

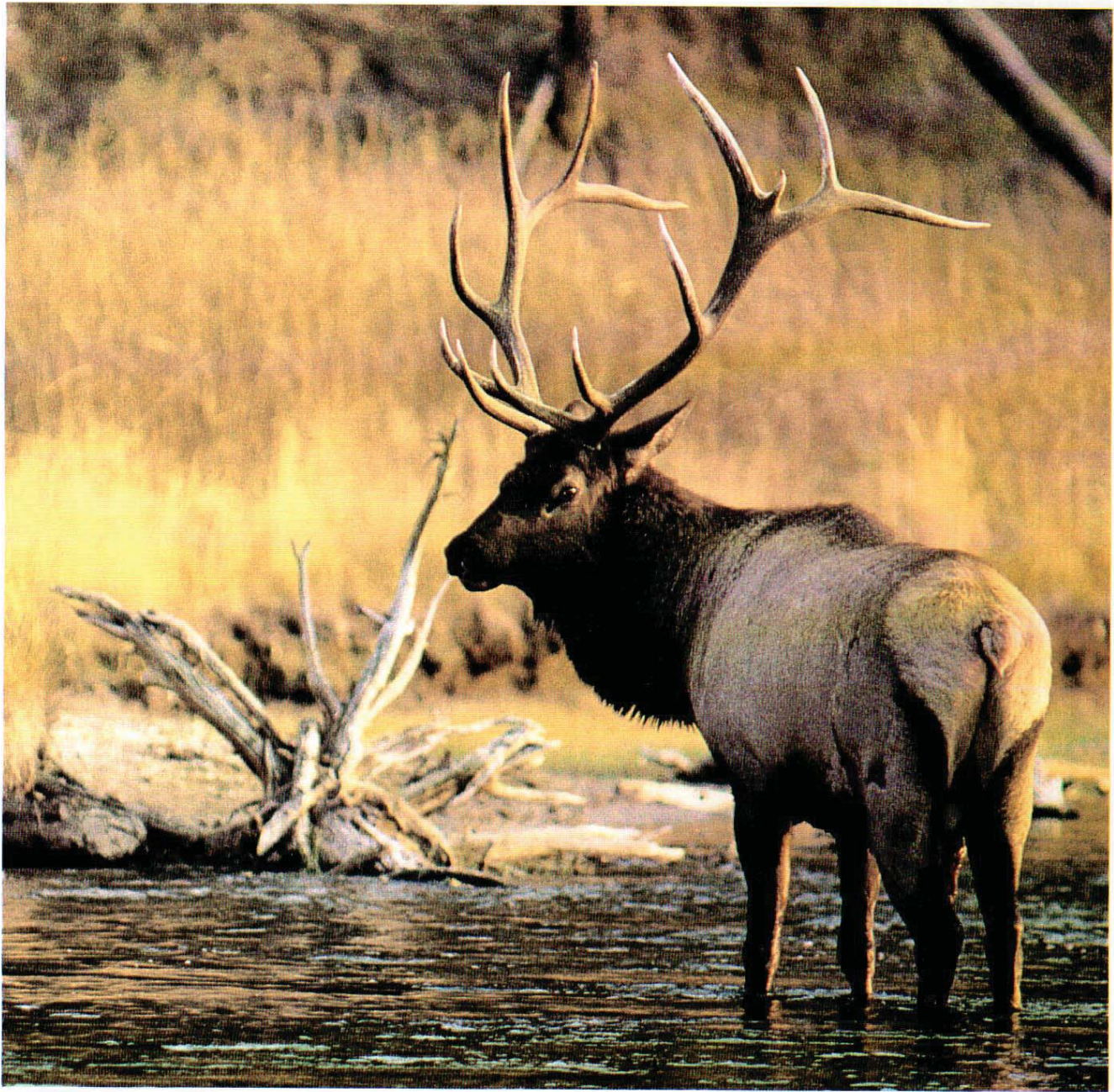
# Rocky Mountain Elk

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**Habitat Extension Services**



WYOMING GAME AND FISH DEPARTMENT

The Rocky Mountain elk continues to be Wyoming's premier big game species. Not only is the elk a favorite among hunters, but other wildlife enthusiasts value this species for its regal posture, impressive size, and photographic potential. With an estimated 75,000 Rocky Mountain elk in the state of Wyoming and 450,000 more throughout the U.S. and Canada, this subspecies is thriving in North America.

