

American Elk (*Cervus elaphus*)

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Fish and Wildlife Habitat Management Leaflet

Number 11



Bull elk

General Information

Before European settlement, an estimated ten million elk roamed the North American continent. The American elk (*Cervus elaphus*), or wapiti, a Native American word meaning “white rump,” once had the largest range of any deer species in North America. For centuries, the elk has been a picturesque icon of the American west and has provided recreational opportunities for hunters, photographers, artists, and other wildlife enthusiasts. Unregulated hunting, grazing competition from domestic livestock, and habitat destruction from unrestrained timber harvesting, urbanization, and westward expansion throughout the nineteenth century reduced American elk populations to less than 100,000 individuals continent-wide by the early 1900s. Fortunately, the elk’s ability to use a variety of habitats, its opportunistic feeding habits, and positive response to management efforts has enabled the species to survive natural and human-induced pressures

over time. These factors, coupled with concentrated wildlife management efforts, have returned the American elk to stable, and in some areas increasing, populations in the United States and Canada.

This pamphlet is designed to serve as an introduction to elk habitat requirements and to assist private landowners and managers in developing elk management plans. Success of any individual species management plan depends on targeting the specific needs of the desired species, analyzing the designated habitat area as a whole to ensure that all required habitat elements are present, and determining what management techniques will best improve the land as elk habitat.

Range

Four subspecies of American elk live in North America today. The tule elk (*C. elaphus nannodes*), the smallest of the subspecies, once freely roamed the valleys of central and northern California. Today, many of the approximately 3,000 tule elk that remain are managed by state and federal agencies on California public lands. The Manitoba elk (*C. elaphus manitobensis*) once occurred primarily from Colorado north into Canada along the eastern edge of the Rocky Mountains; however, it did range east into Minnesota and south into northern Texas. Today, the majority of the Manitoba elk population (approximately 20,000 individuals) are found in the provincial and national parks of Manitoba and eastern Saskatchewan, Canada. The Roosevelt elk (*C. elaphus roosevelti*) and the Rocky Mountain elk (*C. elaphus nelsoni*) are the largest and second largest living elk subspecies in North America, respectively. The Roosevelt elk population, approximately 91,000 strong, ranges along the Pacific coast from northern California to Washington and Canada. The Rocky Mountain elk is the most plentiful of the four elk species (800,000 to 900,000 individuals) and occurs primarily in the mountain ranges east of the Cascade Mountains. However, because of its adaptive nature and variable diet, sustainable populations of Rocky Mountain elk have been successfully introduced or repatriated into historical habitats in many western and eastern states. Rocky Mountain elk now occur in parts of Alaska, Arizona, Arkansas, California, Colorado, Idaho, Kentucky, Michigan, Minnesota, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Texas, Utah, Washington,

and Wyoming. Because of limited population size and/or range of tule and Manitoba elk, this leaflet concentrates on the habitat needs and management of Roosevelt and Rocky Mountain elk.

Habitat Requirements

General

Elk habitat consists of a mosaic of woodland cover and large open areas. Woodland habitat provides escape cover from human disturbance and predators, and wooded corridors provide travel lanes among seasonal habitats. Open areas provide necessary herbaceous forage. Tule elk find suitable foraging and protective cover in various isolated, open coastal regions of California. Because preferred habitat and weather conditions remain constant in these regions, tule elk do not seasonally migrate. Roosevelt and Rocky Mountain elk migrate from one area to another according to season and weather conditions. These two subspecies occupy mountain forests and meadows, valleys, foothills, bottomland woodlands, and open plains throughout the year. Adequate winter habitat in the form of lowland woodland cover is crucial for elk survival. Loss of winter range to development, logging, grazing, agriculture, and other intensive land uses continues to potentially threaten elk populations in certain areas. Loss of native winter range can also create management challenges by wintering elk in developed areas and agricultural settings. Preserving and properly managing woodlands and open areas can assist landowners in supporting elk populations, as well as populations of other species that rely on similar habitat.

