were overgrazed and carrying capacity for wildlife and livestock was below its capability. Specifically, the following problems and concerns were identified:

- Livestock were being turned-out before range readiness.
- Ranges were overstocked with livestock.
- Bunchgrasses were being overused.
- Bluebunch wheatgrass and rough fescue were becoming scarce on the open range compared to areas protected from grazing.
- Livestock were reluctant to graze forest range and areas remote from water.
- Overuse was particularly high near water.
- Weeds were invading grassland range.

Although these concerns were widely acknowledged, conflicts emerged among resource managers and stakeholders in the Trench during the 1960s and 1970s concerning dietary overlap and forage allocation between cattle and wildlife. Coordinated Resource Management Planning (CRMP) began in the East Kootenay in 1975 primarily to resolve these conflicts.

Dr. Michael Pitt from the University of British Columbia conducted a review of cattle/tree/wildlife interactions in the Trench in 1982. He found that although most resource managers believed CRMP had improved many East Kootenay ranges, there was concern that range condition and forage productivity were again declining. Most resource people and stakeholders agreed that combined cattle/wildlife grazing, forest ingrowth, and land alienation were factors but they couldn't agree on who was responsible.

Between 1982 and 1986 the elk population increased from about 10,000 to more than 28,000, but today it is estimated to include about 20,000 animals. A recent elk management plan concluded "Current habitat condition on all potential winter range (gross suitability) is estimated to support 41,400 elk, while the net suitability (minus private land) has the potential to support 24,400 elk". In contrast, livestock Animal Unit Months (AUMs) in the Trench peaked in 1964 (72,900 AUMs) but by 1980, they were down to 41,200 AUMs, and have remained relatively constant since.

Despite improvements in the range resource from Coordinated Resource Management, conflicts continued in the 1980s. It was finally recognized that an equitable forage allocation process was necessary to mitigate conflicts, but site-specific

information regarding optimal turnout dates for cattle, optimal season and intensity of forage use, and dietary overlap between cattle and wildlife were not available for the East Kootenay. This information was considered essential to plan reliable grazing management prescriptions in the area.

PART 3 – Conflicts and Resolution

The East Kootenay Trench Agriculture/Wildlife Committee was formed in 1990 to address resource management conflicts in the Trench including recommendations for an equitable forage allocation process. A monitoring program was implemented to provide local scientific data on 1) total and seasonal forage production, 2) dietary overlap among cattle, deer and elk, 3) seasonal and annual forage use, and 4) range condition and trend.

What Did Monitoring Tell Us?

Monitoring was conducted at four important deer and elk winter ranges that were rotationally grazed by cattle. Skookumchuck Prairie, Premier Ridge and Pickering Hills all occur on native range with a mix of open grassland and groves of ponderosa pine or Douglas-fir and trembling aspen. Two pastures were monitored at Peckhams Lake that contained patches of Douglas-fir interspersed with openings seeded to domestic forages.

Forage Production

Forage production varied at all sites in response to annual precipitation, which equalled 98, 133 and 90% of normal over the three years. In fact, average forage production was 125% higher in the wettest year (1993) compared to the driest (1994). Similarly, forage production also differed among sites with the seeded sites at Peckhams Lake producing nearly four times more forage than the native range pastures in 1993.

Table 1. Total standing crop (kg/ha) among five sites in the East Kootenay between 1992 and 1994.

Site	1992	1993	1994
Skookumchuck Prairie	715[1]	925	900
Premier Ridge	830	1170	865
Pickering Hills	840	1110	1135
Peckhams Lake (new seeding)	2370	3005	1115
Peckhams Lake (old seeding)	2280	4250	1760
Average	1405	2090	930

[1] Data rounded to nearest 5 kg/ha

Ungulate Diets

Deer and elk diets generally contained from 36-52 species throughout the year. Shrubs and trees dominated deer diets each year with bitterbrush and Douglas-fir being the most important species in winter. Grasses were eaten least by deer although they were nearly 20% of spring diets. Small-flowered penstemon was the most common native forb eaten by deer and alfalfa and clover were also used sparingly (<5%).

Elk mainly ate grasses throughout the year and especially in winter. Although elk ate several grasses, rough fescue was usually the dominant species in the diet and small-flowered penstemon the most common forb. Elk also grazed alfalfa and clover in summer and fall. If winter conditions limited grass availability, elk switched to trees and shrubs (>35%) with soopolallie, low Oregongrape and Douglas-fir the most important species.

Cattle diets were less diverse than deer and elk diets. Rough fescue, Idaho fescue, and bluegrasses were the most important grasses for cattle while shrubs and forbs were eaten sparingly in spring, summer and fall. About 12 key species were important in the diets of all three ungulates.

