Chapter 1: Rangelands Resources & Uses

What are Rangelands?

Rangelands cover more than half of the earth's land surface, yet most people don't know what the term "rangelands" means. It is easiest to define rangelands by considering what parts of the earth are and are not included in this term.

Rangelands ***are***:

- Grasslands
- Shrublands
- Woodlands
- Deserts

Rangelands ***are not***:

- Farmland
- Entirely Barren
- Forests
- Covered by rocks, concrete, or ice

Rangelands are usually characterized by limited precipitation, often sparse vegetation, sharp climatic extremes, highly variable soils, and diverse topography. From the wide-open spaces of western North America to the vast plains of Africa, rangelands are found all over the world, comprising a bit more than half of the earth's land surface. Because rangeland landscapes are diverse and complex, they are called by various names around the world, including prairies, plains, swards, steppes, grasslands, pampas, tundra, shrublands, scrublands, woodlands, savannas, deserts, semi-deserts, and arid lands.

Grasslands are ecosystems that are dominated by grasses. Globally, grasslands go by many names, including prairies, steppes, pampas, swards, meadows and velds. In North America, grassland biomes include the tallgrass prairie, shortgrass prairie, alpine meadows, California annual grasslands, Palouse prairie, southern mixed prairie, marshes, wet meadows, tundra grasslands, and desert grasslands.

Shrublands are dominated by shrubs, with an understory of grasses and herbaceous plants. Shrublands across the world are called chaparrals, cerrados, shrub-steppe, maquis, and scrublands. In North America, shrubland biomes include chaparrals, sagebrush-steppes, salt-desert shrublands, tundra shrublands, and mountain browse.

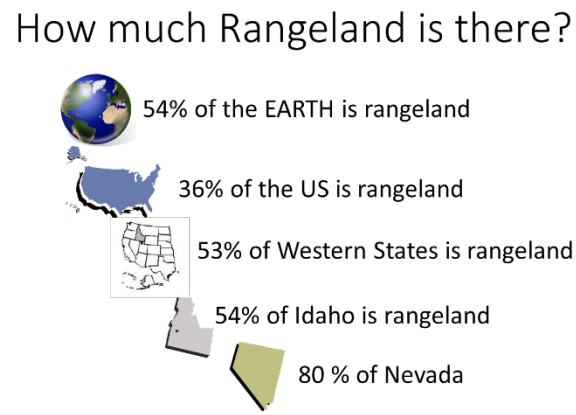
Woodlands and **Savannas** are dominated by widely-spaced trees including junipers, oaks, mesquite and pines with an understory of grasses and forbs. Woodland ecosystems across the world take the names of the trees that dominate the landscape. In North America, the largest woodland biome is the pinyon-juniper woodland. Other woodland and savanna ecosystems include oak woodlands, aspen savannas, and mesquite woodlands.

Deserts are the driest rangelands and experience extreme water shortages and unpredictable precipitation. These ecosystems are dominated by shrubs and succulent cactus plants. Deserts and arid lands in the world cover massive areas and include the Sahara, Namib, Arabian, Atacama, Australian Outback, and Kalahari deserts. The hot desert biomes in North America are found in the southwest and include the Mojave, Sonoran, and Chihuahuan deserts.

How Much Rangeland Is There?

About 71% of the earth's surface is water. The terrestrial land surface on earth includes 23% dense forest, 10% is cropland, and 10% is ice, rock, and/or barren desert. The footprint of humans in the form of roads, houses, towns, and cities is about 3%. That leaves an amazing 54% of the Earth's land surface occupied by rangelands in various forms including: 35% deserts and xeric shrublands, 26% tropical and subtropical grasslands, savannas and shrublands, 15% tundra, 13% temperate grasslands, 6% montane grasslands and shrublands,4% Mediterranean forests, woodlands and scrub, and 1% flooded grasslands (International Livestock Research Institute, 2021).

The geographic and climate systems of rangelands are very diverse, creating many unique plant communities and associations. In the U.S., 36% of the land area (nearly 1 billion acres) is rangeland. A total of 53% of the 19 states west of the Mississippi are rangeland. Nevada is the state most dominated by rangelands which cover about 80% of its area. In Idaho, nearly 26 million acres or 54% of the land area is classified as rangeland.