Food

Elk native diets consist of a wide seasonal variety of green and dried grasses, forbs, and woody plants. Grasses such as native bluegrasses, rough fescue, Idaho fescue, prairie junegrass, needlegrasses and bluebunch, and slender and thickspike wheatgrasses are the primary foods in the spring and summer along with sedges and early forbs. As summer progresses, more forbs and woody browse, such as shrub twigs and branches are consumed. Dry grasses and browse are consumed heavily in autumn. Elk prefer grass, but regularly feed on serviceberry, willow, buds of red osier dogwood, antelope bitterbrush, snowberry, mountain mahogany, winterfat, aspen shoots, western juniper, sagebrush, and other shrub and browse species during winter months. Elk are opportunistic feeders, and will eat any of the plant species listed below when available. However, elk seek to consume a mixture of grasses, forbs and shrubs in winter to ensure proper intake of nitrogen.

Important elk food items. The following food items comprise a skeleton list of common foods consumed by elk. This list is not exclusive; other foods are consumed when available. Items listed in bold print are of particular value for their usefulness as winter foods.

Grasses, sedges and forbs:

native bluegrasses wheatgrasses fescues prairie junegrass beargrass needlegrasses American bistort
buckwheat elk sedge dandelion daisies lupine elk thistle fireweed cow parsnip scarlet falsemeadow
penstemmon golden currant chokecherry clovers vetch

Woody vegetation and shrubs:

huckleberry **serviceberry** **willow** **antelope bitterbrush** **snowberry** **mountain mahogany** **winterfat**
aspen **western juniper** **sagebrush** **red osier dogwood**

Where appropriate, native grasses, shrubs, sedges and forbs listed above may be planted or encouraged to enhance vegetation that already exists in and around open field areas and woodland cover. Adding native species will typically enhance food availability for elk.

Summer range

Elk in the northwest and other regions of the country that experience high snowfall and severe winter conditions typically migrate to higher elevations in summer once adverse winter conditions subside. Protection from human disturbance is a major factor luring elk to summer ranges. A general lack of disturbance provided in the high country woodlands and pastures of national forests, wilderness areas, and national parks makes these lands common elk summer ranges. New grasses and forbs and woodland cover provide the necessary summer food and cover requirements for elk. In states where weather conditions do not prompt migration, elk summer and winter ranges may differ little from one another provided that necessary food and cover requirements are present. A key element of summer range is suitable areas for calving that are free of disturbance, particularly during May and June when calves are most vulnerable.

Winter range

In regions in which cold weather and snow prompt migration, elk winter in lower-elevation wooded areas that provide hiding and security cover. Densely wooded lowlands and north/northeast-facing slopes provide valuable hiding cover, and drier, open south/southwest-facing slopes can provide available forage. Because of their large body size and thick coat insulating them from the cold, elk can be found bedding down on open slopes in winter as well. Located together with open woodlands that receive ample sunlight, these habitats create an ideal complex of cover and foraging opportunities that provide elk with suitable winter range. Since human disturbance causes elk to expend more energy, lack of disturbance is also an important factor for good winter habitat.

Transitional range

Transitional range is used by elk (up through late December) when migrating between summer and winter ranges. Transitional range is commonly made up of habitats such as Douglas fir, aspen/pine, and other woodland communities intermixed with open pasture. These transitional range habitats provide forage needed by elk to build fat reserves in the fall and to support calving in the spring. Since winter range forage quality is typically poor, transitional range can be extremely important in sustaining elk populations.



Security Cover

Forest stands of varying ages, briar thickets, and dense brush and expansive shrub communities provide elk with security cover. Security cover provides protection from predators and enables individuals to safely rest periodically throughout the day. Elk may depend the most on security cover during calf-rearing and hunting seasons. Fallen logs and other woody material on the forest floor is important for providing what is frequently the only cover available for newborn calves. Elk are not particular about the types of vegetation that provide security, as long as it conceals the animals. Security cover is considered adequate when 90 percent of a standing elk is hidden by vegetation at a distance of 75 yards or less. Expanses of security cover need to be large enough to hide a number of elk at one time. Blocks of woody cover that are at least 800 feet wide can provide adequate hiding cover for elk. Lack of roads and human trails are also key elements of effective security cover.

Water

Elk consume water from open sources such as springs, lakes, wetland ponds, rivers, and streams. Vegetation and snow also provide elk with water during summer and winter, respectively.



