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DATE: 3/20/91

FURTHER: Finance

Date of 5-Day Notice: March 26, 1992
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: April 27, 1992

Resources Committee considered SB 216

Authorizing moose and caribou farming.

and recommends it
be replaced with

and recommended:

- replace with _____ CS SB 216 (Res) same title new title
- attached amendment(s) and report it back as follows
- _____ letter of intent adopted

- do pass
- do not pass
- no recommendation
- individual recommendations
- further referral to _____

PTN

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

Department(s)/Date:

fiscal note(s) _____

zero fiscal note(s) ADF 16 4/1/92
for SB

appropriation-no fiscal note

Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

[Signature]

Sens. Cotten & Zharoff
signed No Recommendation
Senator Eliason signed no
recommendation 20 - 1
nothing happens

[Signature]
Chair: Signature and Recommendation

Game Ranching in Western Canada

Lyle A. Renecker and Henry M. Kozak

Trends in the world meat markets have been towards leaner meats as people become more conscious of fat, cholesterol, and energy values. As a result, beef markets have become depressed. Venison is naturally a lean meat with a low percentage of intramuscular fat but high levels of protein. Thus, the sale of meat from wild ungulates raised on commercial game ranches could serve as an alternative to meet the demands for leaner meats.

Recently, Geist (1985) presented a view that game ranching is a threat to conservation of wild ungulates. Earlier, Odum (1971) showed the need to diversify wildlife management, such that a mixture of protective (parks and reserves), productive, and multiple-use systems are practiced. In this article, we will attempt to clarify many of the misconceptions about game ranching and outline the benefits of this new promising industry.

Historical Perspective

Wild indigenous herbivores have been closely associated with human occupation of North America for thousands of years. Paleolithic man exploited large numbers of herbivores in North America more than 100,000 years ago (Martin 1973). In recent times, wild game has been used as subsistence food. As settlements in North America expanded, there was uncontrolled decimation of wild herbivores. Present management concepts are designed to place controls on removal rates of wildlife and guarantee a supply of wild stock for sport hunting. However, with this view of wildlife management, there is a lack of diversity as outlined by Odum (1971) to service the variable needs of the public. In Alberta, resources are generally managed as multiple-use or compromise systems which attempt to satisfy the conflicting demands of several users. Parks are few and the area reserved for resource protection within their boundaries is relatively small. Game ranching is a means of providing this missing dimension to wildlife management. It adds the concept of conservation to lands allocated to agriculture by reversing the transformation of natural habitat to cultivation. As a result, the many rare and threatened species in the highly productive prairie and aspen parkland will be perpetuated.

Interest in game ranching as a commercial enterprise has grown during recent years in western Canada. Initially, Elk Island National Park, Alberta, Canada, served as the model for large-scale management of a mixed-species assemblage of native ungulates (Telfer and Scotter 1975). The herbivore guild, most suited for extensive game ranching in habitats of prairie parkland and aspen-dominated boreal forest zones of western Canada, is a combination of bison, wapiti, and moose, of which bison is the largest contributor in biomass

and productivity (Renecker et al. 1987).

Game Ranching or Farming

Game ranching is a production strategy whereby high fencing costs are diluted by increasing size of the land base and management inputs are minimized. Here, carrying capacity is maximized through a mixed-species grazing system. Because of this need for a large contiguous land base (>25 km²) (Hudson and Blyth 1986) there are few opportunities for private landowners to establish extensive ranches.



A mixture of open grassland, and forested areas and wetlands, such as found in Elk Island National Park, are necessary to exploit a mixed-species grazing strategy on extensive ranches.

Indian and Metis settlements are the best candidates for this strategy since they are associated with large tracts of communally owned land necessary for the mixed-species approach (Hudson 1981). Additionally, game ranching is an opportunity for native people to acquire a feeling of self-importance and income in a manner which is compatible with their traditional concepts. For example, the opportunities produced by this new wildlife industry, which are similar to the traditional lifestyle of native peoples, have been demonstrated by the Sisseton and Wahpeton Sioux in South Dakota for many years (Kozak 1985). The first commercial large scale or extensive game ranching in Canada was established in 1980 on land of the Kikino Metis Settlement in north-central Alberta.

With large properties, it becomes more difficult to control animal movements for calving, velvet antler removal, autumn rut and round-ups, and to take advantage of all economic opportunities. For example, the initial direction of the Kikino Metis Settlement venture was towards a large scale management system with a low labour requirement. However, experience revealed a greater need for control of animal populations (Renecker and Biewald 1985). The trend of this operation has been to intensify with the addition of subdivisional fences to gain fall control over animal movement. In New Zealand, early game farmers first raised red deer on extensive properties in the harsh environments of mountain hillsides. The trend was soon changed towards an intensive style of pastoral management on lowland ranges with sheep replacing the deer on hillsides. This shift in range use and

Authors are research assistants, Department of Animal Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5.

management of lands in New Zealand has resulted in higher fecundity and economic returns which offset the costs of fencing (Yerex 1982).

Current legislation of Alberta is being designed to address the promising industry of game ranching. Present policies and regulations discourage the viability of extensive systems. For example, new born calves will require an ear tag and lip-tattoo within 1 month after birth. This is not feasible on large-scale enterprises because of the secretive animal behavior and cryptic coloration of young. It may be necessary to develop management systems whereby ranchers will assign females to smaller paddocks during parturition for identification and tagging. This requirement will identify animals on game ranches and distinguish them from wild stock.

An important factor of game farming is that meat production is not an important strategy until sufficient breeding stock is available. After 20 years of commercial production in New Zealand, meat production remains a secondary strategy to live animal sales¹. Currently, populations of deer on farms in New Zealand exceed 500,000 animals and until stock numbers increase to 1 million head, supplies will not be sufficient for demands of world venison markets². In Alberta,

¹K. Drew, Invermay Agric. Res. Center, New Zealand, pers. commun.
²T. Hayward, Agric. Canada, Canada, pers. commun.

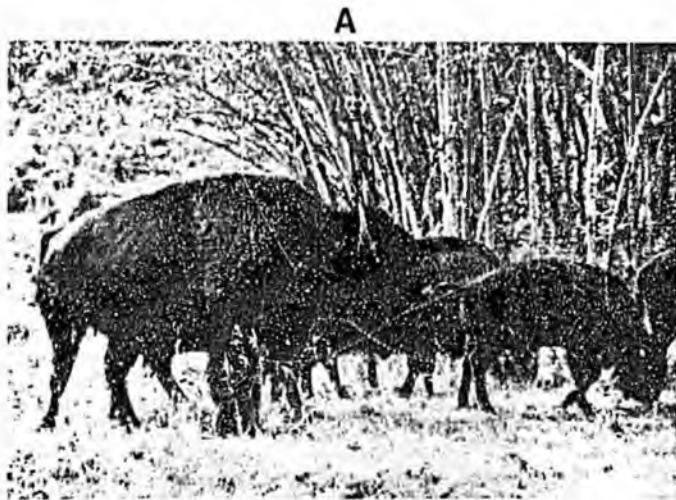
time will be required for similar acquisition of breeding stock.

Agricultural and Conservation Benefits

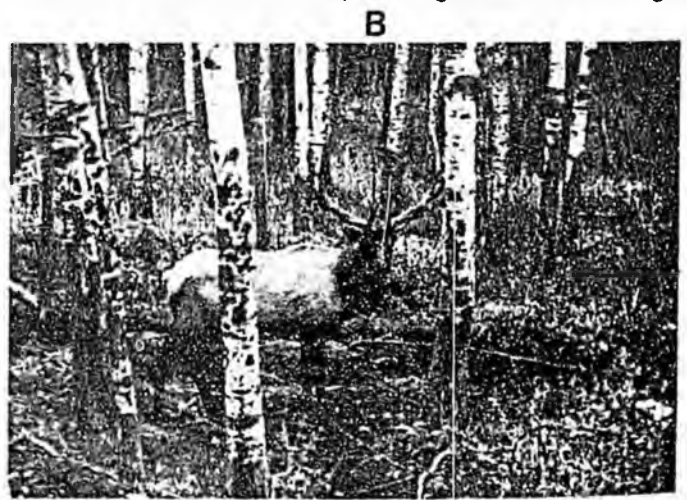
Game ranching was first proposed and investigated on extensive tracts of marginal lands in the aspen boreal forest zone of western Canada by Telfer and Scotter (1975). Land costs, the need to control animal movements, and maintenance of a high level of fecundity will require private enterprise to intensify operations with high stocking rates on smaller paddocks. The game farms will not push the frontier into wilderness lands. In the near future, game ranches will probably replace conventional agriculture on productive lands as was experienced in New Zealand (Yerex 1982). With the development of game farms, lands would be restored to grassland communities where wapiti would replace cattle as the dominant herbivore. Because of their adaptability, wapiti have been recognized as the most productive species in an environment with a mosaic of habitat types and are equally as productive as cattle on good pastures (Alsager and Alsager 1984). So far, only a few game farms have been established for production of valuable breeding stock.

Potential Problems

One anticipated problem about game ranching is that there would be an increase in poaching. Motivation for illegal



A



B

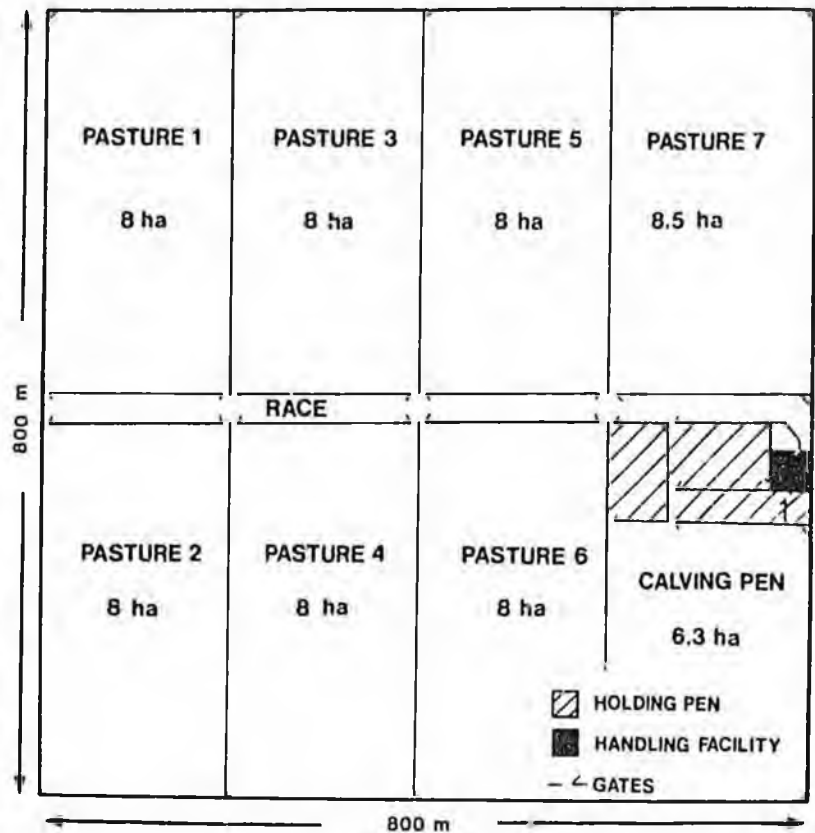
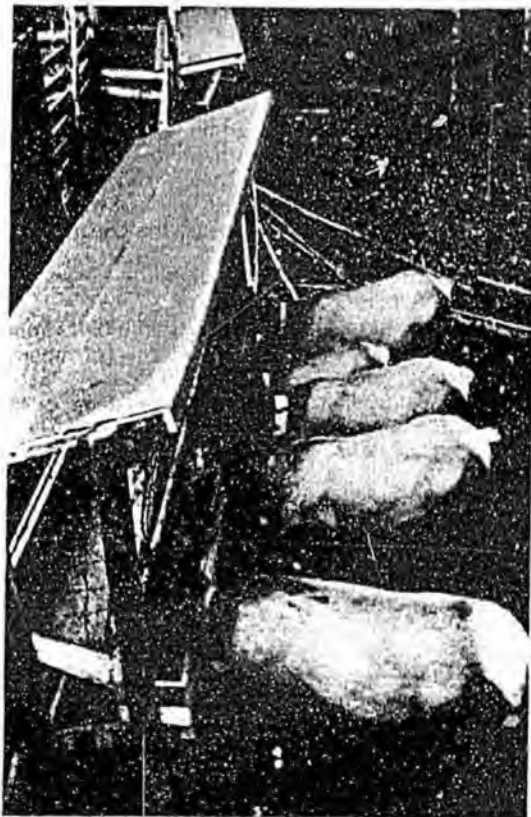


C

TYPICAL HERBIVORE GUILD OF A MIXED-SPECIES GRAZING SYSTEM

- A. BISON
- B. WAPITI
- C. MOOSE

Ungulate species of a game ranch in the aspen-dominated boreal forest.



Intensive wapiti farms are smaller properties with internal fences which adopt full control over animal movements and permit supplementary feeding programs.

harvesting of wild stocks is already at least equal to the regulated harvest for some ungulates (Renecker et al. 1986). By legalizing the sale of meat and other by-products from farmed native ungulates, pressure is removed from wild populations as world markets become saturated. Illegal ventures would become less profitable as prices are controlled thereby reducing the motivation to poach and the entry of illicit products into the marketplace.

Velvet antlers and venison are wildlife tissues stimulating the most concern because of their commercial value. Arguments state that velvet antlers can easily be taken at any point in time during their development. However, velvet antlers are only of commercial value to Korean buyers as a folk medicine for about one week each year. Decimation of wild stock for velvet antlers is not a real problem because of the low opportunity for encounter of wild stock in boreal and montane habitats. Super A Grade velvet antlers occur in early June prior to the last bifurcation of the growing antler. Complete sedation and restraint of the animal are required to ensure that the animal and its antlers can be handled with the necessary care. Damage to the velvet immediately dictates a lower grade and eliminates a profit margin and the motivation for illegal entry of this product into the marketplace. It would be impossible for persons without experience in techniques of animal immobilization, animal behavior and velvet antler removal to remove a product of any value. Also, world supplies have been high, markets extremely volatile and few buyers will deal with quantities of less than one tonne.

Because supply now meets demand, there are more constraints on quality of Super A grade velvet which leads to lower overall prices. As a result, most commercial operations in New Zealand are not orientated specifically for velvet antler production. In order to sell antler velvet in Alberta, an individual must be in possession of a valid big game farm permit. The permit holder is obligated to submit monthly records of animal inventory to the Government. The sale of products must match the animal inventory thereby eliminating the entry of illegal products to the marketplace.

Illicit sales of meat from wild stock has been foreseen as a potential problem of the sale of meat from commercially raised animals. Currently, the federal meat regulations require ante-mortem inspection which ensures observation before slaughter. The marketplace will also stipulate conformity in carcass quality such that the cosmetic characteristics and moisture content of the carcass will be standardized by grain feeding animals for 30-60 days prior to slaughter. This will assure foreign and domestic buyers of a consistent and high quality product for the marketplace. European markets have rigorous standards for slaughter facilities in countries which export venison into the European economic community. Initially, only one such facility will be available in Canada. Finally, all saleable cut meats can be vacuum packaged with a distinctive government seal, thus policing "street peddling" and illegal marketing of venison. Ultimately, the fact remains that commercial buyers of this specialty product will not trade with illicit sources and jeopardize their

business licence when a consistent legal supply of venison is available. Game ranching may not serve to curb the poaching problems that currently exist but it certainly will not augment them since it is the consistent quality of the game ranched product that is desired by the consumer.

Predictably, game meat from ranches and farms will supply the world demands for venison. With the development of the game ranching industry, a constant supply of meat will be distributed to world retailers.

In southern Alberta, the spread of agriculture has been a limiting factor to pronghorn antelope populations (Barrett 1982). As the population of people relative to animal density in North America increases, management systems for wildlife change. These needs will be independent of the development of game ranching.

Currently, the scale of the game ranching industry in Alberta is small. There are approximately 2,700 privately owned wapiti on 85 ranches which encompass about 4,900 ha. If herd growth and expansion of the land base were equal to 20% per year, by the year 2000, we would expect about 29,000 wapiti on 52,400 ha. This would be equal to approximately 0.08% of the area of Alberta or 0.2% of the area of the State of Colorado. At present, conventional agriculture encompasses 29% of Alberta's land area (Anon. 1981).

It must be emphasized that this industry will develop with sound and factual concepts. Positive interest in game ranching is high as it offers viable alternatives to conventional agriculture on marginal lands. It is an enterprise which offers traditional benefits and a feeling of self respect to Native and Metis people. Game ranching provides an opportunity to reverse the transformation of wilderness lands into cleared rangelands required by conventional agricultural practices while landscapes on existing marginal agriculture lands could be enhanced by selecting animals adapted to these environments. If we take time to realize the advantages, it will be possible to recognize that game ranching is diversifying, not replacing wildlife management concepts.

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MEMORANDUM**STATE OF ALASKA
DEPARTMENT OF FISH AND GAME**

TO: The Honorable Lloyd Jones
Chairman
Senate Resource Committee
Alaska State Legislature

DATE: April 8, 1992

FILE NO:

THRU: Ron Somerville *Ron Somerville*
Deputy Commissioner
Department of Fish and Game

TELEPHONE NO: 465-4190

SUBJECT: SB 216 Game Farming

FROM: David G. Kelleyhouse
Director *DKH*
Division of Wildlife Conservation

For several years, Alaskan wildlife biologists have been aware of potential problems associated with game farming/ranching ventures in other states and Canadian provinces. Information has been sketchy, anecdotal and passed primarily through personal communications at conferences. I recently read an excellent overview paper by Dr. Valerius Geist (Professor of Environmental Design, University of Calgary, Alberta, Canada) that addresses specific instances of problems caused by game farming/ranching throughout North America. I was stunned by the magnitude and severity of the problems and the huge costs associated with addressing them. A draft of that paper is attached and I urge all members of the committee to take the time to read it.

If there are any doubts as to the advisability of allowing the husbandry of "domesticated" wild animals in Alaska, Dr. Geist's paper should lay them to rest. True successes are largely limited to Third World countries with burgeoning human populations and accelerated losses of wildlife habitat such as the case in some African nations. Only time will tell if even these situations actually prove successful in the long-term.

In Alaska we enjoy largely unexploited wildlife habitats and populations and a low human population density. Our wildlife generally has been spared introductions of devastating livestock and wildlife diseases and parasites due to geographical isolation. Alaska's wildlife is tremendously valuable and promises even greater value in the future. A wide diversity of Alaskans currently benefits from our wildlife resources personally, culturally, and economically. More intensive management of wildlife in the natural state can meet growing demands for subsistence, recreation, and tourism.

I have severe reservations concerning the advisability of additional game farming/ranching ventures in Alaska. Decisions to embark on such a course should be guided by the best available information. The Division of Wildlife Conservation will provide such information to all parties upon request.

Dr. Charles Schwartz of the department's Moose Research Center (MRC) in Soldotna has been investigating the domestication and husbandry of moose for many years. The following information is drawn from his experience at the MRC, his visits to moose ranches in the Soviet Union, and personal contacts with every known game farm/ranch, research facility, and zoo in North America that has captive moose.

- Of 29 known "parties" that have moose in North America
26 responded to Schwartz' questionnaire.
24 rely on supplementary feeding; 2 on natural browse.
(number of moose held range from 1 to 6)
The MRC has 20-25 captive moose
- Moose have been held by individual parties from periods ranging from 1 to 52 years (the MRC has been in operation since the late 1960s).
- Of 26 respondents, 3 produce moose for commercial purposes; none indicated economic viability of moose ranching except for sale of breeding stock (bulls \$1500, cows \$3500).
- Of the three commercial breeders, none raise moose as their primary farmed species (primary species are elk, reindeer, or bison--all herd animals).
- Material costs alone (no labor) of fencing for moose farmers in 1987 averaged \$13,000 per mile. A 1 mi² enclosure (4 linear miles of fencing, costing \$52,000) in the best moose habitat can support 3-4 moose in the long term; up to 10 moose for 2 years. The MRC spends \$15,000/year on winter supplementary feed (approx 20 animals); \$11,000/year on plant operation.
- Under intensive management and confinement, susceptibility of moose to disease causes excessive mortality of calves from contamination of small pastures or barnyards.
- 70% of all calves (including orphans) raised by the the 26 respondents died before 1-yr of age. Fewer than 20% of animals survive past 6 years. No survival past 10 years. In Soviet Union and on MRC, maximum survival is 12 years. In the wild, survival to 18 years.
- Soviet moose husbandry using "free grazing" system at Pechora from 1949-69 raised 174 moose; 63 disappeared by straying, poaching, and predation; 29 died of disease, nutritional problems, injuries. Only 57 (less than 33%) were slaughtered or distributed to other breeding projects.
- Of three moose farms in the Soviet Union, two have been closed and one has been converted to a research facility for nutritional and physiological study similar to Alaska's MRC.

Alaska could benefit from game ranching

Of Alaska wilderness and wildlife, relative to the rest of the nation, there is a very great amount. Empty lands? Not necessarily.

After the large acreage transfers authorized under the historic land settlement act have been accomplished, the state of Alaska will own about 104 million acres, about 28 percent of the total Alaska land mass; Alaska Native people will own an additional 44 million acres, about 12 percent, or roughly 1/3 of all Alaska. Together the non-federal lands will represent a bit more than two-fifths or 40 percent of the total. The federal government will retain ownership of nearly three-fifths or 60 percent of Alaskan lands.

This vast acreage apparently is dedicated almost entirely to wilderness and wildlife purposes. Initially after transfer much of the land in Native private ownership will remain essentially wilderness with minimum use by people. Of the state's portion, nearly 3/4 has been classified for fish and wildlife. A tiny amount has been classified for agriculture, about 2 percent, and only 16 percent for commercial forestry production.

Then an inescapable fundamental top-priority question facing all Alaskans, including Native Alaskan com-

munities, is working out some reasonable balance in the use of their lands.

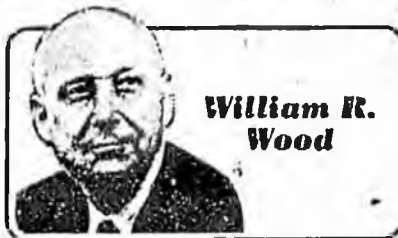
To resolve the fundamental "All Alaska" question will take more than emotionalism, fixed ideologies of any extreme, and selfish specialized interests, however attractive out of context, or in isolation from consideration of the general good.

Any acceptable resolution will require a painfully realistic assessment of potential land resource uses, creative concepts for immediate, mid-term, and long-range uses that fit into a reasoned and well-balanced design for utilization. Truly this is a process without end—so long as the human mind and spirit prevail on earth. There is no quick fix in prospect.

Given the above, is there a common-sense approach to bringing Alaskan wilderness and wildlife into greater production for the benefit of residents in an all-inclusive sense? That is what our endless quest for an answer to our land issue is all about.

The goal of leaving a place better than we found it, over-simplified for clarity, exemplifies husbandry-at-its-best of the natural resources available to us, in reality merely lent to us for a brief time.

For some of the state's marginal



William R. Wood

Views expressed here do not necessarily represent those of the Daily News-Miner

lands, including private ownership lands, game ranching holds much promise. It may offer the soundest approach to bringing a portion of Alaskan wilderness and wildlife into greater production to enhance the several "good-life" styles we enjoy in the North.

A strong case can be made for game ranching in Alaska, particularly in the Interior, but also in Southcentral and southwestern and northwestern areas. In Southeast Alaska the game ranching principle already is being used successfully in the fishing industry. The good case for can be spelled out readily in outline from successful game ranching operations elsewhere. Such experience and state-of-the-art practices must be examined closely

in relation to the particular Alaska project or series of projects that undoubtedly will be proposed this year and subsequently.

For discussion, to whom does Alaska state wilderness wildlife belong? All of us? Then how can we best preserve it and increase its productivity in multiple ways for the common good?

How can a reasonable portion of Alaska state and private lands be set aside for game ranching, beginning perhaps with a pilot project or two?

There are several types of game ranching operations, including but not limited to: those government-operated for preservation of species and tourism, with culling of herds open for recreational hunting, including trophy taking, on a limited permit basis; private club-type operations with access limited to members and their guests only; and private operations for profit, featuring a wide range of income-producing possibilities, from meat production and trophy taking to general recreation, sightseeing, picture taking, and esthetic fulfillment to be derived from wilderness and wildlife.

Paramount for consideration of continued success for private enter-

prise game ranching is not only the preservation but the enhancement of scientific principles of both wilderness and wildlife. Attempts at "exploitation for profit only" are doomed to fail promptly. An enlightened, well-informed people will not tolerate them.

To what extent might limited game ranching, especially in Interior Alaska, relieve pressure upon other wilderness lands and their wildlife? That pressure is building up dramatically. In particular, might a game ranching pilot project featuring Delta buffalo serve more than one good purpose, including resolution of the present farmer vs. buffalo conflict in the Delta agricultural area? Both/and rather than either/or.

Let's think this game ranching prospect through together beginning with a positive and constructive analysis of possibilities as well as problems. Let's reason together and act sensibly for the general good without political posturing or attempted manipulation. Is this too much to ask in face of the number one priority basic issue of land utilization in Alaska?

There is urgent necessity here that demands immediate attention.

FAIRBANKS NEWSMINER 17 NOV. 1982

... formal state recognition and a place on this year's ballot.

During the convention, party members also decided how to deal with the question of party ballots in the upcoming statewide voting later this year.

If the Legislature votes to keep the ballots open to voters of all parties, Green Party candidates will be listed along with all the other candidates as usual, said Sykes. If the Legislature decides on a Republic

And if each party is assigned its own ballot, said Sykes, members have elected to allow voters, whether registered with the Green Party or not, to use the Green Party ballot as long as they do not vote on any other ballot.

Sykes also said Green Party members affirmed their list of key values and priorities. They include gender equality, grass-roots democracy, ecological wisdom, respect for diversity, nonviolence, social justice, decentralization of govern-

future," he said. "That's where the Green Party is different."

The party also voted to sponsor a ballot initiative for statewide health reform, Sykes said.

The Green Party has grown from 300 members statewide in 1990 to 1,089 members, according to the state Division of Elections.

The Green Party convention will wind down Monday following a morning meeting of the Green Party Council, the party's statewide governing body.



Mike Mathers News-Miner

of the Canning River
to their first daughter
to wrap her.

Farming task force urges specialization

By BRIAN O'DONOGHUE
Staff Writer

The future of agriculture in Alaska depends not on seeding big projects with state dollars, but on tree farms, moose ranching and other efforts that market specialized, quality products, according to a task force preparing recommendations for Gov. Walter Hickel.

After months of public hearings around the state, Hickel's 11-member task force is nearing completion of drafting recommendations on a new state agriculture policy for the 1990s.

During a public hearing Friday at the University of Alaska Fairbanks, a consensus took shape within the task force in support of the following points:

- Better marketing efforts are needed, possibly in conjunction with an improved state inspection program.

- The state should continue to make land available for farming, but in smaller blocks under a variety of sales conditions and home-steading options.

- The Legislature needs to address problems created by the restricted titles conveyed in recent agricultural land programs. These programs have left farmers dependent on state loans for development, as the ag-titles are "not bankable," as task force chairman Harold Heinze put it.

- The state should support practical research, while doing a better job of spreading the news about successful products and technologies.

- The state needs to assure the availability of farm operating

loans to finance seed, fertilizer or other annual purchases.

- Tree farming and other select forestry programs should be managed as a form of agriculture, giving farmers on state "ag parcels" the option of raising such crops.

- The task force supports "unrestricted ownership and domestic breeding of all animals, including game species.

"That little point there will be controversial," Heinze said, alluding to Fish and Game's past opposition to moose farming legislation.

Task force member Mike Schultz suggested the recommendations should be linked to specific production goals. "I thought one of our duties would be to set a goal of where we ought to be eight, 10 years from now," said the Delta Junction farmer.

Lt. Gov. Jack Coghill agreed. "I think we're all on the same wavelength of having an overall agriculture policy," said Coghill. "That plan has got to be put in there someplace."

Heinze said he favored more general policy statements.

"One of the problems of putting in goals is it sounds like the mistakes of the past," Heinze said. "Let the marketplace control. We've heard a lot from small family farms. They're alive and well. Most of them are just telling us to get out of the way."

Members of the task force include Heinze, Coghill, Schultz, Jim Carter, Dave Wright, Bob Havemeister, Rob Sexton, James Drew, Herb Eckman, Mark Kulstad and Bob Baer.

Activist who launched

Brian O'Donoghue
56-6661
#244

Game Production: Agricultural Diversification For Alaska?

Lyle A. Renecker

It has become abundantly clear in recent years that agricultural enterprises must diversify if they hope to survive. North America has wrestled with the concept of alternative agricultural practices for over 20 years. Farmers no longer want to approach this business of agriculture with all "their peas in one pod." Political subsidy wars, stabilization plans, depressed commodity prices, and over-production are among the reasons why traditional farming is less profitable and why farmers are diversifying their conventional farm businesses. To the real people in the agricultural sector—the farmers—any change must offer a positive cash flow. More importantly, it must gain the confidence and general interest of farmers.

Consumer trends have been towards healthier and leaner meat products. Meat from native wild ungulates is a natural candidate because of its lean qualities, low percentage of intramuscular fat, and low energy content. In 1986, a conference was held in Des Moines, Iowa which provided 100 options for diversification of the farming community. Deer farming was among them. Commercial game farming would seem a natural alternative to conventional agricultural enterprises that choose to diversify and attempt to meet the greater demand for leaner meats. Here, I describe some of the history behind game production in North America, important political and conservation considerations that involve the game industry and private sector, and how Alaska may fit into the greater global picture.

Historical Perspective



Lyle A. Renecker, Assistant Professor of Animal Science (Reindeer), School of Agriculture and Land Resources Management, University of Alaska Fairbanks.

Man has been associated with the use of native wild herbivores in North America since Paleolithic times more than 100,000 years ago. Prior to the arrival of European fur traders, the Great Plains of North America were abound with wildlife. An estimated 35-75 million plains bison and about 10 million wapiti lived on the continent.

In historic times, native ungulates were utilized as an available source of food first by indigenous Indians and then by explorers and later by settlers who arrived in North America in search of new homes. From his explorations in western Canada, Samuel Hearne in 1770 stated that "moose were the easiest of the deer kind to tame." Homesteaders quickly recognized the favorable disposition of moose and often trained them as beasts of burden or for light farm chores (Figure 1).