Uses and Values of Rangelands

Rangelands provide natural beauty, a diversity of wildlife, recreational, and economic values, including ranching, mining, and electrical power generation. Historically, the primary use of rangeland has been forage for livestock and wildlife. However, the importance of rangeland for recreation, renewable energy production and water resources is growing. The soils, vegetation, and water of rangelands are important to the ecological and economic health of all regions they dominate. Therefore, most rangelands are managed under principles of multiple use, which means that several uses or values of rangeland are managed simultaneously, with care taken to avoid overuse or destruction of natural resources.

Rangelands provide important grazing habitat for **domestic livestock**, including cattle, sheep, goats, horses, lamas, and reindeer. Most of the world's livestock live on rangelands and serve as a highly significant and necessary source of food and livelihood for people all over the globe. Ranching is an important endeavor that uses livestock to convert the nutritious and renewable grasses and other plants on rangelands into food, fiber, and other animal-based products for humans. Domestic livestock have

been grazing on North American rangelands since the mid-1800s, and they still exist today in familiar scenes over range landscapes. Livestock production on rangeland is a vital element in the modern food supply chain, producing meat for American and world populations. Rangelands are the primary source of our meat supply and economically vital to ranching in the western states.

- Most calves and lambs fattened in feedlots are born and raised on range and pastureland.
- Nationwide, range and pasture provide 83% of nutrients consumed by beef cattle, 91% of nutrients for sheep and goats, and 72% of nutrients for horses and mules.
- Rangeland and pastureland in the 19 western states are home to 58% of all U.S. beef cattle.
- Western rangelands harbor 79% of sheep and 88% of goats in the U.S.

A huge variety of **wildlife** thrives on rangeland habitats. Large grazing animals such as bison, elk, pronghorn, and deer are perhaps the most iconic rangeland animals. But smaller critters such as prairie dogs, meadowlarks, sage-grouse, grasshoppers, and brush wolves (a.k.a., coyotes) are inherently tied to rangelands and were named for the habitats they call home. More than 3,000 species of mammals, birds, amphibians, reptiles, fishes, and insects make their home in these complex ecosystems. Plants, water, and soils on rangelands provide unique environments for wild animals and plants, including threatened and endangered species.

Much of the **water** important to agriculture and human use started as rain or snow that fell on rangelands or forests. Though rangelands might appear to be dry, unyielding landscapes they are important for the streams, rivers, lakes, and aquifers that they contain. Because rangelands are located mostly in arid climates with relatively low precipitation, water is doubly precious. The many miles of streams, lakes, and reservoirs scattered throughout rangelands become a water source for irrigation and urban areas. As human populations grow, and water consumption and use increases, the high-quality water produced by healthy rangeland ecosystems is becoming increasingly important.

Riparian areas are the lush ecosystem that consists of vegetation along bodies of water. Riparian areas surround lakes, ponds, wetlands, rivers, creeks, and streams. These areas provide nutritious vegetation for wildlife and livestock, and important habitat for fish and other aquatic species. Without proper management, these areas can be damaged by uncontrolled livestock and wildlife grazing.

Rangelands are increasingly important for **recreation** like hiking, hunting, horseback riding, bird-watching, camping, mountain biking, cross-country skiing, off-roading, and snowmobiling. Rangelands provide varied topography, scenic landscapes, and vast openness for recreation and tourism. In fact, many national parks are on rangelands including Grand Canyon, Arches, Badlands, much of Yellowstone, and Craters of the Moon National Parks. From mountains to plains, from lakes and rivers to deserts, rangeland areas are excellent places to have fun and enjoy life in these wild vistas and open spaces.

Rangelands are also places to produce **renewable energy**. The windy treeless landscapes of rangelands are well suited for wind turbines. According to the US Energy Information Agency, wind energy generation in the last 25 years has increased dramatically from about 6 billion kilowatthours (kWh) in 2000 to about 425 billion kWh in 2023 (www.eia.gov). Rangelands are also good sites for solar power facilities because of their low precipitation and many sunny cloudless days. Solar power generated < 10 billion kWh in 2,000 and rose to 165 billion kWh in 2023. The dry windy plains that are rangelands were once considered wastelands and now are highly valued to power the needs of people well into the future.

Below the rangeland soils are resources for hard rock **mining**, including metals such as gold, silver, and copper plus other minerals such as phosphorus, sodium and cobalt. Mining and extraction of coal, oil, and natural gas are also important energy resources accessed from rangelands. These metals, minerals, rocks, and hydrocarbons are used in many aspects of our modern life and benefit the livelihoods of individuals and economic vitality of surrounding communities.

What is Rangeland Management?