Interspersion of Habitat Components

Ideal interspersion of elk habitat consists of early, mid-, and late successional forested land within close proximity (400 yards) to isolated open areas free from human disturbance. Because elk can form herds requiring sizable tracts of land, providing ideal interspersion of elk habitat components may be difficult for a single landowner. Therefore, cooperatively maintaining and improving components of elk habitat with neighboring landowners may be the most effective strategy for private landowners and managers for

managing elk range. Where feasible, however, landowners should maintain at least 40 percent of their property as security cover.

Minimum Habitat Area

The acreage an elk herd requires to maintain healthy condition varies depending on the region, habitat quality, and distribution of food and cover resources. The home ranges (the area used by individuals throughout the year) of Rocky Mountain and Roosevelt elk differ, as Roosevelt elk generally inhabit regions with a more temperate climate. Home ranges for Rocky Mountain elk vary from 2,500 to 10,000 acres. Roosevelt elk spend most of their lives on 1,500 to 4,000 acres. Variation in home range takes into account herd size, the different summer and winter ranges required by and migration patterns of Rocky Mountain elk, and the climate and topography of the region a herd inhabits. For example, a small elk herd in Oklahoma may require considerably less acreage and have a much smaller home range than a larger herd in Montana. Therefore, parcels of land smaller than the listed home ranges can potentially support elk if properly managed and surrounding land uses permit.

Elk Habitat Requirements Summary Table.

Habitat component	Habitat requirements
General	<ul style="list-style-type: none"> • Woodlands, large open areas.
Food	<ul style="list-style-type: none"> • Grasses, sedges and forbs: native bluegrasses, wheatgrasses, fescues, prairie junegrass, needlegrasses, American bistort, buckwheat, elk sedge, dandelion, daisies, lupine • Woody vegetation and shrubs: serviceberry, willow, antelope bitterbrush, mountain mahogany, winterfat, aspen shoots, conifers, sagebrush
Summer range	<ul style="list-style-type: none"> • High country woodlands and meadows
Winter range	<ul style="list-style-type: none"> • Dense, low-elevation woodlands; north/northeast- and south/southwest-facing slopes
Transitional range	<ul style="list-style-type: none"> • Douglas fir, aspen/pine, and other woodland communities intermixed with open pasture
Security cover	<ul style="list-style-type: none"> • Forest stands of varying ages, briar thickets, downed woody material, dense brush and expansive shrub communities
Water	<ul style="list-style-type: none"> • Springs, lakes, wetland ponds, rivers, streams, vegetation and snow.
Interspersion	<ul style="list-style-type: none"> • Early, mid- and late successional forested land within close proximity (400 yards) to isolated open areas free from human disturbance.
Minimum habitat size	<ul style="list-style-type: none"> • Home ranges for Rocky Mountain elk vary between 2,500 and 10,000 acres • Home ranges for Roosevelt elk vary between 1,500 and 4,000 acres

Elk Habitat Management—Elk are extremely large, adaptive, opportunistic animals that often respond favorably to habitat management and other land practices that improve or change the vegetative composition of an area. Individuals managing property for elk should consider neighboring land uses and residential communities to minimize risks of property damage, potential threats to human safety

(e.g., vehicle collisions), and human-elk interactions that may unintentionally weaken the animals' natural, wild instincts.

The following management techniques may improve elk habitat on private lands. More than one practice may be beneficial in an area depending on the primary land use. An area's size, management goals, vegetation, and geographic region may dictate which management practices are most appropriate. Consultation with and assistance from federal, state or local fish and wildlife and land management agencies can be very helpful in identifying appropriate management actions.

Open field management

Burning - Prescribed burning returns valuable nutrients to the soil and maintains grasslands and open woodlands as open habitat while promoting new growth of grasses, forbs and shrubs preferred by elk. Prescribed burning should be conducted in cooperation with state fish and wildlife agencies and with assistance from licensed burners. These agencies and individuals can help in the development of a burn plan, provide necessary tools, equipment, and supervision, and assist in obtaining all required permits. Prescribed burns should be conducted on a 4- to 5-year rotational basis in late winter or early spring (February to May) depending on the region. When practical, dividing the burn area into strips or plots can leave undisturbed forage adjacent to burned plots. Burn planning should include an assessment of plant species' response to fire to avoid inadvertently eliminating valuable elk forage that may be intolerant of fire. Disked firebreaks should be created around burn areas to maintain control of prescribed burns.

