OSU's HOME ON TH

Out where cattle outnumber people, scientists are helping to sustain an industry and a landscape in the wide open spaces of Oregon's high desert range.

Nicknames can be very revealing. Consider these catchy handles for Oregon's high desert range. It's been called Oregon's Outback, the Other Oregon, and the Big Empty.

You get the idea. The arid, high-elevation plains that spread across the southeastern part of the state are an enormous and sparsely populated place with deep skies and landscapes that seem to stretch beyond the horizon into infinity.

Cattle outnumber people in southeast Oregon. Cattle production is the top agricultural activity in the region and one of the largest agricultural industries in the state, earning more than $400 million in sales last year.

With less than 12 inches of rainfall annually, successful ranching is just as challenging now as it was when cattle ranchers first came to the area in the 1860s. Those first ranchers built a thriving cattle production enterprise from the plentiful forage of the high desert. Rangeland was thought to be inexhaustible.

According to Marty Vavra, that outlook has shifted considerably.

Vavra, a range scientist and eastern Oregon resident for the past 30 years, is superintendent of the Eastern Oregon Agricultural Research Center (EOARC), with branch stations in Burns and in Union.

Much of the center's rangeland research is conducted south of Burns, on 640 acres of state-owned meadow land, and west of Burns, on 16,000 acres of federally owned rangeland called the Northern Great Basin Experimental Range. The Burns station serves as headquarters for a team of scientists who conduct research both to support the region's agriculture industry and to help maintain environmental quality of the high desert range.

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GETTY IMAGES

Sunrise on the high desert range of southeast Oregon, where OSU research is helping to repair the land and improve the cattle industry.

Most ranchers and land managers acknowledge that Oregon's high desert lands were used carelessly in the early days and that action is needed to protect and restore these rangelands, Vavra said.

"When I came to work for OSU in 1971, the emphasis at the eastern Oregon branch station was research to support beef cattle production," said Vavra. "The goal was to ensure that range forages could support consistent weight gain on grazing livestock.

"By the mid-1980s, our research had broadened to include an ecological component," Vavra said. "Our goals broadened to include rangeland restoration and sustainability, as well as supporting viable commodity production in eastern Oregon."

Conducting research to support both environmental and economic goals can be controversial. "There will always be people who question the usefulness of this or that research project, but I think more and more people in this part of the state think we're headed in the right direction," Vavra said.

Fred Otley, long-time eastern Oregon cattle rancher and cooperator with EOARC research, agrees.

"Ranchers in this area depend on both public and private lands," said Otley. "For a few years now, researchers at the station have shifted their emphasis from production to ecological research, and that's been a great benefit to resolving natural resource issues throughout the high desert.

"We're dependent upon healthy watersheds for sustainable beef businesses," he said. "The station's research program is invaluable for both public and private land managers."

The Burns station of EOARC houses research staff from both the OSU Agricultural Experiment Station (AES) and the U.S. Dept. of Agriculture Agricultural Research Service (ARS), an arrangement that began in the late 1940s and has continued, to the benefit of everyone involved. As USDA's research arm, ARS operates research centers throughout the nation and conducts research in all areas of agriculture and natural resource management.

"ARS is a very strong component at the center," Vavra said. "Given our current budget situation, we would have a very tough time conducting programs without them. We're able to share many resources and we all consult with each other as we plan upcoming projects."

The high degree of cooperation between AES and ARS researchers is one of the center's leading strengths, added Tony Svejcar, ARS research leader at EOARC.

"Marty and I try to manage the center as a unit rather than as individual AES and ARS components," said Svejcar. "We both want to make the best use of the scientific expertise here and to have people cooperate as much as they can." AES and ARS scientists work in partnership on a variety of research projects, from cattle grazing behavior to range fire ecology.

> "Fire has been an integral part of range ecosystems since these systems evolved."

For example, Svejcar and AES range scientist Rick Miller joined forces to study how a ruggedly tough tree capable of surviving for hundreds of years in the harsh desert climate is changing Oregon's range country.

Western juniper is an extremely hardy tree species, well-adapted to the dry climate of eastern Oregon. It is native to the area, but over the past century it has increased dramatically across the landscape, and continues to spread.

"Ranchers and land managers are very concerned because juniper trees tend to dominate areas where they become established," said Miller. The trees can eventually absorb all nearby moisture, drying up surrounding grasses, flowering plants, and sagebrush. The disappearance of other rangeland plants means loss of forage and wildlife habitat, and increased soil erosion. Researchers have tested prescribed, or controlled, fire as a way to limit the spread of western juniper.

"Naturally occurring wildfires kept the spread of western juniper in check on the high desert for thousands of years," said Miller. "Before the introduction of grazing, native grasses served as quick-burning fuels that helped keep fires at a low intensity. However, when cattle ranching started in the late 19th century, heavy grazing removed a lot of the grasses and dramatically reduced the occurrence of wildfires on the range. In addition, land managers began fighting fires whenever possible, allowing juniper trees to spread in the high desert unchecked."