However, as this new civilization pushed westward, populations of wild ungulates were slaughtered because of the unprecedented need for food by the frontier settlements and loss of habitat to conventional agriculture. Bison herds were soon decimated in such numbers that between 1873 and 1875 approximately 6.75 million head were killed (most in the United States Midwest). By 1889, William Hornaday estimated that only 635 bison remained in North America. Existence of plains bison today stems from the private efforts of a Flathead Indian and seven ranchers. The roots of plains bison populations were largely derived from 54 wild calves that were caught and raised by these private individuals. This historical event was of great consequence in the conservation of the species and delivers a message about the role of the farmer in wildlife management.

Interest in the commercial production of native herbivores continued to thrive in Canada. In 1915, the Federal Department of Agriculture established a program to evaluate the potential of plains bison x cattle crosses. The purpose was to develop a breed that retained the natural adaptive characteristics of bison to extreme environmental conditions, but maintain the favorable meat characteristics and

temperament of cattle. The program was terminated in 1973. Based on the research findings over the years of the program, it was determined that cross breeding the two species would not be as successful as concentrating on improving the bison or cattle.

Early Interest in Production Strategies

With establishment of Elk Island National Park, a working model of a mixed-species grazing system was initiated. This production strategy utilized an assemblage of a grazer (bison), mixed feeder (wapiti), and browser (moose) which have minimal overlap in their winter food habits. The

Kikino Metis Settlement, in North Central Alberta, Canada was the first to apply this large-scale (game ranch) management system to a commercial operation. This strategy dilutes the cost of fencing by increasing the size of the land base to more than 9 1/2 miles square and minimizes the labor-input by stocking animals at carrying capacity with no supplementary feeding. However, the experience of the Kikino Wildlife Ranch was one of little control over animal movement and economic opportunities were limited to winter when animals can be baited into corrals or traps. The decision of the Kikino operation was a change in direction to more intensive management.

Few private land owners possess the large contiguous tract of land that is necessary for an extensive game ranch. As a result, most commercial operations have been intensive game farms, on smaller properties, with supplementary feeding, which orchestrates a farm management program that exploits all economic opportunities.

Game farming in some Canadian provinces has been increasing at a rate of 30% per year. There are about 17,700 wapiti and 82,600 plains bison on



Figure 1. Moose pulling an Indian travois in north central Alberta (c. 1899). Photograph by C.W. Mathers; permission granted by Saskatchewan Archives (Renecker et al. 1989).

commercial farms and ranches in Canada and the United States. At this stage of development, the game/bison farm industries are largely constrained by availability of breeding stock. It is logical to predict that it will require about 15-20 years for the industry to grow and reach a stable level that is based on the price of meat. For example, if the commercial population of wapiti in Canada continued to grow with the assumptions of good management and normal harvest of products and animals, by 2004, a respectable over-wintering herd of more than 200,000 head would be present on farms (Figure 2). This stock would produce annually 10,500 tons live weight of wapiti for meat production and 133 tons of velvet antlers (Figure 3) for total gross returns of about \$62 million (US).

Industry Development in Alaska at a Glance

Physical Environment

The climate of Alaska is extremely pulsed with short warm summers from June to September and typically cold winters with a mean January

minimum temperature of about -19° F in the Interior. The vegetation varies from temperate forest to montane and tundra types. Only a small proportion of Alaska has a climate and soil base that is suitable for cultivation and crop production. These areas consist of the Cook Inlet-Susitna Lowland and the Tanana Valley of the Interior Alaska Lowlands. Where agriculture is practiced, the principal crops grown in Alaska are cereals (barley and oats), grasses for hay and silage, and potatoes. Because of extremely cold winters and frost conditions forage legume crops are not widely grown in Alaska.

Generally, crop production and grazing in these regions are limited by a growing season which varies from three to four months. However, on Kodiak Island and the Aleutians, grazing can be maintained year round with some supplemental feeding. The best soils for grass production are those with good drainage, have a natural vegetation cover of grasses and forbs, and receive adequate precipitation. Organic soils are poorly drained and susceptible to flooding and erosion. Tundra soils are generally limited in depth and by the environment and not good for intensive agricultural production.

Commercial Game Production

Under the current game farm regulations in Alaska, commercial game production is permissible with bison, musk oxen, reindeer, or wapiti. Commercial reindeer herding has been practiced by indigenous people in the state of Alaska since the turn of the century. During the industry's development, health, management, and marketing programs have been developed and applied. The result has been an extremely important industry to both the Seward Peninsula, where much of the industry is concentrated, and the state as a whole. Because of their adaptive behavior and tolerance to harsh environments, wapiti and bison are other target species that could be easily farmed by the private sector in the agricultural regions of Alaska. For example, wapiti eat less than cattle, adjust quickly to conventional feedstuffs, and their gregarious behavior is compatible with intensive production. Each of these species has adapted to northern environments. With interest in alternative agriculture systems, ecological, physiological, and behavioral adaptations of these wild or semi-domestic species could

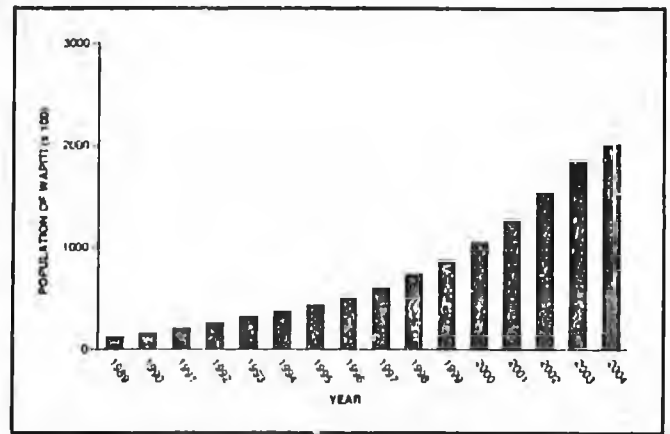


Figure 2. Projected growth of the population of wapiti on Canadian game farms until 2004.

be deployed with an advantage to the farmer. These species have growth cycles adapted to the seasonal food supply and cold tolerance and digestive systems to efficiently utilize native, as well as, domestic forages. For example, bison have adapted to more efficient utilization of low quality feedstuffs than cattle, wapiti are very productive with high growth rates, and reindeer have adapted to both extensive herding in the tundra and, as with other species, they have shown promise for intensive farm operations.

The Private Land Issue

Perhaps the greatest challenge that faces government wildlife agencies is management of resources on private lands. It is difficult to convince a farmer that he should not drain a wetland, clear a forest, or plow a grassland if it translates into more cash returns and less disparity in his annual budget. The farmer requires a tangible benefit in order to fully appreciate the importance of these marginal agricultural lands. Game and bison farming may have created that tangible benefit.

During the winter of 1986-87, there was an estimated 1 million acres of topsoil lost in Western Canada from wind erosion. From pre-settlement to 1985, about 40% of the prairie wetlands disappeared, and during 1984-85, some calculations have shown that forests were being removed at a rate of 80 ac/hr in Western Canada. These areas, like many in Alaska, are marginal, fragile, and probably should never have been altered. They were excellent habitats and range for wapiti and bison and with proper

cies that are naturally adapted to these conditions. With the high value and returns for reindeer, wapiti, and bison, intensive farm operations should seriously consider diversifying conventional agricultural enterprises. If the cost of production is 70-76 percent that of beef and the returns are two-to-three times the price of beef, as has been observed for wapiti and bison (as described by Renecker et al., 1989: p. 264), then it is only common sense to provide the best management possible. Currently, there is one wapiti producer in the state of Alaska. However, it is important for every perspective game farmer to understand the infrastructure, management, and production needs of the species to be farmed and the markets where they can sell their products. But, a new industry must remember that strong public support is maintained through developments that are ethical and logical. There must also be a clear direction in the regulatory procedures of the industry and this originates from consistent definitions mentioned earlier. This new industry of game farming could offer a method of agricultural diversification for Alaskan farmers, however, we will never know unless we conduct the necessary research on which to develop the industry. In a capsule, the needed research is: a) a study of relocation and nutritional stress; b) herd health programs; c) pasture management; d) herd management and productivity; and e) market development, product consistency, supply consolidation. □

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DRAFT 14/August/1991

GAME RANCHING: BOVINE TUBERCULOSIS AND OTHER ILLS

Valerius Geist, Faculty of Environmental Design, The University of Calgary, Calgary, Alberta, Canada, T2N 1N4 fax:403-284-4399; P 403-220-6601/ 288-1508.

Tom Thorne.....

As predicted, the rise in "game ranching" in North America, that is, commerce in dead wildlife, has begun the removal of policies that protected wildlife effectively for over 70 years, has led to an upsurge in wildlife crimes, and the spread of livestock diseases to wildlife, livestock, and people. A case in point is the epidemic of bovine tuberculosis (Mycobacterium bovis) on deer ranches in western Canada and the United States, which began early in 1990. The end is not in sight. In the Province of Alberta alone, about 2,000 from 4,200 captive elk (Cervus canadensis) have been destroyed because of Tb or are destined for destruction. The disease spread to cattle, pigs, bison and humans; as of August 2, 1991, 36 people are under medical supervision for bovine Tb contracted from elk. The disease spread from Montana to Alberta, Saskatchewan and Colorado, and there were independent outbreaks of bovine Tb on game farms in British Columbia and Ontario. Millions of dollars in public funds have been expended to deal with this epidemic. Other disease problems are in the offing. Before dealing with these matters, however, two important problems need to be addressed.

The disease epidemic illustrates some difficulties for scientists addressing policy issue. Our formal communications are impotent to deal with the quick, far-reaching decisions of the market place and politics. The prodigious speed of political decisions altering legislation, outstrips any reasonable timetable of knowledgeable debate engaged in and expected by scientists. Time to reflect, let alone do research is minimal. Changes in legislation may appear as a fait accompli, discouraging further involvement. Public communications by Canadian governments supporting vested interests have been void of scholarly disinterest and rigour, let alone in a form conducive to scholarly discourse. Secrecy and misinformation distributed by public agencies are a concern, as this has not been without effect on the credibility of fellow scientists within agencies. Even to document above requires a break with our mode of referencing, for how does one deal with documents justifying political decisions, that make no pretends at scholarship, but deal with unfounded beliefs and unwarranted assumptions? One bright spot is investigative reporting because it aims to allocate blame. Consequently, it risks court challenges and hostile, public cross-examination. Investigative reporting is normally credible and has been made use of here.

The bypass of informed debate makes utter waste of the available scientific resources and collective knowledge so dearly acquired by society, usually with public funds. This insight, unfortunately, is not original, as it was also reached by the

Science Council of Canada in studies of science and public policy (Background Studies No. 46 & 47). The game ranching controversy is therefore only one example of this expensive malaise which scientists should be aware of.

There is a second important matter: the manner in which the disease epidemic has been handled points to a warning by Beryl L. Crowe (1969) about the behaviour of bureaucracies (the watchdogs hired by the public to guard the public's interest) in her discourse on Garrett Hardin's (1968) "The Tragedy of the Commons". Crowe (op. cit) warned: "Our best empirical answer to the question...Who shall watch the watchers themselves? - have shown fairly conclusively... that the decisions, orders, hearings and press releases of the custodians of the commons...give the large, but unorganized groups in American society symbolic satisfaction and assurances. Yet, the actual day-to-day decisions and operations of these administrative agencies contribute, foster, aid and indeed legitimate the special claims of a small but highly organized groups to differential access to tangible resources which are extracted from the commons. This has been so well documented in the social sciences that the best answer to the question of who watches over the custodians of the commons is the regulated interests that make intrusion on the commons."

CHRONOLOGY OR OVERVIEW OF THE PROBLEM

A circular by the U.S. Department of Agriculture of December 7th, 1990, reports that in April 1990 two herds of fallow deer of 380 animals were destroyed in British Columbia to control Tb; of 13 deer with Tb lesions, 3

had come from Oregon and one from a large fallow deer ranch in New York, where 8 deer with Tb-like lesions have been noticed in the last 4 years. A fallow deer farm in Florida, where one deer imported from New York died of Tb, was to be tested. In a herd of about 250 red deer and elk imported from Canada into New York, 10 from 197 deer tested positive for Tb; two red deer that tested positive had come from New Zealand via Canada. One of the Canadian bull elk, sold to a farm in Wisconsin, died of TB.

In June 1990 an elk, imported May 1988 from Montana close to Yellowstone National Park, died of TB on an Alberta ranch; the stock of 150 elk, 12 deer and 15 bison was killed on December 9th. 23 of the elk were confirmed with TB. On the exporting Montana game ranch, in January 1991, 28 from 143 elk were found to be infected with TB; more were found in July. Four Montana elk ranches were subsequently placed under quarantine. Depopulation of the TB infected elk has been refused, because Montana will not pay market value, but offers only \$50 compensation per elk destroyed. 150 elk sold from the Alberta index ranch were traced to 35 elk ranches in Alberta and 5 in Saskatchewan, which were placed subsequently under quarantine. This increased by February 1991 to 62 ranches in Alberta and 13 in Saskatchewan. In Ontario a large game ranch containing Tb was depopulated in November 1990. By July 1991 about 800 of 2,000 elk destined for depopulation had been killed in Alberta; additional elk await slaughter in Saskatchewan.

There is concern that bovine Tb may have escaped into free-

living elk. In Montana, 83 publicly owned elk were found in 1988 mingling with captive elk on a ranch now known to hold 28 Tb infected elk from 143. The public elk were released. Of the 28 infected elk, 22 are bulls, which one expects to investigate and lick the visiting wild elk, and pass on the disease. This could lead to Tb not only in Yellowstone elk, but also in the bison. In Alberta, in 1990, a minimum of 41 elk escaped from quarantined or Tb infected game ranches, or are unaccountably missing; if 4,200 elk are held captive in Alberta, then this represents an minimum escape rate of about one percent per annum. In addition, a wild bull elk was shot when he tore down a portion of the game fence to reach captive elk on a ranch now quarantined; one elk escaped but was shot. On a ranch with Tb infected elk, 14 elk and 6 deer are missing. The elk may have escaped and are now mingling with wild elk close to Banff National Park. One tagged deer was shot in hunting season. Four eyewitnesses reported seeing free-roaming elk with ear tags and steamers in the general region. A government mission to kill these elk shot 4 untagged, disease free elk. An escape of 25 elk occurred from a ranch on June 3, 1990. Most were recaptured, but 5 bulls were never found. Another 2 elk escape from a now quarantined farm in summer. The real escape figures may be higher as indicated by a source within the Alberta government. Game ranchers are required to report their inventory monthly. However, some game ranches are so large, that the fate of individual animals may be unknown to the owners. This makes adequate testing for Tb impossible. How such registration,

in conjunction with the low compliance and enforcement, can prevent irregularities or provide fool-proof information.

Since the game ranching industry is currently young, its fences new and strong, and the elk valuable and well guarded, one may ask what will happen a few years hence when the fences are corroded and the elk less valuable. With 150,000 ranched elk projected in Alberta, will there be 2,000-4,000 ranched elk escaping annually to mingle with 12,000 wild elk. How many will carry non-native genes and diseases? Will native elk go extinct through hybridization or disease epidemics?

Matters are aggravated by the illegal capture, sale and transportation of potentially diseased and genetically polluted wildlife in a huge continental wildlife market. A game rancher, convicted earlier for illegal trafficking in elk in Alberta, was arrested in Idaho in 1991 with 68 elk and illegal elk x red deer hybrids on an unlicensed game farm. Two of the elk tested positive for brucellosis and were destroyed. The investigating officer reported that another thirty elk and hybrids had been shipped to Canada, raising the specter of bovine brucellosis having been introduced with these elk. There are cases in New Mexico, Colorado, Montana and Idaho where large-scale theft of public elk is suspected or charged. This includes states containing elk with spongiform encephalopathy; some of these elk were destined for Canada. An Alberta game rancher, fined \$25,000 for moving elk for sale without permit, shipped genetically manipulated "shooter bulls" to a ranch in Montana, where the bulls

were destined to be killed in "trophy hunts". A shipment of elk from a Tb infected ranch was sold to a buyer with a fictitious name; they have not been traced. Lanka et al. (1990) report that some veterinarians pointed out that Canada's import procedures were easy to circumvent.

The escape of bovine TB into wild elk is no idle threat. A Tb epidemics struck the fledgling deer ranching industry in New Zealand, as reported by THE DEER FARMER in an ongoing fashion. The disease escaped into feral red and fallow deer and into the opossum (Trichosurus vulpecula), and now covers about one third of both, the North and the South Island. In 1985 TB struck deer farms in Denmark; it spread to cattle and imposed a notable burden on the public purse (WILD UND HUND 91/29 Jan. 1989 pp. 20-21). A Tb outbreak began 1985 in Great Britain when 95 from 391 red deer (C. elaphus spp.) imported from Hungary were found to be diseased; deer ranchers are demanding public compensation and better methods to test for Tb (WILD UND HUND 92/30 July 1989, pp. 18-19). In Great Britain bovine Tb escaped into badger (Meles meles); this led to efforts to eradicate badgers. Earlier this century, in the former Buffalo National Park in Alberta, bovine Tb spread from cattle to bison and infected 6 percent of the elk and moose, and one percent of the mule deer (Tessaro 1986).

Bovine Tb, which appears with high stocking rates of captive deer, is technically difficult to detect, may survive normal quarantine periods, and lie dormant in herds for years. Elk with advanced Tb may look quite normal and had been misdiagnosed by

vets for weeks in Alberta. As in New Zealand, so elk herds on several ranches in Canada had tested negative, but suffered Tb outbreaks nevertheless. The first "index" elk in Alberta was reputedly tested twice for Tb, and showed negative reaction both times. A Montana elk rancher complained about the testing: "We done it and done it. You'd think some of our elk are drug addicts; they've got so many puncture holes in them". By February 28, 1991 Agriculture Canada admitted that the imported elk had been tested for Tb with inadequate methods. It had been aware that the available Tb tests were inadequate, and said so earlier on p. 4-22 of a document entitled "Evaluation of brucellosis and tuberculosis in bison in Canada" produced in 1989. I quote: "The detection of tuberculosis in wildlife is hampered by the lack of proven test methods. There is no reliable blood test, intradermal tuberculin test have not been properly evaluated in many wildlife species, and lymphocyte activation tests are not yet perfected".

Tb infected elk passed the disease to a pig in Alberta as early as June 1990, but that had been kept secret, as had been the case of an infected bison, or the Tb infected fallow deer in B.C. On March 26, Tb was confirmed in cattle which shared a ranch with 350 elk, 219 of which tested positive for the disease.

The first case of a human becoming infected with bovine Tb from handling infected elk, a veterinarian, was reported on Feb. 28, 1991; the number had increased to 36 infected persons under medical care by August. About 20 percent of the persons in contact with ranched elk tested positive for Tb. Those who are

infected with bovine Tb are urged to undergo a 9 months preventive treatment, which however, cannot be handled by all patients. On June 21 it was reported that four workers at a rendering plant became infected by bovine Tb, despite Agriculture Canada's assurance that there was no danger in handling carcasses of infected elk. Rendering and slaughtering plants thereafter refused to handle elk, while the meat inspectors announced through their union on July 24 that the inspectors are not trained to deal with tuberculosis in elk and that they are concerned about their personal as well as the public's health. The Alberta Restaurant and Food Services Association announced July 26 their concern about diseases and the inability to distinguish legal from illegal elk meat. Even Alberta's cattle commission began to voice concerns. By August 2, the infection of four wildlife technicians with bovine Tb from handling dead elk, despite precautions, led to a moratorium in Alberta on autopsies of diseased elk. Additional cases of bovine Tb being transferred from elk to humans are under investigation in Saskatchewan.

Cervid ecology and social behaviour are factors in the spread of tuberculosis. In elk Tb infections break out in the respiratory and digestive system, and as contagious running sores on the exterior of the body. An elk in the latter stages of the disease may drip contagious saliva, feces, urine and puss. Yet elk with advanced Tb may not appear sick. If Tb escapes into elk in the Rockies, then, in time, one will see in national parks tame elk with advanced Tb mixing with tourists on golf courses,

picnic areas, lawns, camp grounds etc., These, contaminated by contagious body fluids of infected elk, may remain hazardous for weeks. Dogs walked on leashes along promenades will almost certainly lick Tb infected puss, risking infection. Diseased elk in the foothills will graze the same areas as cattle, passing on Tb to cattle, as do feral red deer in New Zealand. That would end all hope for a Tb-free status for Canadian cattle, unless, of course, elk are eradicated from the wilds.

Elk groom themselves and others. A contagious elk will work contagious saliva with its tongue into its fur daily. Elk that know one another groom each other. They normally lick the body parts that the companion cannot reach, such as the neck, withers, croup, ears and head. Thus one contagious elk can infect the fur of many elk through social grooming. One thus expects elk free of tuberculosis internally, but carrying the Tb bacterium in their fur where they are expected to survive for weeks. Anyone handling such elk risks not only contaminating his hands, but also dislodging tiny airborne bits of dried sputum containing Tb bacteria that may be inhaled. At risk are not only veterinarians shaving hair with power-sheers from the neck of elk to make cervical Tb tests, but anybody handling the fur of an elk, be they sport or native hunters, wardens, and personnel handling and processing ranched elk.

Livestock diseases have spread to free-living wildlife. Elk in the Yellowstone ecosystem did acquire bovine brucellosis (Brucella abortus)(Rush 1932; Honess and Winter 1956; Davis

1990). Swine brucellosis (B. suis biotype 4) spread from domestic reindeer in Alaska and northern Canada into caribou, grizzly bears, wolves, Arctic foxes, dogs and northern native people (Meyer 1966; Neiland et al. 1968; Neiland 1975; Broughton et al. 1970; Tessaro and Forbes 1986; Gates et al. 1984). While U.S.D.A. dismissed the idea of quarantining Yellowstone National Park, Agriculture Canada, supported by a number of federal and provincial agriculture and wildlife agencies, was deadly serious about depopulating bison infected with bovine tuberculosis and brucellosis Wood Buffalo National Park.

The costs to the Canadian federal government of controlling the TB epidemic on game ranches is high. In Alberta 52 veterinarians and technicians were trying to cope with the Tb outbreak; Agriculture Canada admitted in January 1991 to 25 veterinarians employed full time on the TB epidemic. In addition to the cost of tracing and testing thousands of captive elk, deer, bison and domestic cattle, the testing of over 400 humans who had been in contact with the diseased elk and placing 36 of these under medical supervision and treatment, and the cost of law enforcement, compensation was paid to game ranchers for every animal destroyed to eliminate the TB epidemic. For cattle the law sets an upper limit to compensation of \$1,500 per head, but for elk the compensation limit was to be market value.

Market value for elk is set by auctions. Bids at a Nov. 8 auction in Alberta reached \$3,391 for a bull calf, \$8,183 for a yearling cow, and \$12,464 for cow elk. On November 11 the press

reported that Agriculture Canada and Alberta's Agriculture Animal Health Division had stated that elk destroyed in the TB epidemic could be compensated for at \$8,000-20,000 a head. At a Dec. 1 auction bids exceeded \$16,000 for bred cow elk. However, the arbitration panel consisting of appointees from Agriculture Canada, Agriculture Alberta and the Alberta Game growers was instructed by the federal government to disregard that auction, as there had been irregularities. Only auctions prior to October 31, were to be considered by the panel. As late as December 5th reliable sources informed that Agriculture Canada considered paying up to \$15,000 compensation per elk destroyed. The Ontario game ranch, depopulated of TB infected stock, cost the public \$2 million, and the first elk ranch depopulated in Alberta of 150 elk, 12 deer and 15 bison cost taxpayers \$1.5 million. With mounting public concern over the tens of millions of dollars that would have to be paid out in compensation to elk ranchers, Agriculture Canada announced a compensation rate of \$7,500 per female and \$3,500 per bull elk destroyed. Game ranchers then lobbied that elk destroyed in the TB epidemic be replaced by elk from national parks.

The eradication of bovine Tb has been an ongoing goal in Canada since 1907, towards which much progress was made. In addition to annual operating costs for the Tb eradication programme (i.e. \$3.35 million in 1978), \$18 million were paid out in compensation for cattle destroyed between 1922-1987 (Anonymous 1989:4-9); between 1980-1990 \$2.5 million were paid out in

compensation. This compares to \$5.3 million paid in compensation to game ranchers by the federal government for about 900 elk destroyed between June 1990 and 1991; another 1,100 elk await depopulation, pending agreement by a slaughter plant to accept the potentially diseased elk. About \$250,000 per month is spent in additional operating cost by Agriculture Canada to control the Tb epidemic in elk.

Potentially expensive is the threat to Canada's aspirations to gain a TB free status by 1992. Such a status would be worth not only more than one hundred million dollars in livestock exports annually, but it would save cattle ranchers the expensive Tb testing of their herds. There are also costs due to criminal investigations, but no estimates are available.

Even with a better TB test for elk, the sheer scale of the game ranching industry at maturity, the poor husbandry on marginal operations, the scale of illegal trafficking in game animals, and the lack of enforcement of regulations, will make expensive disease outbreaks inevitable. Agriculture Canada banned in November 24, 1990, the imports of all deer and camelids, and their transport between provinces even for show purposes. A ban on all movements of farmed wild species was put in place in Dec. 8, but was rescinded four weeks later; it had outraged ranchers of exotic stock. Without legal requirements to identify the cause of death of wildlife dying on game ranches, there is a high probability that reportable diseases will not be discovered in time, and that infected herds remain a long time in commerce.

Evidence against game ranching has been compiled by wildlife departments in the United States, while trying to keep out this industry, or to limit the damage it has already done. A report prepared by Lanka et al. (1990) and submitted to court in Wyoming, presents evidence to show that: (1) many wildlife diseases cannot be identified accurately or at all in living animals, (2) that quarantine regulations are inadequate to catch many diseases, (3) that import regulations have been deliberately flouted, (4) that ranched wildlife continues to escape from game ranches for many reasons: breakage of poorly-maintained fences, breakage due to trees falling on fences or due to storm floods, snow drifts forming about fences and tearing them down during the snow melt, big game animals damaging fences, and gates being left open due to accident, carelessness or vandalism. The difficulties encountered in Canada dealing with the TB epidemic confirm Lanka et al. (1990).

Here are two additional foreseeable disease problems:

Meningeal worm. Studies done by Dr. W. M. Samuel, University of Alberta, have shown that elk may become carriers of the meningeal worm Paraelaphostrongylus tenuis (Nematoda), which is indigenous to white-tailed (Odocoileus virginianus Z.) deer of North America (Anderson 1972). There is no method available to consistently identify carriers of this parasite, quarantined elk included. There is no prescription to kill the parasite in situ. There is thus no way to guard wildlife against this disease except a prohibition on all movement of elk into areas free of meningeal

worm. This policy has been adopted by Alberta, but not by other provinces and states.

Currently, white-tailed deer in the west are not infected with meningeal worm as the disease halts, roughly, at the Manitoba - Saskatchewan border. With elk as potential carriers, there is a danger that escaped elk from game ranches carry this disease into uninfected white-tailed deer populations. This would have devastating consequences to populations of mule deer (O. hemionus R.), elk, moose (Alces alces L.), bighorn sheep (Ovis canadensis S.), bison, mountain goats (Oreamnos americanus D.), mountain caribou (Rangifer tarandus caribou G.) populations and domestic livestock.

Spongiform encephalopathy (SE). This is a fatal, incurable brain degeneration that breaks out after a long latency period, up to 30 years after oral infection in humans (Brown 1990). SE is named after the species it is found in (scrapie in sheep, Bovine Spongiform Encephalopathy [BSE] in British cattle, Downer Syndrome in American cattle [Gibbs et al. 1991]; wasting disease in elk and mule deer [Williams and Young 1980, 1982], Transmissible Mink Encephalopathy [TME] in mink [Marsh et al. 1991]). This gives the impression of many types of SE, but note Paul Brown's (1990:38) comment: "The separation of transmissible spongiform encephalopathies into veterinary and human categories is fundamentally artificial, as they all result from the same pathological process, involving the transformation of a normal host-encoded protein into amyloid fibrils that accumulate in and

eventually destroy the brain". In humans SE has several variants, all transmissible, including Creutzfeld-Jakob-Disease (CJD), Gerstmann-Streussler-Scheinker-Syndrome (GSS) and kuru. Many technical reviews of SE and current updates preclude the need for a detailed review here (Weissmann 1989; Kimberlin 1990; Brown 1990; Paine 1990; Odenwald (1990). Uncertainties due to paucity of research on a number of important public health questions, combined with a nearly indestructible infectious agent that currently cannot be removed safely during food processing (Taylor 1989; Brown et al. 1990; Brown and Gajdusek 1991), the rapid spread of the disease geographically, the alteration of pathogenicity in passage between species, the long latency periods expected with oral transmission in food, and the dreadful pathology, make this a very troubling disease - particularly when found in free-living wildlife.

Moreover, the refereed literature presents but a part of the important information, as shown by investigative reporting, in particular by the German weekly DER SPIEGEL (No.32/21:254-255, 1990; No.32/44: 164-166, 1990; No. 45/3 p.189, 1991; see also CBC "Quirks and Quarks", 27th Oct. 1990). It revealed not only unpublished interpretations of the data by the researchers themselves, or exposed the selective perception of agricultural spokesmen, but it also showed how the meat industry circumvented regulations designed to contain the spread of the disease.

Of importance here is that elk and mule deer (Odocoileus hemionus) are known carriers of SE in the western U.S. (Williams

and Young 1980, 1982; Bahmanyar et al. 1985; Guiroy et al. 1991 a, b), that the disease has been found in captive and free-living cervids, that in elk there appears to be fairly rapid lateral transmission, that the geographic distribution of the disease is not known, and that little funding is available to find out. Spongiform encephalopathy in elk and mule deer contains the same infectious protein as scrapie (Guiroy et al. 1991 a, b). "Wasting disease" as used by Bringans (1987) for wapiti in New Zealand is unrelated, and may be a nutritional deficiency disease. In Britain "mad cow disease" probably developed in cattle fed on the protein meal prepared from sheep cadavers, though a spokesman for the rendering business (Wilson 1989) criticizes that this hypothesis has not been tested despite the industries offer of tangible co-operation. Scrapie has only been spread experimentally to cattle by tissue injection (Gibbs et al. 1999). Oral infection is suspected in five species of African antelope which died of SE in zoos (Kirkwood et al. 1990). Here SE spread from female to young and erupted quickly, that is, within 2-3 years. SE appeared in mink on U.S. fur ranches fed meat of cattle that died of "downer syndrome"; cattle inoculated with mink SE tissue also developed SE, and the infected cattle in turn were able to pass on SE via inoculation and the oral route to healthy mink (CBC "Quirks and quarks", 27th Oct. 1990; Marsh et al. 1991). SE has been found in British cats (Leggett et al. 1990) and in Norwegian foxes (Hagen and Bjerkas 1990). In humans kuru is transmitted orally (Brown 1990), but CJD does not correlate

with the consumption of sheep. However, a current outbreak of CJD in Czechoslovakia is associated with intensive sheep husbandry (DER SPIEGEL 32/21:254-255, 1990); the consumption of sheep eyes as practiced in Libya by the Jewish community has been linked to increased CJD (SCIENCE 247[4942]: 523, 2/2/1990; DER SPIEGEL 32/21:254-255, 1990). CJD has been linked to iatrogenic infections from rabies vaccine produced from sheep brains (Arya 1990), and to injections of hormones extracted from human pituitaries (Brown 1990).

