

*A few determined ARS scientists are proving that wise management of the West's vast, sagebrush-covered rangelands can be good for livestock—and wildlife.*



Gregory Lewis, an ARS scientist who heads up research at the agency's U.S. Sheep Experiment Station near Dubois, Idaho, is standing in the shadow of the Centennial Mountains, peering into a sea of sagebrush. On this particular stretch of the

station's landscape, the leathery, silver-blue leaves of sagebrush wall him in on all sides.

Lewis, an animal reproduction specialist, is searching for breaks in the sage's tall, dense canopy. He knows that openings in these unusually thick stands create opportunities for leafy plants that can't otherwise compete with sagebrush's water-slurping efficiency.

Such vegetal variety—which includes burly sage, a rich understory of native grasses, and green forbs clinging to the desert floor—not only supports the station's roughly 3,000 adult sheep, but also provides a safe haven for scores of bird and other wildlife species.

This pleases Lewis—as it does ARS scientists in Oregon and Wyoming, who are also finding ways to ensure conservation of wildlife on America's rangelands.

### “Cock of the Plains”

Sagebrush is the dominant plant on more than 120 million acres in 14 western states. The shrub's monochromatic color, sinewy branches, and coarse leaves seem to belie the stunning menagerie of birds and wildlife that depend on its existence. From the pronghorn antelope to the pygmy rabbit to the more elusive sage vole, the sagebrush ecosystem encompasses a group of plants and wildlife that are perfectly adapted to life on the high desert.

But the greater sage grouse, probably more than any other creature, is inextricably bound to its sagebrush surroundings. The size of a small turkey, the bird relies solely on the evergreen shrub for its winter food. And its elaborate courtship ritual—which has been described as one of nature's greatest spectacles—takes place exclusively in sagebrush habitat. The grouse even captivated Meriwether Lewis and William Clark when they encountered this “cock of the plains” at Fort Clatsop in present-day Oregon.

At that time, sage grouse numbers were purported to be in the millions. Now, fewer than 150,000 birds may remain in 11 states and Canada. Researchers blame the bird's precipitous decline on a combination of culprits, including invasive weeds, increased



STEPHEN AUSMUS (K10283-18)

The roughly 3,000 mature sheep at the Dubois station help, through grazing, to create a mosaic of different densities and ages of sagebrush crown, which helps wildlife like the sage grouse thrive.

predation, poor land-use practices, altered fire frequencies, and fragmented habitat.

Lewis is hoping to turn the tide for this great bird, and he thinks that ranchers, with their grazing cattle, horses, and sheep, can play a part.

STEPHEN AUSMUS (D554-5)



Reproductive physiologist Gregory Lewis (left) and rangeland scientist Corey Moffet measure sagebrush canopy cover of the U.S. Sheep Experiment Station headquarters property using very-large-scale aerial images.





Lewis and Jacobson owe the habitat success they're seeing to a proactive approach that includes wildlife and their habitat needs. "When writing up our research plans, we also write up a sage grouse management plan," says Lewis. And they've invoked two natural forces to help bring about habitat that supports both livestock and wildlife: hooves and fire.

### Creating a Mosaic

The station's roughly 3,000 mature sheep provide the hoof and jaw power—in addition to the mule deer, pronghorn antelope, elk, and moose that move freely on its lands. "We can use grazing sheep as a way of maintaining the areas that sage grouse and other wildlife depend on," Lewis says. The sheep act as four-legged weed whackers, ready to gobble up invasive weeds that threaten sagebrush and other native flora.

Two major sagebrush types, mountain big and three-tip, grow at the station—which is important, since grouse need variety. The station's research also shows that the birds are drawn to areas where the sage canopy isn't overly dense.

STEPHEN AUSMUS (K10278-21)



### With Wildlife in Mind

"Healthy wildlife habitat and livestock don't have to be at odds with one another," says Lewis. He has historical data to help back this up. The sheep station he oversees—which comprises more than 50,000 acres in southeastern Idaho and southwestern Montana—has been tracking sage grouse populations for four decades.

The station even boasts its own in-house sage grouse expert. Quinn Jacobson, a University of Idaho employee, has been at the Dubois station 30 years and oversees sheep operations and range resources. He recalls sage grouse populations being tracked as far back as 1966, when University of Idaho biologist Donald Klebenow studied the bird. In the 1970s, USDA researchers and collaborators were radio-tagging grouse to study their nesting and migration habits.

Though nationwide sage grouse numbers have been on the decline, they appear to be climbing upwards at the ARS research station. "Our trends," Jacobson says, "have been the opposite of what we're generally seeing across the West." Proudly, he and Lewis say that sage grouse numbers at the station are at least as great as they've been in the 40 years records have been kept.