At one time, the North American elk (*Cervus elaphus*) occupied more range on the North American continent than any other deer species. It is estimated that ten million elk roamed North America prior to settlement by European man. However, elk numbers were severely reduced



through indiscriminant hunting, grazing competition from domestic livestock, and habitat destruction. By 1907, less than 10,000 elk were left continent-wide, and this number was on the decline. Public outcry finally reached a fever pitch, and measures were taken to preserve the elk that remained. With protection, elk numbers began to rise. By 1922, there were an estimated 90,000 elk on the continent, over one-third of which were found in Yellowstone National Park, Teton National Forest, and some Canadian provinces. Elk continued to respond to protection, and by the late 1970s, elk numbers had risen to 500,000.

#### Elk Classification

There are six recognized subspecies of elk in North America. Subspecies are normally distinguished using skull and other body measurements, but such things as behavior, habitat use, and geographic distribution are all factors which can help determine whether populations are separate subspecies.

The Merriam elk (*Cervus elaphus merriami*) was the largest subspecies and became extinct just after the turn of the 20th century. This subspecies inhabited the southwestern states of Arizona, New Mexico, and Texas, and the Mexican states of Sonora, Chihuahua, and Coahuila.

The eastern elk (*Cervus elaphus canadensis*) occupied much of the eastern United States prior to the coming of European man. Because it occupied the eastern deciduous forests and the open habitat of the Great Plains, this subspecies was rapidly reduced over its range and is now considered extinct.

The tule elk (*Cervus elaphus nannodes*) is the smallest of the subspecies. It occurs only in California where fewer than 900 animals survive.

The Manitoban elk (*Cervus elaphus manitobensis*) was once found along the eastern edge of the Rocky Mountains from Colorado north into Canada. The majority of the 9,500 surviving animals are found in the provincial and national parks of Manitoba and eastern Saskatchewan, Canada.

The Roosevelt elk (*Cervus elaphus roosevelti*) is the largest living elk subspecies in North America. It ranges along the Pacific coast from northern California to Washington and into Canada.

The Rocky Mountain elk (*Cervus elaphus nelsoni*) is the second largest living subspecies. Like other elk subspecies, the Rocky Mountain elk was heavily affected by indiscriminant hunting, but because of its rugged habitat and elusive nature, enough animals survived to make recovery possible. The establishment of

Yellowstone National Park was of great benefit, offering protection to this subspecies.

Prior to the settlement of Wyoming, Rocky Mountain elk thrived in the western portions of the state, while large numbers of Manitoban elk inhabited the eastern one-half. The Manitoban elk was probably driven to extinction in Wyoming before the turn of the century, while populations of Rocky Mountain elk remain scattered throughout the state.

### **Natural History of the Rocky Mountain Elk**

Rocky Mountain elk breed during a rutting season lasting from mid-September to mid-October. Male elk (bulls) establish "harems" of

their second. Their ability to carry a pregnancy to term depends on their physical size and condition, which in turn, depends on forage quality on winter and transitional ranges. Females reach their reproductive prime at age seven and continue to have excellent breeding success through the age of 14. Though cows may live to be 25, their reproductive success will decline past the age of 14.

Bull elk normally begin breeding at one-and-one-half to five years of age and reach their prime between seven and ten. Older, dominant bulls chase young bulls away from their harems, denying the young bulls opportunities to breed with most of the available cows. These domi-



*During the rut in September and early October, bull elk hardly know a moment's rest (opposite page.) The testing helps select the best genes for the next generation (left), but it also depletes the bulls' strength just before winter sets in. If the winter is severe, large males are among the first to die.*

five to 30 females (cows), which they protect and defend from rival bulls. As each cow comes into estrus, the bull will mate with her.

After a gestation period lasting 245 to 265 days, cow elk give birth between late May and mid-June. Newborn elk calves weigh 35 pounds and grow rapidly. Cows normally give birth to just one calf; twinning is a rare occurrence. A single calf places enough demands on a female elk's energy reserves. The sex ratio of calves at birth favors males slightly.