Grazing - Managed grazing can be a powerful tool to control succession and maintain productive elk habitat in native pasture, rangelands, and other situations. Elk habitat on grazed areas can best be maintained by avoiding overgrazing while allowing some disturbance to control succession. Rotationally resting pastures and fencing livestock from elk winter range can be very beneficial when practical. Determine the best grazing rotation to use on your property with regard to livestock herd size, vegetation composition, and topography.

Plantings – Seeding pasture and open areas with native grasses, forbs, and legumes can provide elk with winter and transitional range forage. Because plantings on large elk ranges can be costly, consultation with local NRCS personnel, as well as other Federal and state wildlife and land management agencies, may be helpful in determining what kind of plantings would best suit a particular region to enhance elk habitat. When practical, any combination of plants listed below can be planted to increase elk forage in open areas.

Grasses		Forbs and legumes	
redtop	orchardgrass	fireweed	common cowparsnip
needlegrass	wildrye	Oregon oxalis	western swordfern
bluebunch wheatgrass	mountain brome	sticky geranium	alfalfa
meadow brome	elk sedge	yellow sweetclover	clovers
timothy	bluegrasses	common beargrass	daisies

Woodland Management

Burning – Controlled burning of aspen and pine stands within elk range can enhance the forage and protective value of the stands by promoting sucker shoots and new growth in the trees. Broadcast and underburn burning techniques can reduce forest litter (downed trees, branches, and other woody vegetation) that could hinder elk movement through an area. However, maintaining woody material on the ground in calving areas should be considered in management involving prescribed burning. All woodland fire management plans should be thoroughly discussed and developed with the assistance of professional forest managers and licensed burners.

Selective and even-aged timber harvest – Private lands managed for timber can maintain stands of elk cover within harvested timber tracts by conducting even-aged timber harvesting, or clearcutting, rotationally (5 to 7 years for pines and 10 to 15 years for hardwoods) on designated stands of timber throughout the property. Selective tree harvest can open forest canopies and enable growth of understory forb and grass species important to elk as forage on winter range. Mast producing trees, such as oaks and dead trees containing nesting cavities (snags), should not be selectively cut as they provide important food and cover for many other species of wildlife. Forest roads should be closed to human use wherever feasible to minimize disturbance. All timber harvest management plans should be thoroughly discussed and developed with the assistance of professional forest managers.

Limiting Factors

For planning purposes, assess the site to subjectively rate the availability and quality of elk habitat within a planning area, based on descriptions of the above habitat requirements. Habitat communities and components that are absent or rated low are likely limiting elk habitat quality. Land uses on adjacent properties may need to be considered to accurately rate the quality of a site as elk habitat.

Habitat Component	Availability/Quality			
	High	Medium	Low	Absent
Food				
Summer range (if applicable)				
Winter range (if applicable)				
Security cover				
Water				
Interspersion of habitat components				
Minimum habitat size				

Management Prescriptions

Management treatments should address the habitat components that are determined to be limiting elk habitat potential. For planning purposes, select among the possible action items listed below to raise the quality or availability of each habitat component determined to be limiting. Programs that may provide financial or technical assistance to carry out specific management practices are listed where applicable.

Habitat component	Management options for increasing habitat quality or availability	Assistance programs
Food	<ul style="list-style-type: none"> Maintain pasture and open field areas by conducting rotational prescribed burning or rotational or deferred grazing where appropriate. 	WHIP, EQIP, PFW, CRP
	<ul style="list-style-type: none"> Preserve and plant, when practical, native bluegrasses, wheatgrasses, prairie Junegrass, needlegrasses, American bistort, buckwheat, elk sedge, daisies, lupine, serviceberry, willow, antelope bitterbrush, mountain mahogany, winterfat, and aspen. 	WHIP, EQIP, PFW, CRP
	<ul style="list-style-type: none"> Eliminate or significantly reduce human disturbance in open pasture and adjoining woodlot habitats. 	
Winter range	<ul style="list-style-type: none"> Preserve and maintain wooded lowlands. Conduct selective tree harvesting, rotational even-aged silviculture, and rotational broadcast and/or underburn woodland burning techniques to maintain winter range in varying ages of growth. 	WHIP, EQIP, PFW
	<ul style="list-style-type: none"> Eliminate or significantly reduce human disturbance in wooded lowlands and adjoining open pasture. 	
Transitional range	<ul style="list-style-type: none"> Conduct fall prescribed burns in aspen stands to promote growth of aspen shoots. 	WHIP, EQIP, PFW
Security cover	<ul style="list-style-type: none"> Preserve and maintain forest stands of varying ages, briar thickets, dense brush and expansive shrub communities. 	
	<ul style="list-style-type: none"> Close calving areas to human activity from May 15 to July 1, and preserve logs and other woody material on forest floor in calving areas to provide cover for newborn calves. 	
	<ul style="list-style-type: none"> Conduct selective tree harvesting, rotational even-aged silviculture, and rotational broadcast and/or underburn woodland burning techniques. 	WHIP, EQIP, PFW
Interspersion & minimum habitat size	<ul style="list-style-type: none"> Combine above prescriptions to increase interspersion of habitat components and amount of suitable elk habitat. 	