In 2002, the researchers made a rough count of about 270 male grouse on the station's lands. "This year, I counted 354 males," says Jacobson. Females are harder to spot, he says, but males tend to stand out during breeding season, because they're strutting around like peacocks and making lots of noise.

**New life is breathed into the ecosystem following prescribed burns. After vegetation is burned away, low-lying plants can establish and better access soil nutrients and moisture.**





A female sage grouse.

STEPHEN AUSMUS (D552-2)

### A Dance in the Desert

If you visit the ARS sheep station in Idaho's sagebrush country in spring, you'd better be ready for some noise. Each year, starting in early April, scores of greater sage grouse return to native breeding grounds to mate.

Just before daylight, male grouse—with puffed-up chests and ornate plumage—whistle and swish their wings to impress nearby females. Dominant males take center stage on these strutting grounds, with younger ones trying to garner attention at its edges.

According to research leader Greg Lewis, the event is a sight to see, especially since U.S. sage grouse numbers have dropped significantly over the last century.

But spend some time at the station during breeding season, and you'd never guess the grouse was in jeopardy. Researchers there have found a way to raise healthy sheep and still make opportunities for grouse and other wildlife. But don't take the scientists' word for it: Just ask the crowds of people who flock to the Dubois station every spring, hoping to see the magnificent bird strut its stuff.

“We try to create a mosaic of different densities and ages of sagebrush crown,” Lewis says. “A canopy that’s within the 10 to 25 percent range is what research has shown to be most conducive to the grouse.”

Grouse typically feed exclusively on sagebrush during the snow-steeped winters. In spring, chicks feed on green, leafy plants starting at 1 to 2 weeks of age. Nesting hens also seek a diverse diet of broad-leafed native plants and sagebrush leaves.

### Jumpstarting the Natural Cycle

Probably the most potent force for achieving optimal wildlife habitat is fire. Carefully planned burns can reset a rangeland’s biological clock, awakening plants that have been dormant for too long.

Aging, bunched-up stands of sagebrush represent an ecosystem that’s hit full maturity. The sagebrush is dominating, and understory growth, including a potential variety of native plants and wildflowers, is squeezed out. By letting a fast-moving fire roll over the sage, low-lying plants are given an opportunity to access soil nutrients and moisture and take hold. New life is breathed into the ecosystem.

Lewis says his research team tries to mimic nature’s fire cycle as much as

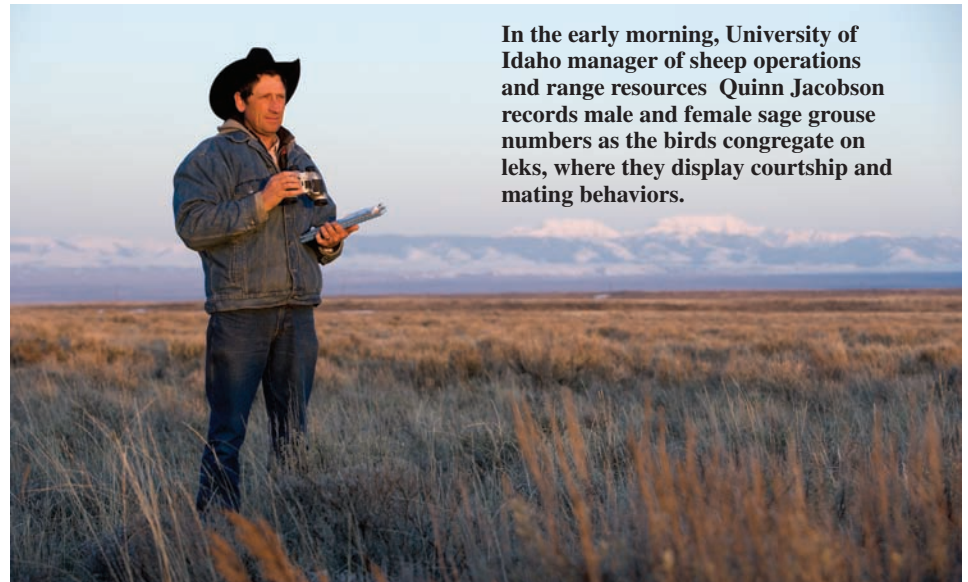
possible. “Our fire plans are based on a 20- to 25-year cycle, which is what researchers think is typical of natural fires burning through mountain big sagebrush.” And most of the fires burned at the station, including one that was prescribed last fall, scream through quickly.