The incidence of SE in elk is difficult to determine, since it can be currently identified only post mortem. The disease surfaced in captive and free-living cervids in Wyoming and Colorado. In sheep scrapie is transmitted laterally through the ingestion of the expelled placenta, and there is evidence that SE is also transmitted laterally in elk. North American cervids could contract SE where their ranges overlap with those of sheep infected with scrapie or cattle with Downer Syndrome. Elk are likely to nibble the bones of dead sheep or cattle, a possible route of SE infection if the bones are from stock that died of SE and contain residues of bone marrow. However, SE has not been reported in Eurasian red and fallow deer, though these species overlap with domestic and wild caprids. In British zoos, deer must have been fed the same rations as African antelope that did develop SE. Maybe Eurasian deer, unlike elk and mule deer, have evolved some protection against SE due their long evolutionary association with many species of caprids where SE is endemic.

The disease agent has not been found in muscle tissue, which is considered fairly safe to eat, but internal organs carry the disease agent. However, the practice of sawing through spinal cord, brain and marrow, and thus spraying the carcass with a film of infected neural tissue and bone marrow would contaminate the meat with SE. The practice of removing brain, spine, large nerves and lymph nodes, all loci of BSE virinos, as once required by German import regulations, has been condemned as inadequate. One cannot remove large nerve strands and lymph nodes adequately in fresh meat and not at all in frozen slabs of meat.

Cooking infected tissues is not adequate to remove the infectious SE agent; it has survived heating at 360° C and autoclaving (Brown et al. 1990). Burning of carcasses, not burial, is the only safe way of destroying the infectious agent as the causative agent survives burial in soil (Brown and Gajdusek, 1991).

SE infected elk on game ranches could remain a long time in commerce because SE is so difficult to detect. Elk, for reasons of antler harvest and building up herds, are kept alive on game ranches longer than the normal latency period for the SE disease agent to multiply and reach the central nervous system. This increasing the risk of elk, saturated with the infective agent, being sent off to slaughter. There could be an element of risk in eating elk meat coming from ranched herds. The element of risk in eating sheep or beef is less as sheep are eaten primarily as lamb and beef as 2-3 year old animals, well before the spread of the

SE agent through the internal organs, lymphatic system, bone marrow and central nervous system.

DISCUSSION Ironically, game ranching is promoted by agricultural bureaucracies in Canada as "alternative agriculture". Concerns that game ranching stimulates commercial poaching, that escapes from game farms put at risk native wildlife through genetic pollution, competition and diseases, while diseases also endangered public health, native people and livestock, that incompatibility of free ranging populations of ranched species and of predators was a threat to native wildlife, that farming wild species has not been found to be boon for conservation (Klein 1970; Ehrenfeld 1974; Holmes 1982; Swenson 1983; Geist 1985, 1988, 1989; Pruitt 1985; Samuel 1987; Onderka and Wishart 1988; Onderka et al. 1988; Lanka et al. 1990) fell on deaf ears. So did the fact of TB epidemics in farmed and feral deer in New Zealand, Great Britain and Denmark.

Early in 1990 Canadian agricultural bureaucracies argued at public hearings for the extermination of the last wild herd of buffalo (Bison bison L.), the bison of Wood Buffalo National Park (Connelly et al. 1990). These bison, infected in 1925 with bovine Tb and brucellosis, were rated so dangerous to livestock, wildlife and public health, that \$22 million in public funds were to be spent eradicating the diseases. Agriculture Canada pointed to its investment in a Tb free status for Canada's cattle, and to the expected economic benefits.

However, the "diseased bison problem" appeared contrived,

because these bureaucracies forcefully supported game ranching, which was known to be a great disease threats. History proved it within two months with a Tb epidemic on game farms. The diseased bison, in their 65 years of existence, had accounted for no known infection of livestock or humans. This compares to 36 humans infected by ranched elk with Tb within a year, plus infected livestock, and the likely loss to Canada of an expected Tb free status for its cattle herds in 1992.

As bovine Tb spread through Canadian elk ranches infecting humans and livestock, agricultural bureaucracies belittled the dangers from Tb or other diseases. On July 18, 1991, in the midst of the Tb epidemic, the Alberta government announced that it had legalized the sale of elk meat. With game ranching entrenched, there is a permanent "disease bridge" for livestock diseases to cross from captive big game to wild populations and back. Will raccoons become the equivalent of the brush-tailed opossum in New Zealand in spreading Tb? Damage to tourism and agriculture from reportable diseases born by wildlife is no longer a question of if, but only of when.

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BOVINE TB

27

Record 125:279-280.

RAISING MOOSE

In 1949, the experimental moose farm started out with 14 moose under the age of three years old, with the idea of raising a domestic animal, and today there are domesticated animals of the third and fourth generation in the herd, all direct descendents of the first fourteen. New-born calves up to five days old were found to be the most suitable for bottle-feeding on cow's milk and for domestication. They become attached for life to the individual feeding them. Such calves can be turned loose without fear that they will run away. At the age of three the tame animals usually bear their first calves and in subsequent years reproduce regularly. Some nearly always have two calves; others usually one calf; while others the chances of producing one or two are about the same. The farm has thus disproved the widely held belief that moose do not reproduce in captivity. Moreover some of the animals are now twelve years old and only one adult has died of disease. The best results seem to come from a system of year-round unrestricted grazing, with the animals unattended by a herdsman, periodically rounded up for check-ups and held in temporary corrals during the calving and mating season. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY, DEC. 1964

Calf Moose are born anytime between April to the beginning of June, usually in mid-May. They grow up quickly. Bottle-raised male roe and red deer regularly turn vicious and dangerous when they grow up and come into rut. This has rarely been experienced with the largest and strongest of deer, the moose. The reason maybe that male moose in rut are quiet and gentle. Since the moose becomes tame so easily, their young have often been bottle raised in the Baltics, Sweden, and Russia. From 1946 until 1948, moose were first captured when one to three days old for the moose

farm. Such animals became extremely tame and attached to humans. -- GRZIMAK ANIMAL LIFE ENCYCLOPEDIA 1962 - VOL. 13

New born calves up to five days old were found to be the most suitable for bottle-feeding on cow's milk and for domestication. They do not show any fear of man and, having lost their mother, follow him around on their own accord. They readily drink cow's milk from a feeding bottle and become attached for life to the individual feeding them. Such calves can be turned loose without fear that they will run away. At the age of three years old the tame animals usually bear their first calves and in subsequent years reproduce regularly. When calves were taken away from their domesticated mothers immediately after birth and bottle-fed, the milk cows were found to transfer their maternal instinct to the milkers. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY - Dec. 1964.

Moose Farming?

The Tanana Athabascan Indians, who lived around Fairbanks before the foreigner came, purposely modified the environment to produce more food. The Indians recognized that spruce forests provide no food for moose and that they set fires to produce more moose browse.

Ivar Skarland is one of the few to have studied the early ways of life. --- ALASKA SCIENCE NUGGETS - NEIL DAVIS (PAGE 146)

Moose meat is low in calories and cholesterol making them very attractive for production and world wide markets. They grow ^{up to} 5 lbs. a day for the first six months.

The moose has been allowed to pasture unrestrained from October to the end of May - during the entire time the moose farm has been in existence, there has not been a single instance of loss of domesticated to roaming wild moose. The rearing and training moose to conditions of domestication absolutely eliminate the seasonal migrated instinct. The application to domesticated moose allows a many - fold increase in economic return over what we receive from wild moose by managed hunting - EXPERIMENTAL MOOSE FARMING 1956 - RUSSIA

And all the above is in addition to the resources that will be made available from these animals. The hides can be tanned and made into clothes, crafts and collectibles, the bones can be made into tools (fleshing tools), crafts (dogsled made from jaw bone), or ground for fertilizer or sold to a dog food industry. The antlers can be made into crafts (knifehandles, belt buckles...) or perhaps ground for the orient (Elk horn in velvet sells for \$26.00 an ounce)

and even the hard toes can be made into jewelry (resembling the look of baleen).

This one resource would be profitable for many different and diverse industries, ranging from tourist businesses, airlines, hotels, garages, filling stations, photographers, truckers tanneries, biologist, teachers, vets, and artists and craftmans and on and on...

UTILIZING DOMESTICATED MOOSE FOR TRANSPORT

Moose possess many qualities of value as a draft animal. -- easily traverse: bogs, densely littered forests, deep snow, have great physical strength, are provided with food anywhere, in winter do not require warm quarters, and are docile to handle. At the same time these animals have their special biological peculiarities. One characteristic is their sedentary way of life. Utilizing moose for draft requires purposeful preparatory training of them from an early age. Practical work on the moose farm shows that there exists well-defined individual variations in the amount of work a moose can do. In this regard selective culling has a great effect on the creation of work moose. A program for work moose must take into account seasonal variations in the yearly cycle of the moose. Moose have the greatest capacity for work in the autumn months. However, using greatly aroused and vicious bulls for work at this time is impossibly dangerous, and after the rut, they lose up to 20% of body weight. Hence, it is concluded that bull moose in general are of little use for work, and it is advisable to use nothing but castrated moose for this purpose. Castration causes moose to become very gentle and tractable, taking no part in the rut. They continue to gain body weight, and therefore, in autumn and the first half of winter, they are in excellent working condition. Castration does not adversely affect growth of moose (even if it is carried out on a four-month old) and promotes apparent increase in the hardiness of these animals. With the approach of warm spring and summer weather the work efficiency of moose is reduced, since the life activity of nearly all moose is lowered at this time and are mainly active at night and spend most all day lying in shady and cool parts of the forest or in small ponds. Therefore, at this time, work on the moose farm was done only at night and periodically. -- 1956, Experimental Moose-farm, pechora-Ilych National Park, Russia

Since the moose become tame so easily, their young have often been bottle raised in the Baltics, Sweden, and Russia. A biologist, Dr. Peter Krott who resided in Finland, tried to ride two bottle-raised young moose and drive them before a wagon. Almost full grown, they were strapped into a special harness, bridles, and halters without any resistance on the first attempt. This could not be done with any young horse, no matter how tame, since it is more ticklish. Because a metal bit would be too cold in the winter, they had rubber. They did not pay any attention to the sleigh behind them and walked around with harness and sleigh as if on their way to pasture. After twenty minutes, they would browse in the bushes, they would lay down to recover from the strain. Later Peter Krott traveled to several towns in Finland to show off his team. The two large animals would follow their master, who lured them up the ramp onto the truck with a cabbage. Their halters were tied to the front wall and, while the truck was moving, they would lie down quietly. When they turned their heads their dangerous antlers were only millimeters from Mr. Krott's eyes - proof of how precisely they could control their movements. When Krott called them, they immediately put their muzzles under his arm and followed like dogs. They were not bothered in their shows by the crowds, the many cyclist, cars, and buses. Only at the station were they terrified when a train dashed past them, although after the train was gone, they calmed down and returned without any difficulties to the exhibition grounds. The children were delighted when, amidst the crowd, the animals lay down to rest and ruminate. Even a private plane flown right above their heads did not bother them.

In the Soviet Union, they were more successful with training moose for riding and pulling carts. Cliff Drawings discovered in Siberia show that moose tended by humans or hitched to a sleigh, suggesting the moose was once as domesticated an animal

as the horse and the cow. As early as 1938, the experimental institute of Serpuchowsk near Moscow had thirteen tame moose who were hitched daily to a sleigh. They would pull one ton and a half cubic meters of logs for fifteen kilometers. Unfortunately, this station was ruined during the German occupation. Later rebuilt in Siberia in the state nature preserve where the moose's main diet grows plentifully. From 1946 to 1948, moose were first captured when one to three days old for the moose farm. They immediately drank cow's milk from the bottle. Such animals became extremely tame and attached to humans. Already at an age of two to three months, the animals are put into a halter and attached to a post with a rope. Within a few weeks, they learn how to walk on a leash. It is important that they not only obey the familiar person's voice, but also that they respond to the sound of a horn. Otherwise, they would only follow the people they know. As soon as the moose have reached a weight of 130 to 150 kilograms, about six months old, they are trained to carry loads and to pull carts. At three years, their training is completed and they are ready for work. They may be ridden and pull weights of several hundred pounds. Full-grown moose can carry up to 250 pounds, which is one third of their live weight. The moose may turn out to be of use for labor in the north. It needs no special food supply, as horses, or gasoline as cars. Deep snow, swamp, or fallen trees are no obstacles for it. Even in the winter it does not need a stable, but can lie down on the snow.

In Livonia, a forester named Harry Walter had a male moose, who skillfully jumped through an open window into and out of his room. During meals it would lie in the living room, and it followed him in the forest like a dog. While it could be ridden, it would not tolerate a saddle. -- GRZIMAK ANIMAL LIFE ENCYCLOPEDIA VOL. 13

POSSIBILITIES OF USING MOOSE FOR MILK PRODUCTION

Because of its qualities of composition, moose milk appears to be a very important food product, especially for northern regions on a subsistence economy and with under-developed animals husbandry where there is found a notable shortage of fresh milk.

Moose milk is a pure white color, much thicker than cow's milk, without smell, having a characteristic salty-astringent taste, easily turned (curdled). When added to sweetened coffee or tea, it acts like cow's cream. When poured in a thin stream, the milk quickly evaporates and in the dry state resembles cheese in taste.

Moose milk shows a very high quality, it is significantly more nutritious than cow's milk. Studies show that butter made from moose milk contained much more vitamin A, C, and D. -- 1956 - EXPERIMENTAL MOOSE - FARMING PECHORA - ILYCH NATIONAL PARK, RUSSIA

A female moose in the wild gives an average of 150 liters of milk per year. Due to regular milking, the lactation period may be extended from four to six months. On the Moose farm, after six years, the best female gave almost six liters daily, 402 liters per year. -- SOVIET UNION, EXPERIMENTAL FARMING IN STATE NATURE PRESERVE OF 1962, GRZIMAK ANIMAL LIFE ENCYCLOPEDIA VOL. 13

Early in the morning in answer to the bugle call, the moose appear on the edge of the forest, there are already more than 40 moose at the Kastroma Farm, which is only eight years old. In answer to the bugle call the moose come out of the forest to the pens. Salted water is ready for them and milk and oatmeal for the calves. Some Moose cows yield

as much as six quarters of milk a day. And what milk! It is five times richer in protein and fat than ordinary cow's milk. It churns to excellent butter. The moose are not at all fussy about their feed, and that makes them ideal domestic animals in forested and marsh - covered regions. A year-old female strayed from a herd, two years later the animal accidentally came upon the person who had been it's herdsman. Hearing the voice, it ran up to him, sniffed at the man's face and nosed and poked its muzzle into his pocket, where he used to keep tidbits for the animals. She followed the man some five or six miles to the farm and never left the place. It is interesting that the moose did not turn wild after two years of living with wild moose.

-- KOSTROMA AGRICULTURAL EXPERIMENTAL STATION SOVIET LIFE,
MAY 1974

It has been established that the milking process does not present any difficulties or danger to the milkers. The moose cows return punctually from their pastures to the farm to be milked. At first a milk yield of 75 to 150 litres per cow was obtained for the lactation. Fourteen years later the top figure has been boosted to 430 litres per cow by various milking methods.

Moose milk contains, on average, 10 percent of fat, some .15 percent of protein, and many vitamins. Appreciable differences in milk yield between cows suggests possibilities of boosting milk productivity by selective breeding. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY,
DEC. 1964



↑
Moose

"Milking Moose"

(In the European
Countries Moose
Are Known as ELK)

By Malvei Khromchenko

EVERY MORNING the year round, no matter what the weather, a bugle calls through the village of Sumarokovo. The bugler is patient, persistent, repeating his notes until the elk appear on the edge of the forest. The day has begun for the elk-breeding farm at the Kostroma Agricultural Experimental Station.

Elk were close to extinction at the turn of the century; they were much too tempting and easy game for hunters. Only extreme conservation measures saved them, and today there are half a million in the Soviet Union. From the central forests (including those in Kos-

troma Region), the elk gradually moved up to the Caucasus and the Carpathians.

Cliff drawings discovered in Siberia show that the elk was once as domesticated an animal as the horse and the cow. We do not know why it went wild again.

People tell the story of a year-old female that strayed from a herd in open pasturage in the Siberian taiga. Two years later the animal accidentally came upon the person who had been its herdsman. Hearing the voice, it ran up to him, sniffed at the man's face and nose and poked its muzzle into his pocket, where he used to keep tidbits for the animal. It followed the man some five or six miles to the elk-breeding farm and never left the place. It is interesting that the elk had not turned wild in the two years it had lived with wild elk.

So domesticating elk is not too difficult. The problem is to get them used to herd life and a fixed order of things.

But the job is worth doing. Some elk cows at the Kostroma farm yield as much as six quarts of milk a day. And what milk! It is five times richer in protein and fat than ordinary cow's milk; it churns to excellent butter. The elk are not at all fussy about their food, and that makes them ideal domestic animals in forested and taiga regions, Siberia and the Far East, for example, where the fodder is sparse.

There are already more than 40 elk at the Kostroma farm, which is only eight years old. Early in the morning, in answer to the bugle call, the elk come out of the forest to the pens. Salted water is ready for them and milk and oatmeal for the calves. The cows have to be milked and, from time to time, weighed and measured. Then they're led out to the forest to graze till evening. This is not to keep them from scattering but to get them more accustomed to herd life.

Four young people—Alexei Mikhailov, the farm's director, and his wife Polina (both are graduates of Kostroma's Agricultural Institute) and laboratory assistants Nadezhda Derkina and Alexei Kelip—make up a team whose practical research has awakened interest beyond Kostroma Region. Last spring something happened at the farm which even got some attention abroad. Nineteen calves were born on one day. And not one of them died. An acknowledged record holder here is Nakhodka, who has already dropped nine calves: one the first year and twins annually ever since.

Reprinted from *Wildlife Production Systems: economic utilisation of wild ungulates*
(eds. Robert J. Hudson, K. R. Drew & L. M. Baskin)

© Cambridge University Press, 1989
Printed in Great Britain

Cambridge Univ. Press
32 East 57th Street
New York NY 10022

Game production in western Canada

LYLE A. RENECKER, CHARLES B. BLYTH &
CORMACK C. GATES

Abstract

Since 1970, interest in commercial game production has increased as conventional agriculture searched for innovative ways to diversify. Initially, Elk Island National Park, with its productive populations of bison (*Bison bison*), moose (*Alces alces*), and wapiti (*Cervus elaphus*) served as a model for the emerging game industry. However, several legal and economic forces now favour more intensive systems. Development of commercial bison and wapiti operations was motivated largely by attractive returns for breeding stock (US\$ 2500), meat (US\$ 8/kg), and velvet antlers (US\$ 10/kg). In early 1987, there were 251 commercial operations in the prairie provinces holding 5100 bison and 2900 wapiti. Despite several obstacles including inimical legislation and limited supplies of breeding stock, these numbers are increasing rapidly. This new industry provides an incentive for landscape conservation on private lands and offers a culturally consistent livelihood for native people.

Introduction

The western interior of Canada once supported a highly productive large herbivore community which included bison, wapiti, moose, mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), and pronghorn antelope (*Antilocapra americana*). These ungulates have provided a subsistence and economic base for native peoples since glaciers retreated some 12,000 years ago (Ray, 1974). But, by the end of the 19th century, this rich grazing system was largely replaced by conventional agriculture. Today, declining profitability of crop and livestock production has encouraged farm diversification. Though in its infancy, game ranching in western Canada is being actively considered as one of several alternative agricultural technologies.

Emergence of game production

During prehistoric and early historic times, subsistence hunters followed two different hunting patterns. Plains Indians depended primarily

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on plains bison (*B. b. bison*) for food, clothing, and shelter. Boreal Indians subsisted on a more diverse harvest of furbearing animals, waterfowl, deer, moose, wapiti, wood bison (*B. b. athabascæ*), and caribou (*Rangifer tarandus caribou*). To both cultures, the parkland (ecotone between the boreal forest and the great plains) was an important part of their seasonal subsistence pattern. With the onset of winter, bison from the adjacent plains moved northward to the parkland (Roe, 1970) followed by Plains Indians who relied upon them for survival and the wood and habitat afforded by this habitat (Ray, 1974). Concomitantly, some Boreal Indians moved southward to winter in the parkland.

By 1790, the Northwest and Hudson Bay fur trading companies had penetrated the western prairie provinces of Manitoba, Saskatchewan, and Alberta. Trade in pemmican (a mixture of dried pounded meat, fat, and often berries) soon exceeded that of furs. The journals of traders and explorers provide numerous references to the provisioning of large quantities of game meat. During the mid 1800s, Fort Edmonton required approximately 500 bison annually representing a daily consumption of over 300 kg (DeSmet, 1847; Webb, 1967). Most bison were procured from September to May whereas moose, deer, wapiti, and smaller animals provided an alternative food source during summer when bison moved southward to the plains (Losey, 1978).

By the late 1860s, heavy demands on wild herds had taken their toll. The depletion of ungulates did not go unnoticed. Early conservation efforts included legal proclamations such as 'The Buffalo Ordinance' of 1877. This and other legislation was enacted to prevent further depletion of wildlife from uncontrolled hunting, but was largely ineffective. As a result, plains bison were eliminated from the parkland and prairies, and only a few wood bison were left in the northern boreal forest (Soper, 1941). Wapiti were reduced to a few remnant populations.

During the next 30 years, forest succession proceeded rapidly with vastly reduced grazing by native herbivores and fewer fires (Lewis, 1976). With legal land title and rail transport systems in place by the late 1800s, agricultural development and timber harvesting proceeded at an uncontrolled pace. Agricultural development initially concentrated in the most productive landscapes, extending more slowly into marginal northern areas.

Early interest in game production was in response to dwindling numbers of wild animals in the late 1800s (Sifton, 1916). The adaptability of wapiti to intensive management was soon recognised (Lantz, 1910). In 1915, the Dominion Department of Agriculture established an experimental bison/cattalo (bison x cattle hybrid) herd to evaluate prospects of developing a new breed for western agriculture (Rorabacher, 1970).

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Renewed interest in game ranching in western Canada stems largely from recognition of the high productivity of wild herbivores, a need for landscape conservation, declining profitability of conventional agriculture, and growing consumer interest in leaner meats. Initial attention focused on ranching natural assemblages of large herbivores including bison (grazer), moose (browser), and wapiti (mixed feeder) (Fig. 13.1). The model for this mixed-species production system was Elk Island National Park (EINP), which seemed to demonstrate that native grazing systems were reasonably productive and practical to manage (Telfer & Scotter, 1975).

Extensive game ranching is a low-input strategy whose economy of scale derives from the relationship between perimeter (fencing costs) and area (production capacity). However, few private landowners control enough land (over 25 km²) to exploit this extensive option (Hudson, 1981; Hudson & Blyth, 1986) although lands controlled communally by native people are suitable. Despite the advantages, the experience of the first extensive commercial ranch in Canada (the Kikino Metis Settlement in north-central Alberta) was that difficulty controlling stock on large properties results in a loss of economic opportunity, such as harvesting velvet antlers.

The alternative is to dilute investment costs by increasing stocking rate on a smaller land base through seeding tame pastures, fertilising, and winter feeding. These operations exploit the advantages of subdivisional fences to manage grazing intensity, maximise stock productivity through supplementary feeding, and capitalise fully on commercial markets.

Current status

Although the concept has been discussed and practised for nearly two decades, the industry in western Canada is still in its infancy and enabling legislation is just now being developed. Only the Kikino Metis Settlement in central Alberta has established a large-scale ranch although interest among Indian and Metis Settlements is high. In Alberta, at least 19 of 39 settlements are embarking on game ranching ventures (G. Lynch, Alberta Fish and Wildlife Division, personal communication). Because of the financial constraints of development and limited availability of breeding stock, most private entrepreneurs are interested in intensive game farming on smaller properties.

In early 1987, there were 251 commercial game ranches and farms in

Fig. 13.1. Primary species considered in a mixed-species grazing system in the boreal forest. Top, bison (grazer); middle, moose (browser); bottom, wapiti (mixed feeder) (reprinted with permission from Renecker & Kozak, 1987).

Alberta, Saskatchewan, and Manitoba holding 5100 bison and 2900 wapiti (Table 13.1). Most of these operations were small (64–128 hectares) with few operations raising more than 200 head of either species.

The plains bison is legally defined as a domestic animal in most provinces (Chapter 19). The wood bison is officially endangered and therefore cannot be used commercially. Wapiti ranching is permitted in Alberta and Saskatchewan, but slaughter is only allowed in the latter. Currently, meat supplies are absorbed by local markets in Saskatchewan but a small number of carcasses serve restaurants in British Columbia, Ontario, Quebec, and several maritime provinces.

Trade of indigenous wildlife has been controlled by stringent provincial regulations except in the Northwest Territories where there is a traditional commercial/subsistence trade among native people. Although game meat is sold in several eastern provinces, most western provinces do not permit the sale of game meat from indigenous wildlife except plains bison. Therefore, the main current commodities are breeding stock and velvet antlers.

Exports of wapiti from Canada to New Zealand from 1984–86 totalled 286 head (J. Parliament, Agriculture Canada, personal communication). Annual sales are predicted to exceed 200 animals in the near future, representing a gross revenue of approximately US\$ 540,000. Records of production and a guarantee of temperament are now standard requirements by New Zealand buyers. Within Canada, domestic trade exceeded 400 head during 1986 at a value of approximately US\$ 2.5 million. Records indicate that 1092 bison were imported from 1980–86 both for slaughter and breeding purposes (A. Dagenais, Agriculture Canada, personal communication).

Table 13.1. *Bison and wapiti on private ranches in Alberta, Saskatchewan, and Manitoba, May 1987.*

Province	Number of ranches	Number of animals
Alberta		
Bison	113	3,500
Wapiti	85	1,800
Saskatchewan		
Bison	18	800
Wapiti	20	1,000
Manitoba		
Bison	13	800
Wapiti	2	100

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Canada's contribution of velvet antler to the primary market in Korea is small compared to the volume exported by New Zealand, China, and the Soviet Union. Canada produced approximately 3200 kg of wapiti velvet in 1986, valued at more than US\$ 204,000. Although the major outlet for wapiti velvet has been Korea, buyers from Hong Kong and ethnic markets within Canada will easily absorb velvet antler produced during the early development of the industry. The major constraint is the lack of a 'marketing desk' where velvet can be pooled and sold in bulk to buyers who normally require quantities of at least one tonne.

Land base and range productivity

Most of northern Alberta, Saskatchewan, northern British Columbia, Manitoba, and the subarctic of the Northwest Territories and Yukon are covered by aspen-dominated parkland and boreal forest, some of which has served for livestock grazing, marginal agriculture, fur trapping, sport hunting, and forestry. Although northern landscapes could be used for wildlife production, most jurisdictions restrict commercial operations to private lands in the agricultural zone. The agricultural area which holds the greatest promise for game production covers about 820,000 km² (Fig. 13.2).

The boreal forest, aspen parkland, and prairie are best described as a continuum. In the southern parkland, prairie grasslands predominate. Aspen (*Populus tremuloides*) and balsam poplar (*P. balsamifera*) become increasing important components of the canopy as the proportion of meadows decreases with increasing latitude. Coniferous trees, primarily white spruce (*Picea glauca*), black spruce (*P. mariana*), and jackpine (*Pinus banksiana*), increase with latitude, dominating boreal forests in the subarctic. Meadows are scattered throughout the boreal forest and are particularly well developed in the Slave River Lowlands and the Peace/Athabasca Delta. Without perturbations, such as flooding, clearing, and fire, meadows are colonised by woody species and commonly succeed to forest (Rowe & Scotter, 1973).

Production of native forage in the parkland and boreal forest is generally high (Table 13.2). However, production varies widely in response to a number of environmental conditions such as thermal radiation, moisture, fertility, and plant community composition. Nutritional quality of forage is an important criterion of range carrying capacity. During winter, forage digestibility is marginally adequate for maintenance as a result of lower protein (5–8%) and dry matter digestibility (27–45%) (Renecker, 1987). However, the growth pulse during spring and summer, although brief, is sufficiently high (protein content of 20–30%; dry matter digestibility of 70–77%) to support rapid growth and fattening of native ungulates (Renecker, 1987).

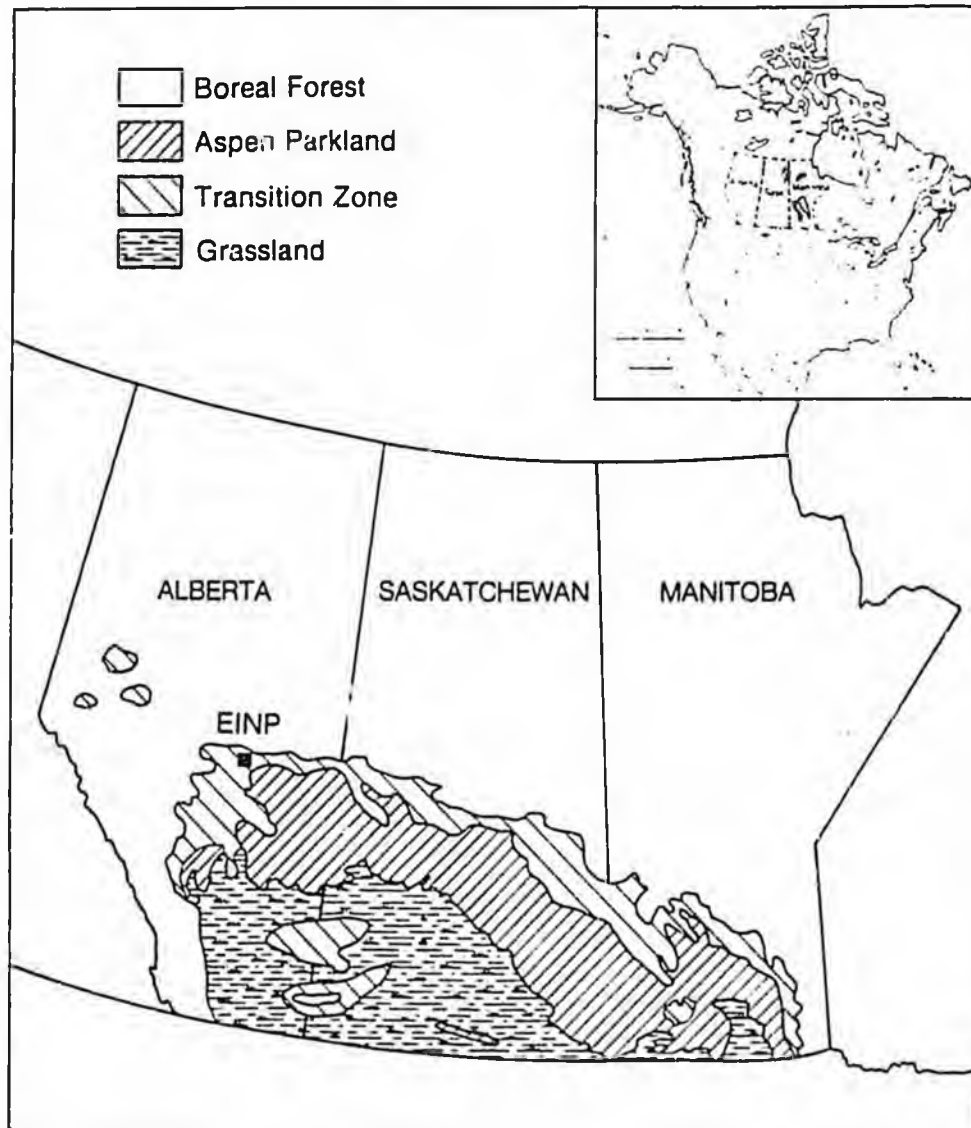
Productivity

Records of early fur traders and explorers describe an abundance of ungulates in the western interior. The journals of Alexander Mackenzie gave an impression of the productivity of the plains in 1793:

All this country, to the south branch of the Saskatchewan, abounds in beaver, moose-deer, fallow deer, elks, bears, buffaloes,

In 1869, Issac Cowie (Ogilvie, 1979) recorded an encounter with one of the last large herds of bison:

Fig. 13.2. Vegetation zones of western Canada, according to Zoltai (1975).