Competition for forage could be a factor on some pastures in this study given the diet similarities found between cattle and elk. Cattle can compete with elk in fall and winter through their summer grazing. Similarly, elk could compete with cattle through spring grazing on pastures that cattle later use for summer forage. Although cattle and elk diets were similar, no competition is expected unless food or space becomes less available. This may be possible in dry years when forage is limiting, as forest encroachment advances, or if livestock and wildlife populations increase. No competition was expected by elk with deer, or by cattle with deer, except possibly for specific species such as bitterbrush in particular years.

Table 2. Relative importance of forage classes and individual species in the East Kootenay from 1992 to 1994.

Species/Forage Class	Deer	Elk	Cattle
Grasses			
Wheatgrass species [1]	L	M	H
Smooth bromegrass	L	L	L
Cheatgrass	0	L	L
Idaho fescue	L	M	M
Rough fescue	L	H	M
Prairie Junegrass	0	L	M
Bluegrass species	L	M	H
Needlegrass species	L	M	H
Total Grass [2]	L	H	H
Forbs			
Alfalfa/clover	L	L	0
Small-flowered penstemon	L	L	L
Total Forbs	M	M	L
Trees and Shrubs			
Saskatoon	L	L	L
Yellow ceanothus	L	0	0
Douglas-fir	H	L	0
Bitterbrush	H	0	L
Total Trees and Shrubs	H	M	L

[1] Species Categories 0 = None L = 0-5% M = 6-10% H => 10%
[2] Forage Class Categories L = 0-10% M = 11-50% H => 50%

Total Forage Use

Fifty percent utilization is commonly recommended for proper-use on many range types in North America. Combined wildlife and cattle use ranged from about 50% to >90% of the total forage available and it often exceeded 70%. On native range, forage use was equally split between wildlife (17 and 30%) and cattle (18 and 35%) while cattle used between 35 and 60% of the available forage on the seeded sites.

Wildlife and cattle sequentially graze most range units in the Trench. Typically, cattle are grazed in spring or fall, while wildlife use the same ranges in early spring, fall and winter. Therefore, not all of the total standing crop is available to one ungulate species over the entire grazing season or during a specific foraging period. While cattle or wildlife may moderately use the forage available in a single grazing period, some range units are virtually continuously grazed even though range use plans prescribe rotational grazing for cattle. Ultimately, range condition will decline if preferred species are repeatedly and heavily defoliated, and they are unable to store carbohydrates and set seed.

Cattle rotations must provide adequate forage carryover for fall and winter wildlife demand. Although fall cattle grazing can reduce available forage for wildlife in fall and winter, pastures may receive more wildlife use in spring because forage plants contain less standing litter.

Plant Communities and Range Condition

We believe that both cattle and wildlife are contributing to present conditions on Skookumchuck Prairie, Premier Ridge and Pickering Hills. All three sites are in early stages of succession and appear relatively static.

A reference area exclosure at Skookumchuck Prairie was constructed in 1951 and has been re-sampled at about 10 year intervals since 1960. This exclosure provides perhaps the only opportunity where long-term information is available to compare grazed and ungrazed plant communities in the Trench.

Sandberg's bluegrass, prairie Junegrass, needle-and-thread and low pussytoes were the most common plants on both the grazed and ungrazed plots in 1951. Over the last 50 years there has been little change in the grazed plant community other than needle-and-thread replacing Sandberg's bluegrass and minor fluctuations in forb cover.

Vegetation inside the exclosure has changed dramatically with 50 years of total exclusion from livestock and wildlife grazing and fire. By 1970, bluebunch wheatgrass and rough fescue had become the dominant grasses inside the exclosure and Sandberg's bluegrass, needle-and-thread, and low pussytoes all decreased significantly. Rough fescue and Idaho fescue have largely replaced bluebunch wheatgrass since 1970, but since then, Idaho fescue appears to be displacing rough fescue as the dominant grass. Furthermore, ponderosa pine established in the exclosure in 1982 and by 1994 it was nearly 13% cover.

The plant communities at Skookumchuck Prairie, Premier Ridge and Pickering Hills will remain in a low successional stage if the present levels of heavy wildlife and livestock forage use continue. These winter ranges are presently dominated by

bitterbrush, which can be valuable for mule deer in some winters. A shift in the plant community to more perennial bunchgrasses, however, will improve carrying capacity for combined use by cattle, elk and deer. Other management inputs such as selective harvesting, juvenile spacing, and prescribed fire are also required as forest encroachment continues at an escalating rate.