Raising a calf to maturity seems to be a learned process, as older females have much better success than their younger, inexperienced counterparts. Cow elk do not breed in their first fall and have a low pregnancy rate in

nant, physically fit bulls do the majority of the breeding, thus assuring that the best genetic stock is passed on to new generations of elk. Bull elk may live to be 15 years old. As they become older, they have smaller harems than their younger rivals and engage in only a small part of the breeding.

### **Habitat Requirements of the Rocky Mountain Elk**

#### *Diet*

The Rocky Mountain elk has one of the most variable diets of any big game species. This subspecies is an "opportunist," feeding on a host of plant species depending on season, plant species availability, and geographic region.

While grass, forbs, and woody browse are all consumed by elk, grass species seem to be preferred where they are available.

Spring finds elk on transitional ranges, between winter to summer range. Elk diets during this period (April to mid-June) are almost exclusively made up of grass species, including native bluegrasses, rough fescue, Idaho fescue, prairie junegrass, needlegrasses, bluebunch wheatgrass, slender wheatgrass, and thickspike wheatgrass. As summer begins, most elk have moved to summer range where they will stay for approximately four months. With the summer heat, some forage areas begin to dry out, and grass protein content is reduced. Elk correspondingly shift their diets, consuming forb and sedge species in addition to grasses. These include American bistort, buckwheat, dandelion, erigeron (daisy) species, lupine, and elk sedge. During this period, elk can often be found in the vicinity of snowbanks, forest canopies, or north-facing slopes where residual moisture produces succulent vegetation and the cooler site provides escape from the summer heat.

As summer wanes, elk begin the gradual migration back to winter range areas, grazing on transitional ranges until the end of December. Habitats such as Douglas fir stands and aspen/lodgepole pine communities are used extensively at this time. Forb species lose their succulence during this period, and elk again shift their diets to consume dry grasses and browse. Some studies indicate that at least a small portion of elk diets are made up of lichens where they are available. If fall rains are plentiful and grass species begin to sprout new vegetation, elk will forage on these items.

With the onset of winter, snow conditions may limit grass availability, forcing elk to include more shrubs in their diet, including antelope bitterbrush, mountain mahogany, serviceberry, willow, and winterfat. If snow depth limits shrub availability, elk will shift their diets to include aspen, conifers, sagebrush, willow, and other taller browse.

#### *Water*

Elk prefer to graze in locations one-quarter to one-half mile from water sources, though this distance may vary, depending on weather conditions during the particular season. A localized water source is particularly important for lactating cow elk whose demand for water is dramatically increased during the nursing period. Snow fulfills these moisture requirements during winter months when free water is not available.

#### *Security Cover*

Rocky Mountain elk evolved in open habitats adjacent to receding glaciers. However, with the resurgence of modern man onto areas of elk occupation, the animals have learned to avoid people. Elk normally occupy areas which contain food or other resources in conjunction with security cover. Security cover may consist of thick brush or heavy timber that allows elk to hide. In areas where elk are observed, disturbance to these animals should be minimized or eliminated, particularly on winter ranges. Occasional disturbance will probably not harm an elk herd, but continued disturbance may force elk from a critical area, stress animals to the point of death, or both.

Studies conducted on elk disturbance con-





*Elk are predominately grazers, but in the winter, they may take a wide variety of foods, including sagebrush (above), a variety of mountain shrubs, and even aspen bark (opposite page) when the going gets tough.*

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clude that elk avoid areas of human disturbance almost without exception. Thus it is important to avoid disturbing elk on transitional and winter ranges whenever possible.

#### *Seasonal Movements*

While it is commonly believed that elk migrate, not all populations of each subspecies do so. The tule elk of California, for example, does not. All its food and habitat requirements are met in the same area, and weather conditions never become extreme enough to prompt these animals to move. Most Rocky Mountain elk, however, migrate from summer range (high elevation) to winter range (low elevation) and back each year. There are at least two reasons for elk migrations: the appeal of better and/or more abundant food and improved weather conditions. While a number of studies have indicated that several factors are responsible for migrations from summer to winter range, the greatest single factor prompting elk movement is snow condition and depth. When snow becomes crusted or hard packed, elk are unable to reach food buried beneath. Although elk can move through snow up to three feet deep, they tend to avoid areas where snow is 18 inches deep or deeper.

