

B-1003
November 1994

Winter Big Game Feeding:



AN UNDESIRABLE
WILDLIFE
MANAGEMENT
PRACTICE

by

Rich Olson

Rangeland Wildlife Habitat Extension Specialist
and

Andrea M. Lewis

Publications Assistant

Department of Range Management
Cooperative Extension Service
University of Wyoming

Introduction

With the exception of hunting, no other wildlife management activity causes as much public polarization as the winter feeding of big game animals. Each winter, many well-intentioned people start artificial feeding programs for elk, deer, and antelope under the assumption that supplemental feeding will ensure winter survival. Unfortunately, supplemental feeding often causes more harm than good to native wildlife populations and associated habitats.

The supplemental winter feeding of deer and elk became a wildlife management tool in the West during the 1920s to augment natural forage and prevent damage to stored hay. Throughout the 1930s, the supplemental feeding of deer and elk expanded to include every winter rather than just severe winters. During the early 1940s winter feeding studies on deer showed that (1) mortality among fed deer was greater compared to unfed deer, (2) highest deer mortalities occurred with fed alfalfa, and (3) feeding deer concentrated on lower elevational winter ranges resulted in the destructive overbrowsing of native forage plants and led to further dependence upon supplements. As a result of these studies, state wildlife management agencies adopted a “don’t feed” policy in the late 1940s and early 1950s. However, the image of these agencies suffered because the general public could not understand why domestic livestock but not deer, elk, and antelope could be successfully fed during severe winters.

Time and money spent on short-term supplemental feeding may be better applied to long-term improvement of natural forage and rangeland habitat. The purposes of this bulletin are to: (1) describe differences between big game and domestic livestock nutritional demands and digestive systems as related to supplemental feeding, (2) present arguments against feeding big game animals, and (3) provide guidelines for those who insist on feeding big game.

Big Game Habitat and Nutritional Relationships

As part of their annual life cycle, big game species spend their summers consuming forage and storing energy as body fat to supplement forage intake during winter. The amount of energy animals can store depends on the energy levels required for maintenance



Each winter, some big game animals will perish regardless of available natural foods or winter feeding programs because of their low-body fat reserves. Supplemental feeding will not save these animals because they cannot consume enough food to maintain body weight, and in many cases microorganisms in the rumen cannot digest foreign supplemental food materials.

and other activities during various periods of the year. Lactating females require more energy than males during summer. However, during the fall rut males require more energy than females. Rapidly growing young animals convert most of the consumed nutrients from milk and forage into body growth, primarily muscle and skeletal tissue. Young of the year store very little fat for the demanding winter nutritional period.

Each year, some big game animals enter winter destined to die regardless of available food or winter conditions because of their low fat reserves. Other animals enter winter with plenty of reserves. Many of these animals are likely to survive regardless of the winter severity. There is also a group of animals that has marginal fat reserves and may be susceptible to winter mortality if conditions become severe enough. Providing the proper supplemental feed may help these animals with marginal fat reserves survive if feeding is started during early winter. However, in most cases supplemental feeding alone will not save animals in the absence of fat reserves because they cannot consume enough food to maintain body weight. Also, microorganisms in the rumen, which digests the food, may not be adaptable to the new diet.



The condition and quality of summer and fall wildlife habitats is just as important for big game survival as winter range. The amount of stored body-fat reserves in big game animals depends largely on the forage quality of foods consumed on summer and fall ranges. Wintering big game animals will experience declining body weight due to cold climatic conditions regardless of winter range forage conditions.

There is growing evidence from wildlife and rangeland habitat biologists that the condition and quality of summer and fall ranges is just as important for big game survival through winter as is winter range. Historically, wildlife biologists have emphasized the importance of the quality and quantity of winter range. Biologists are now finding that wintering big game animals will experience declining body weight regardless of winter-range condition. Therefore, the condition and quality of summer and fall ranges, which directly affect the amount of stored fat reserves, may have as much influence on winter survival as the quality of winter range.

Big game herbivores possess physiological adaptations such as fat storage, regulation of metabolic activity, behavioral characteristics, and weight-loss capabilities that enhance winter survival. The length of time big game animals can survive winter conditions depends on: (1) the amount of stored fat reserves, (2) the rate of fat-reserve use as influenced by available forage, and (3) the degree of stress from cold temperatures and human disturbances.