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Based on range areas and carrying capacities, pristine populations of perhaps 60 million bison and 10 million wapiti have been estimated (Seton, 1974). The best information on the dynamics of this grazing ecosystem came from the 80-year history of Elk Island National Park.

Stocking and harvests

Since their introduction, in 1907, plains bison have remained the dominant herbivore at Elk Island followed by wapiti, moose, and deer (Fig. 13.3, Table 13.3). The live ungulate biomass has varied widely around a long-term average of 58 kg/hectare. Although the carrying capacity for bison is high at Elk Island (8/km², 36 kg/hectare), it can be increased ten-fold with supplemental feeding and pasture management. Similarly, stocking rates of wapiti under intense management on private farms can exceed 375 kg/hectare (250/km²).

Table 13.2. Available biomass of forage in habitats utilised by native herbivores.

Habitat	Peak biomass (kg/hectare)	Reference
Boreal-Parkland transition		
Wet meadows	948-2,640	Telfer & Scotter (1975)
Mesic meadows	516-1,298	Telfer & Scotter (1975)
Upland meadows	861	Telfer & Scotter (1975)
Grassland-snowberry	1,082	Renecker & Hudson (1986a)
Aspen forest	1,590	Renecker & Hudson (1986a)
Willow-sedge	3,523	Renecker & Hudson (1986a)
Scrub-poplar grassland	2,322	Renecker & Hudson (1986a)
Open parkland		
Rough fescue grassland	1,207	Bailey & Wroe (1974)
Mixed-wood boreal forest		
Aspen-cranberry	390	Renecker (personal communication)
Aspen-spruce-bearberry	570	Renecker (personal communication)
Boreal forest		
Wet sedge meadow	2,090	Bailey & Penner (1973)
Dry sedge meadow	516-1,316	Gates (personal communication)
Willow sedge savanna	278-650	Gates (personal communication)
Spruce forest	199	Gates (personal communication)
Dwarf birch-willow bog	336	Gates (personal communication)

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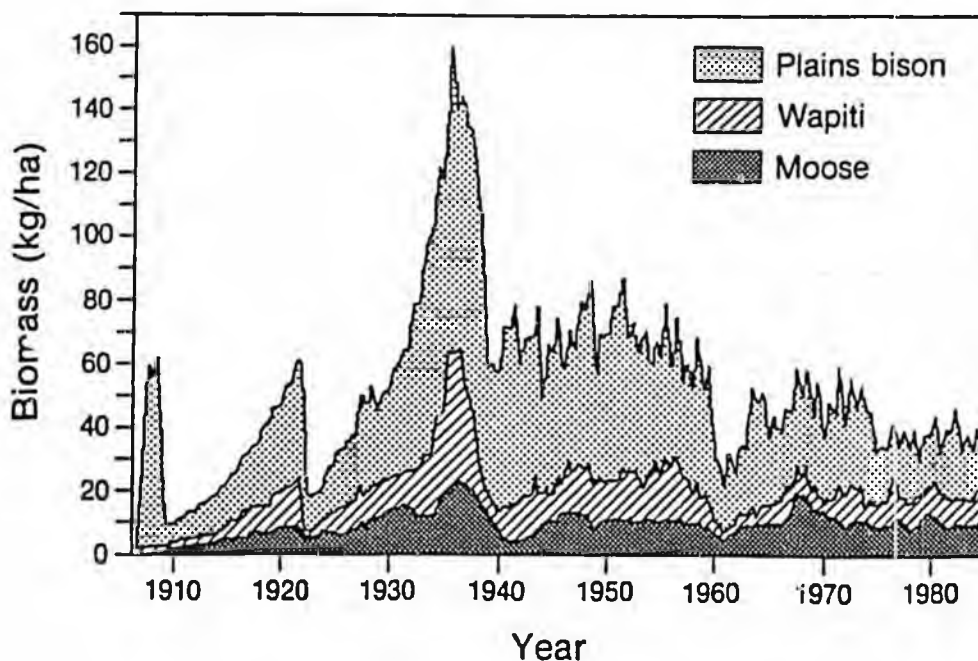
Removals by slaughter and live capture has totalled 17,679 animals since 1907. Although the first harvest occurred in 1928, regular annual harvests to control populations did not begin until 1935. Average harvests from this time until 1960 were slightly over 14 kg/hectare. After major reduction campaigns

Table 13.3. Average carrying capacity and productivity in the northern portion of Elk Island National Park, 1907-85.^a

Species	Herd size (animals)	Density (animals/hectare)	Biomass (kg/hectare)	Herd increment (%/year)	Annual harvest (kg/hectare)
Plains bison	840	0.082	35.6	17.4	5.5
Moose	127	0.029	8.8	—	0.9
Wapiti	511	0.05	12.2	19.1	1.5
Mule deer	118	0.016	0.8	3.8	0.0
White-tailed deer	63	0.005	0.3	46.7	0.02
Total	1,659	0.18	57.7	—	7.92

^aCurrent area 11,000 hectares.

Fig. 13.3. Liveweight biomass of plains bison, wapiti, and moose at Elk Island National Park (drawn as proportion of total biomass).



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in 1959/60, the annual harvest required to control the new lower population was almost half that required during the previous 25 years, averaging 7.3 kg/hectare on a liveweight basis.

These empirical results are close to predictions by conventional stocking calculations and linear programming. Telfer & Scotter (1975) estimated the carrying capacity to be 54 kg/hectare with a sustained yield of 11 kg/hectare/year. Hudson & Blyth (1986) used linear programming to explore optimal stocking patterns which would maximise forage utilisation and sustained yield. The analysis indicated that annual sustained productivity could be increased from 9.4 to 14 kg/hectare by increasing the proportion of grassland and maintaining populations of 14 bison, 8 wapiti, and 2.8 moose/km².

The problem with such calculations is that they do not account for density-dependence. To correct this deficiency, Blyth (1989) used time series analysis to obtain empirical estimates of *K* (density at which population growth = 0) and more importantly MSY (equilibrium density at which maximum sustained yield is achieved) based on 80 years of data from Elk Island (Table 13.4). The high stocking rates can be attributed to the ecological adaptations and dietary specialisation of these ungulates. Although maximum stocking rate and production can be reached at ecological carrying capacity where plant succession reaches a balance with animal density, because of public pressure for pristine systems, EINP has been managed at or below MSY.

Growth and meat yields

Routine winter slaughters and roundups at Elk Island have provided a great deal of information on growth (Fig. 13.4). Sex differences in the weights of plains bison become pronounced after 3.5 years of age. With pasture management and supplemental feeding, growth rates are higher with

Table 13.4. Maximum sustained yields (MSY), equilibrium densities (*K*), and ecological carrying capacities for Elk Island National Park.^a

Species	Maximum sustained yield (no./km ²)	Equilibrium density (no./km ²)	Ecological carrying capacity (no./km ²)
Plains bison	2.5	12.0	19.0
Wood bison	1.0	5.0	6.0
Wapiti	2.4	7.0	10.0
Moose	0.8	2.8	5.3

^aData for most recent representative time period (Blyth, 1989).

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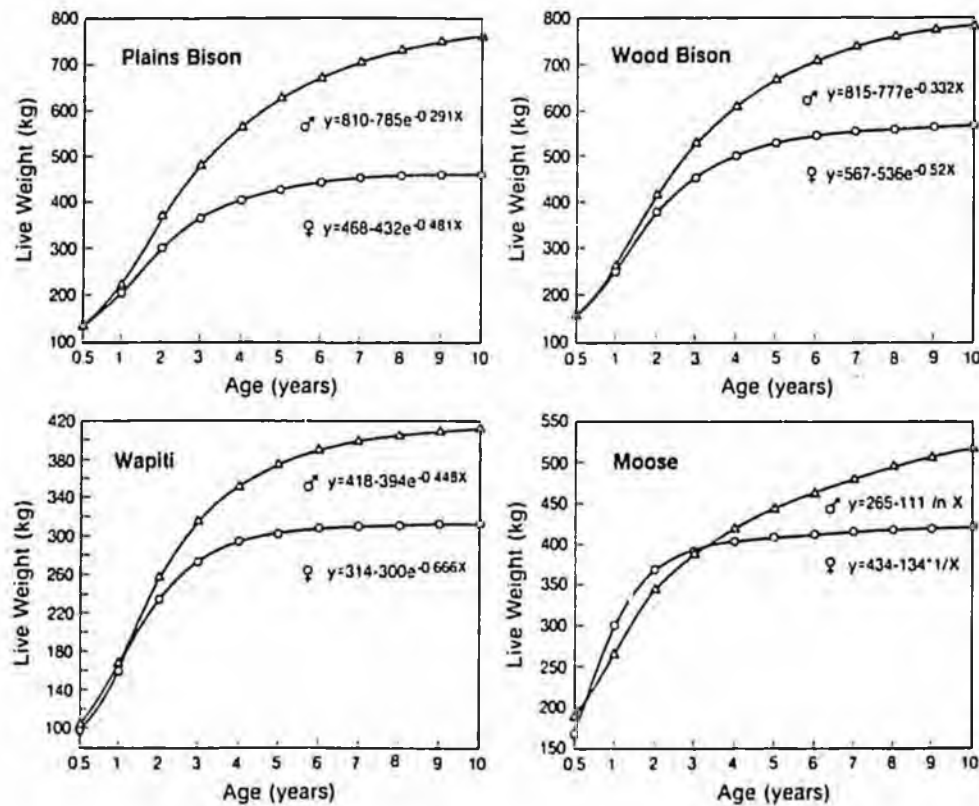
males and females reaching 730 kg and 635 kg, respectively, at 2.5 years of age (S. Biewald, Alexco Foods Ltd, personal communication).

At maturity, female wood bison are larger than female plains bison, but mature weights of males are similar. Wood bison from the Mackenzie Bison Sanctuary in the Northwest Territories had dressed weights which were 54% of liveweights (Gates, personal communication) and 18% higher than carcass weights reported by Halloran (1960) for plains bison.

Wapiti at Elk Island are large relative to other populations of the Rocky Mountain subspecies (Peek, 1982; Blyth, 1989). Dressed weights of males approach 60% of liveweight (Renecker, personal communication). Smith (1973) found that yield of retail meat cuts was 54% of the field dressed weight for wapiti shot by hunters. However, when animals were slaughtered under controlled conditions, the total yield of commercial meat cuts (European style) is 78–81% of the dressed carcass (Renecker, personal communication).

Records of moose weights at Elk Island are incomplete and do not follow a smooth curve, which may reflect some environmental influence upon indi-

Fig. 13.4. Growth curves for ungulates at Elk Island National Park.



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vidual cohorts. Dressing percentages have varied from 47% (Blyth, 1981) to 50% (Blood, McGillis & Lovass, 1967).

Technology and management

Infrastructure

Legislation governing game ranching has evolved as new technology has developed. Initially, the Alberta government stipulated that perimeter fences must be of 9-gauge wire netting at least 2.1 m high, with 15 cm mesh and with wooden posts spaced at 4 m intervals. Such high fencing standards were considered necessary to withstand challenges from bison, wapiti, and moose, especially when animals are first introduced or during the rut. However, with adequate feed and appropriate management of breeding groups, fences are seldom tested by farm-bred stock and standards can be relaxed with substantial reductions in development costs (Table 13.5). Provincial governments in western Canada have since relaxed these requirements acknowledging the effectiveness of lighter high tensile netting.

Adequate yard construction is costly, but the benefits are justified. Handling facilities for bison consist of a working alley of several stanchions separated by sliding gates and with one side hinged for quick release of excited animals. Squeezes constructed for bison are necessarily larger and stronger than those for cattle and are equipped with a stop gate.

Handling facilities for wapiti can be of lighter construction. Animals are sorted using a round drafting corral into small holding pens with 2.4 m walls of vertical boards. They can be moved singly into the crush which has a drop-floor and side panels made of either foam or plywood.

Range management

Knowledge of habitat and forage preferences is fundamental for evaluating stocking rates on extensive properties. For plains bison, sedges and grasses comprise the majority of the diet throughout the year. In spring and summer, browse (primarily willow) is a major component of wood bison diets in the Mackenzie Sanctuary suggesting diet diversification when forage quality is high. However, wood bison depend largely on sedge during winter periods (96% of wood bison diet in the Mackenzie Bison Sanctuary) (Gates, personal communication).

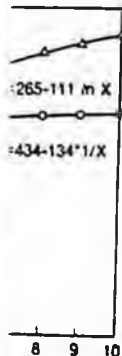
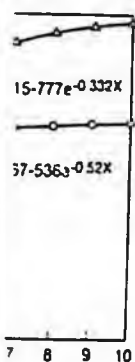
Wapiti are mixed feeders and show greater versatility than bison. In winter, wapiti may include more than 60% browse in their diet; however, during early spring foraging shifts to green growth in sedge meadows and finally forbs and leaves predominate in diets of late spring and summer (Gates & Hudson, 1981, 1983; Nietfeld, 1983). In autumn when forage quality declines

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with plant senescence, wapiti concentrate on leaf litter which can comprise almost 60% of their diet (Nietfeld, 1983). When snow conditions during winter permit, wapiti crater for fine grasses, legumes, and leaves. As snow deepens and available biomass is reduced, woody twigs become increasingly important.

The staple winter foods of moose are woody twigs but dependence on bark increases during early spring (Cairns, 1976; Renecker, 1987). During spring and summer, moose increase intake to about 10 kg dry matter/day by stripping leaves from trees and shrubs (Renecker & Hudson, 1985) and increase their selectivity for green leaves and forbs during autumn when variation in forage quality is greatest (Renecker & Hudson, 1986a). Although moose are extremely cold tolerant they are easily heat stressed and rely

Table 13.5. Specifications and costs of game fencing.

Materials	Specifications			Cost (US\$/km)
	Mesh dimensions (cm)	Smooth wire spacings (cm)	Height (m)	
Perimeter fence				
9 gauge wire netting (Watchman)	15	—	2.1	6,800
12 gauge netting (1.9-2.0 m high) plus 2-wire electric	5-20	20	2.4	3,800
15-wire electric	—	5-20	2.4	2,500
Race fence				
12 gauge netting (2.0 m high) plus 4-wire electric	5-20	20	2.8	3,400
Subdivisional fence				
12 gauge netting (1.2 m high) plus 4-wire electric	5-20	20	2.0	2,300
12 gauge netting plus 1-wire electric offset 30 cm on outrigger	5-20	—	1.9	2,700
15-wire electrified (wood posts every 12 m and 2.4 m fibreglass stays every 3.7 m)	—	5-20	2.4	2,300

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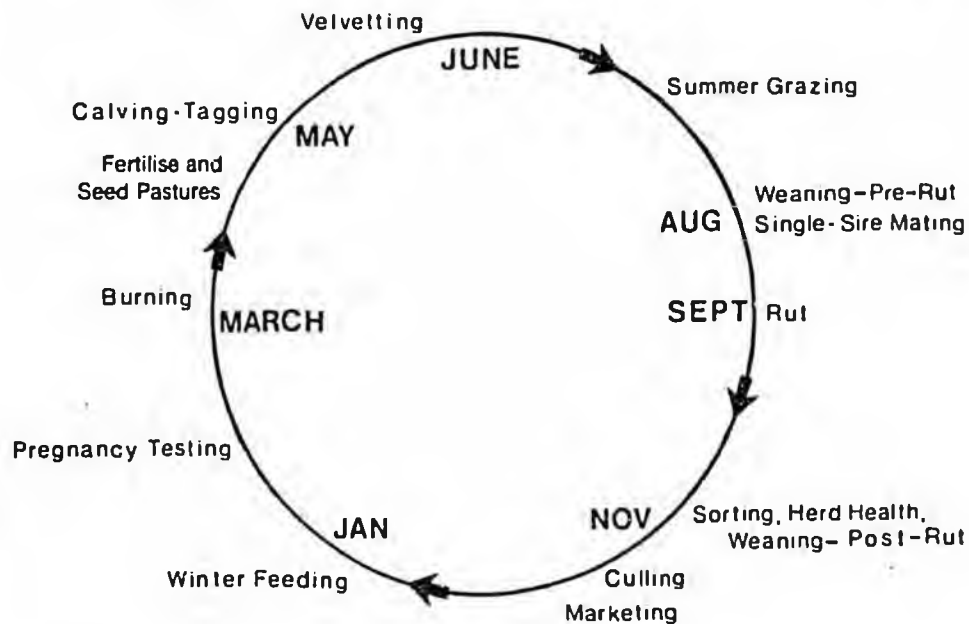
There are benefits to hastening the flush of plant growth in spring. Fire can be used as a tool to remove litter from meadows, topkill shrubs and trees, remove decadent growth, maintain the browse supply, and to recycle nutrients (Wright & Bailey, 1982). Similarly, fire can be combined with herbicide spray programme to reduce forest cover and expand grasslands. However, use of fire is controlled both provincially and regionally in western Canada and may be restricted when forest fire hazards are high.

Husbandry

The cycle of management of a representative commercial game enterprise based on wapiti and bison is illustrated in Fig. 13.5. Calving occurs between mid May and early June for both bison and wapiti. Government regulations in Alberta require that wapiti calves be tagged and registered within 30 days of birth. Hinds are usually placed in small pastures prior to parturition for close observation, protection from predators, and habituation to humans.

Velvet antlers are removed from wapiti stags in early June using methods described by Denholm (1979). Until recently veterinarians have been constrained by lack of a suitable antagonist for xylazine, the general sedative-

Fig. 13.5. Management calendar for a bison-wapiti game ranch or farm.



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analgesic used in the procedure. Recent studies have shown that a combination of yohimbine and 4-aminopyridine is an effective antagonist for xylazine, eliminating problems of prolonged recumbency (Renecker & Olsen, 1986a,b).

There is a controversy of whether to wean wapiti before or after the rut. The advantages of pre-rut weaning in early September are that high-quality forage is readily available. Climatic conditions are usually less favourable when animals are weaned in November which can result in static body growth. On the other hand, if calves remain with the hinds during the autumn rut they learn the location of supplementary winter feed. For bison, the rut begins in mid July when forage production and quality are high. Generally, bison calves are not weaned until the autumn roundup.

As stocking rates increase on intensive operations, supplementary winter feeding is necessary. A feeding programme usually begins in November and can be used to train stock to move into corrals for handling. For wapiti, a combination of alfalfa and whole oats provides an adequate winter ration. Generally, mature wapiti hinds consume 4.5–6.6 kg dry matter/day of alfalfa during winter (Renecker, personal communication). Bison are less selective grazers and can best utilise grass hay supplements. Overwinter loss of perhaps 10% of bodyweight is advisable to capitalise on compensatory gains in spring and to minimise calving difficulties.

Production and economics

Investment and production costs

Only government agencies, community projects, and native groups possess the land base to effectively exploit the extensive management option. Most private operators begin with small parcels of land which meet the minimum government requirements (65 hectares prior to 1987, now 45 hectares in Alberta). To dilute financial investments, fences are usually constructed around 8–20 hectare parcels, the area is fully stocked, and intensive management practices are employed. These operations can expand as a positive cash flow is realised.

Capital investments for game are similar to those of conventional livestock enterprises, but variable costs of production are comparatively low (Table 13.6). Under circumstances where beef is produced at US\$ 1.24/kg, cash costs of production may be US\$ 0.94/kg for bison and US\$ 0.86/kg for wapiti.

Product values

Commercial markets already exist for breeding stock, velvet antlers, meat, and other by-products. Because of limited supply, current prices

Table 13
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Item
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Table 13.6. Representative budget for a wapiti ranch which would encompass 240 hectares when the maximum breeding population is reached.

Item	Cost (US\$)
Capital investment	
Over 8-year period	
Land (@ US\$ 400/hectare)	104,000
Boundary fence	38,000
Yards	8,800
Internal fence	19,000
In year 1 only	
Machinery	
(tractor, front end loader, ATC, truck, trailer, etc.)	30,000
Crush	2,200
Electronic scale	3,000
Breeding stock	
5 mature stags (@ US\$ 3,330)	16,650
45 mature hinds (@ US\$ 2,590)	116,550
Annual variable costs at enterprise maturity	
Velvet antler removal (@ US\$ 22/animal)	3,030
Herd health (@ US\$ 7.4/animals)	4,820
Sorting, culling, etc. (@ US\$ 7.4/animal)	4,880
Supplemental feed	22,940
Fuel, oil, grease, equipment maintenance utilities, taxes	2,370
Pasture management (@ US\$ 14.8/hectare)	3,850
Annual fixed costs at enterprise maturity	
Principal plus interest (20% down payment; loan for 30 year period @ 10.75% interest)	24,617
Depreciation (enterprise maturity)	6,000
Total fixed plus variable costs	72,507
Annual returns at enterprise maturity	
Velvet antler sales (400 kg Super A Grade @ US\$ 92/kg)	36,800
Live animal sales (112 yearlings @ US\$ 2,220)	246,400
Meat sales (culled and surplus stock; 18,485 kg @ US\$ 4.70/kg)	86,880
Total returns	370,080
Annual balance sheet summary at enterprise maturity	
Cash inflow	370,080
Cash outflow (fixed plus variable costs)	72,507
Net profit	297,553

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for breeding stock are high, ranging from US\$ 3330–8600 for mature wapiti stags and US\$ 2590–4700 for mature hinds. Bison bulls are valued at about US\$ 1440 and cows between US\$ 1100–1800.

Both export and domestic markets are strong. New Zealand has been the primary buyer of Canadian wapiti but increasingly animals are being redistributed to meet a growing local demand. A strong domestic market also exists for bison. With renewed interest and a higher price for leaner meats, producers are scrambling to obtain breeding stock, inevitably inflating its value.

Velvet antlers from wapiti stags provide a major source of revenue. However, yields vary widely with both age and plane of nutrition. Stags pastured on native range and offered no supplementary feed will produce approximately one kilogram of velvet antlers at one year of age. Production tends to increase at a rate of one additional kilogram/year until the stag is 8 years old when production remains static or declines marginally. However, with supplemental feeding, production can be increased to at least 1.5–1.75 kg as a yearling with an additional 1.5–1.75 kg of production each year until the animal is 8 years old when production decreases. If harvested at precisely the right time in early June, a mature stag can produce velvet antler valued at US\$ 740.

Ultimately, the industry depends upon the sale of meat. In Saskatchewan, Quebec, and Ontario, the only provinces permitting slaughter of farmed wapiti, the live weight and carcass values of wapiti are US\$ 4.75/kg and US\$ 11.10/kg, respectively. Currently, bison are sold on domestic markets for twice the price of beef (US\$ 2.10/kg live weight and US\$ 4.90/kg carcass weight). Export opportunities exist but the product must be in stable supply and consistent in quality if interest is to be maintained. Because of constraints on meat quality and hygiene required by the European Economic Community, it is doubtful whether field slaughter could be permitted for meat destined for export.

Although hunting of ranched game generally is prohibited, on several Indian and Metis Settlements hunters can purchase a bison hunt. The head and cape are valued at US\$ 3500. Traditional activities of Indian and Metis people, such as horse-back riding, guiding, and camping can be combined to provide spin-off benefits of US\$ 2400/package.

Implications

The main goals of commercial game production are to diversify animal agriculture, to offer a culturally consistent livelihood for native people, and to encourage landscape conservation. At a time when the

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profitability of conventional crop and livestock production in Canada is declining, the combination of low operating costs and high value of bison and wapiti presents a new opportunity for farm diversification. Game ranching offers more efficient use of marginal lands and opens new market opportunities.

Native people are important potential beneficiaries. In a recent report (DIAND, 1984), the Canadian Department of Internal Affairs and Northern Development expressed concern about rising costs of access to fish and game resources for many native people in the Northwest Territories. The report noted a decline in reliance on game and fish resources related to the high cost of harvesting in terms of both capital outlay and operating costs. One of the suggested remedial measures was to develop alternative food production technologies suited to the northern environment. Game production ranks high among alternative technologies which could contribute to regional self-sufficiency and which would be consistent with traditional native lifestyles.

The most controversial aspect of game production is its environmental impact. Hard-fought debates have raged between those who perceive game ranching as an environmentally sensible agricultural alternative, and those who predict the destruction of wilderness values and loss of hunting opportunities. Although game ranching may provide a tangible benefit for private landowners who apply conservation principles to their properties, there is fear that this will be counterbalanced by poaching if the sale of game meat is permitted (Geist, 1985). On the other hand, the constant supply of venison into the marketplace and stringent processing regulations may reduce the incentive to market poached meat (Renecker & Kozak, 1987).

As this new industry develops, the welfare of wild species on commercial operations will come under greater public scrutiny. Procedures such as capture, mechanical restraint, chemical immobilisation, and velvet antler removal will be questioned. For the industry to develop with strong public support, considerable emphasis must be placed on animal welfare. For this reason, provincial game producer associations have developed Codes of Ethics which function as guidelines for the new industry.

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Dr. Wood

Revised

A RESOLUTION RELATING TO THE ESTABLISHMENT OF A COMPREHENSIVE AND PROGRESSIVE POLICY OF GAME AND HABITAT ENHANCEMENT FOR THE STATE OF ALASKA.

GOAL: DEVELOPMENT OF A WRITTEN PLAN FOR THE LONG RANGE MAXIMUM UTILIZATION OF ALASKA'S NATURAL GAME AND HABITAT RESOURCES WITH THE CONCURRENT ENHANCEMENT AND PROTECTION OF OTHER RESOURCE VALUES.

WHEREAS without a working State of Alaska policy which is clearly defined and supported by the people of Alaska, by the Legislature and by the Governor, little progress will be made toward an economically worthwhile program of game and habitat enhancement in Alaska; and

WHEREAS the people of Alaska generally lack the knowledge of the economic and esthetic benefits of a wise game and habitat enhancement program commonly applied in other nations throughout the world; and

WHEREAS the full potential of the wildlife resource in Alaska has not been realized; and

WHEREAS modern methods of habitat enhancement such as wildfire management are not being used to their highest potential; and

WHEREAS game and habitat enhancement can promote economic development and future well being for all Alaskans; and

WHEREAS Alaska has fallen behind other states and nations of the world in optimizing game and habitat enhancement opportunities; and

WHEREAS active terrestrial game and habitat enhancement programs have been neglected while fisheries enhancement programs have demonstrated a profound economic success.

WHEREAS Alaska provides a unique opportunity with the establishment of large tracts of privately owned land with excellent game and habitat opportunities; and

WHEREAS Alaska now produces far less game than enhanced habitat is potentially capable of supporting and does not realize the full potential of modern active management techniques promoting the wise use of the renewable base. This includes but is not limited to; habitat enhancement, game ranching or herding, fur farming, consumer and subsistence food and fur needs, industrial raw materials and aesthetic products at competitive prices on the world market.

WHEREAS Alaska has a minimum of 220 million acres of land capable of supporting game and habitat management programs. The land includes 44 million acres owned by Alaska Natives and 104 million acres owned by the State of Alaska.

WHEREAS there has been a failure to coordinate within the State and between the State and federal government, programs and policies regarding game and habitat enhancement.

BE IT RESOLVED by the Alaska State Legislature that the State of Alaska hereby commits to a policy of game and habitat enhancement that encourages and promotes the wise use of Alaska's renewable resources including, but not limited to the following actions:

(1) The State of Alaska shall promptly determine the most expedient means to promote game and habitat management programs.

(2) The State of Alaska shall identify and remedy current State statutory and regulatory barriers to game and habitat enhancement.

(3) The State of Alaska shall actively assist in the planning and development and when appropriate, in the financing of game and habitat enhancement programs.

(4) State of Alaska agencies shall work closely with private and Native land owners and with federal land owners to cooperatively stimulate game and habitat enhancement programs and to provide for the processing and marketing of game as a result of these programs.

(5) The State of Alaska, in cooperation with educational entities within the State shall develop an information and education program designed to inform and involve the public about the benefits and potential of game and habitat enhancement.

(6) The Legislature, in cooperation with the Governor, shall establish a task force, composed of representatives of forestry, game management, agriculture, business, and consumer interests, which shall be responsible for the study of legislative options for implementing the policies enunciated in this resolution.

THE GAME GROWER

NEWSLETTER OF THE
ALBERTA GAME GROWERS' ASSOCIATION

VOLUME 2 NO. 1

April, 1986

ABOUT THIS ISSUE

The purpose of this news letter is to inform members about key issues in the new industry of game ranching. Articles will emphasize animal husbandry, management ideas, markets and prices, membership drives, executive matters, upcoming field days and meetings and arguments which support the business of game ranching. We will attempt to deal with all species of interest, as information becomes available. Comments, suggestions and contributions are most certainly welcome.