Alternately, snowmelt and spring green-up of grasses prompt elk to again move upslope to summer ranges. Elk will follow receding snowlines upslope, feeding on succulent new growth visible as snow melts.

#### *Winter ranges*

Elk prefer and seek out low-elevation areas containing both wooded and south/southwest-facing slopes for use as winter range habitat. Wooded and/or brushy areas or areas with topographic relief provide thermal cover and shelter from winter storms. Windblown ridge tops and open, sunlit areas make forage available for elk consumption during winter months.

Most historical winter ranges are located in valley bottoms or foothills, many of which have been settled by humans or grazed by their livestock. This encroachment has severely reduced elk winter range during the past 200 years. The reduction in elk winter range is the single most critical factor limiting elk numbers in Wyoming and other states. Only through management and protection of these wintering areas will the Rocky Mountain elk survive throughout its present range.

#### *Summer ranges*

Because of their locations, summer elk ranges are not nearly as limited as winter ranges. Most elk summer range is found in the high country of national forests, wilderness areas, and national parks. While intense pressure to develop some of these areas exists, it appears that, at

least for the moment, summer range availability in Wyoming is not a factor limiting elk numbers.

While summer range appears to be more plentiful, these areas are no less critical for elk. Following a rough winter, elk are anxious to return to summer range to restore fat reserves lost during the winter months. Cows use this time to nourish their unborn calves, which undergo the greatest amount of growth during the final trimester of pregnancy, as well as to prepare for the tremendous nutritional demands of their offspring during nursing.

#### *Transitional ranges*

Transitional ranges can exist between summer and winter ranges. While elk do not use these ranges as extensively as summer or winter



ranges, they are no less important. Transitional ranges can be critical to the survival of elk coming off depleted winter range in the early spring. Additionally, the lack of adequate winter range forage may be partially alleviated by forage production on transitional ranges. Conversely, elk moving from summer to winter ranges may move great distances from one to the other. In such cases, the availability and condition of transitional ranges may be critical to elk survival.

#### **Management Strategies for the Rocky Mountain Elk**

A person owning winter and/or summer elk range possesses a unique and valuable wildlife resource. In most cases, winter and possibly transitional ranges are the only elk habitat in private ownership. Remote, high elevation summer ranges are more likely to be in public ownership.

#### *Range preservation*

Because elk winter range is in short supply and critical to the survival of an elk population,

it should be managed and maintained as such. If possible, the land should be left ungrazed by domestic livestock to provide as much standing forage as possible for elk. If this is not a possibility, domestic grazing should begin after elk have moved to summer range, and reduced or halted in early to midsummer to allow forage plants to regrow prior to the onset of winter. Ideally, the land manager should limit total grazing use by livestock and wildlife to 50 percent of range forage capacity, allowing 15 percent for plant maintenance and loss to climatic conditions such as drought and freezing.

There are organizations which provide funds for elk habitat improvement and/or preservation of elk habitat. These include the Rocky Mountain Elk Foundation and The Nature Conser-

ting, reseeding, and herbicide application. More detailed information regarding each of these techniques is available from your county extension office, the Soil Conservation Service, or the Wyoming Game and Fish Department.

Resting the area from domestic livestock grazing is a simple and effective method of restoring lightly damaged elk winter range. Extensive range damage may require more aggressive management for full restoration.

Prescribed burning is an effective method for increased forage production on elk winter range. In fact, many of the habitats used by elk throughout the year benefit from occasional fires and some are even dependent on fire for their regeneration. In many winter and transitional elk ranges, fire suppression has led to sagebrush



vancy. A landowner may also wish to explore elk habitat preservation or improvement options available from the Soil Conservation Service (SCS) and the Wyoming Game and Fish Department (WG&FD). Both the Conservation Reserve Program (SCS) and the Conservation Easement Program (WG&FD) are available for this purpose.

