Thunder Basin Research Initiative

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Welcome to Thunder Basin

Thunder Basin Ecology Factsheet #1

Notes from the field

The Sun isn't up yet: I know it, the birds know it, and my half-empty coffee cup is quickly coming to the same realization. But that's when a bird researcher has the most to learn — something my foggy brain is still coming to terms with as I load the truck.

Even if you manage a full night's sleep, the grassland doesn't always make life in the field easy. In early May, the Rochelle Hills are cloaked in chilling mist, and by July the grassland is parched and baking. Flood and drought, sun and snow, cheatgrass, prickly pear, mosquitoes, and the occasional rattlesnake can make some days feel as if they will never end.

But the grassland always rewards your efforts. In the summer heat, the reward is the resinous smell of ponderosa pine that wafts down from the hills, mixing with the pungent aroma of the sagebrush below. It might be catching the reflection of my headlights in a swift fox's eyes or a sage-grouse who seems to be struggling with the "chicken conundrum" about crossing roads. A bull elk might leap from any creek bottom, a golden eagle take flight from any bluff.

Swift fox pups

This landscape is a patchwork in every sense of the word. It's a place where grassland meets the sagebrush sea, where wildlife and livestock coexist, and where ranchers, researchers and energy executives share the goals of learning what the grassland has to teach and to work with the land so its wonders remain for generations to come.

— Courtney Duchardt

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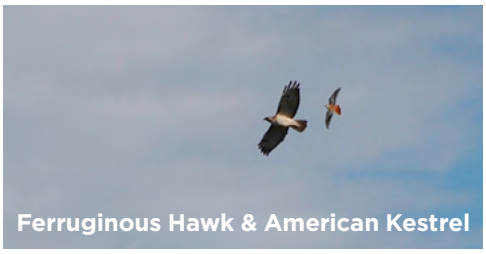
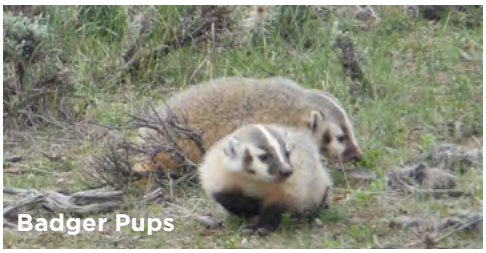
Return to UW Extension publications site


Golden Eagle


Greater Sage-grouse


Ferruginous Hawk & American Kestrel


Mixed-grass Landscape


Badger Pups


Cattle

PUBLIC LANDS (STATE AND FEDERAL) HISTORY

The Thunder Basin National Grassland is a patchwork of state, federal, and privately-owned lands located in the eastern edge of the Powder River Basin of northeastern Wyoming. The public lands (state and federal) in this region are managed mostly by the U.S. Forest Service with an intermingling of privately-owned and state lands. This ownership pattern is largely a function of the federal government purchasing the land from homesteaders throughout the Great Plains in the 1930s Dust Bowl era in the effort to halt erosion from agricultural cultivation of portions of land to comply with requirements of the Homestead and other acts. The degraded lands of former farmsteads were revegetated. By 1960, a large portion of these restored lands were designated as Forest Service National Grasslands, including the area we know as Thunder Basin.

It is not surprising that maintaining crops in this region proved difficult for farmers — at approximately 12.5 inches of rainfall per year, the climate is semi-arid, with high winds, hot summers, and cold winters. Although these rangelands are ill-suited as cropland, Thunder Basin National Grassland currently supports both ranching and energy development. The rural landscape provides inherent diversity of plants and animals.

LANDSCAPE

Thunder Basin National Grassland isn't only a grassland. The landscape is a mosaic of different habitat types characterized by patches of both mixed-grass prairie and sagebrush grassland that is different than the sagebrush steppe further to the west with areas of short-grass prairie.

The Thunder Basin National Grassland supports some of the largest black-tailed prairie dog complexes in North America, which are typified by shorter, sparser vegetation than the surrounding areas. Thus the Thunder Basin region is a complex landscape with heterogeneous ownership patterns, soils, vegetation structure, and wildlife species which all combined make resource management across these mosaics challenging.

Elevations in the Thunder Basin National Grassland range from 3,600 to 5,200 feet, and the landscape is dissected by the Rochelle and Red Hills, which support ponderosa pine and juniper plant communities. It is also bisected by creeks and rivers lined with cottonwoods and other moisture-loving vegetation. The name "Thunder Basin" is derived from the Little Thunder and Black Thunder creeks that run through the area.

A guiding principle in ecology is that areas with a lot of variety in habitat structure have more diverse animal communities. Because the Thunder Basin National Grassland contains many habitat types, wildlife diversity is also high.

WILDLIFE

More than 100 species of birds have been observed on the grasslands, including ducks, hawks, eagles, owls, grouse, and songbirds.

Pronghorn, mule deer, elk, black-tailed prairie dogs, white-tailed jackrabbits, and cottontail rabbits can be found throughout the grasslands. Small mammals include kangaroo rats, thirteen-lined ground squirrels, and even bats. Mammalian predators include swift fox, red fox, coyotes, and badgers.

Other species include short-horned lizard, prairie rattlesnake, tiger salamander, and the plains spadefoot toad.

LAND USE

While supporting a diverse array of wildlife, the Thunder Basin is also an important economic resource. Approximately 87 percent of the land is used as rangeland for cattle and sheep ranching. The five counties that make up the Thunder Basin — Campbell, Converse, Crook, Niobrara, and Weston — are home to more than 300,000 cows and calves and 100,000 ewe sheep and lambs. Of Wyoming's 23 counties, Converse County ranks number one for sheep production, and Campbell County ranks number five for cattle production. The foundation for these livestock operations is the native rangeland vegetation. (See Ecotones and the Thunder Basin National Grassland map page 4.)