Miller began investigating the impacts of wildfires in the mid-1980s and is now one of OSU's foremost fire researchers. He reconstructs the fire history of high desert rangelands by studying core samples from juniper trees throughout the region.

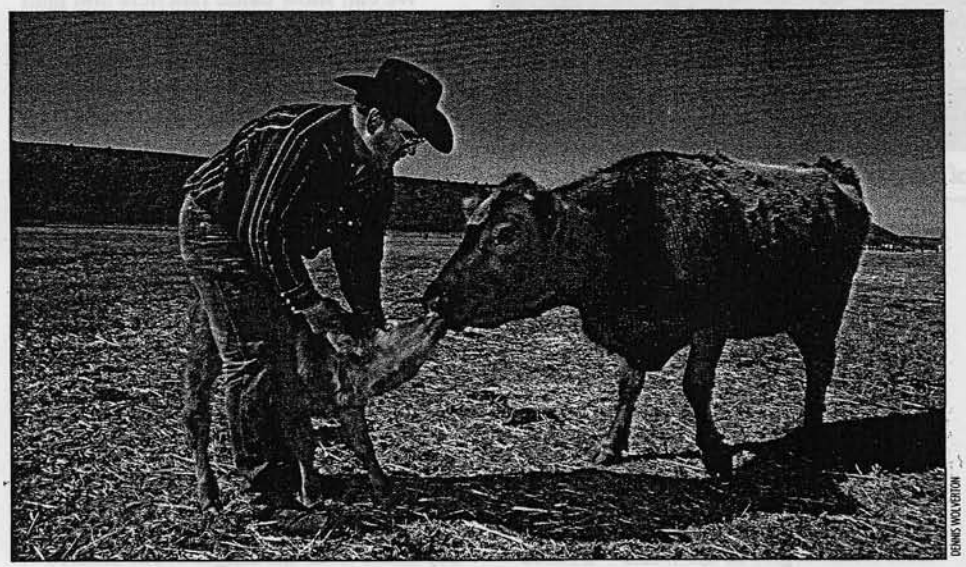
"Fire has been an integral part of range ecosystems since these systems evolved," said Miller. "We've been studying the fire history of the area—the frequency and extent of fires that burned in the past. The next step is to simulate presettlement fire cycles with prescribed burning programs."

Fire ecology research has become a high priority in recent years due to frequent wildfires throughout the West. Miller is currently cooperating on fire research projects in Montana, Nevada and Arizona.

While Miller painstakingly pieces together a record of fire events from the high desert's past, other scientists at the research center are using futuristic satellite-based technology to analyze the movement of grazing cattle.

In a cooperative project to study cattle feeding efficiency and grazing behavior, scientists are tracking cattle movement using global positioning systems (GPS). An AES animal nutritionist, David Bohnert, and an ARS range scientist, Dave Ganskopp, have fitted cattle with high-tech collars that contain devices that use satellites to periodically record the positions of individual animals.

"A GPS unit uses radio signals from several military satellites to calculate its position on the Earth's surface," said Bohnert. Only the size of a bar of soap, the GPS unit can pinpoint an animal's position to within about eight yards. Bohnert used the GPS collars to monitor how far cattle