CONTENTS

<u>TOPIC</u>	<u>PAGE</u>
Business	
Information from the President	2
Constitution	
Alberta Game Growers Association By-Laws	4
Developments Outside of Alberta	
New Zealand Deer Farming	9
Game Ranching in the Northwest Territories	10
Game Ranching in the Yukon	11
The Bison Scene	
News from Agriculture	12
Buffalo (Bison) Meat	
Why Eat Buffalo Meat?	14
Manitoba Scene	
Game Farming Activity in Manitoba	18
Husbandry and Management of Wapiti	
Breeding Strategies	19
Supplemental Feeding Systems for Wapiti	22
Short Issues on Game Farming	
For Your Interest	24
Arguments Supporting Game Ranching	
Game Ranching in Alberta: An Industry with a Future	28
Colorado Conservation Officer's Opinion	30
Support Drive	
Help Fortify Our Position on Game Ranching	31
Sales	
Bison Stock for Sale	34
Elk Island National Park Bison Sale	34
Membership Directory	35

BUSINESS

2

INFORMATION FROM THE PRESIDENT

The Alberta Game Growers Association held their inaugural meeting in Lethbridge, Alberta from October 31st to November 2nd, 1985. Organization of this meeting to form the Association was through the prime direction of Mr. Gordon Sherman and Mr. Judd Bunnage. At this meeting there was a number of speakers providing information on subjects such as status of game ranching legislation, research and animal productivity studies, fencing requirements for game farms, marketing and an update on the New Zealand scene.

During the business meeting, the purpose of the Association was established and a board of directors were elected. The primary motive for the formation of the organization was to unite game producers in Alberta such as to form an active, official lobbying group promoting the betterment of game ranching in the province. The first issue of the game grower has been sent to all persons interested in game farming. For readers not registered as members of the Alberta Game Growers Association, we request that you join the Association if you wish to receive "The Gamegrower" on a regular basis and attend our occasional field day. The field day will involve a meeting at the home of a producer where a tour of his facilities, discussion on some aspect of game ranching and a social gathering will be conducted. Thus, you should consider this a complementary issue. Join now, we need your support in order to help you. An application form is attached. Complete the application below and send with \$10.00 (cheques made payable to the Alberta Game Growers Association) to:

ALBERTA GAME GROWERS ASSOCIATION
c/o Lyle Renecker
310 Ag/For Center
Department of Animal Science
University of Alberta,
Edmonton, Alberta T6G 2P5

During the November meeting, a Board of Directors was elected and a president and secretary/treasure appointed. These persons are:

President: Lyle Renecker

Secretary/Treasure: Judd Bunnage

Board of Directors: Gordon Sherman
Ken Jones
Dr. Gordon Godkin
Walter Jerram
Frank Crawford

Mr. Bunnage and myself have assembled a constitution for the Association. I have attached a copy to this newsletter and would ask everyone to read this document and suggest changes or omissions, if necessary.

APPLICATION FOR THE ALBERTA GAME GROWERS' ASSOCIATION

NAME: _____

ADDRESS: _____

CITY: _____ PROVINCE: _____

POSTAL CODE: _____ HOME TELEPHONE: _____

BUSINESS TELEPHONE: _____

ARE YOU A PRODUCER?: _____ YES; _____ NO

IF YES: WHAT STOCK DO YOU PRESENTLY POCCESS AND WHAT ARE FUTURE INTENTIONS?

IF NO: ARE YOU INTERESTED IN THE POSITIVE DEVELOPMENT OF THE NEW INDUSTRY OF GAME RANCHING?

CONSTITUTION

4

ALBERTA GAME GROWERS ASSOCIATION

BY-LAWS

1. NAME

The name of the association shall be "Alberta Game Grower's Association".

2. OBJECTIVES

The Association shall have for its objectives the promotion and growth of game farming in Alberta. Game farming has the potential to become a useful and profitable agricultural enterprise. Alberta has the opportunity to become a leader in the industry. To achieve these objectives the Association shall:

- (a) be a non-profit organization of persons, firms, partnerships and corporations engaged in co-operative activities to further the improvement of game farming throughout Alberta;
- (b) promote game farming as a viable new agricultural enterprise.
- (c) provide a forum for discussion of and obtaining solutions to questions concerning game farming in Alberta.
- (d) work closely with government regulatory agencies to (achieve) recommend suitable regulations to govern the game farming industry.

3. MEMBERS

1. There shall be two classes of members:

(a) Active members: Active members shall be those individuals, partnerships, firms and companies incorporated under the laws of Canada or any Province of Canada, which individual, partnership, firm or company is or are actively engaged in the breeding of game animals, who apply for Active membership and are accepted as Active members, and who pay the prescribed admission fee who are farming game animals within the province of Alberta. Provision for Active membership is provided for residents of Alberta engaged in active research involving game ranching or lobbying for game ranching.

(b) Associate members: Individuals, partnerships, firms or corporations may, upon application and acceptance of the Board of Directors, and upon payment of the prescribed admission fee, become Associate members but such Associate members shall not be entitled to vote and shall not hold office in the Association.

4. GENERAL MEETING

(a) A general meeting of the Association (to be called "Annual Meeting") shall be held once in every calendar year at such time and place as the Board of Directors may designate. In addition to the Annual Meeting, the Board of Directors may, whenever they think fit, call a general meeting of the Association (to be called "Special Meeting") at such time and place as the Board of Directors may designate. Thirty days notice at the least, specifying the place, the day and the hour of the meeting, and in case of special business, the general nature of such business shall be given to the members of the Association but the accidental omission to give notice to any member, or the non-receipt by any member of such notice, shall not invalidate the proceedings of any general meeting. The Annual Meeting and a Special Meeting may be convened by one and the same notice. Without any special notice that such other business is to be dealt with, the business of an Annual Meeting shall be to receive and consider the report or reports of the Board of Directors, and officers, and accounts and balance sheet and the report of the auditors thereon, and the election of Directors and to consider and if thought expedient, the approval and ratification of the acts and proceedings of the Board of Directors and officers. All other business transacted at a general meeting shall be deemed special:

(b) Order of business at all general meetings shall be substantially as follows:

- 1) Identification of Active Members
- 2) Reading of minutes of Previous Meeting
- 3) Report of Officers, Directors and Committees where applicable
- 4) Correspondence, where applicable
- 5) Unfinished business, where applicable
- 6) Election of Directors, where applicable
- 7) New business, where applicable
- 8) Adjournment.

(c) Questions arising at any meeting of the Association or at any meeting of any Committee of the Association shall be decided by a majority of votes. In the case of an equality of votes, the Chairperson of the meeting, who shall ordinarily have no votes, shall cast the deciding vote. All votes at any such meeting shall be taken by a show of hands unless a ballot is demanded by any member of the Game Growers Association present, except questions to amend the constitution of the Association which are resolved by a 2/3 majority of those entitled to vote.

(d) A question of procedure at or for any meeting of the Association or any Committee of the Board, which has not been provided for in these By-laws shall be determined in accordance with Robert's Rules of Order.

5. BOARD OF DIRECTORS

(a) The Board of Directors shall have complete power to admit applicants to membership in the Association and the decision of the Board of Directors in that regard shall be final.

(b) The Board of Directors shall have the power to suspend or expel any member who fails to observe any rule or regulation set forth in these By-laws or whose conduct is, in the opinion of the Board, prejudicial to the interests of the Association. A member so suspended or expelled shall, after the expiration of sixty (60) days, have the right to apply to the Board of Directors for reinstatement and may be reinstated at the next meeting of the Board, provided, two-thirds majority of the members of the Board of Directors present thereat vote in favour of such reinstatement. If the Board of Directors refuses to reinstate a person suspended or expelled from membership, such person shall have the right to apply for reinstatement to the next succeeding general meeting of the Association, but reinstatement by general meeting shall be only a vote of two-thirds of the members of the Association present thereat and entitled to vote. No special notice of such an application need be sent to members of the Association and it shall not be deemed to be special business.

(c) The affairs of the Association shall be managed and conducted by a Board of Directors who shall be Alberta residents (Canadian citizens) and who shall be elected by ballot at the Annual Meeting of the Association as follows:

- Two (2) Directors for a 3 year term
- Two (2) Directors for a 2 year term
- Two (2) Directors for a 1 year term.

All directors elected after 1985 shall hold office for a term of three years.

(d) The Board of Directors may delegate any of their powers to Executive Committee.

6. EXECUTIVE COMMITTEE

(a) The Executive Committee shall be appointed by the Board of Directors from within the Board of Directors and shall consist of a Chairman and a Secretary Treasurer who are non-voting members of the Executive Committee.

The Chairman shall:

- (a) be responsible for calling and shall preside at all meetings of the Association;
- (b) be an ex-officio member of all committees without a vote, unless he is specifically planned as a member of that committee;

- c) report to each Annual meeting concerning the operation of the Association;
- (d) be the official spokesperson of the Association;
- (e) carry out such other duties as may be assigned to him by the Association.

The Secretary-Treasurer shall:

- (a) ensure the safe keeping and control of all securities, funds and financial records;
- (b) cause to be prepared and present to the Association an annual budget;
- (c) cause to be prepared and present an Annual report to the Association showing the financial position of the Association, the results of the yearly operation of the Association and any such financial reports which the Association may from time to time require;
- (d) cause to be prepared and present to the Association at each of its regular meetings, a financial statement including financial holdings and transactions of the Association, and such other reports for the preceding months as will enable the Association to judge the activity of the Association;
- (e) in consultation with the Chairman, prepare and distribute the Agenda for each meeting of Association and of the Executive Committee;
- (f) provide such notice as required in these By-laws of all meetings of the Association and of the Executive Committee;
- (g) maintain an attendance record of those attending all meetings of the Association and of the Executive Committee;
- (h) be responsible for the preparation and distribution of the minutes of all meetings of the Association and of the Executive Committee;
- (i) conduct correspondence as directed by the Association;
- (j) be responsible for the safe keeping of the Seal and all minutes, records and documents of the Association;
- (k) perform any other related duties assigned by the Association.

The Executive Committee shall:

- (a) in an emergency, exercise the powers of the Association, but its powers in this respect may not be exercised in conflict with any expressed or established policies of the Association;
- (b) report in detail to the Association at its next meetings on any exercise of emergency power;
- (c) make recommendations to the Association on the goals, objectives and priorities;
- (d) establish methods, including the review of utilization data, for monitoring the effectiveness of all programs and services;
- (e) perform such other tasks as the Association might direct.

7. ANNUAL DUES

- (a) The Board of Directors may determine from time to time the amount of the initiation fee, if any, and the annual dues payable to the Association by members.
- (b) The annual membership shall run from Jan. 1 to Dec. 31 of each calendar year.

8. CONSTITUTIONAL AMENDMENTS

This constitution may be amended by extraordinary resolution at any annual or special meeting of the Association by affirmative vote of three-quarters of the members present. Notice of all proposed amendments shall be given to the Secretary in writing sixty (60) days in advance of a general meeting (unless a spontaneous call for amendments from the floor by a majority of the Board of Directors is made) and they shall be included in the notice calling such meetings, otherwise they should have no power to deal with same.

This By-law may be amended after written notice is given at any regular meeting of the Council. Such notice shall contain the content and the rationales of the proposed amendment, and shall be tabled until the next regular meeting. An amendment shall require an affirmative vote by two-thirds of the members for adoption.

9. BANKING

The Association, from time to time, shall designate (a) chartered bank(s) or (a) credits union(s) in which the funds of the Association are to be kept on deposit, and may authorize the opening of such accounts as may be necessary. The president and the secretary shall have access to these funds.

NEW ZEALAND DEER FARMING

TERRY HAYWARD

Regional Development Branch, Agriculture Canada

The New Zealand deer farming industry is 15 years old now, however, the seeds for it were sown in 1851 when the first deer were imported.

New Zealand has no native mammals except for a species of bat. Early settlers first introduced deer to develop a local food supply and later to develop a sport hunting industry. By 1920, the deer at large in New Zealand were declared a noxious animal. Efforts over the next 30 years were aimed at controlling and reducing the New Zealand deer population. By 1950, a turning point was reached as it became financially worthwhile to recover deer carcasses and export the venison.

In 1970, the first deer farming licenses were issued and by 1975, exports of venison dropped of as live sales, for captured deer, to farmers netted better returns.

From the first deer farm established in 1970, there are now an estimated 2,500+ farms holding upwards of 500,000 deer with very active national and local deer farming associations. In the early 1970's, the few pioneer deer farmers were being watched while they learned the techniques necessary to habituate wild deer. Over the years, the systems have been studied, learned and basically understood. To those early New Zealand deer farmers have come the financial rewards. For them, there was little information from research, less from advisory services and much scepticism from financiers and fellow farmers, a situation not unlike that being experienced in Canada today.

For those interested in following the news from New Zealand on advances in deer farming, you may contact:

New Zealand Deer Farming Association
Box 2678,
Wellington, New Zealand.

This organization puts out an informative magazine titled, "The Deer Farmer", which is only available through subscription to the above address.

The New Zealand deer farming scene is vastly different from the Canadian situation, however, work done in New Zealand over the last decade may point out beneficial shortcuts to our own industry as it evolves.

GAME RANCHING IN THE NORTHWEST TERRITORIES

TERRY HAYWARD

Regional Development Branch, Agriculture Canada

Interest in game ranching in the Northwest Territories, while not widespread, covers reindeer, muskox, caribou and bison.

REINDEER

The Canadian Reindeer Company of Tuktoyaktuk manages between 12,000-15,000 animals. These animals are the result of a seed herd of 2,370 animals that came from Alaska in March, 1935. They were delivered to the then, newly established, Reindeer Grazing Reserve located in the Mackenzie Delta. The reindeer importation was conceived to supplement the dwindling wildlife of the Canadian Arctic, and to improve the economic conditions of the natives. The original policy was to keep a government-owned nucleus from which additional units could be obtained and put under Eskimo management. Over the herd's 50 year history, it has been returned to federal government control for a variety of reasons. In March, 1974, the herd was again sold to private concerns and now belongs to the Canadian Reindeer Company. This company has worked diligently over the past decade in establishing a herd management program, federally inspected slaughter facilities and marketing programs for meat and live animals south of the 60th parallel.

MUSKOX-CARIBOU

The Inuvialuit Development Corporation (IDC) of Inuvik is a native corporation that, this year, conducted a muskox slaughter with federal meat inspectors on hand. The IDC conducted this slaughter firstly to provide inspected muskox meat for the N.W.T. pavillion at Expo 86 and secondly to assess the possibility of future commercialization of this natural resource of the high Arctic. The IDC is also interested in caribou harvesting on a commercial basis, and is presently studying this.

BISON

Recent interest in establishing a wood bison ranch has been expressed by groups in the Fort Smith area. At the present time, it is understood that all plans to pursue this ranch are on hold for a variety of reasons.

Expansion of game ranching/farming in the N.W.T. may be limited in the future to the existing operations as opposed to new entrants into this industry.

GAME FARMING IN THE YUKON

TERRY HAYWARD

Regional Development Branch, Agriculture Canada

The year of 1985 saw the establishment of the first game farm in the Yukon. Mr. D. Nolan of Whitehorse established the Yukon Game Farm and stocked it with 30 elk from southern Alberta. These animals complimented the two elk, 3 moose and numerous dall sheep already resident on Mr. Nolan's farm.

Mr. Nolan's interest in game spans many years. His enthusiasm has prompted others to consider game farming as a natural direction in the agricultural development presently underway in the Yukon. However, availability of land and capital, in the Yukon, are two major stumbling blocks to further game farming units being set up. Nevertheless, interest remains high.

Initially, Mr. Nolan was assisted in establishing his elk herd with a grant provided under the Canada/Yukon Economic Development Agreement. The grant committee viewed the Yukon Game Farm as being able to provide short and long term economic opportunities in the area of tourism, production of stock for domestic and export sales, velvet production, providing animals for relocation in areas where wild stock is approaching depletion and red meat production.

Recently, interest has also been expressed by Yukoners in the potential establishment of reindeer herds. There will be more on this topic as information on this form of game farming becomes available. For those interested in contacting Yukoners re: game farming, it is suggested that you write to the following:

Mr. R. Filteau,
Agriculture Advisor,
Department of Renewable Resources,
P.O. Box 2703,
Whitehorse, Yukon.
Y1A 2C6

THE BISON SCENE

12

NEWS FROM AGRICULTURE

JUDD BUNNAGE

Alberta Agriculture, Edmonton

I hope this letter finds everyone excited about spring and looking forward to a new season. I feel that this year may be quite important to the whole game ranching industry what with regulations just around the corner and a processing plant for bison tantalizingly close. More on those in a moment.

This past weekend I was in Winnipeg attending the annual meeting of the Canadian Buffalo Association. They had about 25 people there who seemed quite opportunistic about the future. They do need additional members to carry out some of their plans. The topics receiving the most time were marketing in general and the New Brunswick TB fiasco in particular.

The New Brunswick TB issue was really an unfortunate non-issue. The whole thing started over the discovery of TB reactors in some bison slaughtered in a herd in New Brunswick. The herd was quarantined while testing was conducted. About 12 head were subsequently found to react and the whole herd was ordered destroyed. The owner was very disturbed as you can imagine, especially when he learned that the Government was not going to give him compensation equal to beef prices. Over the protests and advice from several calmer bison producers from Ontario, this producer complained to his MP and other important political people. It was then revealed that 5 of the animals did indeed have early stages of TB (ie. evident in the visera). The animals were perfectly safe to eat, but suspecting another tuna scandal, the opposition parties dragged the Minister of Agriculture through the dirt for several days. Needless to say the public was unduly alarmed and bison meat sales plummeted for quite a while. When it was all over, it was learned that the minister had acted very properly and the meat was perfectly safe. Unfortunately, politicians and the media are not renowned for their attempts to undo the damage caused by unfair reporting. The bison industry will survive. Bison meat is too good of a product to be hurt long because of bad publicity.

Incidentally, the source of the infection has not yet been found. Two other herds, both in Ontario, have been temporarily quarantined pending further blood tests. It has also been rumored that all the herds in Canada will be ordered tested within the next two years. This is a good thing. The publicity around the announcement that all of the remaining herds in Canada are free of both TB and Brucellosis will do us more good than the New Brunswick scandal did us bad. A word of warning, if you don't have facilities to work and restrain your bison, you had better think about doing it now. Agriculture Canada will have a lot of teeth in the proposed test order. It may come down to "test or slaughter them".

I am not sure that the old saying that "no news is good news" applies in the next two items. From what I have heard, the proposed bison slaughter plant has progressed to the stage that the developer is only waiting for the banks to arrange for the transfer of the funds. We are all

keeping our fingers crossed that no new snag hold up construction any longer. The European Economic Community group have given tentative approval to the blue prints. Several European orders are pending. All we need now is the plant and more bison.

The other no news item is the failure of the equally elusive game ranching regulations to appear. They have been promised for several months now. I know the regulations exist as I saw an earlier version, however I understand they have undergone considerable changes recently. I am not sure whether the changes are positive or negative, but they at least allow for game ranching to exist although somewhat inhibited.

The final topic that I would like to address today involves reproduction in bison. From what I have been able to learn, poor calf crops were reported for a number of herds. This affected at least three other provinces as well as Northern Alberta. Most of the problems were on farms in areas that we would describe as bush farms or marginal land types. I don't think that we really know what is the cause, however I would like to propose a few ideas. We have had some tough weather, both summer and winter, for the two previous seasons. Pastures in Northern Alberta have not been in good condition. The bison, being undomesticated, reacts to nutritional stress like a wild animal. If they lack adequate food during the summer, the cows fail to come into estrus or breed. Nature has long ago taught them that if food is not available in the summer, it certainly will not get any better later on in the year, therefore to ensure that the cow will survive through the winter with a minimum of stress, the luxury of breeding is denied. We who have been raising beef cattle have kind of forgotten that we have taught the beef cow reproductive system to not worry and get pregnant anyway because winter feed will come from somewhere. Considering this theory further, it therefore becomes critical for us to provide good nutrition for the bison prior to and during the breeding season. I know of several herds that have had outstanding breeding success, and in all cases, they have had better than average pasture. The idea of reserving a good pasture for the bison to use from about June 15 to September, or several such pastures, makes a lot of sense. The sheep farmers call this flushing. I think we will have to experiment with this idea some because the bison don't like the same types of flushing pastures that sheep and cattle do. One producer turned his herd out onto an oat field but they would not eat the stuff. It may have been too rich for them. Bison don't like high protein pasture like clover or alfalfa. I suspect that a good grass pasture would be better. I plan to do some more work on this question this summer. In the meantime try to reserve some new pasture for your bison to use for the period 6 weeks prior to and during breeding season, if you can. Neither the industry nor likely you can afford another wreck like the summer of 1985.

BUFFALO (BISON) MEAT

14

WHY EAT BUFFALO MEAT?

SIGFRIED BIEWALD

Dandy Food Services, Edmonton

Well for one reason, it tastes very good! If you tried Buffalo meat and did not know what you were eating, you would think it was the best tasting beef you ever ate. Buffalo meat is naturally tender and flavoured. It tastes by itself.

Unlike other meats, Buffalo does not derive its flavor from its fat. The average fat content is 2.8%, making Buffalo meat low in calories.

Buffalo meat is 25% to 30% higher in protein than beef. Since the meat is more concentrated, pound for pound you get your moneys worth.

The Buffalo (Plains) is no longer an endangered species and has been successfully raised commercially for a number of years. Due to the nature of the animal, they are handled as little as possible and spend most of their time on grass with minimal time in the feedlot.

NUTRITIVE VALUE OF BUFFALO MEAT

Buffalo meat is a prime source of many essential nutrients in our diet. It contains a high amount of B vitamins, iron and copper. It also contains a high amount of actomyosin, a compound associated with fast muscle action.

Buffalo meat is also found to be non-allergenic. Being very lean and high in nutrients, WEIHGT WATCHERS has placed Buffalo meat on their legal list.

SELECTING AND PURCHASING BUFFALO MEAT

The most common Buffalo cuts available are steaks, roasts, hamburger and stew meat.

A. Servings Per/Pound

TABLE 1. Average number of servings cut per pound of Buffalo meat.

Cut of Buffalo Meat	Number of Servings/Pound
Stew, Ground, Cubed	4
Boneless Roasts, Rib and Top Loin Roasts	3
Arm and Blade Pot Roasts, T-Bone and Rib Steaks	2
Short Ribs, Shank Cross Cuts	1 to 2

B. Grading

Buffalo meat is graded at A1, which is the top line of animal. Each carcass is inspected and certified by Federal Meat Inspectors at the packing plant.

CHARACTERISTICS OF BUFFALO MEAT

A. Beef and Buffalo Meat Comparison

TABLE 2. Comparison of the appearance and texture of Buffalo and Beef meat.

Animal Meat	Muscle Colour	Texture	Fat Colour	Bone Colour	Texture
Beef	Red	Connective Tissue Evident	Pinkish	Greyish	Coarse
Buffalo	Cherry Red	Fine Texture	Creamy	Pinkish	Hard

TABLE 3. Composition of Buffalo and Beef meat.

Animal Meat	Water	Protein	Fat	Calories Per Ounce
Beef	44%	24%	27.9%	99
Buffalo	63%	35%	2.8%	47

STORAGE OF BUFFALO MEAT

A. Refrigerated Storage

Fresh buffalo meat which is not to be frozen should be stored in the coldest part of the refrigerator or cooler.

Pre-packaged fresh Buffalo meat should be stored unopened in the refrigerator or cooler in the original wrapping not to exceed two days for steaks, cubes or stew meat and three days for roasts.

Fresh Buffalo meat that is not pre-packaged should be removed from the market wrapping, wrapped loosely in waxed paper or aluminum foil and refrigerated up to a maximum of two days.

Cooked meat should be wrapped or covered to prevent drying and stored in the coldest part of the refrigerator or cooler within one to two hours of cooking. Cooked meat will keep longer if left in larger pieces and not cut until ready to use.

B. Freezer Storage

Fresh pre-packaged meat may be frozen in the original wrapping for one to two weeks. For longer freezer storage, the original package should be over-wrapped with special freezer material.

Wrap fresh Buffalo meat closely and seal tightly in moisture/vapour-proof material, separating individual servings by a double layer of wrapping material. Store at 0 degrees F., -18 degrees C.

Recommended maximum storage time is between 3 to 4 months for hamburger and 6 to 12 months for other cuts.

COOKING METHODS

Here are some examples on how to prepare Buffalo meat. Please note that Buffalo meat is lower in fat than beef and therefore requires less heat or less time to cook. Fat works as an insulator and because of the low fat content in Buffalo meat, the heat penetrates more easily. All red meats will toughen if overcooked, so for maximum success, cut down the temperature that you would use for beef by 25% OR the cooking time that you would use for beef by 25%.

DANDY GOURMET SPICE IS RECOMMENDED IN PLACE OF THE SALT AND PEPPER SEASONING SUGGESTED.

A. To Roast

CUTS: Rib steak or roast, loin and T-bone steaks, tenderloin and roasts from the sirloin.

- season with salt and pepper;
- place meat with fat side up in open roasting pan;
- do not add water, baste nor cover;
- roast in slow oven;
- cook at 75% of the time that is recommended for beef at normal temperatures.

B. To Broil

CUTS: Rib steak and loin, T-bone steaks, tenderloin and steaks from the sirloin.

- season with salt and pepper;
- place meat 2 to 5 inches from flame or element;
- cook at 75% of the time that is recommended for beef;
- cook and turn until desired doneness.

C. To Cook in Liquids

CUTS: All cuts from the chuck, foreshank, brisket and stew meat.

- brown meats on all sides in own fat;
- season with salt and pepper;
- add liquid, cover and cook below boiling point until tender;
- cook at regular times recommended.

Buffalo can also be pan-broiled, fried and braised.

THERE IS NO SUCH THING AS TOUGH BUFFALO IF IT IS COOKED PROPERLY.

For additional ideas and recipes, please write to:

SIGGY BIEWALD,
Executive Chef,
DANDY FOOD SERVICE,
17820-107 Avenue,
Edmonton, AB. T5S 1J1

or call our office at (403) 489-3974 or (403) 489-3983

MANITOBA SCENE

18

GAME FARMING ACTIVITY IN MANITOBA

LYLE RENECKER

Department of Animal Science, University of Alberta

The Canadian Game Farmers Association held a meeting on April 5th in Minitonas, Manitoba. The primary thrust of this meeting was to inform and organize personnel interested in game farming in Manitoba. With the return of the incumbent New Democrat Party to power in Manitoba, there should be an increase in the number of game ranching licences approved during 1986. However, there is a hold on the game ranching program until an official cabinet is announced.

Requirements for game farming vary from regulations in Alberta. A land base of at least 40 acres of suitable habitat is required before a permit will be issued. There are no government infrastructure subsidies for entrepreneurs setting up operations in Manitoba, although programs are available through the Department of Manpower to offset labour expenses. The province will insist that fences should be at least 7 feet high and constructed with materials adequate to confine the species listed on their permit. Manitoba also appears adamant against the movement of wapiti from other provinces or the United States into their province. As a result, they have proposed a program whereby wapiti would be made available from the province at no cash cost. The farmer would then return animals to the province on the basis of 2 for 1 over a 10 year period. This strategy will help preserve the integrity of the Manitoba subspecies of wapiti.

Live Sales to New Zealand - In the last 5 years, live wapiti stock exported to New Zealand have ranged from 40-120 animals. It is expected that in 1986 approximately 200 head will be exported. There has been concern that there may be a downturn in sales to New Zealand in the future because of the removal of specific tax breaks protecting game farming investors which reduce overall profits and eventually funding into the industry. However, it is expected that this situation is only temporary.

Discussion of Wapiti Reproduction (Dr. J. Haigh) - The duration of gestation (pregnancy) in wapiti is approximately 253 days as compared to 233 days for the European red deer. Conception occurs during the fall breeding season or rut which peaks in Canada during the early autumn (September 20 to October 10). During this time, the semen is of the highest quality, according to Dr. Haigh, which promotes successful fertilization. By understanding this reproductive cycle, operators can adjust the time and place when cows and bulls are grouped in pens during the autumn rut thereby setting the spring calving time. This can serve as a beneficial management technique to the farmer who may have other priorities during spring such as seeding.

Fencing Costs - It has been estimated that an average cost for 9 gauge Watchman wire fence is about \$15,000/mile in comparison to Cyclone fence which costs \$6,700/mile. These cost estimates include wire, staples, posts, etc., but no labour.

HUSBANDRY AND MANAGEMENT OF WAPITI

19

BREEDING STRATEGIES

DR. JERRY HAIGH

School of Veterinary Medicine, University of Saskatchewan

Whether we are farming elk for export to New Zealand or for an internal market, the bottom line that will ultimately keep the bank manager at bay, will be the number of calves born. The more calves that are born early in the season (late May and early June) the better they will look when the buyers come around. Once, and if, a venison market is established here these early calves will also be the ones that bring the better return on the hook.

There is no doubt that buyers, whether they be New Zealanders or not, are keen to know the parentage and pedigree of their purchases. Every buyer likes to fancy him/herself as a judge of animals and the vendor who can confidently define the animals for sale is more likely to make a sale. In time, as the industry grows, we may develop some meaningful production indices and progeny testing. Certainly the red deer in New Zealand are now "computerized" on many properties. The main criteria are growth rate of progeny and antler weight.

How then to ensure the maximum number of breedings as early as possible?

To deal first with the bull/cow ratio, there is little evidence anywhere about the bull elk. In the case of red deer, a wide variety of ratios have been tried. As many as 200 hinds have been served by one stag. Although he got most of them in calf, I do not know what the spread of fawning dates was. In sheep and cattle, where most of these studies have been conducted, ratios also vary quite widely. What is known is that individual males of any species vary in their ability to fertilize females. Until we have some more concrete figures with which to work, we would probably be unwise to ask a mature wapiti bull to handle more than 40 cows. As there are few farmers in the position of even having 40 cows available for breeding, this may not be a problem just now.

The most common practice in New Zealand is "single sire mating". There are a few properties where multiple sires are let into large paddocks, mostly on hill country, and allowed to sort themselves out with the hinds. The single sire system provides many advantages and one or two disadvantages. The principle advantages are the provision of pedigree and the reduced fighting among males. A potential disadvantage would arise if a male turned out to be infertile. This however would be a disadvantage even in a multiple sire development if the infertile male was also the dominant animal (at least until he was demoted).

There has been a little work done on fertility evaluation of red deer and elk. There remains a very long way to go before this is a standard technique. From the findings so far, about eight percent of males of either animal have inferior quality semen throughout the rut. Most of the animals had been known to breed successfully, but if experience with cattle and sheep is anything to go by, they would be less efficient as sires than most and should certainly be used with

caution. The best policy to ensure that all cows become pregnant is probably to put in the first choice bull from about Sept. 10th and let him have one month with the cows. This should ensure two cycles per cow. A back-up bull can then be sent in for another three or four weeks. In order to avoid late calves, the cows should be run without a bull from about the end of the first week in November.

There are several policies that the elk farmer can adopt when it comes time to decide on a strategy for breeding. These will depend not only on the farmer's inclination but also upon the quality and design of the fencing and yard system that has been established.