Rangeland management is the careful use and stewardship of rangelands to meet the needs and desires of those who live on and care about these lands. Rangeland management involves managing unforested lands with natural plant communities dominated by grasses, shrubs, and forbs. This endeavor is different from agriculture because plants and animals are not managed in isolation or solely for production purposes. Management decisions about rangelands are made with ecological properties in mind, such as soil health, vegetation ecology, wildlife habitat, invasive plants, and watershed science. Range managers also need to consider a landowner's objectives, which might include livestock production, open space, recreation opportunities, or energy production.

Because manipulating these intricate ecosystems requires a mix of science-based knowledge and practical experiences, rangeland management is described as both a science and an art. Although management decisions stand on scientific principles, there is no "silver bullet", nor are there pre-determined "correct" solutions that can apply to *all* rangeland management situations. This is why rangeland management is an art: it includes becoming familiar with a wide array of land types, weather situations, plant communities, animal habitats, and having the knack for administering land management decisions based on what is known or understood about that rangeland. A successful range manager embraces learning through experience built upon a solid foundation of scientific knowledge.

History of Rangeland Use and Ownership

Before European explorers discovered the Americas, indigenous peoples lived on and managed rangelands across North America. Native Americans skillfully sustained rangelands through conscious habitat management strategies especially involving the use of fire. Though rangelands can often appear barren and inhospitable, many groups of Native Americans honed sophisticated practices to cultivate crops, gather native plants, and harvest wild animals for food and shelter to sustain culturally advanced communities. When Europeans began to explore and inhabit North America, they brought with them diseases which decimated Native American populations, and we consequentially know little about the ecological state of rangelands that Native Americans inhabited and the management practices they implemented.

Explorers Meriwether Lewis and William Clark were among the first Europeans who journeyed across western North America in 1805-1806. Lewis and Clark traveled from St. Louis to the Pacific Ocean and reported on many different grasses, forbs, and woody plants on the rangelands they traversed. They described prairie dogs, sage-grouse and other animals still common today on rangelands.

Lewis and Clark's discoveries during their journey westward sparked increased interest in these uncharted lands. The idea of making dreams come true in the boundless west seemed appealing to many easterners. As a result, the first wagon-traveled road, called the Oregon Trail, crossed the country in the 1840s. In 1862, the Homestead Act helped to motivate major settlement on rangelands, followed by additional laws to allocate land for settlement and human use. Most of these settlements surrounded rivers, creeks and streams where water was available to irrigate crops and to provide for livestock. Between 1870 and 1900, rangelands were seen primarily as land well-suited for livestock production. The wide-open spaces of western rangelands were known to provide forage and habitat for sheep and

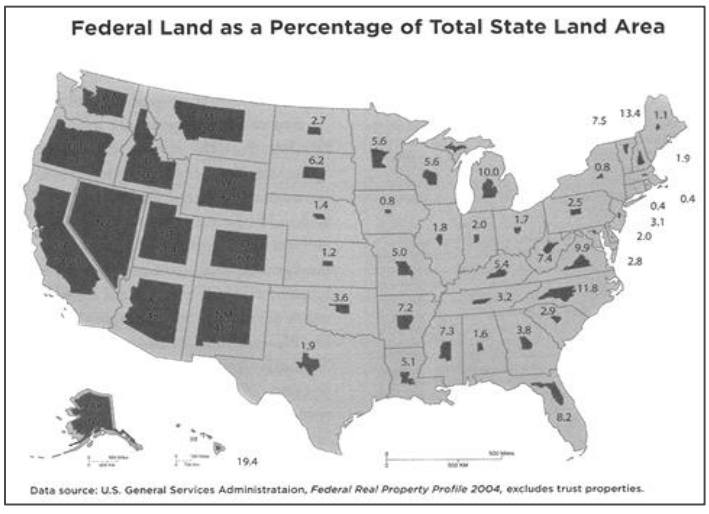
cattle. By the late 1880s, the western livestock production industry peaked. During this era, large ranches running thousands of cattle and sheep dominated the business sector of western North America.

The Forest Reserve Act of 1891 set aside about 47 million acres of National Forest to preserve forests and grazing lands. This act set the foundation for the U.S. Forest Service (USFS), created in 1905, to provide for management of rangelands and grazing practices. In 1934, the Taylor Grazing Act recognized the importance both of controlling use on public grazing lands and providing for their improvement. This led to the formation of the Grazing Service, which eventually was combined with the General Land Office to form the Bureau of Land Management (BLM) in 1946.

