

Rangelands Animals

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MAJOR TYPES OF ANIMALS ON RANGELANDS

Rangelands provide habitat for countless mammals, birds, amphibians, fishes, and insects. A great majority (84%) of mammals found in North America spend at least a portion of their life in rangeland ecosystems. Large grazing animals such as bison, elk, pronghorn, and deer are perhaps the most iconic rangeland animals. Grazing livestock species including cattle, sheep, goats, and horses also inhabit rangeland landscapes. These hooved animals are called **ungulates**. Other mammals commonly found on rangelands include rodents and rabbits.

Rangelands are also characterized by a variety of birds. Large game birds such as grouse, quail, pheasants, and turkeys call rangelands home. Migratory song birds including meadowlarks, buntings, sparrows, and doves fill the grasslands, shrublands, and woodlands with color and song. Raptors including hawks and falcons can be often found in the rangeland skies. Some birds are so attached to rangelands that vegetation types are in their name like prairie falcon, meadow lark, sage thrasher, and scrub jay.

Insects are most prolific inhabitants of rangelands that are as diverse as the grasses, forbs, and shrubs on which they live. Insects play many ecological roles on rangelands, which can be either beneficial or detrimental. Periodically, large outbreaks of certain insects occur, namely grasshoppers or Mormon crickets, and can cause great devastation to rangeland ecosystems by eating rangeland plants and adjacent croplands. Insect herbivory competes directly with wildlife and livestock foraging, but

because of their small size and inconspicuous nature, they are often overlooked in both stocking rate estimates and forage assessments. Insects are not only powerful herbivores that forage on native plants; they also can be introduced into areas to control undesirable plants such as noxious weeds, a process known as **biocontrol**. They also play a vital role in decomposing dead plant material in the soil and improving soil aeration. Insects are also the indispensable pollinators of plants that sustain genetic diversity among rangeland plants.

Diet Selection: Plants, Animals or Both

Animals that live on rangeland can be categorized based on their foraging patterns. For example, classification is first based on whether the animals eat plants, other animals, or both:

Herbivores are animals that eat plants.

Grazers – are animals, like cattle, elk and bison that eat mostly grasses.

Browsers – include deer and goats that eat mostly shrubs. The leaves and small stems of woody plants are called “browse” so these animals are called browsers.

Intermediate Feeders – eat a mix of grasses, forbs and shrubs depending on which is most nutritious at the time. Sheep and pronghorn antelope are basically opportunistic feeders that each eat grasses and forbs in the spring and summer and then switch to shrubs in the winter.

Carnivores eat other animals including insects, birds, reptiles, or mammals.

Omnivores are animals, including most humans, who eat a combination of animals and plants.

Digestion Strategies of Herbivores

Herbivores can be further classified based on how they digest the grasses and forbs that dominate rangelands. These plants are composed mostly of fiber or cellulose, which is a type of carbohydrate that cannot be digested by the enzymes of the grazing animal’s stomach. However, many herbivores have a specialized fermentation organ and a symbiotic relationship with bacteria, protozoa, and fungi that can break down cellulose into compounds that can be used by the grazing animal.

Ruminants include animals such as cows, sheep, goats, deer, elk, and moose. These animals have specialized digestive systems that include a **rumen** to ferment the cellulose abundant in the cell walls of rangeland plants.

Hind-gut fermenters include rodents, rabbits, and horses. These animals have an enlarged cecum, which houses fermentation of forage particles to release energy from the cellulose. The cecum is located past the true stomach (i.e., behind the gut) – therefore these animals are called “hind-gut fermenters.”

Concentrate-selectors are animals that do not have a way to digest fiber and must avoid cellulose by foraging carefully and selecting berries, seeds, or roots low in cellulose. These animals include birds and bears that find an adequate diet on rangeland by carefully selecting plant parts low in cellulose.

Wild, Domestic, and Feral Animals

Humans have developed varying levels of relationships with animals over the centuries. Our influence over animals can vary from strong and close to weak and distant.

Wild animals or **wildlife** are animals whose behavior, physiological, and genetics are largely not influenced by humans. There is a huge variety of wildlife species that inhabit rangelands including elk, deer, rabbits, insects, reptiles, and birds.

Domestic animals are those that have been strongly influenced by their relationship with humans. The behavior and breeding of these animals has been modified by humans creating new species from their wild ancestors. Domestic animals include cattle, sheep, goats, horses, pigs, geese, chickens, dogs, cats, and honey bees.

Feral animals are those which were once domesticated but have severed their ties with humans and gone back to a “wild” lifestyle. Wild horses and burros are good examples of feral animals on rangeland.