Resolution

Biological Considerations in Forage Allocation

Simply put, forage allocation is a process of dividing the forage on any management unit among herbivores. The biological foundation for forage allocation is carrying capacity, which links dietary preferences and forage utilization to the sustainability of the forage resource.

Forage allocation needs to account for annual variations in forage production, and carrying capacity must be based on the combined stocking rates of all ungulates. Both cattle stocking rates, and wildlife population levels, must be set, and maintained, to ensure the sustainability of the range resource under common use.

Forage left after ungulate grazing is not wasted and is required to protect soils from erosion, build soil organic matter, maintain structure, and promote water infiltration. Forage allocation must ensure that adequate herbage remains to provide habitat structure and forage for non-ungulates and to impede weed encroachment.

When forage is limiting only two options are available: increase the forage resource or reduce the amount of grazing. The size of the forage resource can be increased by controlling forest ingrowth, and by establishing seeded pastures for livestock turnout and as "intercept ranges" for wildlife returning to the winter range.

Planning and Politics

Although forage allocation relies on biological information, it is essentially a planning and decision-making process that begins with a shared vision of the overall land use ethic that will be pursued. Current land use paradigms range from preservation with no use, to single use with little political or administrative influence. If forage allocation is a worthy goal, we must think broadly to balance personal interests, social values, economic considerations, ecological values, inter-agency priorities, and government policy and legislation, as these all relate to equitability. In other words - conservation with use.

This model acknowledges the importance of land-based products such as beef, wildlife, timber, water, and recreation while protecting soils and vegetation for long-term sustainability. In order for it to succeed, however, goals and objectives must be consistent with the ecological potential of the land management unit, and livestock and wildlife should be managed as components of the system.

In our view, forage allocation should be a principal part of range use planning on common use ranges in the East Kootenay. Plans must be based on definable land units so that specific knowledge of diets, animal distribution, forage production and use, and other information can be incorporated into the planning process. Politics, at various levels, play an integral role in allocating forage in a responsible manner, but a successful plan depends on sincere negotiation, flexible decision-making, and regular evaluation to determine if objectives are being met.

Summary and Conclusions

Sound range management decisions must be based on factual information to produce sustainable grazing practices that conform to the Forest Practices Code of BC Act. Data collected from the Vegetation Monitoring Program provides comprehensive local information that will assist in developing local plans on combined use ranges in the East Kootenay. The main conclusions from this program are:

- Forage production varied at all sites in response to annual precipitation. Management planning must consider this variability in setting animal stocking rates to ensure proper use over the long-term.
- Competition for forage could be a factor on some East Kootenay ranges. Cattle can compete with elk in fall and winter through their summer grazing, whereas elk could compete with cattle through spring grazing on pastures that cattle later use for summer forage. Little or no competition is expected unless food, or space, become limiting.
- Combined wildlife and cattle use often exceeded 70% in this project. A continuation of combined grazing by elk and cattle that exceeds proper use will result in competition between ungulates and deterioration of range condition.
- Wildlife and cattle sequentially graze most range units in the Trench and some range units are virtually continuously grazed even though range use plans prescribe rotational grazing for cattle. Ultimately, range condition will decline if preferred species are repeatedly and heavily defoliated.
- Improvements in range condition obtained by altering cattle grazing rotations can be lost if combined wildlife populations are not balanced with available forage.
- Grazing prescriptions for cattle must provide adequate forage carryover for fall and winter wildlife demand. Combined use by cattle and wildlife must leave adequate ground cover to provide habitat structure and food for non-ungulates, protect soils from erosion, and to impede weed infestation.
- Cattle stocking rates, and wildlife populations, must be set, and maintained to ensure proper levels of use and the sustainability of the range resource.
- Native plant communities, that are currently producing less than their capability, will remain in a low successional stage if the present levels of wildlife and livestock forage use continue on some range units in the Trench.
- Forest encroachment continues to be a significant problem on most East Kootenay ranges. Unless this problem is reversed, more range will be lost for wildlife and cattle. Subsequently, managers will have no alternative but to reduce wildlife and cattle numbers.
- Forage allocation should be a central focus of range use planning on common use ranges in the East Kootenay. Plans must be based on practical management units and consider local knowledge of diets, animal distribution, forage production and use. A successful plan depends on sincere negotiation, flexible decision-making, and regular evaluation to determine if objectives are being met.

Results from the Vegetation Monitoring Program are pertinent to the ecosystem restoration planning initiatives now underway in the NDT4. The information is of educational value for managers by providing knowledge on wildlife and cattle grazing impacts on rangelands, and enhancing existing or potential bunchgrass sites within this planning area.