Since the late 1800s, livestock grazing has been the predominant economic use of public rangelands, while hunting and fishing remained the main recreational uses until the mid-1900s. The 1990s brought ever more people to western landscapes. Concern for the health fueled environmental laws in the late 1900's including the National Environmental Policy Act, Wilderness Act, and Endangered Species Act. Many changes are occurring on western rangelands in the 21st century such as increasing subdivision, recreational use, wildland fires, and sustainable energy development. These modern trends reveal new values for rangeland and can create conflicts with which ranchers, land managers, and all rangeland users will need to contend.

Who Owns and Manages Rangelands?

Land can easily be categorized by land ownership such as Federal, State and Private with public lands including both federal and state lands. But this distinction can hide the important reality that private and public lands are inextricably tied. For example, many ranchers in western states graze their herds and flocks on their private land and hold permits for grazing on state, BLM or USFS land. Thus, an individual ranch (the amount of land used to care for the livestock) often includes both private and public lands. In fact, there is often not even a fence or boundary marker between public and private lands. Thus, it is important to be aware of land ownership boundaries when recreating or working on rangelands. On private land the person or organization owning the land will have specific goals on what they want to see or produce on the land, and they will have specific resources to apply to the land's management. Public lands, on the other hand, have policies and procedures that must be followed to manage the resources for their intended use as described by their agency.



Federal lands are those owned and managed by federal agencies such as the Bureau of Land Management, U.S. Forest Service, National Park Service, National Wildlife Refuge System, Army Corp of Engineers, and U.S. Military bases. Federal lands are about one-quarter (26%) of U.S. lands. However, it is clear from this figure entitled "Federal Land as a Percentage of Total State Land Area" that almost half (49%) of the thirteen western states are federal lands.

These federal lands are owned by all U.S. citizens, and they are managed and cared for on our behalf by various federal agencies. The BLM manages the greatest area, overseeing 31.4% of all federal land (10.9% of all U.S. land). The USFS manages 24.5% of federal land (8.5% of U.S. land). The National Park Service oversees 22.2% of federal lands (7.7% of U.S. land) and National Wildlife Refuges account for 11.3% of federal land (3.9% of U.S. land).

Federal Agencies Owning and Managing Rangelands	
Agency and Website	Major Purposes
Bureau of Land Management www.blm.gov	Administers and manages land, and develops management and conservation programs.
United States Forest Service www.fs.usda.gov	Manages national forests and grasslands, and provides technical and financial assistance to state and private forestry agencies.
Natural Resources Conservation Service www.nrcs.usda.gov	Provides technical assistance to private land owners, serving through Soil Conservation Districts and the Farm Services Agency.
National Park Service www.nps.gov	Preserves national parks and reserves for resource conservation and recreation.
Fish and Wildlife Service www.fws.gov/refuges/	Manages lands and waters set aside in the National Wildlife Refuge system to conserve America's fish, wildlife and plants.

State-owned lands include state wildlife refuges, state parks, state school lands, and other land parcels owned and managed by the individual states. Lands owned by states account for 9% of all land in the U.S. These lands are managed by land care professionals in agencies such as Fish and Game agencies, State Departments of Land, and State Parks and Recreation.

Private lands are owned and managed by individuals, corporations, and Native American tribes. An individual landowner may simply be a person or family who owns a house with a yard or small pasture. Large landowners include ranchers that cover thousands of acres and are owned by a family, family corporation or business entity. All landowners manage their land for different personal or professional goals. Many rangeland owners are ranchers who garner income from grazing livestock or offering recreational opportunities, including hunting and guest ranches. Private lands are often called "**deeded land**" because an individual or corporation holds the deed to the land.

Land Ownership by State

	% Federal	% State	% Private
	------ 13 Western States----		
Alaska	60	29	11
Arizona	41	13	46
California	40	2	58
Colorado	36	4	60
Hawaii	13	1	87
Idaho	61	*5*	*34*
Montana	29	6	65
New Mexico	29	11	59
Nevada	81	0	19
Oregon	27	5	68
Utah	63	7	30
Washington	27	9	64
Wyoming	48	6	45
13 Western States Combined	**48**	**14**	**38**
	-------- 6 Plains States------		
Kansas	0	1	99
Nebraska	1	1	98
North Dakota	3	2	95
Oklahoma	1	1	98
South Dakota	7	0	93
Texas	1	1	98
6 Plains States Combined	**2**	**1**	**97**
	------ 31 Eastern States----		
31 Eastern States Combined	**5**	**6**	**89**
	------ All 50 States----		
All 50 States	**26**	**9**	**65**

Source: www.nrcm.org/documents/publiclandownership.pdf

Managing Working Landscapes

Rangeland management is a challenging endeavor because many land resources and ecological forces that affect rangelands like fire, invasive plants, wildlife, and water resources do not respect fences or property boundaries. Because western rangelands often resemble a checkerboard of interspersed land

ownerships, public and private landowners need to work together for the good of the land, water, and animals that inhabit these spaces.