For the small farmer with only a few animals in a single paddock, there may not be much of a problem initially. Until the herd begins to grow, and some of the male calves mature, the farmer will probably only have a single bull running with whatever number of cows he has been able to obtain. As long as the bull is fertile and willing, and the level of nutrition is correct, all will probably be well.

It will not be long, if nature takes its accustomed course, before this beginning farmer will be forced to review the farm policy. Male calves in their first winter are no threat to the herd bull. Even at the beginning of the second winter, they will come into the rut at least a month later than the boss and will be very unlikely to do any breeding. It will not be breeding that will worry the farmer. It will be the potential for fighting.

In the wild, these young males (and even the two year olds) aptly named "teenagers" by biologist Tony Bubenik, will be kept at bay by the herd bull simply by a combination of visual and auditory effects. The larger antlers, bigger body size, thicker neck and deeper toned bugle will serve to tell anyone in the vicinity that the females in the group are not available. Not that this will necessarily stop these females from chancing a foray away from the herd if they think that they can get away with it.

In the confines of captivity, the continued close proximity of the males may create problems. The degree and severity of the problems will depend very much upon the size and configuration of the paddock. If there is somewhere for the youngsters to remain out of sight of the boss, then all may be well. At least the paddock must be large enough for the males to separate by a hundred meters or so. Even then the young bull(s) will be relegated to a small area and will probably spend a good deal of the time tucked up against the fence.

The most dangerous moment may not come for the youngsters as for the dominant bull. After a period of three to six weeks of full blown rut he will have exhausted himself. This will have very little to do with the number of cows that he has served, the exhaustion will be due to his constant threatening and chasing of the subordinate animals and the fact that he will have eaten very little during this time. With almost no warning one of these animals will take over the herding of the cows. In nature, this system works exceedingly well and provides a "back-up" bull to ensure that the cows are pregnant. The exhausted master bull moves off and leaves the field to his younger rivals. The two and one year olds have developed more slowly than the adults and their semen quality and

testosterone levels will peak a month or more afterwards. This in turn ensures that they are in ideal breeding condition when needed.

In captivity, the tired older bull may not be able to get far enough away. I have even seen a defeated 14 year old bull killed by a vigorous two year old. If you have only a single paddock, it will be essential to have it large enough. Some bluffs or other visual barriers will also be important. If you are in the single paddock situation you will be better off with a long narrow paddock. Feed the females at one end. The herd male will be happy to keep them fairly close to the food and the other male(s) will be able to stay as far away as possible. They can be fed at a different location. Do not forget to provide water at two sites as well if no snow has fallen.

Better yet will be a farm that has been properly designed to allow adequate separation of the animals. Non breeding bulls should be held in an entirely separate paddock. They can be densely stocked and will seldom do more than threaten one another, although there will be dominant animals in the paddock.

If the farm is set up with handling yards and a well designed central race, it will be possible to replace bulls by drafting them when the need arises. The best situation will ensure that the two breeding bulls are not in immediately adjacent pens. I have spent hours watching both red deer and elk sparring through a fence. This not only exhausts the males, but also damages the fence.

A quick look at some of the normal happenings around the breeding season may help with an understanding of events. The first signs of impending breeding will be the increase in neck girth of the bulls. In late August, they will shed their velvet. On the farm this may not be of much help as the velvet will already be in a deep freeze. There are three things that the farmer will readily notice. These are the start of the bugling chorus, the rubbing by the bulls of their antler stubs against anything solid and the so-called "thrash urination" behavior during which the bulls will lower their heads, thrash at real or imaginary objects and vary deliberately spray their bellies and manes with pungent urine. The unwary farmer standing nearby will require a shower before dinner. The intensity of the bugling and any sparring seen will increase over two or three weeks.

It will bear repeating many times that the docile, cuddly, bottle-raised bull will now become as dangerous as a combination of a rattlesnake, an enraged bull elephant and mafia hit man. There is only one place for these animals. For those of you who haven't tried it, elk meat is delicious.

Research has shown that all of these events going on with the bulls serve to stimulate and to some extent synchronise the onset of breeding activity in the females. Certainly when females are raised out of sight and smell of the bulls, the onset of estrus will be delayed. A brief mention here will serve to remind readers that both the males and females should be on a rising plane of nutrition as they enter the rut. Nutrition is a big subject worthy of its own section and will be dealt with elsewhere.

SUPPLEMENTAL FEEDING SYSTEMS FOR WAPITI

HENRY KOZAK

Department of Animal Science, University of Alberta

One of the most frequently asked questions in livestock production (particularly for a recently farmed species such as wapiti) is what to feed and at what level. Different feed types and levels can have profound effects on rates of gain, natural foraging behavior and reproductive performance of the cow.

Currently, I am conducting research which will examine the effects of nutrition in relation to productivity and management of farmed wapiti. Work for this study is being carried out at the Ministik Wildlife Research Station located approximately 50 km southeast of Edmonton, Alberta. This article will discuss some of the preliminary findings of my research as well as my thoughts on winter supplementation of farmed wapiti.

The first topic that I would like to discuss is feeding systems. There are three fundamental goals in developing any feeding system. First, the feeds utilized should be both palatable and safe for the animal. Secondly, feeding systems should be adapted to the system of farming to which they are associated, for example: grain, hay or forage harvesting. Finally, the practice must be economical. The best way to incorporate these goals is to establish what feeds wapiti prefer and then to use locally grown or easily obtainable feeds to meet their needs.

Wapiti are classified as mixed or intermediate feeders utilizing both grasses and browse in different proportions depending upon the season of the year and quality and quantity of the forage. As a general rule, wild wapiti consume a diet of approximately 60% browse and 40% grasses during the winter months. High stocking rates on marginal ranges would soon deplete the natural forage thus, the need for supplemental feeds arises.

Wapiti can be suitably supplemented with either grains or hay or a combination of both. The type of feed supplied can have a profound effect on natural foraging behavior. Studies comparing pelleted, cubed and baled alfalfa have shown that feeding pelleted hay as a supplemental ration caused increased grazing, browsing and stripping of bark from trees when compared to the other feed types. Studies at Ministik have also demonstrated an increase in the utilization of natural forage when pelleted supplementation is provided as compared to supplementation with alfalfa/brome hay. As a result, the physical form of the feed supplied can be utilized as a management tool to obtain the degree of range utilization desirable for each particular ranching operation.

The second question to deal with is the level of supplementation. Feed requirements of wapiti vary according to the age class of stock, season and actual level of animal performance desired at that time. Feeding for weight gains in weaned calves is desirable in order to ensure that target

weights are reached for breeding the next fall, although conception rates may be reduced in overfat animals. Feeding for gain in mature wapiti cows may also have deleterious effects. Mature pregnant cows should be fed at a maintenance level or even allowed weight losses through the winter months. Studies at Ministik have shown that, as in domestic cattle, overwinter weight losses of 10% from peak fall weights will ensure successful calving. Wapiti possess the ability to adequately compensate for overwinter tissue losses after green-up in the spring.

Studies have established that about 17.5 g dry matter of good quality feed per kg of body weight per day is required to maintain body weight of confined pregnant wapiti. An additional energy requirement of 30 percent is required for free-ranging wapiti and would bring the estimate of dry matter required for maintenance up to 22.75 g/kg/day. Feeds generally contain 10% water and thus are 10% less in weight on a dry matter basis. Therefore, maintenance intake of free-ranging wapiti cows during gestation can be expected to equal approximately 6.38 kg/head/day of good quality hay (on the basis of a 250 kg cow).

At present, feed costs of wapiti look low in comparison to the price of stock and many ranchers feel that feeding their wapiti all they want to eat is caring for them in the best possible manner. Studies at Ministik have shown that overfeeding of pregnant cows, especially during the last three weeks of pregnancy, can seriously affect calving success. Dystocia, stillborn calves and lactation failure after calving are all possible repercussions of overfeeding.

Due to the variability in diet preference of wapiti, there is a great flexibility in designing a supplemental feeding system and no one particular system is suitable for all regions of the province. In summary, feeding systems should be both practical and convenient for each ranching operation making use of locally available feed supplies. Feeding levels should be adjusted to each age class of animals and overfeeding of pregnant hinds should be avoided. Although costly, perhaps the most serious consequence of overfeeding is lowered productivity and a reduced calf crop which ultimately translates into dollars lost.

SHORT ISSUES ON GAME FARMING

24

FOR YOUR INTEREST

LYLE RENECKER

Department of Animal Science, University of Alberta

1. Livestock Feed Security

Recently, The Minister of Agriculture in Alberta, the Honourable LeRoy Fjordbotten, introduced the new Canada-Alberta Livestock Feed Security plan for Alberta livestock producers in Alberta during 1986. The program includes several types of eligible livestock producers who can receive assistance towards the purchase of feed when shortages exist. However, this program does not provide any scope for the new agricultural industry of game ranching. Perhaps, the Alberta Game Growers Association should inform the Minister of this omission and suggest that Alberta Agriculture also provide coverage for game farmers.

2. Velvet Antler Brokers

There has been several enquiries about prospective brokers for velvet antlers. I have obtained the names and telephone numbers of two brokers in Canada:

Chung Lee, Vancouver: 604-594-5663

John Chai, Manitoba: 204-738-4342

Although the largest importer of velvet antler is undoubtedly Korea, many producers may find it advantageous to pool their harvest and pursue local markets initially. You may actually find the demand of this market to be large and will provide a short-term sink for antler products.

3. Velvet Antler Prices

The velvet antler market has been extremely volatile in recent years resulting in price fluctuations from \$75-250/kg. Recently, R. Bryant stated, in the February/March issue of 'The Deer Farmer', that velvet prices in New Zealand will vary between \$18 for D Grade to \$120 NZ for Super A velvet antlers. This translates to approximately \$14-96 Can. for the two grades, respectively.

Export of velvet from New Zealand has increased steadily in recent years, from 4.9 T in 1982-83 to 18.8 T in 1984-85. The March 12, 1986 issue of the New Zealand Deer Report stated that 14 T of processed velvet may be exported from New Zealand this year.

4. Animal Safety and Immobilization

If you are an entrepreneur interested in wapiti farming, undoubtedly the potential sales of velvet antlers from your bulls will be of interest. It is unlikely that operations will be established for the production of velvet alone, however, returns from these sales could provide equity to supplement budgets.

If velvet antlers will be harvested from your bulls, then some form of chemical restraint must be administered. The restraint is important because it ensures that care and safety of both animals and man have been considered. Xylazine (commonly known by its trade name Rompun) is one of the most commonly used drugs by veterinarians to tranquilize wapiti (elk). It has the advantage of being relatively safe for animal sedation and readily procurable by veterinarians. Perhaps most important, xylazine is quite effective. However, all benefits generally have tradeoffs which compromise effectiveness. Although wapiti respond rapidly to an injection of xylazine, and thereby permit handling, animals recovering from the drug may require 2 to 5 hours of "baby sitting" until they can maintain a sternal posture, eructate (expel gas accumulations in the rumen - prevent bloat), thermoregulate and be safe from the potential damage to muscles and nerves in the limbs. I have been aware of a white-tailed deer which was extremely sensitive to xylazine and required 24 hours to recover from the effects of the drug.

Recently, there has been experimentation with reversal agents for the sedative effects of xylazine. The results from numerous experimental studies with both domestic and wild species are promising in that recovery times can be reduced to 2 to 15 minutes. To the wapiti producer, this relates to man-hour requirements and ultimately to dollars saved. However, these drugs are not commercially available at present.

5. Velvet Antler Quality

Only prime velvet antlers will provide high returns to the producer. There are two criteria which are very important in obtaining Grade A velvet. First, velvet antlers reach their prime for the commercial market during a very brief period in late spring. During this period antlers are rapidly growing and a difference of only a few days could mean a reduction in Grade from A to B or C. The other factor which can influence grade is damage which could occur during immobilization. Thus, the need for an effective means of restraint. In other words, know the "do's and don'ts and the when's and the why's" before you and your veterinarian proceed.

6. Animal Weights

Sooner or later your operation will require a platform scales for weighing animals. With the advancement of technology, there are electronic scales which average animal weights as they walk across the platform. Most importantly, these units do not require motionless animals to obtain

an accurate weight. There are several brands of units available which you may want to consider for your game farm.

7. Support for the Alberta Game Producers

Recently, letters have been sent from the Canadian Game Farmers Association and the Canadian Buffalo Association to the Honourable Don Sparrow in support of Game Farmers in Alberta. However, we must continue to reaffirm our position and needs. This can be most effectively conducted with letters or telephone calls to Mr. Sparrow.

8. Yield of Velvet Antlers

Expectant yields of velvet antlers is a concern of any wapiti producer. Extra yields result in additional funds which maximize farm returns. If your animals have been only offered range pasture, a rule of thumb is to expect a yield of 1 kg of velvet/yr from wapiti bulls up to 8 years of age. With supplementation, these velvet yields can easily be increased to 1.5kg/yr or better. A substantial increase which can subsidize the necessary expense of immobilizing drugs and a veterinarian.

9. Live Animal Sales to New Zealand

In recent years, there has been numerous shipments of wapiti breeding stock to New Zealand aboard wide body aircraft. The collection points for these flights have been either Toronto or Vancouver. However, there has been an indication that flights could leave from Edmonton if a sufficient group of animals was assembled to fill the aircraft. Producers may want to keep this possibility in mind and combine efforts to coordinate a gathering of sales and shipment.

10. Adequate Records

Whether your enterprise is centered around the production of bison, wapiti or both, the need for maintenance of herd records will become more apparent over time. Records on reproductive performance and weight gains are a necessity when selling breeding stock, especially to New Zealand.

Another benefit relates to feeding programs. A working knowledge of weight gains and losses of adult, yearling and calf groups will inform producers of appropriate times to provide supplementary feed. What does this mean? It means more money in the bank!

This is only a brief list of the benefits and the next question is how to keep records efficiently. As your breeding herd increases in size it will become more difficult to maintain records on cards or animal record sheets. If you have purchased a computer and hope to adapt it to your game farming operation than you will need an appropriate software program. For

those readers interested in such a package, I will have a program available in the near future for IBM (and the compatibles) users.

11. Membership List

I have enclosed a membership directory for the Alberta Game Growers Association. Encourage other members to join the Association.

12. Game Grower Articles

I am interested in contributions for the Game Grower newsletter from any member. If you would like to share your vast experience, knowledge or expertise in any aspect of the industry please call or write me.

13. June Meeting

There has been many delays in the last several months which have eliminated the chance for an April meeting. I am planning a June field day at the Ministik Wildlife Research Station at the time when velvet antlers will be removed. Keep this in mind and more information will be provided as time unfolds.

ARGUMENTS SUPPORTING GAME RANCHING

28

ABOUT THIS ARTICLE: This article was written as a rebuttal to arguments presented by people opposed to game ranching in Alberta. The article was accepted for publication in *Western Canada Outdoors* 1986.

GAME RANCHING IN ALBERTA: AN INDUSTRY WITH A FUTURE

HENRY KOZAK AND LYLE RENECKER

Department of Animal Science, University of Alberta

Revisions to the Alberta Wildlife Act (Fall 1984 Session of the Legislature) have provided the opportunity to legalize game ranching and game farming as an agricultural industry in Alberta. Since that time, the tabled legislation has become somewhat controversial and the concept of game ranching met with some criticism. The purpose of this article is to discuss the concepts behind game ranching in Alberta and to try and alleviate some of the concerns presently being expressed about game ranching.

The concept of game ranching in Alberta was originally based on the mixed-species production strategy. This system implies that large tracts of marginal lands would be enclosed and management inputs minimized. Experimental game ranches in Alberta, such as the Kikino Wildlife Ranch near Lac La Biche, have demonstrated the impracticality of extensive game ranching because of the need to control animal movement. As a result the idea of game farming, as opposed to mixed-species ranching, has been growing in popularity. In this system small tracts of highly productive lands are utilized to intensively raise wildlife. This trend was also experienced in the New Zealand situation where game farming has been practiced for 20 years. In New Zealand, ranches had their beginnings on marginal hillsides but soon moved to highly productive sheep ranges when it was learned that the low productivity of deer on marginal ranges would not offset the high fencing and operational costs.

As the legislation in Alberta stands today, game ranching is only allowed on privately owned lands. This restriction, along with trends towards intensive game farming (rather than game ranching) makes the idea of widespread privatization of public lands for this new enterprise highly improbable.

In Alberta today, any resident can operate a game ranch on private lands for the purpose of live animal sales. The sale of game meat however, remains an unresolved issue due to concerns about poaching of wild stocks. These concerns are basically unfounded due to regulations being imposed upon game ranches. All calves must be eartagged and lip tattooed to identify them as farm raised animals. Monthly and yearly inventories of all farm stock must be submitted as well as an individual record of any animal acquired, sold or slaughtered by a rancher. In addition, meat from game ranched animals can be vacuum packaged with a government seal to identify it as originating from a legal source. Once

game ranching becomes established, it will take many years to satisfy demands for breeding stock and meat sales will remain secondary. In New Zealand, meat sales are still secondary to the sale of breeding stock after 20 years of operation. However, the sale of meat is required to provide future incentive and stability in the marketplace; a necessity for any developing industry.

The velvet antler market is a highly volatile one, and since a nearly sufficient world supply is available, it demands a high quality product. Velvet antler is only prime for about one week during the antler growth cycle. Removal of antlers before or after this period results in an inferior product that commands a very low price. Also, damage to these prime velvet antlers, during removal by inexperienced persons, renders them virtually unmarketable. As a result, the poaching of velvet antler from wild stocks is an almost impossible task. In addition, game ranching will provide a sufficient and steady supply of game meat and by-products thus driving these prices down and making poaching even less economically viable.

Existing game ranching regulations provide a "once only" opportunity of acquiring six animals from the government for a nominal fee. The rancher has no choice in the sex or age ratio of animals he receives and since six animals is far from a viable operation, additional animals must be purchased from existing game ranches at market prices. It will soon become apparent that the acquisition of ranch-raised stock is preferable to wild stock since they are more easily managed, handled and less susceptible to stress related diseases as experience has shown at the Ministik Wildlife Research Station operated by the University of Alberta. As a result, acquisition of wild stock illegally is improbable due to the above reasons and the close monitoring and regulation of game ranch activities. In addition, capture and safe transport of wild animals without the public or government officials being aware is practically impossible due to field logistics.

Since animals must be acquired from other existing game ranches, the movement of animals across provincial and federal borders is also a concern. Quarantine procedures presently in practice for domestic stock will be required for the movement of wild stock as well. This will serve to eliminate disease and parasite spread from animals introduced from outside Alberta's borders. Only native Alberta species are candidates for game ranching in Alberta, therefore there will be no introduction of exotic species for the purpose of game ranching.

With world trends turning towards leaner meats, game ranching provides the opportunity for existing farmers and ranchers to diversify their income. The concept of game ranching has also been met favorably with several native groups in Alberta and can provide them with a new industry and a feeling of self sufficiency. The creation of regulations governing

game ranching in Alberta has been a laborious process with the utmost consideration given to all confounding aspects. The careful attention given to these issues will ensure the preservation of wildlife and the right to hunt wildlife in Alberta. In no way is game ranching a threat to wildlife conservation, but rather it is an industry that can be of benefit to all Albertans.

COLORADO CONSERVATION OFFICIER'S OPINION

HENRY KOZAK

Department of Animal Science, University of Alberta

As many of you are well aware of, one of the main arguments against establishing game ranches in Alberta is the concern that it will promote the poaching of wild game. As a result, some people anticipate that enforcement costs would increase considerably.

I could not see how game ranching could possibly affect poaching or enforcement. Thus, I decided to contact Mr. Mike Bauman a conservation officer in the State of Colorado. Colorado allows game ranching under special permits called 'Commercial Wildlife Park Permits' issued by the state licensing section. Approximately 75 licenses were issued during 1986 in Colorado.

The state does not capture or sell animals to prospective ranchers. As a result, operators must purchase their stock from established ranches and animals must be marked for identification. The state allows the sale of meat, velvet, and live animals as well as paid hunting on Commercial Wildlife Parks. Meat is not specially packaged but must be invoiced and the carcass must have an appropriate identification seal attached to it. Mr. Bauman claims that the meat can easily be traced back to its source and feels that meat sales in no way promote poaching of wild game. In addition, he states that he knows of no increase in enforcement costs that can be attributed to game ranching. In conclusion, there is no adverse feeling concerning game ranching among the conservation officers in the State of Colorado and no feeling that game ranching poses any threat to wild populations.

SUPPORT DRIVE

HELP FORTIFY OUR POSITION ON GAME RANCHING

As everyone probably realizes, the greatest opposition against the development of the new agricultural industry of game ranching is the Fish & Game Association. Recently, they have been escalating their activities against game ranching and have been passing out self-addressed cards, such as the sample provided immediately below. These were inturn signed and sent to the Minister. I have formulated a letter defending our position on game farming and addressing our needs in Alberta. A copy is attached to this newsletter and I would ask everyone to place their address on this letter, sign it and send the letter to the Honorable Don Sparrow. The letter requests a response, therefore Mr. Sparrow should respond. Also, please ask as many people as possible to send letters which address the same issues or stating that they simply do not agree with the stand of the Fish & Game Assoc. on the issue of game ranching. A clip-out form is provided in this newsletter which can be clipped out, signed, dated and mailed to Mr. Sparrow. Remeber, one letter represents about 1000 votes to politicians.

SAMPLE OF MOST RECENT ANTI-GAME RANCHING PROPAGANDA FROM THE ALBERTA FISH & GAME ASSOCIATION

Date _____

Dear Mr. Sparrow:

Game ranching is a retrograde step in the otherwise sound history of game management in Alberta. Wildlife should remain in the public trust. I would like to see all sections dealing with the promotion of game ranching for the sale of meat or other products removed from the Alberta Wildlife Act.

EXAMPLE

Signature _____

PLEASE CLIP OUT THIS NOTE. GIVE TO OTHER INTERESTED PERSONS AND MAIL

.....

Date _____

Honourable Don Sparrow
Associate Minister
Public Lands and Wildlife
Legislature Building
Edmonton, Alberta T5K 2B6

Dear Mr. Sparrow:

I am a person who is interested in the wildlife and outdoors of Alberta, but do not support the views of the Alberta Fish & Game Association on their attitude towards game ranching. I feel the new agricultural industry of game ranching will greatly benefit our province and the government should move immediately towards solidifying the concept of game ranching in the regulations of the Wildlife Act. Furthermore, the arguments represented against game ranching are emotional and lack a factual basis. Game ranching is merely a productive option which diversifies wildlife management practices.

Sincerely,

.....

Honourable Don Sparrow
Associate Minister
Public Lands and Wildlife,
Legislature Building,
Edmonton, Alberta T5K 2B6

Dear Mr. Sparrow:

I believe that the concept of game ranching will be a sound investment for the province of Alberta and that this new agricultural industry will in no way jeopardize the principles of wildlife management. However, I am disappointed that your government has again delayed the passing of regulations which will formalize the new industry of game ranching. There is a large sector of the voting sector who are interested in game ranching and awaiting final placement of the regulations. As a result, development of this new industry is delayed which only injures this province's position as a production center.

There is no question that with high returns from live animal sales that producers will gear production towards the demand for breeding stock. Ultimately, the stability of this new industry will hinge on the sale of meat. As a person interested in game ranching, I must emphasize that sale of meat should be included in the new regulations. There are measures which can be used to prevent illegal trade.

There are factual reasons why game ranching is a sound agricultural practice and should be supported by your government. Producers and interested people in the province need your support on this issue and request that entrenchment of game ranching in the regulations of the Wildlife Act be as soon as possible. I am highly in favor of game ranching and as a concerned Albertan request a response to this letter. Thank-you for your response.

Sincerely,

SALES

34

BISON STOCK FOR SALE

1. NORTH DAKOTA - There are 30 yearling and 30 two year old female bison for sale. The first set of blood tests have been completed so interested buyers should pursue immediately. Contact: Siouxland Buffalo, Grand Forks, North Dakota.
2. HIGH LEVEL - Approximately 50 head of bison for sale. Contact: Carl Harris, High Level, Alberta.

ELK ISLAND NATIONAL PARK BISON SALE

A closed bid auction of approximately 150 bison will probably take place in December, 1986 or early 1987. Producers interested in purchasing additional stock should keep this future sale at Elk Island National Park in mind. More information will be provided as the sale approaches.

MEMBERSHIP DIRECTORY

35

MEMBERSHIP DIRECTORY

Arthur R. Lee
Box 566,
Vermillion, Alberta, T0B 4M0

Godkin, Gordon
Box 1468,
Innisfail, Alberta, T0M 1A0

Blyth Freda
R.R.# 1, Site 4,
Fort Saskatchewan, Alberta, T8L 2N7

Haigh Dr. Jerry
Large Animal Clinic,
Univ. of Saskatchewan,
Saskatoon, Saskatchewan,

Boake Matt
General Delivery
Bonanza Alberta T0H 0K0

Hainstock, B. Wade
Box 112,
Hazel Dell, Saskatchewan, S0A 1G0

Buhrmann, Hans
Box 207,
Pincher Creek, Alberta, T0K 1W0

Hayward Terry
Agriculture Canada,
Cornerpoint Building, 10179-105 Street
Edmonton, Alberta, T5J 1E2

Bunnage Judd
Alta. Agriculture,
7000-113 St,
Edmonton, Alberta T6H 5T6

Hudson, Robert J.
Dept. of Animal Science,
310 Ag/For Centre, University of Albe
Edmonton, Alberta, T6G 2P5

Coles, Ralph
Box 1329,
Pincher Creek, Alberta,

Jackson, Rob
Triple J Farms
R.R. #1,
Andrew, Alberta, T0B 0C0

Crawford, Frank
F.J. Ranch,
Box 1198,
Athabasca, Alberta, T0G 0B0

Jerram, Walter
R.R. #1,
Legal, Alberta, T0G 1L0

Curry, Clay & Jean
Box 654,
Elnora, Alberta, T0M 0Y0

Jones, Ken
R.R. #1,
Cheadle, Alberta, T0J 3H0

Dixon, Fred A. & Ann
Pincher Creek Ranches,
Box 1893,
Pincher Creek, Alberta, T0K 1W0

Klassen, Ernest
Wardlow, Alberta, T0J 3M0

Galicia, Oscar
Box 275,
Blairmore, Alberta, T0K 0E0

Kolodka Stan
Stan Kolodka Constr. Ltd,
Box 213,
Bonnyville, Alberta, T0A 0L0

Kozak Hank
#10 Martin Close,
Red Deer, Alberta, T4N 0H1

Kozak, Henry M.
Dept. of Animal Science,
310 Ag/For Centre, University of Alberta,
Edmonton, Alberta, T6G 2P5

Matthew, Llewellyn
Dept. of Rural Economy,
515 General Serv. Bldg., University of Alberta,
Edmonton, Alberta, T6G 2H1

McDougall Bruce
5928-99 Street,
Edmonton, Alberta, T6E 3N9

Murto William
Box 69,
Benalto Alberta TOM 0H0

Orcheski, Joe & Georgina
Round Hill, Alberta, T0B 3Z0

Patten, Dan
9240-110 Ave.,
Grande Prairie, Alberta, T8V 3A7

Rebkowich, Paul
Box 38,
Wandering River, Alberta, T0A 3M0

Renecker, Lyle A.
Dept. of Animal Science,
310 Ag/For Centre, University of Alberta,
Edmonton, Alberta, T6G 2P5

Sawatzky Brian P.
Box 1573,
Peace River, Alberta T0H 2X0

Sherman, Gordon & Sandy
Box 7,
Site 10,
Cardston, Alberta, T0K 0K0

Smulan, Randy
Box 277,
Wanota, Saskatchewan, S0G 5A0

Troescher Ernest A.
15207-96 St.,
Edmonton, Alberta, T5E 6C3

Twa, Jim
2410-20 Ave. S.,
Lethbridge, Alberta, T1K 1G6

Underwood George
P.O. Box 1225,
Peace River, Alberta T0H 2X0

Wells, Shelley
Sleepy Valley Game Farm &
Petting Zoo, R.R. #1,
Rocky Mtn. House, Alberta, T0M 1T0

Welsh, George
14332-92 Ave.,
Edmonton, Alberta,

Wong David
Alta Indian Agr Dev Corp,
#202, 5940 MacLeod Trail South,
Calgary, Alberta, T2H 2G4

Zoratti Barney & Anne
Box 1780,
Pincher Creek, Alberta, T0K 1W0

FISCAL NOTE

STATE OF ALASKA
1992 LEGISLATIVE SESSION

BILL NO. SB 216

Revision Date: _____

Department Affected: Fish and Game

Title: An Act authorizing moose and
caribou farming.

BRU: Wildlife Conservation

Component: Wildlife Conservation

Sponsor: Senator Dick Shultz

Requestor: Senate Resources Committee

COMPONENT SERIAL NO.

0	4	7	3
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Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0

CAPITAL	0.0	0.0	0.0	0.0	0.0	0.0
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REVENUE FUND SOURCE: 1024	0.0	0.0	0.0	0.0	0.0	0.0
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FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER FUND SOURCE:						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: No FY 92 impact.

ANALYSIS: (Attach a separate page if necessary.)

This analysis assumes that (unlike farmed elk, bison, muskoxen, reindeer) surplus moose or caribou are not defined as "domestic mammals;" the sale, transfer or transport of live animals may be regulated by the department; passage of the bill will not result in widespread, uncontrolled private ownership of these species.

Prepared By: Phil Koehl *PK*

Phone: 465-4190

Division: Division of Wildlife Conservation

Date: 4/1/92

Approved by Commissioner: *[Signature]*

Agency: Department of Fish and Game

Date: 4/2/92

March 31, 1991

Senator Jones
Alaska State Senate
Pouch V
Juneau, Ak 99811

Dear Senator Jones:

Myself and the enclosed list of Alaskans are strongly AGAINST SB 216, "Moose & Caribou Farming" that is currently in the Senate Resources Committee.

After extensively reviewing data and studies done by Lyle Rennicker at the UofA, and Wayne Regelin of Ak. Fish&Game, and articles on the failed Russian and Canadian moose farming, not to mention a multitude of defunct farms of domestic animals here in Alaska that proved to be a dismal failure, i.e. Matanuska dairy farming, Fairbanks pig farming, Delta chicken ranches, Seward chicken ranches, Mat. valley and Kenai peninsula beef cattle farming, and at least 6 fox farms.....

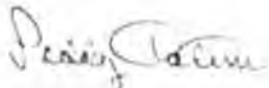
We feel moose and caribou should be left in the wild and not subjected to domestic farming or private ownership.

The law (AS 16:40) already allows musk ox, reindeer, and buffalo to be lawfully farmed under certain regulations...

Let's leave the wild game of Alaska, that belongs to all Alaskans, just that, Wild.....

