

# Saving the Great Plains with prescribed fire, mixed grazing

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Morgan Treadwell, Ph.D., Texas A&M AgriLife Extension Service rangeland specialist, San Angelo, lights part of a 1,000-acre prescribed burn of tall prairie grass near Fort Worth. Credit: Brian Treadwell

Rangelands in the Great Plains, and the ranchers who depend on them, are losing battles against an invasion of brush and shrubs on historical grasslands.

Ranchers are under increasing stress due to changing environmental conditions and subsequent losses of rangelands to woody plants, but a

relatively new management approach shows promise in turning the tide against encroaching brush and shrubs.

Texas A&M AgriLife Research scientist Brad Wilcox is among a group of researchers, extension specialists and educators who hope pyric herbivory will one day become a routine point of conversation in rangeland conservation and wildfire mitigation.

Pyric herbivory utilizes controlled patch burns to promote forage growth. Over thousands of years, fire and mixed animal grazing helped shape the Great Plains, which cover more than 452 million acres across 12 states.

Wilcox, Ph.D., AgriLife Research ecohydrologist in the Department of Ecology and Conservation Biology in the College of Agriculture and Life Sciences, Bryan-College Station, said the invasion by woody plants like cedar and mesquite presents a host of problems for producers, native ecosystems, and properties in both rural and urban areas.

Wilcox is leading a consortium of researchers, extension specialists and educators looking to help ranching operations and landowners prevent and reverse rangeland losses by replicating natural fire and grazing.

This undertaking, the Prairie Project, is a team effort that spans many institutions, agencies and disciplines. The project promotes pyric herbivory, mixed animal grazing and other disturbance regimens on rangelands in the Great Plains to make these areas more resilient to woody plant encroachment, wildfire and extreme heat events.

The Texas A&M University-led project is a collaboration with Oklahoma State University and the University of Nebraska and is funded via a five-year, \$10 million U.S. Department of Agriculture National Institute of Food and Agriculture grant to test and promote pyric

herbivory and other replicated natural disturbance regimens.

## **Protecting the Great Plains with fire, grazing**

Native rangelands are the most endangered habitat in the U.S. and globally. Rangelands represent 30% of the land area in the U.S. and 40% of landscapes around the world, but many of these ecosystems are under pressure from encroaching, dense woodlands.

Woody shrubs lead to lost forage volume, which reduces producers' operational capacity and sustainability, especially during increasingly volatile weather associated with [climate change](#), Wilcox said. Woody shrubs also directly contribute to wildfire intensity and potential for loss of life and property.

Pyric herbivory utilizes controlled burns and a mix of grazing animals like goats and cattle to fill the roles naturally occurring fire and native grazers played in protecting prairie grasslands from encroaching woody plant species. This relatively new management approach is designed to help livestock producers reclaim rangelands lost to woody plants.

Wilcox said research has shown a wide range of benefits from using prescribed fire to minimize wildfire fuel and to create ecologic biodiversity that supports wildlife and agricultural operations. But adding the animal component with grazers and browsers and promoting ungulate species to keep woody plant species in check between burns is where pyric herbivory becomes a winning combination.

"We are trying to spark large-scale public change when it comes to utilization of this disturbance regime that these grasslands evolved under," he said. "The science is clear about the benefits of using fire, but we are arguing that pyric herbivory and adding browsing animals such as goats and other ungulates to cattle operations is the most effective and

efficient way to restore the Great Plains."

## **The Prairie Project: a public, private partnership**

The project is enormous in span, Wilcox said. It is an extremely collaborative effort between the institutions, the respective facets within them and the people executing the mission to produce research, extension and education elements that support the Prairie Project's goals.

Researchers hope to provide best practice recommendations that make rangeland ecosystems more resilient and productive to support healthier environmental and economic conditions throughout the Great Plains states. Extension specialists and agents will develop ways to demonstrate to producers and the public the benefits of the science-based methods, with an eye toward fostering generational changes in how rangelands are managed.

The educational element will utilize the missions of research and extension to target the wide array of demographics within the Great Plains, from rural producers to urban dwellers and kindergartners to graduate students and future natural resource professionals.