Research scientists have demonstrated that some big game animals will feed less during very severe winter conditions even when high-quality supplemental feeds are offered. Mule deer have voluntarily

reduced food intake for 60 days and withstood a weight loss of 40 percent. Even when fed high-quality supplemental feed, weight losses in deer vary from 25 to 30 percent during periods of voluntary forage-intake reductions. Deer lower their metabolic rates and maintenance energy requirements during winter as a way to reduce required food consumption. Likewise, elk may naturally lose up to 24 percent of their weight under severe conditions.

Difference in Digestive Systems

Big game animals have different rumen characteristics compared to domestic cattle. These characteristics evolved over time to enable big game animals to survive winters in their natural habitat. Like domestic cows, elk, deer, and antelope are ruminants with compartmentalized digestive systems that include the rumen. Microorganisms in the rumen break down food materials to furnish energy, protein, and fats for maintenance and growth.

Relative rumen sizes vary between species of ruminants. For example, rumens of domestic cows can hold 13 to 15 percent of the total body weight in forage materials, elk can hold 6 to 15 percent, and deer and antelope can hold 7 to 10 percent. Relatively smaller rumen sizes in big game animals, coupled with generally higher metabolic rates in smaller wild ruminants, suggest that food intake rates and conversion to available energy must be higher in big game animals compared to cattle. Thus, the diet of smaller ruminants should consist of more easily digestible forage materials to maximize the efficiency of energy expended on feeding during winter. Rumen microorganisms in wild herbivores are adapted to efficiently convert existing native forage to useable energy but are not adapted to convert commercially blended feed mixes.

Rumen internal structure and function differ between species, thus influencing diet selection and assimilation and subsequently winter survivability. Cattle rumens are adapted for bulk and roughage diets, deer and antelope rumen for selective materials (forbs, leaves of shrubs, etc.), and elk rumen for intermediate diets for easy adaptation to seasonal changes in forage intake. Unlike deer and antelope, elk digestive functions are similar to those of domestic cattle, which can obtain nutrients from relatively poor-quality feed more effi-

ciently. The digestibility of native shrubs, forbs, grasses, and alfalfa is similar for elk and cattle. They can digest grass and alfalfa better than native shrub forage while deer and antelope handle portions of woody browse better than the herbaceous grass and alfalfa feeds. Thus, supplemental livestock feeds cannot accommodate these differences in diet selection and assimilation to meet the needs of all wild herbivores during winter.

Arguments Against Feeding

There are several reasons for not providing supplemental feed to big game during the winter. These include the creation of physiological problems, the disease impact on adjacent natural habitats, interference with the natural selection process, stress associated with human contact during the feeding process, and excessive costs.

Physiological Problems

Many well-intentioned people start artificial feeding programs too late in the winter when rumen microorganisms are already adjusted to digesting native forage and malnourished conditions already exist. Changing rations suddenly under these circumstances can cause serious physiological complications such as diarrhea, impaction, acidosis, and rumenitis. Mortality in malnourished deer has resulted when supplemental feeding programs start under these conditions. To be successful, supplemental feeding programs should start well before severe winter conditions appear to warrant feeding.

Disease

Other disease problems can develop from supplemental feeding programs. The incidence of necrotic stomatitis (caused from downy brome, also known as cheatgrass, imbedded in an elk's mouth from unclean hay) and brucellosis (where it exists) increase among elk when animals are forced into close confinement by concentrating herds on small feeding sites. Brucellosis causes abortion and small, non-viable calves within elk and cattle herds. This disease is especially threatening to livestock producers because cattle may contract the disease by direct contact with an aborted elk fetus or with after-birth. The incidence of brucellosis in free-ranging elk herds wintering on native range is extremely low because natural distribution



Supplemental feeding programs can cause severe impact on adjacent natural forage foods when big game populations are maintained at artificially high levels beyond the natural carrying capacity of existing habitat. In this photo, curl-leaf mountain mahogany, a highly preferred natural forage food for mule deer, displays a severely hedged appearance due to overbrowsing from high populations of wintering mule deer.

results in less contact with aborted fetuses, thus reducing the disease's spread. Wyoming Game and Fish Department (Wyoming G&F) data show that feed-ground elk in western Wyoming produce approximately 50 percent fewer calves due to brucellosis problems compared to elk on native winter range.