#### *Range improvement*

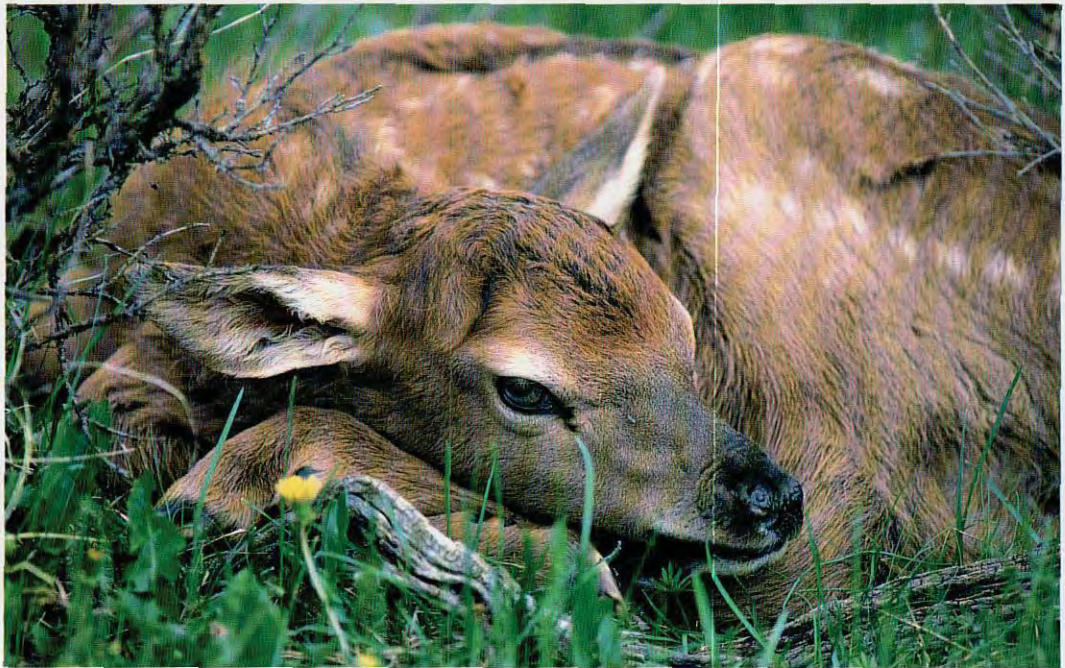
Where grass and forb production has declined on elk winter or transitional range, a variety of management treatments are available for habitat improvement. The first step in winter range improvement involves evaluating the area to be improved, deciding on the goals of improvement, then deciding on the best method(s) for reaching those goals. Consult personnel from the Soil Conservation Service or the Wyoming Game and Fish Department for assistance in evaluating an area and choosing the best method of treatment.

A variety of techniques exist for improving forage production on elk range. These include resting the area from grazing, prescribed burning, range pitting, chaining, dozing, clear-cut-

*Some of the most amazing growth in the animal world is the explosive development of elk antlers (opposite page). In mature bulls, the previous year's antlers are shed in February. By the following August, these bulls will have grown new racks that can weigh more than 40 pounds. Winter is a stressful period for all wildlife, but elk are better equipped to handle the season than are many other species. Cows not only survive the deep snow and cold (above) but support a developing fetus as well.*

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*Elk calves are generally born in late May or early June. While the calves can walk almost immediately after birth, they spend the first few days of their lives in hiding (below) while their mothers graze. Losses to bears and other predators can be high during this period.*



burning can be used to effectively rejuvenate these areas. Burning these areas stimulates aspen growth, resulting in an upsurge of aspen shoots, a favorite elk food. Burning also removes conifers and sagebrush which may have encroached on the site.

Fall burns are recommended for aspen stands because dry conditions result in a hot burn that kills most, if not all, the parent trees. After the burn, the site should be monitored and all surviving parent trees killed by girdling or cutting. This is critical to insure maximum sucker response in the following years.

Fire is an integral part of most natural envi-

or conifer encroachment on the range, thus reducing the area's size and forage-producing capabilities. A preferred habitat type for elk, aspen stands can be lost entirely if fire is not a part of the environmental picture.