Elements of the consortium are also working with eight participating ranches in Nebraska, Kansas, Oklahoma and Texas to gather data on various experiments being conducted by teams of researchers and graduate students. The ranches also provide the Prairie Project with locations to demonstrate pyric herbivory's effectiveness.

"For as broad and big as this project is, it's been a seamless cooperative effort, and participation with the ranches is critical," Wilcox said. "They provide us a network of demonstration ranches where we can apply management practices and evaluate how various methods are working. They also provide us a place to apply the extension outreach and

education components to showcase the effectiveness of pyric herbivory and related practices."

## **Spreading pyric herbivory methods like wildfire**

Morgan Treadwell, Ph.D., Texas A&M AgriLife Extension Service rangeland specialist in the Department of Rangeland, Wildlife and Fisheries Management, San Angelo, said wildfires around the U.S. and world are making people increasingly aware of ways to mitigate their severity, including the use of prescribed burns. But to a great extent, the general public remains fearful of fire.

But landowner adoption rates of pyric herbivory concepts, she said, especially among ranching operations, are likely to increase due to its appeal as a cost-efficient brush management strategy. Having sustainable methods for control is important because ranches face constant threats of being overwhelmed by woody plants.

Treadwell, who is leading the AgriLife Extension efforts, said the project's ability to facilitate and promote peer-to-peer learning about pyric herbivory, and the opportunities and challenges the method can present, will be a crucial part in establishing momentum.

"Legacy ranch owners and new landowners alike need inspiration to connect with the land," she said. "Right now, I think many of them feel overwhelmed by the extent woody brush encroachment is occurring and don't know where to start. But the results of pyric herbivory are difficult to ignore, and if they see it work on other ranches and learn how it could be implemented into their operations, I think the practice will spread like a wildfire."

Treadwell said one benefit of the cooperative effort between states is that producers and industry professionals in each state perform well in

certain aspects of pyric herbivory. Nebraska and Oklahoma have implemented successful campaigns to reduce woody plants with fire, whereas Texas has used browsers successfully.

"There is relevancy to this project from a range of perspectives, whether it is production agriculture or protecting people and property in urban-rural interfaces," she said. "But in all this is a great example of our land-grant mission. We are affecting agents of change that will ultimately create a more sustainable and profitable environment for the public and producers, respectively."

## **Generational transformation through education**

Ben Wu, Ph.D., professor for undergraduate teaching excellence in the Department of Ecology and Conservation Biology, said education will take time. But public awareness about climate change, drought and wildfires makes it easier to share the benefits of the practice.

He will lead the education component of the project that hopes to make generational changes in how the public views fire. His team will deploy an array of teaching and promotional tools to reach students in classrooms, producers in the field and the general public through various mediums.

Wu said prescribed fire as a wildfire mitigation tool is gaining momentum. Widespread embrace of practices like prescribed burns and pyric herbivory appears to be growing as drought-stricken states grapple with wildfires in rural-urban interface.

The public is aware that woody material fuels wildfire intensity, which in turn makes wildfires more difficult to control or extinguish. Public awareness in turn is creating opportunity to engage policy makers about the benefits of using prescribed fire to remove fuel or to serve as a fire

break that can save lives and property and prevent billions of dollars in losses associated with wildfires.

Introducing pyric herbivory concepts that provide additional benefit to both public safety and agricultural production presents a natural fit within the current discussions, Wu said.

"This summer has been difficult to watch, but it also provides context and opportunity for adding to important conversations about wildfires. The majority of problems related to wildfire is the amount of woody material," Wu said. "We argue that pyric herbivory helps manage woody plants and the environment challenges drought, heat and subsequent wildfires represent. So, this benefits the native habitat and wildlife, the producers these rangelands support, and public safety."

## **Committed to rangeland restoration, management**

The Prairie Project's success will require long-term commitment, Wilcox said. But the NIFA grant shows a commitment by the USDA to seek economically viable ways to manage encroachment of [woody plants](#) that has worsened over the past century.

"This problem won't be solved in five years," he said. "But we are laying the groundwork for sustained success."

Provided by Texas A&M University

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