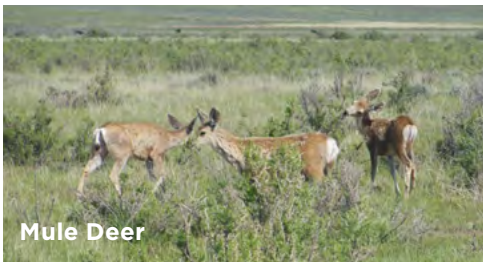
The name Thunder Basin is synonymous with coal. Rich fossil beds make the Thunder Basin an important source of oil, natural gas, and coal. In fact, North Antelope Rochelle Mine, located here, is the largest coal mine in the United States. If you ask the locals how you know you are in the Thunder Basin, they will tell you, "when you see loaded coal cars going south on the railroad and empty coal cars going north."

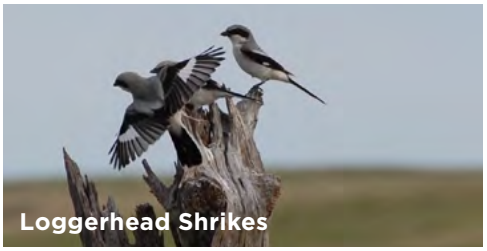
RESEARCH

Challenges in this landscape span conservation, agriculture, climate, and energy. Greater sage-grouse require sagebrush and tall vegetation, but mountain plovers require short vegetation – habitats established by different disturbance patterns. Livestock grazing must be compatible with wildlife management and increasing weather variability under predicted climate change. Finally, energy resources must be developed responsibly to sustain natural resources for wildlife and livestock. In 2014, a group of scientists, ranchers, energy companies, and consultants formed the Thunder Basin Research Initiative (TBRI) to develop a foundation of knowledge from which to address challenges in the Thunder Basin.

TBRI partners include the University of Wyoming, the United States Department of Agriculture (Agricultural Research Service - Rangeland Resources Research Unit), the United States Forest Service, the Thunder Basin Grasslands Prairie Ecosystem Association, local ranchers, and local energy companies. Together, they have begun basic and applied research to understand the complexity of Thunder Basin's resources and how to optimally manage such a special place for future generations to enjoy.


Sagebrush Grassland


Mule Deer


Loggerhead Shrikes


Research: Measuring the leg of a nesting mountain plover


White-tailed Jackrabbit

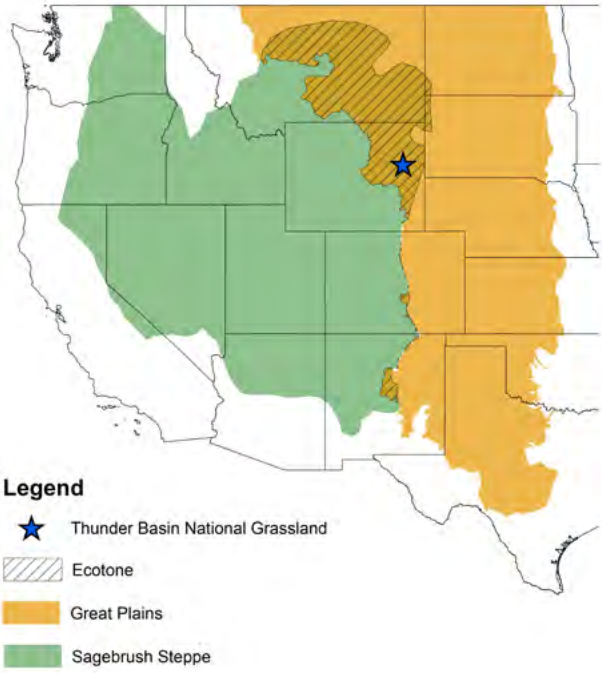

Prairie Rattlesnake


Plains Spadefoot Toad


Pronghorn

ECOTONES AND THE THUNDER BASIN NATIONAL GRASSLAND

An **ecotone** is a transitional zone between ecosystem types. Ecotones often occur along gradients of elevation, temperature, or precipitation.



Clockwise from top left: Wyoming big sagebrush seedling, silver sagebrush, scarlet globemallow, blue grama

At approximately 105 degrees west longitude, the Thunder Basin National Grassland is situated along the ecotone between the Great Plains and the sagebrush steppe. One of the gradients that influences the change between habitat types in this area is moisture; moving from east to west across the Great Plains, average rainfall decreases. Because tall and dense vegetation requires a lot of moisture, we see a transition from tallgrass prairie in the east, to mixed-grass and finally to shortgrass prairie in the drier regions to the west.

Thunder Basin also is located on a gradient of elevation and temperature; with an increase in average elevation and percentage of annual precipitation falling during the winter months (usually as snow), the mixed-grass and shortgrass prairie eventually transitions to shrubland.

In the sagebrush steppe, as in the Great Plains, these transitions shape the vegetation community. For example, the eastern edge of the sagebrush steppe is lower in elevation and receives proportionally more summer precipitation than the rest of the sagebrush steppe. Thus, silver sagebrush, which is more tolerant of wet summers than big sagebrush, is more abundant, often found in riparian zones along rivers and streams. Other sagebrush species found in this region are Wyoming big sagebrush, fringed sagewort, and birdsfoot sage.

UW EXTENSION

USDA United States Department of Agriculture
Agricultural Research Service

This is the first in a series of factsheets on the wildlife, ecology, and landscape of the Thunder Basin National Grassland in northeastern Wyoming.

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