HABITAT NEEDS OF RANGELAND ANIMALS

Food, water, cover, and space are the four basic habitat essentials required by all wildlife and livestock to survive, thrive, and reproduce. The specific combination of food, water, cover, and space required by a given species (called its “niche”) is unique to every species that lives on rangelands. Because of these specific requirements, any time the habitat is altered, it is improved for some species but made worse for others. Additionally, because each species’ niche is different, it is impossible to maximize the habitat quality of all wildlife at the same time. Therefore, trade-offs must be considered when managing habitat quality for wildlife and livestock.

Certain wildlife species depend solely on rangeland habitats, such as **sagebrush obligates**. These animals cannot exist without the habitat elements found only in sagebrush steppe communities. The Sage Grouse, Brewer’s Sparrow, and Pygmy Rabbit are examples of sagebrush obligate species.

A habitat is basically the “home” of a species. This natural home of an animal includes all biotic, climatic, topographic, and edaphic (soil) factors that affect life. Rangeland habitats must provide animals four basic elements:

Food requirements for rangeland animals include energy, nutrients, and minerals. **Energy** sources in plants can come from starches, sugars, fats, and cellulose. **Nutrients** come mostly from protein and vitamins. **Mineral** requirements focus on phosphorus and potassium. When determining the

food available to rangeland animals, rangelands must be evaluated on the basis of food requirements (the types of vegetation present and the diet preferences of animals) and the special arrangement of available food.

Different types of animals require different amounts of food each day. As a general rule, ruminants such as bison, deer, cattle, and sheep will eat about 2.5% of their body weight per day (in dry weight of forage); hind-gut fermenters such as horses and rabbits will eat about 3.5% of their body weight each day; and concentrate selectors such as birds, bears, and mice will eat about 0.25% of their body weight daily.

Water requirements vary depending on the animal species and weather conditions. In general, sheep and goats require 1-1 ½ gallons of water once every two days; donkeys require 3-4 gallons of water every day; horses require 5-8 gallons of water once or twice a day; and cattle and bison require 8-10 gallons of water every one to two days. Rangeland animals meet their water requirement by drinking fresh water and obtaining water from forage. Plants can contain significant amounts of water. For example, immature grasses may be up to 75% water by weight -- if an animal eats 28 pounds of immature forage, it will consume about 2.5 gallons of water.

Cover is required for shelter from weather conditions and from predators. **Thermal protection** is provided by plants when it offers animals shade in the summer and shelter from cold in the winter. Thermal cover for most rangeland animals is provided mostly by trees and shrubs. Plants can also offer **hiding cover** for animals to protect them from predators. Many animals use large plants to hide under or to gain protection through “visual obstruction.” However, other animals, like pronghorn antelope and prairie dogs, gain protection from predators by a lack of visual obstruction. These animals prefer to be out in the open where they can see predators coming and escape by running away.

Space is an important consideration for breeding and nesting, home range, social intolerance, and disease transmission. An animal’s home range is the area in which an individual animal conducts its normal daily and yearly activities. This area can be shared with other animals. The home range of an animal is directly related to its body weight; the larger the animals the larger its home range. Home ranges also vary by foraging habits; carnivores have very large home ranges; home ranges of herbivores are comparatively smaller.

Limiting Habitat Factors

Location and size of home ranges and habitats are set by limiting factors such as water, food, climate, and topography. These limiting factors are basic requirements that limit the size, growth, and/or vigor of an animal population. Rangeland habitats can be influenced by human activities that either add or remove limiting factors. For example, when ranchers add water tanks to pastures they may remove a habitat limiting factor (i.e., access to water) for wild and domestic animals. On the other hand, building roads and housing subdivisions may create factors that limit access to food and cover. However, habitat modification does not always affect a wildlife species’ ability to survive, thrive, and reproduce.

One can envision habitat as resources that are held in a wooden barrel. The limiting factor is determined by the height of the lowest plank in the barrel. In this example, food is limiting the animal’s ability to survive, thrive, and reproduce. If improvements to water, cover, or space occur, the species’ population will not be affected. Similarly, degradation



to water, cover, or space will not affect the population unless the degradations are so severe that one of these habitat essentials replaces food as the limiting factor. Habitat changes only affect a population when the species' limiting factor is enhanced or degraded. Therefore, if food is degraded, the species will be negatively impacted and if improvements to food occur, the species will benefit.

Stocking Rates and Carrying Capacity

The number of animals a piece of land can support on a long-term basis without causing damage to the range resource is the **carrying capacity** (or grazing capacity) of the land. **Stocking rate**, on the other hand is the number of animals a land manager places or maintains on a piece of land over a specified period of time. Thus, carrying capacity is set by Mother Nature, through soil and climate characteristics, while stocking rate is set by humans, through livestock or wildlife management.