Impact to Natural Vegetation

In some cases, supplemental feeding programs have a severe impact on adjacent natural habitats. Wild ruminants will continue to use native vegetation even when supplemental feed is provided. In addition, natural vegetation is impacted from trampling and soil compaction that restricts plant uptake of water and minerals when supplemental feeding occurs. There is no doubt that impacts to natural vegetation occur when animals are concentrated by supplemental feeding.

Ruminants feeding on high-quality, highly digestible feed such as alfalfa still have an innate requirement to ingest coarse roughage materials such as twigs and bark. Most browse plants such as willow, aspen, bitterbrush, sagebrush, serviceberry, cottonwood, and others



On elk winter feed grounds, aspen bark is commonly eaten by large herds of hungry elk attracted by supplemental feeding programs. Big game animals will continue to eat natural vegetation even when supplemental food is provided. Severe impacts to natural vegetation occur when big game animals are concentrated by supplemental feeding.

are consumed beyond a plant's ability to maintain life. Over time, these browsed species disappear from intensive feeding sites, resulting in a diminished capacity of the native range to support big game and other wildlife.

From a sociological standpoint, supplemental feeding tends to erode the correct educational concept of the relationship between wildlife numbers and habitat carrying capacity. A common public perception develops where habitat destruction becomes acceptable because supplemental feeding can supposedly mitigate habitat loss. From a public viewpoint, feeding produces more animals for hunters, outfitters, and non-consumptive recreational uses.

Livestock operators may support supplemental feeding to reduce damage to native rangeland and cropland. However, wildlife populations regularly maintained at artificially high levels above native rangeland carrying capacities by supplemental winter feeding programs may compete with livestock for summer forage. This situation should be carefully considered by livestock operators before engaging in a supplemental feeding program.

Degrading "Natural Selection"

Without supplemental feeding, severe winter weather helps eliminate genetically inferior individuals from a herd, which strengthens a herd's ability to produce individuals with superior traits adaptable to stressful environmental conditions. This "natural selection" process builds healthy big game herds that become more resistant to disease and environmental stress over time. Supplemental feeding programs, sustained over a long period, can weaken this natural evolutionary process.

Increased Stress

Supplemental feeding of big game typically occurs along roads and highways near towns or other areas of human habitation. In these areas, animals are subjected to additional stress from human disturbances, dogs, and potential automobile mortality. In addition, native vegetation for shelter is usually much reduced or absent, resulting in exposure to cold temperatures, wind, and deep snow. These additional stresses require assimilation of more energy from digested foods at a time when maintaining body condition is critical. In good natural habitat, these animals would seek shelter and reduce activity to conserve energy.

High Costs

Costs associated with winter wildlife feeding can be unrealistic for many people. Often, many more animals are attracted to winter feeding programs than originally anticipated, causing unexpected increases in feeding costs. When this occurs, some well-intentioned feeders abruptly stop feeding programs, causing detrimental physiological impacts to wildlife dependent on supplemental feed.

During the 1988-89 winter, the National Elk Refuge in Jackson Hole fed 4,772 tons of pelleted hay to approximately 9,486 elk during a 122-day period. At a cost of \$150 to \$179 per ton of hay pellets, the total feed cost that winter was approximately \$750,000 or \$79 per elk. Considering the negative consequences of feeding big game as discussed previously, the associated costs of a feeding program can rarely be justified.

Guidelines for Determined Feeders

In spite of the considerable information available describing adverse impacts on big game animals, natural habitat, and potential harm to other wildlife and livestock as a result of supplemental feeding, some people insist on feeding big game during the winter. For those determined to feed wintering big game animals, the following recommendations are offered to reduce impacts to wildlife and natural habitats:

- **Start Feeding Early** – Supplemental winter feeding should start in early winter (December) to help those animals with low winter body fat reserves as well as calves and fawns which enter winter with low fat reserves and high metabolic rates. Delaying a supplemental feeding program until midwinter will threaten the survival of animals that were in poor condition going into winter.
- **Avoid Feeding Commercial Livestock Feeds** – Feed milled wafers that are specially processed for big game. Do not offer commercial feeds and supplements developed for cattle or horses. When feeding alfalfa hay to elk, offer leafy, high-quality, third-cutting alfalfa without a large percentage of coarse stems. At first, offer supplemental feed slowly to allow the rumen microorganisms in big game to adjust to the different high-quality forage.
- **Feed Often** – Try to feed twice a day (morning and evening). During extremely cold weather periods, increase the per-animal daily ration. Both of these strategies benefit small fawns or calves by providing an energy boost before colder nighttime temperatures begin. Young animals also need extra energy during long cold spells.
- **Select Feeding Areas Carefully** – Locate feeding areas where big game animals do not have to cross roads, rivers, fences, or other obstacles to reach them. If feeding areas are located in high elevation mountains, avoid locations with common cold-air inversion layers such as mountain valleys where lower air temperatures can increase physiological stress. To avoid cold-air