In 2002, during a planned burn at the station, ARS agronomist Steven Seefeldt—formerly with the Dubois unit—discovered that soil seared by fire reached a blazing 600°C. But that incredible heat only affected the soil’s

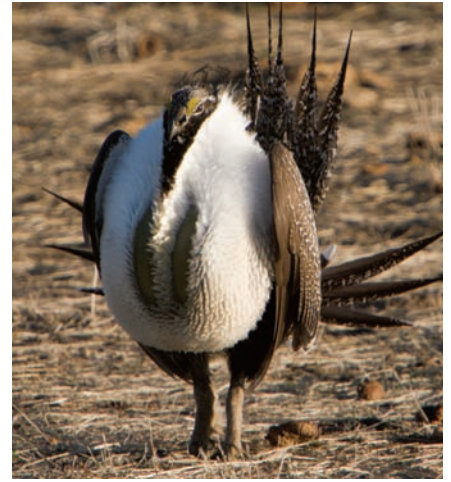
top surface; it didn’t penetrate more than 1 centimeter deep. Such a quick-moving, superficial fire doesn’t kill deep-rooted perennial plants and ensures that the seed bank lying dormant beneath the soil isn’t scorched.

“Many grazing animals favor these recently burned areas,” says Jacobson. They stay greener into the late summer than nonburned sites, because fire has dealt a blow to the water-gulping sagebrush, allowing more diminutive grasses and forbs a chance to thrive.

STEPHEN AUSMUS (D553-13)



In the early morning, University of Idaho manager of sheep operations and range resources Quinn Jacobson records male and female sage grouse numbers as the birds congregate on leks, where they display courtship and mating behaviors.



In “a dance in the desert” (described on left), a young male grouse struts about (left), then puffs up his chest (center) to look larger to other males, then makes a loud popping sound known as “booming” (right) to gain a female’s acceptance for mating.

The birds appear to be reaping the benefits of the Dubois fire program. Since 1995, when the station began the planned burns, the researchers have seen a marked increase in the number of new grouse breeding grounds, or “leks.”

### Standoff With a Weed

In Burns, Oregon, ARS rangeland ecologist Jon Bates agrees that fire, once a vital part of the sage grouse environment, has practically disappeared from some parts of the West because of fire-control practices.

As a result, plant species that rely on periodic fires are diminishing as aggressive intruders—western juniper and other pinyon-juniper species—invade their territory.

Western juniper’s dominance causes severe reductions in plants essential for sage grouse habitat. As juniper proliferates, the sage grouse are left with less forage and fewer places to seek refuge. And the lack of native plant cover exposes sage grouse nests and chicks to predators like coyotes, ravens, hawks, and other raptors.

Bates, who works at the ARS Range and Meadow Forage Management Unit, says, “Cutting or burning juniper can increase the abundance of plants that provide food and hiding cover for sage grouse.”

But not all western juniper represents a threat, says rangeland scientist Chad Boyd, formerly with the ARS unit at Burns. Old-growth juniper occurs in rocky areas, which typically aren’t sage grouse habitats. It becomes a problem when it creeps into sagebrush grasslands where it hasn’t grown before.

The ability to track problem plants and assess their impact on native environments is a real challenge across remote western lands. But that’s where ARS scientists at the agency’s Rangeland Resources Research Unit in Cheyenne, Wyoming, come in.

There, rangeland scientist Terry Booth has developed an aerial imaging system that can help land managers find out what’s really growing out on the range. By pairing a light aircraft with computerized digital photography, he’s found a way to gather telling information about an area’s vegetation, water resources, and potential wildlife habitat. (See “Revolutionized Rangeland Monitoring,” *Agricultural Research*, February 2006, p. 16-18.) Booth says assessing stream health is especially helpful to the sage grouse. “Grouse chicks need the high-protein forbs that grow in meadow plant communities along streams.”

With funding from Barrick’s Squaw Valley Ranch and Nevada Bighorns Unlimited, he’s also testing his monitoring system’s ability to tally the nation’s sage grouse populations.

Right now, grouse are counted during the breeding season by observers on the ground. ARS’s aerial methods will greatly increase efficiency, allowing 6 to 10 leks to be tallied in the time it currently takes to do 1.

Like Booth, the other ARS scientists working on rangeland issues are eager to share their findings with ranchers, land managers, and the public. Lewis says, “We want to say to people, hey, you can do this too, without too much cost or trouble. Commerce and creation of opportunities for wildlife don’t have to be opposing forces.”—By **Erin Peabody** and **Laura McGinnis**, ARS.

*This research is part of Rangeland, Pasture, and Forages, an ARS National Program (#205) described on the World Wide Web at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).*

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