Prescribed burning is particularly effective for increasing the size of openings through the removal of sagebrush or other shrub species that may have encroached on grassland habitats. While both spring and fall burns have merit, the decision on when to conduct a burn depends on the goals of the burn and the circumstances at the site. Consult experts from your county extension office, the Soil Conservation Service, or the Wyoming Game and Fish Department for advice on when to conduct a burn to improve elk habitat.

As mentioned earlier, aspen communities are preferred transitional habitats for elk between summer and winter ranges. Because aspen reproduce through suckering (sending up shoots from the root stocks of plants), prescribed

ronments. Its absence or exclusion can only compound problems over the long term. With wise and careful planning, fire can be an effective management tool with a wide variety of applications. For more information regarding prescribed burning, please see the Wyoming Game and Fish Department habitat extension bulletin number 49, "Fire Management and Wildlife."

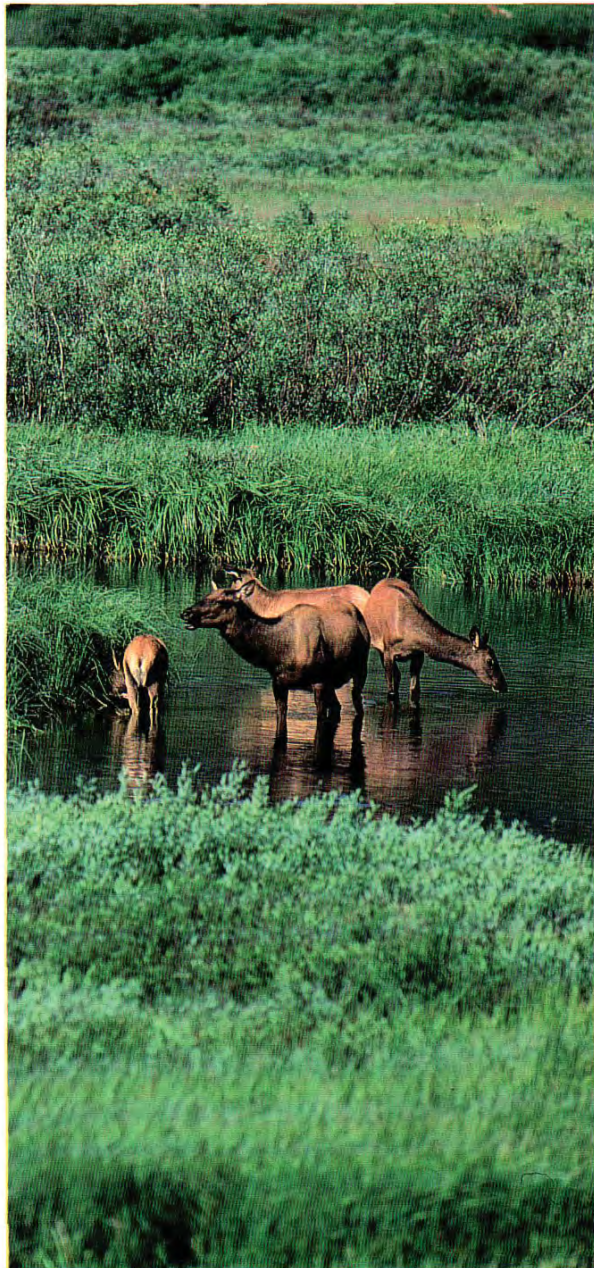
Pitting is a useful management tool for increasing water absorption and thus, forage production of an area. The pitter moves over an area, scraping depressions into the soil which trap moisture. This moisture encourages the growth of forage for elk. Where dense mats of ground vegetation have taken over an area, the range pitter will also remove some of this vegetation allowing other favorable plant species to become established. Results from the use of range pitting vary widely depending on location, soil composition, and vegetation types, but using a range pitter normally produces favorable

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results.

Chaining and dozing are similar techniques which accomplish the same goal. In areas where sagebrush or other shrub cover has become excessive, these techniques can be used to eliminate all or some of the excess shrub component. Chaining involves dragging a large, heavy chain through an area. As the chain moves, it tears shrubs from the ground, allowing other plant species to establish themselves. Two bulldozers are normally used to pull the chain through the area. Dozing is a similar process but involves a single bulldozer, less the chain, which crushes shrubs when driven through an



area. Chaining is a somewhat more efficient method for shrub removal, but either technique will produce desirable results.