inversion layers, feed on or near adjacent ridge tops. Try to select feeding areas where thermal cover such as trees and broken terrain exist to provide an escape from cold winter wind.

- **Feed Along Existing Trails or Secondary Roads** – If possible, feed along an existing stock trail or little-used secondary road (not a major highway), spreading the feed as much as possible. Use markers to ensure an even distribution of feed. Feeding along a stock trail or little-used road prevents animals from trampling natural vegetation. Spreading the wafers out allows more animals access to the food and reduces competition.
- **Feed Large Groups of Animals** – From a cost-effective and logistical standpoint, feeding large groups of animals is more efficient. This reduces the amount of travel time and labor involved in feeding several small groups of big game animals located at different feeding areas. However, luring small groups of animals into one larger herd can lead to damaged adjacent native vegetation and increase disease transmission.
- **Avoid Creating Competition Among Different Species** – Do not feed deer and elk together. When both species are present, keep them at least 200 to 300 yards apart. Elk are more aggressive than deer, consuming more wafers and the better hay. This situation will force deer to consume poorer quality hay and fewer wafers, which can cause compaction in the digestive tracts of deer. Pronghorn antelope require a smaller wafer than deer or elk and may require supplemental alfalfa to start them on wafers. Discontinue feeding alfalfa after antelope become accustomed to the wafers.
- **Appoint Feeding Supervisors** – Assign one person to monitor each feeding operation and keep accurate daily records on mortality, amount and time fed, amount of feed consumed, and other information of interest. When one person assumes responsibility for supervising each feeding operation, changes in animal behavior and health are easily recognized. Adjustments in the feeding regime can be incorporated quickly to compensate for the changing needs of the animals.

- **Maintain Feeding Operations Throughout Winter and Spring** – From a nutritional standpoint, the winter-spring transitional period from supplemental feed to natural rangeland forage is hard on pregnant females. Also, the loss of their winter coats during early spring requires more energy for animals to maintain body warmth. Continue feeding throughout early spring until the majority of big game animals discontinue regular visits to the feeding area.

Summary

From a long-term perspective, supplemental feeding is not a wise investment. Supplemental feeding merely replaces lost native winter range temporarily, and it supports a dangerously high population level beyond the carrying capacity of natural rangeland. Money earmarked for a big game winter feeding program would be better spent in managing and improving vegetative production on existing crucial wildlife rangeland habitat. Benefits derived from rangeland habitat improvement projects are much longer lasting than short-term feeding programs and benefit numerous other wildlife species as well. In addition, yearly costs of feeding operations are subject to inflation. However, habitat improvement projects and/or acquisitions of crucial big game habitat are not vulnerable to annual increases following the initial capital outlay.

Biologically, both big game and domestic livestock should be managed cooperatively within the framework of the native rangeland carrying capacity. Range improvement in conjunction with proper livestock grazing and wildlife population management is a better investment than supplemental feeding to enhance both wildlife and livestock production. For more information on rangeland habitat improvement techniques, contact a University of Wyoming Cooperative Extension Service educator or visit a local Wyoming G&F office.

Acknowledgements

Information presented in this bulletin was extracted primarily from the following references:

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Special thanks and appreciation are extended to Bill Hepworth, wildlife management coordinator; Diane Abendroth, habitat specialist; and Bernie Holz, game warden, Wyoming Game and Fish Department, for their additional contributions of information, time-consuming review, and helpful suggestions to improve this publication.

Sincere gratitude is extended to Randy Anderson, extension communications director, Ag Information, College of Agriculture, for providing an attractive layout format for this publication.

Issued in furtherance of cooperative extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jim DeBree, Director, Cooperative Extension Service, University of Wyoming, Laramie, Wyoming 82071.

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