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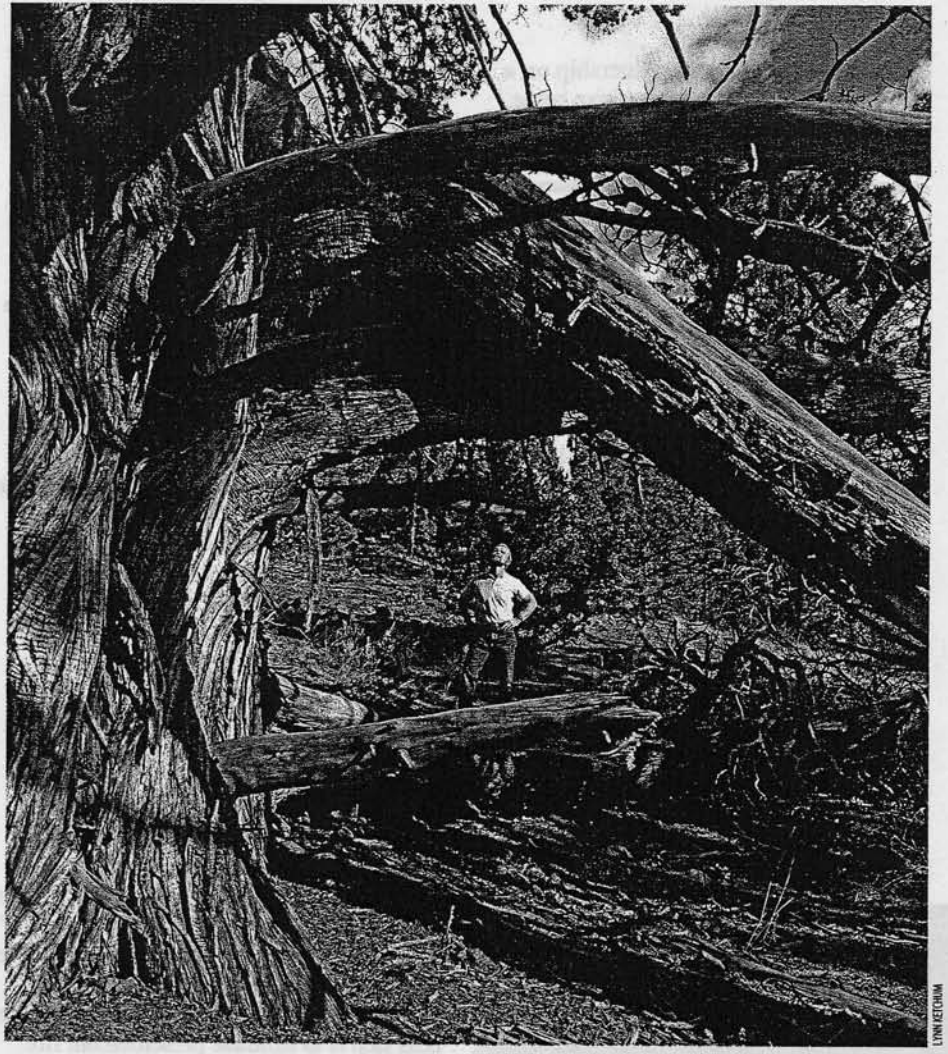
Eastern Oregon cattle rancher Fred Otley tends a cow and calf on the high desert range.

BOB ROST

Marty Vavra, superintendent of OSU's Eastern Oregon Agricultural Research Center, has studied Oregon's rangeland since 1971.



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OSU range scientist Jeff Miller examines one of Oregon's oldest juniper trees.

traveled each day, how many hours of the day they grazed, and how much pasture area they used. The GPS collars made it possible to collect detailed information consistently over long periods of time.

"There is no other way of getting this quality of data short of sending someone out in the field to follow the animals and record where they go," Bohnert said.

Ganskopp used the collars to study livestock distribution patterns in large range pastures of up to 100,000 acres and to measure ways to influence where cattle go as they graze in the pasture.

"The goal of this research is to find ways to attract cattle into areas they have not habitually used, or prevent cattle from going into areas that ranchers and land managers may want to protect from grazing impacts," said Ganskopp.

"We found that moving water sources, where possible, works well to influence where cattle go as they graze," he added.

The longest standing research project at the center uses one of the oldest agricultural technologies in the world—a fence—to assess the long-term effects of grazing on Oregon's high desert rangelands.

In 1937, range scientists set up thirteen 4-acre grazing exclosures at the Northern Great Basin Experimental Range. An exclosure is a tract of land surrounded by a fence that prevents cattle from entering. With an exclosure on every major pasture in the 16,000-acre experimental range, researchers have been able to limit grazing within these areas for nearly 70 years. Today, Svejcar and Miller are cooperating on the exclosure research.

"The grazing exclosures attract a lot of interest because of the controversy about the effect of grazing—it's bad, no it's not bad—that sort of thing," Svejcar said. "The exclosures allow us to get good on-the-ground comparisons of the impacts of various degrees of grazing."

For example, Svejcar said, taking vegetation measurements inside and outside the exclosures gives a reasonably clear picture of the effects of cattle grazing on specific range plant communities. A few years ago, researchers conducted controlled burns across some of the exclosures and the adjacent grazed areas to measure the effect of burning on grazed and ungrazed pastures.

BOB ROST

OSU animal nutritionist David Bohnert (left) and ARS range scientist Dave Ganskopp fit a cow with a GIS collar.

The GPS unit can pinpoint an animal's position to within about eight yards.

"We can show cattle ranchers and land managers exactly what happened to the land under various types of management," said Vavra. "They can see for themselves the effect of one strategy or another on sustaining natural resources and wildlife habitat on rangeland."

Sustainability is the recurring theme in all research at EOARC, Vavra stressed.

"Our overarching goal is to increase our knowledge of how eastern Oregon wildlands, rangelands, and forestlands function, both from an ecosystems standpoint and from a commodity production standpoint," he said. "Sometimes our research directions go together and sometimes they don't."

The occasionally divergent research directions Vavra describes are quite a departure from the single-focus studies conducted in the past. But for many who live and work on the high desert rangelands, EOARC's present research directions offer the best approach to helping agricultural producers and rangeland managers find new ways to maintain healthy businesses and strong ecosystems in Oregon's Outback.

For more information about EOARC, see http://oregonstate.edu/dept/EOARC/
For more information about the USDA ARS, see http://www.ars.usda.gov/

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