I would like to hear from you and your views, of the 40 persons I spoke with on this matter, only 2 were undecided, the rest were definitely against it.

Sincerely,



Paddy Tatum
mile 276 Parks Hwy
Senana, Ak. 99760

cc: Schultz, Frank, Cotten, Eliason, Halford, Menard, Zharoff

PETITION AGAINST SB 216 - MOOSE & CARIBOU FARMING

We the undersigned do hereby make it known we are AGAINST SB 216 "Moose and Caribou Farming" sponsored by Schultz and Frank. After weighing the facts of both sides of the issue -- our conclusion is this idea is unfeasable, unsound biologically and financially, detrimental to wildlife, and serves the purpose of only a few, whereas the wild game of Alaska belongs to all the people.

- 1 Paddy Talum AT. 2 Nenana, a.k. 99760 582-2535
- 2 Jerry Waldhoff Po Box 3121 Siderior AK 99744 None
- 3 ~~Debra Schornberg~~ Box 574 Clear AK 99704 582-2559
- 4 ~~Alfred C. Rockard~~ Box 40124 Clear AK. 99704 582-2164
- 5 ~~Alfred C. Rockard~~ Schield Box 40123 CLEAR AK 99704 582-2523
- 6 Carl Shields Box 40123 Clear AK 99704 582-2523
- 7 Paul Schornberg Box 574 Clear AK 99704 582-2559
- 8 Carl H. Larsen Box 40052 Clear AK 99704 582-2319
- 9 Harold A. Bennett Box 611 Clear AK 99704 582-2355
- 10 Gail Fluvent Box 40060 Clear AK 99704 582-2384
- 11 Donald H. Mackey Box # 422 Clear, AK 99704 582-2604
- 12 ~~Charles Williams~~ Box 43 Hill, AK 99743 582-2525
- 13 Samantha Smith Box 655 Clear, AK 99704 582-2115
- 14 Bert A. Kawate Box 509 NENANA, AK 99760 582-2534
- 15 Margie G. Peley Box 7 Nenana, AK 99760 832-5530
- 16 Robin Ridlington Box 202 Nenana, AK 99760 832-5816
- 17 Kristine L. Luy Box 265 Nenana, AK 99760 832-5690
- 18 Margaret Tolat Box 690 Clear AK 99704 832-2730
- 19 Larry B. Dool Box 690 CLEAR AK 99704 582-2750
- 20 John M. Dool Box 581 Clear AK 99704 582-265
- 21 Joyce E. S. Srenslaci Box 386 Clear AK 99704 582-2576
- 22 Kent R. Sorenson Box 636 Clear AK 99704 582-2507
- 23 Keith Hardina Box 479 Clear AK 99704 582-2512
- 24 Mary E. Fisher STR 2 Nenana 211 99760 582-2704
- 25 Myrtle C. Fisher STR 2 NENANA AK 99760-582-2784
- 26 Barbara G. Cox P.O. Box 378 Nenana AK 99760 582-2524
- 27 Arthur J. Schmuck P.O. Box 343 Nenana AK 99760 832-5435
- 28 Helen A. Schmuck P.O. Box 343 Nenana, AK. 99760 832-5435
- 29 Ludwig W. Michael P.O. Box 40042 Clear AK 99704 582-2300
- 30 ~~John M. Dool~~ Box 690 Clear AK 99704 582-2750

31	Paul Turnquist	Box 419	Clear AK 99704	582-2696
32	ALBERT MADUX	Box 4001	Clear AK 99704	582-2310
33	Steve Holmes	Box 598	Clear AK 99704	582-2918
34	Steve Hockin	Box 3044	ANDERSON AK 99744	582-2785
35	Rick Duffy	Box 3031	Anderson AK 99744	582-2928
36	Maurice Dupraw	40117	Clear AK 99704	582-2423
37	LESLIE MORTENSON	459	Clear, AK 99704	582-2476
38	Helaine Michael	481	Clear, AK 99704	582-2476

UTILIZATION OF MOOSE FOR
SUBSISTENCE VALUE

The management of domesticated moose is a matter of great importance as sources of meat, of milk, and as draught animals, (tools, clothing, jewelry, animal feed, fertilizer).

As a source of meat the domesticated moose is highly productive. First, the loss of meat due to wounded animals getting away when hunted in the wild is avoided. Second, domestication permits the meat productivity of moose to be managed by selection and feeding. Third, castration of Bulls excludes the appreciable losses in their meat output caused by the abrupt drop in their fatness and weight during the mating season (Sept.-Oct.). Sexually mature domesticated bulls, during the mating period, will lose up to 20 per cent of their meat output, on the other hand, castrated domestic bulls remain in their well fed state until the beginning of winter, when the slaughter of meat animals begins.

In natural conditions, when the most nutritious green fodder is exhausted the calves stop growing for the whole winter. Consequently, six-months-old and year-old calves usually have the same live weight. But when the domesticated calves on the farm were given additional forage in the form of potatoes and fodder root crops, they continued to gain weight through out the whole winter, by as much as 40-80 kg. This enabled the farm to obtain year-old calves with the record live weight of 208 kg. ---THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY - DEC. 1964

Doug Welton
6810 Steese Hwy
Wetlain (FAI) AK 99712



Alaska State Legislature

Please enter into the record my testimony to the Resources
 committee on S.B. 216 - Moose/Carbon Farming committee name
dated 4-10-92
 bill/subject

Unfortunately, I was not allowed to rebuttal after Dave Kellyhouse spoke, and now today I can't speak.

Again, & Again, they speak about all these problems.

But, why don't they these problems (mainly disease) at the MRC.

If this bill doesn't pass I will personally see to it that the MRC is shut down immediately so as not to be subjected to

the chance of contacting disease from their

"Tame Moose Herd". You need to talk to Dave Johnson (ex-moose herder for 11 years at MRC) He has a

P.O. Box in Soldotna but I've lost it. You should also contact Paul Reusch

Signed: _____

Wong Wilton

Testifier

Rural - ALASKANS

Representing (Optional)

Address

Phone No.

Fisheries Biologist in Soldotna.

He raises orphans from the Kenai Pen. area.



Alaska State Legislature

Please enter into the record my testimony to the 5 Resource committee name

committee on SB 216 , dated 4/3/92 .
bill/subject

The task force developed by the Commission and related to agriculture has stated that Native animals are viable industries which need to be pursued. Ted Keen at the St. Division of Ag. office has told me that he sees native species as what may be the only profitable animal agriculture business. Why can't we as citizens even give it a shot. I support SB 216.

Signed: [Signature] Robert Shumaker
Testifier

Representing (Optional)
P.O. Box 3712 Palmer
Address:
746-4453
Phone No.



Alaska State Legislature

Please enter into the record my testimony to the Resource Committee (Senate)
committee name

committee on S.B. 216, dated April 3
bill/subject

We the undersigned sat patiently for 2 hours
waited to be heard at the scheduled tele-conference
from 1:30 PM - 3:30 PM

- 1) Doug Wilton 6810 Steese Hwy. Fbks. AK 99712
- 2) RICHARD ROBERTSON 672 LOVE RD 99712
- 3) William KRUSE 6955 Johnson Rd Seward AK
- 4) Joseph L Carlson 49 1/2 mile Elliott Hwy Jay AK.
- 5) Nancy J. Carlson 49 1/2 mile Elliott Highway Jay Ak
- 6) John BREWSTER 32 73223 FBKS, AK 99707 452-2047
- 7) Eval Wilton 6810 Steese Fbks. ALASKA 99712 474-9583
- 8) DIXIE THOMPSON 656 Keeling Rd N.P. AK. 99705 455-3995
- 9) Gary Thompson 656 Keeling Rd N.P. AK. 99705 455-3995

Signed: _____

Testifier

Representing (Optional)

Address

Phone No.



Alaska State Legislature

Please enter into the record my testimony to the Resource
committee name

committee on SB 216, dated April 3, 1972
bill/subject

We have a farm 60 miles north of FBKS where we raise and sell several kinds of farm animals. Our prime purpose is not to make money and not for food - however, we make enough to pay for feed and raise our own meat & eggs. Our prime purpose is for what we call "animal therapy" - we have 12 adopted children and 5 home made children. Many have been abused and neglected before coming to our home. This means that they have no idea how to be caring, nurturing & loving. We give them animals to care for. This is a learning process and animals are a non-threatening relationship. Besides developing a nurturing and caring attitude, the child learns to be responsible & be a hard worker.

We have 25 years experience in raising abused and neglected kids. We chose rural Alaska for our home 15 years ago. Some ranching exp explained moose or caribou would go hand in hand with our type work...
... Changing the lives of ~~these~~ "abused children".

Signed: Nancy J. Carlson
Testifier

Alb. Game Ranching Assoc.
Representing (Optional)

P.O. Box 71185, FBKS, AK 99707
Address

Message # 485-2016
Phone No.



Please enter into the record my testimony to the Sen Resources committee name

committee on Moose/Caribou SB , dated April bill/subject

~~3 1/2~~ 3 1/2 years ago one of our Biologists told me about the Herds of F+G "They won't outright lie to you they just won't tell the whole truth"

F+G says there is no surplus in the wild stocks of Moose, — they try to gloss over the orphaned moose which will do nothing but die if left to nature.

Surplus NEEDS to BE defined as orphans, hurt, or when a herd is up to its carrying capacity.

Disease? We have visited the Moose ^{Research} Center — they have NEVER had any disease problem. THE ^(Dave Johnson) herdsman — who worked there for 10 yrs. said they rarely ever had vet.s come in to look at the moose.

We have been learning about Moose Farming for 4 years now, we've been told by lifelong Alaskans that people in the interior have wanted to Moose farm for over 30 years. This would help the small Family Farms supply fresh healthy milk and meat for their children.

Signed: _____
Testifier Opal Walton

Representing (Optional) _____
6810 Stearns Hwy, Ft. Kenai AK 99712
Address _____
474-9883

Phone No. _____

We must not look at the economics of raising moose as a huge enterprise, we must consider the individual Alaskans, and the hundreds of wayward moose in our society that make up this "Big Picture". OK! The researchers haven't figured out how to capitalize on the moose by farming or ranching them, but they have figured out how to raise them. Are we going to stick to the present study; shoot mentality, and harvest them through hunting seasons and with cars trucks; trains only?

Dave Johnson, a retired herder from the MRC, admits that he can't count all the calves that died from diarrhea over his 11 years, ~~and~~ but also admitted that he never tried simply adding fresh willow to the milk they fed, or even a little cod liver oil or vitamin E, that successfully cures scours. He said they lost so many, that year ago they had to just let the cows feed them!

Nor did Paul Beach, a soldierfish biologist who raises orphans every year, ever offer any of his successful techniques to the herders of MRC moose.

)) So if disease is truly a major problem or concern of the Diets. I would like to advise you all to take whatever steps

Necessary to shut down the MRC and remove the "tame moose herd" from the premises.

Opening back up 4 sq. miles of prime moose hunting to the public. Of course that will mean the good ol boys will have to hunt elsewhere! How hasn't there been a major spread of disease from the place, when in fact there has been lots of wild moose mingling with the captive herd for 25 years. Thru the fence line traps the wild animals have come and gone, but the biggest problem has been the wild ones getting in and not wanting to leave. Think we can get a tally on how many bears and wolves have had to be destroyed to protect their Tame Moose herd?

The willingness and adaptableness to being milked cannot be disputed, these animals don't give a lot, but it's the most nutritious milk on earth and could nourish people in remote areas and villages across the State.

So what if it can't be a big dairy project, and why should it matter to F & G how many times they have to be milked.

The fact that the moose doesn't have sweat glands doesn't matter either, for most of the year the temperatures are low enough

(2)

to allow for these animals to be utilized for work and recreation, opening up country that is unpenetrable to most people now. You don't have to carry feed or water, they find for themselves making them my kind of ride. Just because you guys don't want or need one for this purpose, shouldn't mean we should be ignored and criminalized, they used these animals for these purposes forever. That is until the formation of F&G.

It's believed that at one time the moose was just as domestic as the cat and dog is today, and it's obvious that they still are. The animals that come into our society should be looked at as gifts, not grief. It's time there was awareness and education of how to deal with these animals instead of other policy we have now. I'm sick and tired of the officials killing these animals. It has to be stopped and I will see to it that it is.

Go ahead and listen to these guys as they show their omniscient knowledge. If they really gave a hoot about the moose more than their cushy jobs and paychecks, they

would have long ago supported my offer and plans, to put moose to better use, and to enhance the habitat to keep the moose away from the roads, rails and city streets. What really gets me is these people that are representing the opposition, are from a Dept. called Wildlife Conservation.

And certainly its not FIG's worry nor should the costs have anything to do with their position, can they honestly say they care about how much the people of this State pay for the feed for their moose herds. They don't even have to pay for the wire or posts that hold them in.

Don't they want the oil companies to donate pipe to anybody but them?

Mr Swartz has had to try harder and harder to justify the existence of the MRC for years. What can they possibly learn now about nutritional needs, they know exactly what the moose requires and they know exactly what needs to be done to the habitat to make more moose, that concerns me! The Division of Wildlife Conservation isn't doing it!

(5)

OK! I can only raise a few moose,
I want make millions, but my family
will eat good, and we will have pride
in ourselves for having been able to stick
up for the moose and this little guy and for
providing people with a meaningful purpose
and something to look forward to.

I want you all to think long
and hard about this, if guys that mount
machine guns to their airplanes and slaughter
wolves from the air are going to have the
final say about our FIG in this state,
we are in big trouble. I'll bet Dave
Kellhouse has never been to the MRC,
and is simply telling you all exactly what
Chuck and Wayne are telling him to say.

In fact few of our so called moose
managers in this state have ever been there
These boys need to get their heads out
of the books and get with the program.

This year, the program is, we
take care of the Orphaned, abandoned,
lost, hurt, and problem moose that keep
cropping up in our cities and neighborhoods
and allow the people to take care of
these animals and show some responsibility.

For the F&G Dept. to even mention "humane treatment" is a disgrace. I could read some excerpts from their own journals that would make you sick and the fact that they have allowed for thousands of moose to get slaughtered along the railroad tracks is exemplary of how much they really care.

They should shut-up and go home, cuz sooner or later the people of this state will prevail.

It's more than a moose people!

Please move this legislation out of this pissing match and vote it into existence, lets start saving moose now.

The moose has been held hostage on this political pedestal long enough

Thank you!

2 more things - moose are selling for 6,000 to 12,000
Orphans are auctioned now because of the demand
Calves sold 2 years ago for \$3,200 for a breeding pair

• It's learned that optimum carrying capacity is 6-8 and some areas
its 12. (not 3-4 moose)

①

It is a fact that orphaned moose will have a 99% chance of dieing, it is a fact that within the 1st week of birth these babys will imprint a human as its mother, they will remain tame, gentle and tractable, if taught with a bugle (Russia) or whistle (M.R.C. ALASKA) they return to these calls. An older orphaned moose ~~and~~ cow may never become as gentle and tame as the newborn orphans, however, it is not necessary for them to go into the winter alone to die, our M.R.C. (Moose Research Center, ALASKA) states that tame moose Fed all winter are able to breed at one year of age, they could provide us with young which are the most desirable since they are the ones which become so tame. Also a one year old tame bull moose will have a rack (one moose at 1 yr old had 7 tines on one side and 8 tines on the other side!) A young bull moose which has been gelded will remain gentle and tame taking no part in the rut, they continue to gain weight in the fall and winter, ^{their meat remains} good even to old age (Russia). ^{also Canada} Russia has proven that Moose milk is 5 times richer than cows milk, it churns into excellent butter, is like cows cream when added to coffee, (I make yogurt, and from all I've read of Moose milk, I believe it would be well suited to make into yogurt, and yogurt is extremely healthy) I can not express to you how ANGRY I am

(2) (1)

That this information has been kept from the Alaskans especially the peoples in remote villages, people who live out of town or in the bush, these people, with so much of their lifestyle being filled with such struggles, I believe it is criminal that the heads of F+G of ALASKA (some of these heads have had this knowledge!) have kept this "Reliable" source of meat and FRESH-HEALTHY milk products from our Children. It is becoming more and more talked of that according to Alaska's Constitution in Article 8, that it is already legal for Alaskans to Moose farm. F+G disagree. This issue has never been settled in court. It takes very little study to find that Alaska's Wildlife is at a record low - this is how F+G have been game-wonching the wildlife. Who do they work for? I can no longer refer to F+G as "ALASKA's" or "Ours". There is some good ^{honest} people in this dept., 3 yrs. ago one of the biologists (who, after about 30 yrs has recently retired) stated about the heads: "They won't put right lie to you, they just won't tell the whole truth." The 4 sq. miles of the M.R.C. with their approx. 25 tame moose, in all the years of operation has never had a single disease problem. We visited the M.R.C. and spoke with the herdsman of 10 yrs about this and other interesting facts. I asked Dave Johnson

(3)

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The Native organizations are open to us teaching interested villages who want to Moose farm, ^{beginnings of} orphans could become their tame moose heads (small scale) we have a couple cabins, which they are aware of, which ^{are} open to their people to come learn from here. Also Moose which prove to ~~be~~ be too stubborn to become gentle could be relocated in areas with low moose populations, the M.R.C. ^{ALASKA} reports states successful transplants of moose which populated those areas.

Alaska has a great need for habitat enhancement, the State of ALASKA (except where there has been recent fires) is covered with old growth, (old growth provides approx.

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If you would think there is lots of moose food

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Sincerely
Opal Welton

Fragmenta Theriologica

The Composition of Moose Milk Following Late Parturition

SKŁAD MLEKA LOSIA PO POZNYCH WYCIELENIACH

Lyle A. RENECKER

Renecker L. A., 1987: The composition of moose milk following late parturition. *Acta theriol.*, 32, 10: 129—133 [With 1 Table].

Two hand-reared moose cows conceived and gave birth to calves in captivity. Parturition in one cow occurred during mid-August with the calf dying as a result of dystocia. Both cows were hand-milked for the first week of lactation to determine yield and % lactose, protein, fat and total solids content in the milk. Although milk yields were low from these moose, milk was extremely concentrated with respect to protein and fat content, while milk lactose remained low in comparison to that of a Holstein cow. Production of concentrated milk may be beneficial for the survival of cervids such as moose which inhabit ephemeral environments with a short growing season.

[Dept. of Animal Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5].

1. INTRODUCTION

Like other northern wild *Cervidae*, reproduction in moose (*Alces alces*) is strongly seasonal. Rut generally occurs between late September and mid October (Murie, 1934; Lent, 1973) synchronizing the time of parturition for mid May to early June (Murie, 1934; Hauge & Keith, 1981) with the pulse of new vegetative growth. Although moose are seasonally polyestrous, the peak of the breeding period falls within one estrus cycle. Few cases of late breeding have been documented for moose.

With parturition, the moose cow must produce milk to nourish new offspring. Knorre (1961) determined the chemical composition of milk from hand-reared moose in the Soviet Union. Several authors in North America have reported the composition of moose milk collected from cows either trapped and immobilized (Franzmann *et al.*, 1975) or sacrificed (Cook *et al.*, 1970). However, there are no studies in North America which determined the chemical composition of moose milk obtained from animals milked regularly by hand during the first week of lactation.

In this paper I document the occurrence of a late parturition in habituated moose and report on the chemical composition of moose milk obtained from hand milkings during the first week of lactation.

2. METHODS

Two hand-reared moose cows were maintained in a 2 ha pasture on a pelleted aspen-concentrate ration (Schwartz *et al.*, 1985) and supplemented with hand-cut browse at the Ministik Wildlife Research Station, approximately 48 km southeast of Edmonton, Alberta, Canada. The moose were 5 years old at the time of conception and were firmly habituated to human presence.

The two moose cows were milked by hand for 5 days subsequent to parturition with samples taken for analysis on selected days. Animals were milked either in the pasture or a staunchion. Initially, a 1.5 ml dose of oxytocin (Dominion Veterinary Laboratories, Winnipeg, Manitoba R2W 3R4) was administered intramuscularly to initiate the release of milk from one cow, whereas bunting and massaging the udder of the other cow stimulated milk release.

Samples of milk were placed in a 50 ml sample bottle containing an iodine tablet to preserve samples. Milk was analyzed for percent protein, fat, lactose and total solids by the Alberta Milk Testing Laboratory, Edmonton, Alberta, Canada. Milk samples were also collected from a Holstein cow following parturition as a comparative standard. Energy content of milk samples were calculated using a formula which was determined by Perrin (1958).

3. RESULTS AND DISCUSSION

3.1. Reproduction

A hand-reared moose cow gave birth on August 21, 1983. The calf weighed 17 kg and was dead at birth as a result of dystocia. The gestation period for moose is approximately 240–260 days (Peterson, 1955) which would imply that conception in this cow would have occurred between December 18 and 24, 1982. Other cases of late breeding have been documented for moose on December 15 (Moisan, 1955) and mid-December (Coady, 1974) and for wapiti (*Cervus elaphus nelsoni*) during mid-January (Wishart, 1981).

Female moose commonly breed as yearlings (*i.e.* 16–18 months of age) and maintain high reproductive rates until they are at least 12 years old. Duration of estrus during the rut is less than 24 hr, however, the cow may be receptive for 7–12 days (Knorre, 1961). Although the peak breeding season falls within one estrus period, wild *Cervidae* such as the moose, may have up to six periods of heat as indicated by Wishart (1981) for wapiti. The duration of each estrus cycle in moose has been estimated between 18–26 days (Stewart *et al.*, 1985). Extension of the breeding season in wild ungulates into December and January may relate

to plane of nutrition and body weight as reproductive success has been shown to be considerably higher in yearling wapiti receiving high quality diets (Flook, 1970).

3.2. Milk Composition

The samples of moose milk were thick, pale yellow to beige in color and very concentrated when compared to that of a Holstein cow (Table 1). During the first week of lactation, concentration of protein, fat and total solids was high in milk from moose and similar to reports by Knorre (1961), Cook *et al.* (1970) and Franzmann *et al.* (1975). Robbins *et al.*

Table 1
The composition of milk from two moose and one Holstein cow.

Days after parturition	Fat (%)	Protein (%)	Lactose (%)	Total solids (%)	Energy MJ/kg
Moose cow 1					
4	4.7	17.5	2.6	31.0	6.3
5	6.0	18.8	2.6	31.2	7.1
Moose cow 2					
2	4.0	9.2	2.5	24.5	4.1
3	7.5	9.5	2.0	27.4	5.4
5	11.7	12.0	1.3	32.4	7.4
Holstein cow					
5	2.5	3.1	4.3	11.3	2.4
Holstein — Alberta Provincial Average					
	3.6	3.2	5.0		3.0 ¹

¹ Kim Whitehead, pers. commun. Alberta Milk Testing Laboratory, Government of Alberta, Edmonton.

(1981) suggested that the higher protein content of milk from wild *Cervidae* may reflect greater tissue demands for this nutrient. This is shown by a higher body protein content than that of domestic ruminants (Gardner *et al.* 1964, Robbins 1973). Unlike the pattern commonly observed in members of the family *Bovidae* (Jenness & Sloan, 1970), moose milk has relatively low lactose content similar to concentrations observed for barren-ground caribou (*Rangifer tarandus groenlandicus*) (Hatcher *et al.*, 1967), however, the energy content of this milk is relatively high and similar to that of red deer (*Cervus elaphus*) (Arman *et al.*, 1974) and wapiti (Kozak, 1986). Although the sample size is limited, the results suggest that the characteristics of moose milk may reflect a survival mechanism. Like caribou, moose inhabit environments in which the summer growth pulse of forage are very brief and food resources are of high quality and clumped. White and Luick (1984) have

suggested that low levels of lactose production may actually reflect the status of body tissue stores of the cows and the primary need for weight gains. A strong feedback mechanism to replenish body condition during the short growing season, before the onset of the autumn rut, may indeed pre-empt high lactose production.

Moose cows produce about 150 kg of milk per lactation in the wild, but domesticated individuals have produced up to 430 kg (Yazan & Knorre, 1964). Nevertheless, this is considerably less than milk yields/lactation of domestic cattle breeds which produce over 1700 kg (Arman, 1979).

The yield of milk from the moose varied between 1920 and 2160 ml/d (320 and 360 ml/4 hr milking). This value is similar to milk production of hand-milked wapiti hinds during the early stages of lactation (values range between 1495 and 2900 ml/d) which received either no feed supplement or a pelleted concentrate ration (Kozak, 1986). When combined with the milk composition data, an understanding of maternal investment and anti-predator strategy is revealed. Although there is a need to maximize body condition of the dam to ensure high conception rates, the moose must also provide adequate milk energy to successfully rear her offspring. White and Luick (1984) hypothesized that while a need to replenish body stores may be responsible for the low content of lactose in milk, low lactose production may in turn be the mechanism which controls low milk production. Clearly, the benefit to the dam would be conservation of energy which could be redirected towards weight gain. Because moose generally live in closed forest habitats, their young depend on cryptic colour and secretive behavior to avoid predators. Arman (1979) alternatively suggested that the purpose of concentrated milk in wild ungulates that hide their calves may be to reduce suckling time and thereby minimize the threat of predation. Thus, two schools of thought can be applied to the adaptive significance of concentrated milk. Its role may be associated with either maximizing maternal body condition before the autumn breeding season or predator avoidance as observed in moose calves.

Acknowledgements: I wish to thank C. D. Olsen, D. M. Renecker, M. L. Watson and D. A. Welch for their assistance during sample collection and to Dr. R. J. Hudson, D. M. Renecker and H. M. Kozak for reviewing the manuscript.

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Received, September 10, 1986. Accepted, November 25, 1986.

Dr Wood

WILD GAME ENHANCEMENT/GAME RANCHING/GAME FARMING

INTRODUCTION

Alaska has a diversity of fish and wildlife, much of which is found in relatively low densities, generally in remote situations and/or seasonally. One of the attractions for non-Alaskans, as well as many Alaskans, is the opportunity to view, photograph, catch and shoot one or many individuals from within this renewable resource group. The above provides an economic opportunity which to date has only received limited attention through guiding operations for both consumptive and non-consumptive purposes, and the limited fur industry which includes wild harvest and some fur farming.

The economic opportunities for rural Alaska, particularly with the establishment of large parcels of private land, warrant consideration by private enterprise as well as state government. It is probable that existing state policies will require modification before Alaska will realize the benefits enjoyed by other areas of the world.

To date, Alaska has primarily managed hunters, trappers and fisherman as they practiced wild harvest of fish and game populations. Limited attempts have occurred in the areas of habitat modifications, transplanting and stocking. World-wide experience suggests that habitat enhancement and intensive management of the animals themselves results in increased populations of fish and wildlife. These efforts can range from relatively simple habitat manipulations, through game ranching and aquaculture to intensive game, fish or fur farming. Such efforts in Alaska are likely to benefit Alaskans and a wider diversity of society than is currently enjoyed.

At present, enjoyment and use of much of Alaska's wildlife resource is limited by poor access and undeveloped marketing schemes. In many areas, wildlife is the only renewable resource present. Timber production is marginal or non-existent in most of the state, and farming of agronomic crops is feasible only in selected areas of favorable climate and soils. However, wildlife is present in most of the state in forms which can potentially be used on a sustained basis to provide meat, hunting and viewing pleasure, hides, fiber and other materials for crafts. Considering the renewable nature of this resource in the absence of other such resources, it becomes apparent that ways of more fully utilizing wildlife should be investigated.

Game and fish ranching should not be viewed as a means of greatly increasing wildlife populations. This is particularly true in northern latitudes, such as Alaska, where primary production of plant life in rangelands, streams and lakes is relatively low. However, it is reasonable to expect that more intensive management of wildlife populations and habitat can provide increased opportunities for wildlife viewing, improved conditions or facilities for harvest and/or hunting and fishing, reduced waste, better preservation of game products, culling and manipulation of population structure to better match demand, and control of predatory losses. Habitat improvements resulting in increased carrying capacity and species diversity may also be possible in some situations, particularly where profit taking is possible. These activities will also generate meaningful employment.

Any type of game production system must be based on ecological principles. The first step in its development should be the inventory of available lands in terms of acreages and distributions of habitats for specific animal species. Seasonal availability of food and cover within each habitat must be estimated and possibilities for improvements evaluated. Common use grazing relationships, fire, predation, disease, insect disturbance, snow and other weather conditions all affect the carrying capacity of different habitats. Consequently, considerable understanding of year-round animal requirements and tolerances is essential in the successful management of a game production enterprise. One of the earliest lessons learned in game ranching or farming activities in Africa was that these activities require more, not less, knowledgeable management than do common livestock. Mismanagement of vegetation, soil and water resources can result in disastrous reduction of carrying capacity and catastrophic decreases in animal populations. Losses of this type can be particularly serious when they involve overutilization of vegetation, since recovery may require decades of reduced use.

With increased biological and legal control of animal populations, greater inputs in habitat management are justified. In situations where the game rancher can control the size and structure of populations using his land and be entitled to the profits generated with the animals, inputs to habitat can become practical. Generally, the most cost-

effective inputs are those which manipulate plant succession to produce vegetation more suitable as habitat for a particular species. Removal of spruce by cutting, burning or crushing to enhance production of willow or aspen is an example of the above. Production of supplemental feeds or mechanical manipulation of physical features of the habitat are more costly and change the nature of the ranch more to that of a farm, but are alternatives that may have a place under some goals of ownership.

Game ranching and farming operations in other regions of the world have demonstrated a number of values to society. Increased sustained-yield harvest of animal products has been achieved through professional hunting, use of corrals and fences, salting, spotlighting, and use of portable abattoirs. Simultaneously, significant income has been generated through allowance of fee hunting for trophy animals. Additional income has also been generated by providing accommodating conditions and facilities for tourists and other recreationists.

In some areas, wild species have actually been demonstrated to have the ecological advantage over common stock, providing for more complete use of the vegetation resources. In brushland situations, browsing herbivores (e.g., giraffe, white-tailed deer and moose) are more productive than true grazers. Similarly, reindeer or caribou have a distinct advantage over other species in utilizing snow covered tundra. For centuries, reindeer herding was a main stay of the Lap society, and is a major occupation in the U.S.S.R. today, just as white-tailed deer ranching has become a major income-generating activity in west Texas. Horse and yak production as well as reindeer herding represents a major economic base in nearby northeastern Siberia. Moose farming has also been undertaken in that region. Closer to home, western Alaska once had a thriving reindeer ranching industry of over 600,000 animals, where in fact, little, if any other opportunity for a land-based economy has been developed. Mining may change this picture temporarily, but mines are not renewable.

As stewards of the land we must be careful not to limit our agricultural perspective to those species typically considered in ranching or farming systems. This is particularly true in our state traditional agriculture is relatively limited in potential. Conversely, we must also avoid sentimentality and select game production schemes which are ecologically sound. Our vision and wise action in these matters will tap a huge, relatively untouched, renewable resource which will benefit generations to come.