Clear-cutting involves the removal of small patches of timber habitat in areas of extensive forest. On private lands containing extensive tracts of forested habitat, clear-cuts should be smaller than five acres and cut in contoured patterns with an irregular edge to create a mosaic pattern and increase habitat diversity. Old, dying aspen stands that occur on private lands can also be rejuvenated using this method. Clear-cutting of entire patches of aspen stimulates them to "sucker" and send up new aspen shoots. If prescribed fire is not an option for treatment of an aspen stand, a landowner may wish to investigate this clear-cutting technique. With aspen stands, both these techniques accomplish the same goal: revitalization of the aspen stand, making it more attractive and beneficial to elk.

Reseeding an area to benefit elk is a feasible, but often costly, management technique. Grass/forb seed can be quite expensive, and the time involved to till and plant the seed is another consideration. If reseeding is planned, consult experts from the Soil Conservation Service, State Agricultural Extension Services, Bureau of Land Management, U.S. Forest Service, and the Wyoming Game and Fish Department before initiating the project.

Herbicide application is quite effective at increasing total plant diversity in an area, though its potential long-term effects on other facets of the environment deserve careful consideration. Herbicides are particularly effective at reducing shrub and mat-forming forb densities in areas of elk winter range where they have become dominant, crowding out valuable grass forage species. In areas that cannot be burned or are too steep for mechanical treatment, the use of herbicides may be the only option.

If herbicides are used, treating small patches of the range in any given year is recommended. Herbicides should be applied in an irregularly-shaped, mosaic pattern or sprayed in diagonal strips over the treatment area using half the recommended application rate. This method allows some areas to receive full treatment, others to receive partial treatment and still others to remain untreated. The resulting habitat diversity opens up areas for grass/forb production while allowing escape and thermal cover to remain as well. As with the other techniques discussed, consult experts from the

*Once calves begin foraging on their own (left), they tend to select food that has higher nutritional quality and lower fiber content than adult foods. They can afford to do this because they require much less food than an adult elk.*

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*Growth rate is rapid among calves. Born at about 32 pounds, they may weigh more than 200 pounds by December.*



Soil Conservation Service, Agriculture Stabilization and Conservation Service, Weed and Pest Control, and the Wyoming Game and Fish Department for recommendations on herbicides to use, rate of application, timing of application, etc.

#### *Supplemental feeding*

The supplemental feeding of elk, or any big game species, is not recommended. Concentrating animals in such a manner increases the potential for disease transmission (including brucellosis and scabies), as well as dependence upon unnatural food sources. This may result in less healthy populations and reduced reproduction. Supplementally fed animals are less inclined to forage for themselves and can lose their natural wariness, increasing the chance of predation. Concentrating elk may result in range degradation to the area surrounding the feedground. Collisions with motor vehicles while elk are feeding near highways and elk grazing damage to fields and haystacks are other undesirable possibilities resulting from supplemental feeding.

Keep in mind that elk populations are neither stagnant nor constant. They fluctuate annually, higher in years of mild weather and/or plentiful forage and lower in years of severe weather and/or poor forage production. Big game herds do not, nor should they be expected to, remain at a

constant level year after year. Though starvation of big game animals is not pleasant, it is a natural process that removes less fit animals the range simply cannot support at the time. To intervene in this process is to remove natural selection from elk population dynamics and

jeopardize the future condition and capacity of the range to support elk.

#### **Conclusion**

With proper management, elk numbers throughout Wyoming will continue to remain at desirable levels. While much of the management responsibility lies in the hands of state and federal wildlife managers, those of us who care about elk need to be aware of the needs of the species, and potential threats to its survival. Only through the involvement of knowledgeable, concerned citizens can we assure that the Rocky Mountain elk will remain a free-ranging part of our state's wildlife heritage.

*Written by Evin Oneale through the Wyoming Cooperative Fishery and Wildlife Research Unit.*

*This publication is one in a series of habitat extension bulletins produced by the Wyoming Game and Fish Department. Call 1-800-842-1934 for additional information or assistance.*

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