Collaborative groups often come together to address landscape challenges. For example, Coordinated Weed Management Associations work together to manage invasive plants that care little about who owns the land and often cross boundary lines. Rangeland Fire Protection Associations bring together the knowledge and skill of ranchers with the strategies and communication of professional fire fighters to combat wildland fires. A specific example is a group of ranchers in Arizona who came together to form the Altar Valley Conservation Alliance which works to reduce urban expansion and keep ranching a dominant use in their valley. Collaborative groups often include diverse collections of people from community members (producers, farmers and local residents) to industry and non-governmental organizations, university researchers or educators, and state and federal government agency representatives. These cooperative and collaborative partnerships have accomplished many goals to maintain and restore the lands they care about.

The variety of rangeland resources and values leads to the challenge of managing these lands for several resources all at one time. This idea of **multiple use** is so important that it is described in the mandate for several land management agencies such as the BLM and USFS. In the US Code of federal statutes, "multiple use" is described as "*the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people…*"(43 U.S. Code § 1702 – Definitions). Managing rangeland for several uses at one time can be challenging and cause win-lose situations. However, wise management can lead to beneficial situations such as livestock grazing to manage wildlife habitat, sheep grazing under solar panels, or mining activities which support stream restoration. This is quite a change from a century ago, when most citizens considered rangelands "wasteland" and thought that meat production was the best use for rangelands.

References and Additional Information

Fazio, J.R. 1999. Lewis and Clark in Idaho—A lesson in science under stress. *Rangelands* 21:3-5. Available at: https://journals.uair.arizona.edu/index.php/rangelands/article/view/11430/10703

Heady, H.F. and R.D. Child. 1994. Rangeland Ecology and Management. Westview Press, Inc. Boulder, CO.

Holecheck, J. 2000. Range Management: Principles and Practices. 4th edition. Prentice-Hall, Inc. Upper Saddle River, NJ.

Miller, R.K. 1981. Improved Stewardship Through Innovation and Cooperation. *Rangelands* 3:126. Available at: (https://repository.arizona.edu/handle/10150/638281)

Mosley, J.C. 1985. Let's not forget the art in range management. *Rangelands* 7:154-155. Available at: (https://repository.arizona.edu/handle/10150/638601)

International Livestock Research Institute (ILRI). 2021 with technical contribution from FAO, IUCN, WWF, UNEP and ILC Rangelands Initiative. (https://www.rangelandsdata.org/atlas/)

Sayre, N. F. (2023). A History of North American Rangelands. In *Rangeland Wildlife Ecology and Conservation* (pp. 49-73). Cham: Springer International Publishing. (https://link.springer.com/chapter/10.1007/978-3-031-34037-6_3)

Thomas, H.S. 1994. History of public land grazing. *Rangelands* 16:250-255. Available at: (https://repository.arizona.edu/handle/10150/639027)

RANGELANDS - An Introduction to Wild Open Spaces

Rangeland Center
University of Idaho
Moscow, ID 83844-1135
(208) 885-6536
range@uidaho.edu
www.uidaho.edu/range

Idaho Rangeland Resource Commission
P. O. Box 126
Emmett, ID 83617
(208) 398-7002
ghyde@idahorange.org
www.idahorange.org

University of Idaho
Rangeland Center

IDAHO RANGELAND Resources Commission

The University of Idaho Rangeland Center and the Idaho Rangeland Resource Commission are mutually dedicated to fostering the understanding and sustainable stewardship of Idaho's vast rangeland landscapes by providing science-based educational resources about rangeland ecology and management.

Many people are credited with writing, editing, and developing this handbook, including Lovina Roselle, Karen Launchbaugh, Tess Jones, Ling Babcock, Richard Ambrosek, Andrea Stebleton, Tracy Brewer, Ken Sanders, Jodie Mink, Jenifer Haley, Gretchen Hyde, and Joan Jones.

Updated in 2024