ISSUES

In order for Alaska to optimize the opportunities available to the broadest segments of society, which is mandated under Alaska's constitution, a number of issues must be explored in depth with regard to existing state policy, laws, and in some cases, as these relate to the federal government. The following is a list of some of these issues, although it is not exhaustive.

Alaska Fish and Game Laws and Regulations:

- Establishment of seasons and bag limits.
- Methods of take.
- Sale of fish and game products.
- Subsistence versus other consumptive and non-consumptive uses.
- Management, including utilization of fish and animals, on private lands.
- Importation of fish and animals which has implication to both existing and imported fish and wildlife as well as to domestic animals from a predator, disease and pest stand point.
- Predator control.
- Baiting.

Land management and regulation:

- Access and trespass.
- Burning or other vegetation manipulation.
- Construction of ponds, fish ladders or other structures on private lands.
- Fencing or the use of natural barriers.
- Determination of carrying capacities.
- Water quality standards and wetland regulations.
- Leases of state or federal land.

Health and inspection standards

- Pre and post slaughter inspections.
- Processing plant standards and inspection.
- Field slaughter opportunities.
- Mobile slaughter facilities.
- By-product processing.
- Meat grading.
- Antler grading.
- Carcass disposal.
- Other waste product disposal.
- Raw product export.

Public and/or private economics

- Capital availability.
- Projected returns to individuals, regions, the state.
- Types of operations.
- Projected demand by type.
- Enhancement of existing tourist industry.
- Regulation and enforcement costs.

CONCLUSION

Existing worldwide experience suggests that Alaska is not optimizing its opportunities relative to fish and wildlife. Presence of large blocks of private land in rural Alaska have altered the status quo of how the state manages and/or regulates this renewable resource. Is the State of Alaska going to play a positive role in optimizing its fish and wildlife resources?

In order to begin to answer the above question, it is suggested that the legislature establish and fund a broad based task force, charged with bringing recommendations back to the legislature within one year.

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Moose Alert

Soviet farmers learning to harness power of the moose

Not only do hunters kill far more moose in Russia each year than in Alaska, the Soviets have pioneered moose husbandry for meat and milk production as well as for riding and farm work.

Three experimental moose farms exist in the Soviet Union, according to H.R. Timmerman, one of Ontario's top moose biologists. Timmerman attended the third International Moose Symposium held in Syktyvkar, U.S.S.R., during the summer of 1990.

Timmerman, in an article published in the May edition of Angler & Hunter magazine, said he visited the oldest such farm, established in 1949 by K. P. Knorre near Yaska. During the past 40 years this farm has raised and domesticated 450 moose, some of which represent the sixth generation of original stock.

Operation of the moose farms, as Timmerman describes it, is similar to dairy and beef production with domestic cattle, but with some notable differences.

The Russians have found that the key to domestication of moose requires that each newborn calf imprint to a human milkmaid four to five hours after birth.

Consequently, as moose cows approach the time to give birth, they are taken to an enclosure and attended by milkmaids until birth occurs, usually from early May through mid-June each year.

After its first suckling, each calf is removed from the cow and fed from a bottle by the same milkmaid up to five times a day. Each cow is milked by hand at the birth site. They quickly substitute their milkmaids for their offspring and are released from the enclosures to the surrounding forest, but return twice a day for milking at 6 a.m. and 8 p.m.

That should sound familiar to anyone who has ever been associated with a dairy farm. And incidentally, I'm not being chauvinistic in saying that the moose cows and calves are taken care of by milkmaids. I assume men could handle those chores as well as women, but Timmerman doesn't indicate that he saw any men involved in that phase of the operation, and his pictures with the article show women doing the milking and handling of the calves.

As they grow older, the calves are fed milk substitutes or diluted sheep milk, taught to drink from a pail and are weaned by mid-September. About 95 percent survive to six months of age, when they are usually moved to an active logging area so they can feed on remaining tree tops and limbs.



Soviet farmers are perfecting methods to milk moose. They also raise the ungulate for food.

Moose cows are bred for milk production by selecting the best individuals, Timmerman says. Those who give the most milk generally give birth to calves that also have high milk yields. A moose cow produces about a gallon of milk a day, but this can be increased by more frequent milkings.

Eventually, I suppose by selective breeding, you could have some Jersey- and Holstein-type moose and even some Hereford and Black Angus types for meat.

Moose milk is richer than domestic cow's milk, containing up to 11 percent fat, 9 percent protein and a host of vitamins and micro-elements. Timmerman says the milk has been touted as having unique medical properties, particularly for the treatment of stomach ulcers and radian lesions. However, this hasn't yet been scientifically proven.

The moose milking must not be an economically

viable operation. In fact, it appears the farms are more on the line of a socialist experiment, and Timmerman speculates they may soon disappear.

At present, all the milk produced at the farm Timmerman visited is fed back to calves. This is partially due to the lack of facilities to sterilize, store and distribute it, he says.

Bull calves and cows that don't produce much milk, as well as calves, are butchered for meat, which is two to five times cheaper than cattle, he says. This would seem to indicate that raising moose for meat could possibly be an economically rewarding enterprise.

The bull calves, like beef cattle, are castrated. Timmerman says they are quiet and calm and retain their excellent meat qualities even to old age.

In the past, some castrated bulls were trained to



Anchorage Times
July 18, 1991

Ed Cooper

OUTDOORS
COLUMNIST

carry humans on saddles, cargo or haul sleighs in winter. Training the moose, however, was a labor-intensive process. Men were involved here, and apparently a bit of wild east rodeo was part of the exercise.

The training also tended to cause the animals to lose their fear of man or dogs, making them vulnerable to poachers and predators.

Yes, poachers are a significant factor in annual moose harvests in the Soviet Union, as they are in Alaska and other parts of the world.

Alaska's game regulations, incidentally, do not allow private ownership of moose, as they do buffalo and musk ox. Bills have been introduced in the legislature to allow moose ranching, but none have passed.

Officials in the Soviet Union estimate about 1 million moose roam the wilds in eight of its 15 federated republics, with the highest densities in the Baltic republics, the western and northern regions of the Russian Federated Republic, including the Komi A.S.S.R., and northern areas of Byelorussia and portions of the Ukraine.

In 1988, some 70,000 moose were reportedly taken by 20,000 to 30,000 hunters, a major percentage of whom are professionals. That compares with less than 10,000 moose taken by hunters in Alaska during the same year.

Now Russia is opening up its hunting, not only for moose, but also for bear, wolves and other species, to hunters from other parts of the world. They are likely to provide formidable competition to Alaska's guides and outfitters starting as early as next year.

Incidentally, Alaska isn't the only place in the world where officials worry about wild moose roaming streets, highways and railroad tracks. Timmerman said that up to 70 moose are captured in and around Moscow each year.

They just take them out to the moose farms. But then, I suppose to a moose, that could be the equivalent of being banished to Siberia.

REGULATIONS

A. FOR ALL ANIMALS

As with all types of livestock farming it is necessary that regulations be established to protect all animals in our country from disease and to assure the purchasers of our products that what they are buying from us is safe to eat. Agriculture Canada has an entire branch staffed by highly qualified veterinarians, scientists and inspectors. This branch supervises the import of all animals of any kind into Canada, monitors all diseases of animals within Canada, and inspects all food products, as necessary before sale. They work closely with provincial departments of agriculture to maintain a reputation that is respected the world over. For example almost any country will accept live animals or food products that are exported from Canada. Many other nations would like to have our reputation.

Every regulation of Agriculture Canada that applies to similar domestic animals is also applied to game farm species in the same way. This is why most animals on game farms (which were imported from game farms in U.S.A.) have papers to show they have been tested for a wide scope of possible diseases and been inspected by veterinarians at least two separate times.

Most regulations which apply to other forms of livestock regarding care, transportation, feeding, stray animals etc. also apply to game farm animals.

B. NATIVE SPECIES

In game farming another type of regulation is also necessary. Since the public owns all animals which range freely across the province it is necessary that precautions be taken to be sure that the animals owned by the public are not mixed up with those that are owned privately. As the owner of the private animals it is the responsibility of the game farmer to identify his animals and keep them on his side of the fence. The Fish and Wildlife Division of the Alberta Government has been given the responsibility of protecting and managing our wild animals for the benefit and enjoyment of all of us. As with any situation between neighbors who own a similar kind of livestock the key to good relations is a good fence and an attitude of cooperation on both sides.

Fish and Wildlife have administered regulations since the early 1950s pertaining to the operation of game farms in Alberta. These first game farms were mainly "viewing farms" and there were very few of them established until the sudden growth of game farming in the mid 1980s. At that time concerns were expressed that game farming (or ranching) might present a great risk to our native wildlife. Since the industry was new there was no evidence to suggest these fears were justified but rather than take any chance a new set of regulations was established in 1987.

Some facts about the present regulations might help us understand that there is a sincere effort first to protect the free ranging animals that belong to all of us and second to allow the existence of game farms.

1. All big game farms are licensed by the Alberta Government.
2. Game farms must be located entirely on private land. No part of a game farm may be on crown land.
3. Game farms must be fenced in an approved manner and must have a facility suitable for holding animals (to do blood tests or inspect eartags) and facilities are inspected before a permit is issued.
4. Every animal on a game farm must be identified (registered) with a metal tamperproof eartag in each ear. These tags are arranged through the government and no two animals have the same number.

5. Game farmers must record daily every change in their inventory such as sales, purchases, births, deaths, imports and exports. This record is sent in monthly.

6. Game farmers must record on a manifest the transfer of any animal from one farm to another.

7. The government has each game farm animal recorded on a computer so they know exactly where each animal is and what animals are on each farm.

8. Any animals imported to Alberta from outside Canada must pass all health test required by Agriculture Canada. They must have a health certificate from the country of origin, an export permit from the wildlife officials in the jurisdiction of origin, blood tests to prove that they are pure elk, and be identified by tamperproof metal tags. They must pass inspections by Canada Customs, Agriculture Canada and inspectors in the country of origin. The animals may also be inspected by Alberta Fish & Wildlife who must give the game farmer an import permit before the animals can come into Alberta.

9. Game farm products must all be identified by a metal seal provided by Fish & Wildlife. The farmer's inventory record must show what animal the product (e.g. antlers) came from and to whom the product was sold for export. These products can only be sold to licensed product buyers or other licensed farmers.

After reading the above summary of regulations it becomes obvious that it would be very difficult for any game farmer to obtain an animal or animal product which came from the wild. Moreover game farmers have made great investments in fences and facilities and would not want to risk having their permit renewed refused. The opposition to game farming from people who genuinely care about the welfare of wild animals is subsiding as people understand and appreciate the controls under which these farms operate.



All game farm animals must be identified by two tamperproof metal tags.

GAME FARMING IS OPEN TO ANYONE

As long as you meet the requirements to obtain a permit anyone with some ability to handle livestock and at least 60 acres of privately owned land can be a game farmer. To learn more about this interesting industry, fill out the attached membership form or call the Alberta Game Growers Association Office at (403) 662-6212 in Spruce Grove, Alberta.

HISTORY

Game ranching is not a new frontier. Agriculture Canada conducted research on bison and bison hybrids between 1915 and 1965. Research on bison, moose, and wapiti (elk) has been conducted by the Wildlife Productivity and Management Programme at the University of Alberta since 1974. Elk and bison have been raised in Elk Island National Park for over 70 years.

Regulations were established in the 1950s to control the development of game farms in Alberta. The first game farms were mainly for viewing of animals and only a few were established. The sudden success of game farms which were started in New Zealand in the mid 1970s coupled with the depressed agricultural prices and concerns about soil and water conservation prompted many Albertans who were knowledgeable livestock people to go into game farming in greater numbers.

The number of big game farms (not counting bison farms) in Alberta has grown from just a handful in 1986 to over 100 in 1990. There are now over 3000 elk on Alberta farms. Some are also raising white tail and mule deer and a few raise moose.

Although Alberta Fish and Wildlife will occasionally allow the capture of deer in areas where they are overpopulated for game farms (a maximum of 6 of a species in the lifetime of the farm) nearly all animals now in captivity were raised on game farms.

Since the law recognizes bison (buffalo) as being "domestic" it is not necessary to have a license to raise them. Most of the information in this pamphlet pertains to raising elk (wapiti) although many of the same benefits also apply to bison and other species of animals native to Alberta.

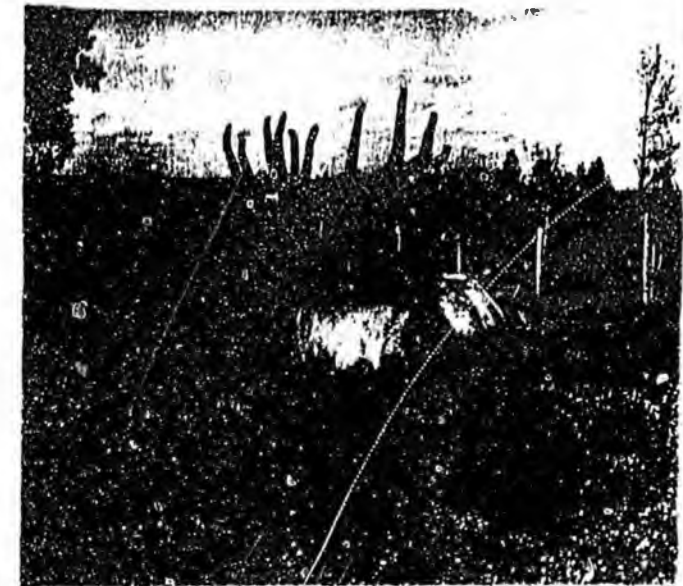


Bison adapt well to life on the farm.

OTHER BENEFITS

- Game farming conserves the soil by leaving it in grass rather than tilling it each year and exposing it to erosion by wind and water.
- Game farming preserves the species. For example there would be no plains bison today if they had not been preserved in captivity. The Pere David deer which has been extinct in China for a century is now being re-established from a game farm in England.
- Game farms provide an opportunity to learn things about the

GAME FARMING IN ALBERTA



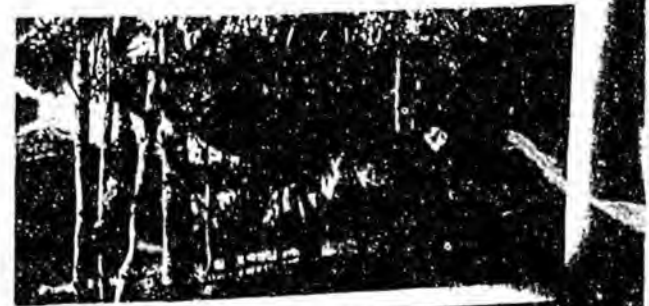
Wapiti - 70,000 years of adaptation makes them a most efficient converter of our natural forage to high protein low cholesterol red meat.

Farmers Working With Nature For The Benefit Of Both.

CODE OF ETHICS ALBERTA GAME GROWERS ASSOCIATION

This code shall serve as a guide to members of the association in conducting their affairs. The code is not intended to cover all possible undesirable activities and in no way shall restrict the right of the board of directors to expel any member "whose conduct is, in the opinion of the board, prejudicial to the interests of the association" as provided in the constitution.

- Members are concerned about the welfare of natural populations of wildlife and support the public's right to enjoy them.
 - Members abide by all laws of any jurisdiction within which they carry on their activities as game growers.
 - Members will provide adequate food, shelter, space, handling facilities and health care to ensure the well being of animals in their care.
 - Members will take precautions as necessary (often beyond the requirements of regulations) to prevent the spread of parasites or disease.
 - Members will not deliver any animal into the custody of a person who, in the opinion of the member, does not have the facilities or the ability to provide for the animal's needs.
 - Members offering animals for sale will give an honest description as to age, health records and genetic background to the best of their knowledge.
 - Any knowledge which is gained by members in raising their animals which might benefit the natural populations in the wild will be made available without charge to any government agencies or other organizations which will use the knowledge for the betterment of natural populations.
 - Any violation of this code by a member may be reported in full detail in writing to the Ethics Committee of the association. If it is the opinion of the committee that a violation may have taken place the committee will schedule a hearing to allow the member in alleged violation an opportunity to respond. If it is then the opinion of the Ethics Committee that the member did violate this code the committee will present to the board of directors all details and make a recommendation to:
 - send the violating member a letter of reprimand, or
 - suspend the violating member for a period of time, or
 - expel the violating member from the association.
 The recommendation will be adopted only after a majority vote by the board of directors.
 - In the event that the member who is alleged to have violated the code is on the Ethics Committee or on the board of directors they shall abstain from all meetings, discussions and votes regarding their alleged violation.
 - In all cases of an alleged violation all details of the violation, hearing, recommendation of the committee and decision of the board or a letter of reprimand will be absolutely confidential. The only information released by the board will be that a specified (named) member has been "suspended" or "expelled".
- The Code of Ethics has been approved by resolution of the board of directors December 2, 1988 and becomes effective and enforceable on January 1, 1989.



GETTING STARTED

The main requirements for starting a big game farm are: 60 acres of privately owned land capable of producing good pasture, a suitable fence, a handling area and squeeze (for blood testing and ear tagging), a basic herd of breeding stock, some basic knowledge and experience in handling livestock, and a license (not needed for bison).

Before starting a big game farm it is a good idea to visit several existing farms and attend as many meetings and seminars as possible.

The Fish & Wildlife Division has a publication which outlines the procedure to get a license. It tells how to submit a development plan for approval. You must build your fences and handling facilities exactly as shown on the plan you get approved. Your facilities are then inspected and when you pay the \$100 fee your permit is issued.

You should be able to construct the minimum 10 acre fence, install gates, one cross fence, handling facility and water supply for about \$10,000. Exact price will depend on the design you use and how much of the labour and material you are able to supply yourself.

You should not start any construction without first having your development plan approved. If changes are needed they are easier to make on paper.

Breeding stock is available from many of those presently raising elk. It may be a good idea to look at the availability of stock early in your planning stages and to get the opinion of an experienced elk farmer before you make a large investment.

Alberta Game Grower Association meetings are a good place to meet other game farmers and learn more about the industry. A membership application form is attached. You will note that you do not have to own a game farm to be an associate member.

NOTE: If you are interested in learning more about the industry you should pick up a copy of "Big Game Farm Procedures Manual" from a Fish & Wildlife Office near you.

FUTURE CONSIDERATIONS

The Alberta Game Growers Association would like to see provision for the sale of meat from game farm animals provided that they are slaughtered in a government inspected facility and that the animals are positively identified (by their metal ear tags) as coming from a game farm.

The present regulations that apply to the slaughter of other farm animals for sale provide for the identification of the animal by a government brand inspector, inspection of the live animal and later the carcass by a government appointed meat inspector or veterinarian. The packaged game farm meat could also be marked as "farm raised" with the animal number stamped on the package. The result would be a tightly controlled system that would be very difficult for the poacher to penetrate. It would require no more inspection costs than those presently needed for bison or beef.

The Association would also like to see game farming recognized by the Alberta Department of Agriculture as a part of our diversified capacity to produce a valuable product from our land. Game farmers do not want to depend on grants, handouts, or subsidies from government but could use advice on nutrition, genetics, preventative health care, and marketing. They look forward to seeing the many qualified people in our provincial Department of Agriculture becoming more available to game farmers as our industry grows.

ECONOMIC CONSIDERATIONS

* Some studies show that the feed required to produce one pound of beef will produce 1.3 pounds of bison meat or 1.4 pounds of elk meat.

* Bison that are 24 to 30 months old can be finished on a barley ration for 60 days and will sell for \$1800 to \$2000 for meat (\$3.00 to \$3.30 per pound dressed).

* Bison, elk and other game animals are very well adapted to our climate. They require no special shelter and respond well to good feed.

* Although elk cannot be slaughtered in Alberta there is definitely a North American market for venison. Elk venison is something many North Americans have eaten. It is a socially acceptable food. Many people consider red meat an essential part of their diet yet they are concerned about the higher cholesterol levels of other meats. The Government of New Zealand's annual report on export sales showed nearly half a million kg of venison was exported to Canada and the U.S.A. last year.

* In New Zealand where game farming is 10 years ahead of us they now have 1/4 million head on about 4000 farms. In selling their venison the biggest problem in breaking into a new market is to get enough animals to give customers a steady supply. This is the kind of a problem many farm producers would like to have.

* When the antlers that elk grow each year are carefully removed at exactly the right stage they contain a substance that is of value to pharmaceutical companies in Hong Kong, Korea, and other oriental countries. This results in a cash bonus to elk farmers. In 1989 a mediocre bull that produced 15 lbs of velvet antler gave his owner a bonus of about \$1400.

* The velvet antler bonus that elk farmers receive is money from outside our country from people who have earned it by producing cars, computers and VCRs for us to buy. Farmers feel good about getting needed cash income by producing a product someone else wants to buy rather than from a subsidy our government must borrow and our children must repay.

* There are no special grants, subsidies or handouts to help people get started or expand in game farming. Some of the normal farm incentives such as reduced tax on purple fuel apply to game farms the same as they do to any other farm.

* Game farming is attracting investors without special tax concessions or grants that are given to most new industries. In fact investors with risk capital are coming forward far faster than game farmers can find stock for their basic herds. They are often satisfied with taking a share of the profit rather than demanding return of their capital plus a fixed or floating interest rate as required by banks. They will also give a game farmer money to invest in animals without insisting on a mortgage on his land and home.

* Game farming is fast proving to be one of the most efficient ways to convert the forage produced on our land into cash that comes from outside our country. When we combine native animals that have adapted to our climate for thousands of years, our vast areas of land that is best left seeded to grass, a population of stock people who have mastered the art of recognizing an animal's needs, and investors who are willing to put their dollars on the line to produce something that the world wants to buy, we have a winning combination.

ALBERTA GAME GROWERS ASSOCIATION APPLICATION FOR MEMBERSHIP

I would like to be considered for membership in the Alberta Game Growers Association and understand that I will receive copies of all publications to members including "The Canadian Game Farmer & Bison Bits" magazine, notices of meetings, conventions, field days and special events. If I am approved as a "full member" I will also have voting rights at all meetings. (Full membership is available only to those who are actively farming game animals within Alberta or are engaged in active research in Alberta involving game ranching.)

I have read and agree to comply with the Code of Ethics of the Association.

NAME _____

PHONE _____

If membership is in name of company or partnership, state the name of the individual who will have voting rights and exercise other membership privileges.

ADDRESS _____

I am interested in the following species: (Check where applicable) ELK _____ DEER _____ BISON _____ OTHER _____
I presently own and / or operate a game farm: Yes _____ NO _____
I hereby apply for (check one) _____ FULL MEMBERSHIP \$100.00
_____ ASSOCIATE MEMBERSHIP \$ 50.00

ENCLOSE A CHEQUE FOR THE APPROPRIATE AMOUNT AND SEND TO

ALBERTA GAME GROWERS ASSOCIATION
BOX 3299, SPRUCE GROVE, ALBERTA T7X 3A6

PHONE: (403) 962-6212

Memberships expire on Dec. 31 each year.

USE THIS FORM TO APPLY FOR
MEMBERSHIP AND RECEIVE BACK
COPIES OF LAST 2 NEWSLETTERS
AT NO CHARGE.

Will diseases be brought in with game animals imported into Alberta?

Canada has some of the highest import standards for livestock of any country in the world. To be eligible for importation from outside Canada, game animals must pass the same tests required for livestock. In addition, the authority to require additional testing, and, where necessary, to close the province's borders to imported game animals, will be maintained in the Wildlife Act and in the proposed new Livestock Industry Diversification Act.

Alberta has an obligation to prevent the introduction of diseases which do not exist here and which could pose a threat to our wildlife. Meningeal (brain) worm of elk, deer, moose and other species is an example of such a disease. Since Alberta is presently free of this parasitic disease, a moratorium has been imposed on the importation of elk and deer into Alberta. This moratorium will remain in place until a satisfactory method is developed to ensure that imported animals do not carry the parasite into our province.

Is commercial production of wild animals a new practice?

No. Commercial production of game species is not new. All animals now farmed were once wild. And, even after centuries of commercial production, the wild counterparts of farmed animals continue to exist as wildlife. Clearly, wild animals and their domestic counterparts do not threaten one another's existence.

Will the sale of elk meat increase the incidence of poaching?

Strictly controlled slaughter of elk will add provincial brand and meat inspectors, as well as public health inspectors, to the anti-poaching team that already exists in Alberta. The meat industry is one of the most highly regulated in Canada, and is fully

capable of handling elk meat in a manner which will protect both the consumer and the wildlife of Alberta.

How will the sale of elk meat be restricted to that from game production animals?

Game production animals will be slaughtered under the system of controls and in the slaughter facilities which already exist in Alberta. All elk presented for slaughter will be inspected for proof of ownership under the Livestock Identification and Brand Inspection Act by provincial brand or meat inspection staff. The same inspectors will ensure that only those elk which can be identified as originating from a licensed game animal production farm will be permitted to be slaughtered. Only designated plants will be permitted to slaughter elk raised on game animal production farms. In addition, carcasses will be ribbon-branded in a manner which will allow identification of legal game meat with the plant of origin.

How will the sale of velvet antlers be restricted to those from game production animals?

All velvet antlers sold in Alberta now must bear a special tag issued only to licensed game animal producers, and the producer must report all sales. This system will be maintained by Alberta Agriculture along with regular farm inspections to verify the sales reports. In addition, velvet antlers must meet very rigorous quality standards in order to be acceptable to buyers. Antlers grow through this acceptable phase in a matter of a few days, so the window of opportunity for harvesting wild elk with acceptable antlers would be prohibitively short even if there were a legal market for unregistered velvet.

How will the transportation of game production animals be regulated?

Control of the transportation of game production animals will become the responsibility of Alberta Agriculture. All game production animals being transported anywhere in Alberta will continue to be required to be accompanied by a manifest. This is similar to the present requirement for cattle and horses. Game production animals destined for shipment out of the province will be required to be accompanied by an export permit under the Wildlife Act.

Will game animal production be allowed on Alberta Crown land?

No. Current restrictions contained in the Wildlife Act will be incorporated in the Livestock Industry Diversification Act, to prohibit the production of game animals on Crown land.

Will game animal production be the first step towards allowing paid hunting?

No. The Wildlife Act prohibits paid hunting of big game species on game farms and ranches. In addition, the Livestock Industry Diversification Act will prohibit hunting, paid or otherwise, on game animal production farms.

LIVESTOCK INDUSTRY DIVERSIFICATION IN ALBERTA

A Livestock Industry Diversification Act has been introduced to the Alberta Legislature. The proposed Act will be designed to permit the development of a more viable game animal production industry. When the proposed legislation is enacted, the sale of elk meat will be allowed in the province and responsibility for overseeing game animal production will be transferred from Alberta Forestry, Lands and Wildlife to Alberta Agriculture.

Game animal production is potentially very important for Alberta's agriculture industry. With increasing competition from abroad for our traditional agricultural products, our producers need opportunities to diversify. To help Albertans make the most of the exciting opportunity this new industry provides, the government is proposing legislation that will allow game animal production to grow and to develop further the market for its products, while continuing to protect our native wild animals.

Is game farming new to Alberta?

No. Game farming – the raising and sale of game animals for breeding stock – has been allowed in the province for more than 30 years. About 3,300 elk (plus small numbers of moose, white tail deer and mule deer) are now being raised on 120 licensed game animal farms in Alberta. The sale of products such as velvet antlers from animals produced on game farms has been allowed. The sale of meat from these animals has not been permitted.

What species of animals can be game farmed in Alberta?

Only those big game species which are native to Alberta and which Alberta Forestry, Lands and Wildlife permits may be game farmed. Elk is the species of major interest. The other animals permitted to be farmed are moose, white tail deer and mule deer. Under the proposed changes, Alberta Forestry, Lands and Wildlife will continue to determine which species can be game farmed.

What will change under the new legislation?

When the proposed legislation is enacted, game animal production in Alberta will be expanded to allow the sale of elk meat from animals raised on licensed game production farms in the province. In addition, Alberta Agriculture will assume the primary responsibility for supervising and regulating game animal production farms. The raising of game production animals will only be permitted on licensed farms that are regularly inspected for compliance with the Act and regulations.

Why is this change being made?

It will allow game animal production to become a viable agricultural enterprise. Our traditional agricultural products will continue to face increasingly stiff competition abroad. Our producers and processors need opportunities to diversify.

What is the status of game farming in other parts of Canada and in the United States?

With the exception of Newfoundland, all provinces have already enacted or are considering legislation to allow game farming. Saskatchewan permits the raising and sale of meat from both native and non-native species, including elk. British Columbia allows the farming and sale of meat from fallow deer, red deer, bison and reindeer. The Yukon and North West Territories allow the raising of bison, reindeer and elk, and permit meat sales for bison and reindeer. Ten of sixteen of the western states in the United States allow the farming of native big game species. Eight of these ten states allow the sale of meat.

Is it economically feasible to raise game animals: domestically?

Yes. Elk production is desirable from the farmer's perspective because three saleable commodities are produced – meat, velvet antlers and breeding stock – each of which is in demand. Several strong markets have been developed for elk velvet antlers that recognize Canadian elk velvet as a premium product. Breeding stock continues in strong demand.

Will wildlife populations in Alberta be depleted to obtain breeding stock for game animal production?

No. Fish and Wildlife officials of Alberta Forestry, Lands and Wildlife will continue to tightly control and restrict the collection of live wild game animals under the Wildlife Act.

How will game animal production herds of elk be built?

The herds will generally be built over a period of years through the breeding of the animals currently on game animal production farms. Some animals may be added through importing animals from game farms outside Alberta. Such imports, if

allowed, will be strictly controlled to prevent the introduction of diseases or genetic impurities, and protect the health and genetic integrity of our native wildlife.

What's to stop a producer from capturing a wild animal and adding it to his herd?

A system of controls is already in place to prevent this from happening. Producers are required to identify their animals through the use of a tamper-proof ear tag in each ear of the animal. The producer is issued a set of pre-numbered tags, and each tag must be accounted for. An inventory control system is in place which ensures that records of all births, purchases, sales and deaths are kept and made available to inspection staff. This system will be continued under the jurisdiction of Alberta Agriculture.

Do game production animals pose a disease threat to the wild herds?

No. Game animals confined to game production farms are susceptible to the same diseases as wild, free-roaming wildlife. However, since game production animals are accessible and manageable, diseases are relatively easy to prevent or control through good husbandry along with vaccinations and treatment for any problems which may arise. It is clearly not in the best interest of the game animal producer to allow the productivity of his animals to suffer through the presence of diseases.

Wild animals in Alberta are not free of diseases and parasites. For example, many elk and deer are infected with liver flukes, some big horn sheep are infected with lung worms, and moose are generally subject to heavy infestation of ticks.