The currency of stocking rates is the **animal unit** (AU). An AU is 1,000 pounds of grazing animal. In other words, a 1,000 pound cow equals 1 AU, a 1,200 pound bison is 1.2 AUs, and a 150 pound mule deer equals 0.15 of an AU. Stocking rate is often stated as the number of AUs/acre/year or acres/AU/year. For example, if the stocking rate of a pasture is 4 acres per AU per year (i.e., 4 ac/AUY) then it requires 4 acres to provide enough forage for 1 AU, such as a 1,000 pound cow, for a year.

An **animal unit month** (AUM) is the amount of forage an AU can eat in a month. Recall that a ruminant animal eats about 2.5% of its body weight each day. Therefore an AUM equals 750 pounds of forage (1,000 pounds of animal \times 2.5% \times 30 days = 750 pounds). The terms AU and AUM are widely used in rangeland management, but there is not universal agreement on the quantities each term expresses. Usually, 1,000 pounds of grazing animal equals an AU and an AUM is generally about 750 pounds.

More information on animal units and how to set a stocking rate is included as a student reading in the teacher resource guide. The article is called "**Forage Production and Carrying Capacity: Guidelines for Setting a Proper Stocking Rate.**"

RANGELAND ANIMAL INTERACTIONS

Rangelands are very diverse habitats with a great variety of plants and geographic features. Livestock and wildlife often occupy the same area of rangeland. Interactions among livestock and wildlife on rangelands can be harmful, beneficial, or benign (no effect on either).

Types of Interactions

Any of the following relationships can exist depending on the animal and its habitat requirements:

- **Mutualism** (or Protocooperation): a relationship between two animals in which both benefit from the association. *For example -- Cattle Egrets (a type of bird) often perch on the backs of cattle or bison and eat insects and grubs. The insects benefit the birds as a food source. The cows and bison get the benefit of getting rid of the bothersome pests.*
- **Commensalism**: a relationship between two individuals in which one derives some benefit while the other is unaffected. *For example -- Dung beetles eat the feces of ruminant animals like cows or elk. The dung is a food source for the beetles (a benefit), but they have no effect on the ruminant animals.*

- **Antagonism:** one species benefits at the expense of another (i.e., predation/parasitism). *For example -- When a coyote eats a rabbit or lamb it gets a benefit as a food source, but the rabbit or lamb is harmed.*
- **Amensalism:** a relationship between two animals in which one is adversely affected and the other is unaffected by the association. *For example -- Bison can carry brucellosis (a bacterial disease) with no apparent symptoms. When bison interact with domestic cattle they can infect the cattle with brucellosis which can cause spontaneous abortion. The cattle are therefore harmed and bison are unaffected.*
- **Competition:** if two animals use the same resource (such as food or water) and if that resource is in limited supply this may cause harm to both animals because neither will have enough to meet their requirement. *For example -- When elk and cattle eat the same forage and it becomes limited both the elk and cattle may be harmed – they may not have enough to eat and may become thin. Competition only occurs when the common resource is used by both animals. Animals are “competing” for a resource only if there is not enough for both of them to meet their requirements.*
- **Neutralism:** a relationship between two species that interact or share the same habitat but do not affect each other. *For example -- Meadow larks or bluebirds are largely unaffected by cattle or elk. And cattle and elk have no real affect on meadow larks or bluebirds.*

Livestock and Wildlife Interactions

Ranch management and subsequent grazing management strategies can negatively or positively impact wildlife that utilizes similar landscapes as livestock. Livestock can be an important management tool for improving wildlife habitat. In other words, livestock grazing can be used to purposely manipulate forage to improve wildlife habitat for a chosen wildlife species. Livestock managers can alter the timing, frequency, intensity, and type livestock grazing to achieve wildlife habitat management goals. For example, spring grazing by cattle on the mountain benches near Boise encourages the growth of shrubs that are important winter forages for deer and elk. This process is referred to as prescribed or **targeted livestock grazing**, and is the strategic use of livestock grazing to achieve specific landscape goals.

In other situations, livestock grazing can damage habitat value if it is not carefully applied and purposefully planned with wildlife habitat in mind. Potentially negative impacts of livestock and wildlife interaction include parasite/disease transmission, reduction of cover, or changes of the types of plants available as forage. Several aspects of ranching such as fences and roads can also be detrimental to wildlife species.

Good land stewardship and conscientious grazing management strategies that account for wildlife can be used to limit negative interactions and enhance habitat quality and promote complementary relationships between wildlife and livestock on rangelands.

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