Available Assistance

Landowners interested in making their individual efforts more valuable to the community can work with the Wildlife Habitat Council and NRCS to involve school, scout, and community groups and their families, as well as state and Federal fish and wildlife agency personnel, in habitat projects when possible. Onsite education programs demonstrating the necessity of elk habitat management can greatly increase the value of an individual management project. Corporate landowners should encourage interested employees to become involved. Involving Federal, state, and non-profit conservation agencies and organizations in the planning and operation of an elk management plan can greatly improve the project's success. Assistance programs available through various sources are listed below.

Programs that provide technical and financial assistance to develop fish and wildlife habitat on private lands.

Program	Land Eligibility	Type of Assistance	Contact
Conservation Reserve Program (CRP)	Highly erodible land, wetland, and certain other lands with cropping history. Stream-side areas in pasture land	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10 to 15-year contracts. Additional financial incentives are available for some practices	NRCS or FSA State or County Office
Environmental Quality Incentives Program (EQIP)	Cropland, range, grazing land & other agricultural land in need of treatment	Up to 75% cost-share for conservation practices in accordance with 5 to 10-year contracts. Incentive payments for certain management practices	NRCS State or County Office
Partners for Fish and Wildlife Program (PFW)	Most degraded fish and/or wildlife habitat	Up to 100% financial and technical assistance to restore wildlife habitat under minimum 10-year cooperative agreements	Local office of the U.S. Fish and Wildlife Service
Waterways for Wildlife	Private land	Technical and program development assistance to coalesce habitat efforts of corporations and private landowners to meet common watershed level goals	Wildlife Habitat Council (301-588-8994)
Wildlife at Work	Corporate land	Technical assistance on developing habitat projects into a program that will allow companies to involve employees and the community	Wildlife Habitat Council (301-588-8994)
Wildlife Habitat Incentives Program (WHIP)	High-priority fish and wildlife habitats	Up to 75% cost-share for conservation practices under 5 to 10-year contracts	NRCS State or County Office
State fish and wildlife agencies and private groups such as the Rocky Mountain Elk Foundation may have assistance programs, available literature, or other useful tools in your state.			State or local contacts

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NRCS

Wildlife Habitat Management Institute

100 Webster Circle, Suite 3
Madison, MS 39110
(601) 607-3131

In cooperation with partners, the mission of the Wildlife Habitat Management Institute is to develop and disseminate scientifically based technical materials that will assist NRCS field staffs and others to promote conservation stewardship of fish and wildlife and deliver sound habitat management principles and practices to America's land users.



www.nrcs.usda.gov

www.whmi.iastate.edu

Wildlife

Habitat Council

1010 Wayne Avenue, Suite 920
Silver Spring, MD 20910
(301) 588-8994

The Wildlife Habitat Council's mission is to increase the amount of quality wildlife habitat on corporate, private, and public land. WHC engages corporations, public agencies, and private, non-profit organizations on a voluntary basis as one team for the recovery, development, and preservation of wildlife habitat worldwide.



www.wildlifehc.org

This document was prepared in consultation with:



Rocky Mountain Elk Foundation

P.O. Box 8249

Missoula, MT 59807-8249

1-800-CALL-ELK

<http://www.elkfoundation.org>

"Ensuring the future of elk, other wildlife and their habitat."

We received helpful comments on the draft leaflet from Kevin Lackey and Tom Tomin, Rocky Mountain Elk Foundation, Missoula, MT, and Dr. William Alldredge, Colorado State University, Fort Collins, CO.

All photos provided courtesy of the Rocky Mountain Elk Foundation.

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