USDA United States Department of Agriculture

NATURAL RESOURCES CONSERVATION SERVICE

WORKING LANDS FOR WILDLIFE



GREAT PLAINS GRASSLANDS BIOME

A FRAMEWORK FOR CONSERVATION ACTION

A Framework for Conservation Action in the Great Plains Grasslands Biome



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This framework is designed to work in concert with a full suite of WLFW-provided online resources (www.WLFW.org) including training, spatial data and scientific publications. Archived technical sessions help staff and partners craft the local solutions represented in this framework. The collection of maps and spatial data enable practitioners to rapidly visualize and analyze opportunities for threat reduction in their local areas. Electronic access to published literature cited throughout this framework enables readers to learn more about the science behind this framework.



Conserving Resilient Rangelands for People and Wildlife

Photo: Shutterstock/MaxVoran

Rangelands throughout the world support a diversity of grass, forb and shrub communities. These systems benefit people by providing healthy air, clean water, food and fiber, abundant fish and wildlife habitat, and recreational and cultural values. Covering one out of every three acres in the contiguous U.S., rangelands constitute the lower 48's single largest land use. Grazing by domestic livestock is the common thread that sustains rangelands at ecosystem scales, which is why they are often referred to as working lands.

Across the western U.S., working rangelands are a primary driver of healthy rural communities and abundant wildlife. While seemingly endless, rangelands are being lost at an alarming rate to land use conversion, woodland expansion, invasive grasses, and dewatering of mesic sites. An ever-growing list of imperiled grassland and shrubland species reflects the continued loss of more than a million acres of working rangelands annually.[1]

"Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest."

—Aldo Leopold, Father of Modern Conservation

- In the West, 70% of all land is rangeland
- 2/3 of this rangeland is privately owned, encompassing the most productive grass and shrublands west of the Mississippi River



Figure 1

Formerly dismissed as 'fly over' country, rangelands today are taking their rightful place as a centerpiece in the conservation of America's western heritage. Maintaining our nation's rangelands provides an opportunity to reduce climate impacts by storing above- and below-ground carbon across this massive biome.[2] Working rangelands are the glue connecting a patchwork of protected areas that together provide an ecological footprint large enough to sustain nature and people.



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Win-Win Solutions



About Working Lands for Wildlife

Photo: Shutterstock/Moose Henderson

Working Lands for Wildlife (WLFW) is the USDA Natural Resources Conservation Service's (NRCS) premier approach for conserving America's working lands to benefit people, wildlife and rural communities. WLFW uses win-win solutions to target voluntary, incentive-based conservation that improves agricultural productivity and wildlife habitat on working lands. WLFW takes an ecosystem approach, but focal wildlife species guide conservation delivery and are used as barometers for success because they require healthy, functioning ecosystems as habitat. As the world's largest source of conservation funding, the Farm Bill provides the help producers need to make improvements to their working lands. Understanding the Farm Bill's many programs is essential to unlocking its full potential.

WLFW uses co-produced science[3] to develop frameworks that guide conservation actions spanning multiple states and focal species. **Frameworks provide the common vision and coordination to address resource concerns and ecosystem threats across boundaries.** In the western U.S., the Great Plains and Sagebrush frameworks provide a collective roadmap for the conservation of working rangelands. Frameworks build upon past achievements of Lesser Prairie-Chicken (LPCI) and Sage Grouse Initiatives (SGI) that together have conserved 10,309,950 acres of working rangelands with 3,261 participating ranches.

Spatial targeting lies at the heart of WLFW's threat-reduction strategies. WLFW prioritizes proactive conservation in and around intact but

vulnerable rangeland 'core areas'. This focuses efforts in places where they are more likely to be effective and cost efficient, rather than reactive responses in regions that are already highly degraded (Figure 2).

These WLFW frameworks for western rangeland share the same vision: *Wildlife Conservation Through Sustainable Ranching.* As the flagship effort of WLFW, SGI showed what can be achieved through voluntary conservation, helping reduce threats at unprecedented scales, benefiting wildlife, and precluding the need for listing sage grouse under the Endangered Species Act.[4,5] Interwoven in these frameworks are insights gained through LPCI, SGI, and state-based WLFW initiatives in the Northern Plains Grasslands and Nebraska Sandhills, as well as new science and technology that help inform how we deliver conservation.

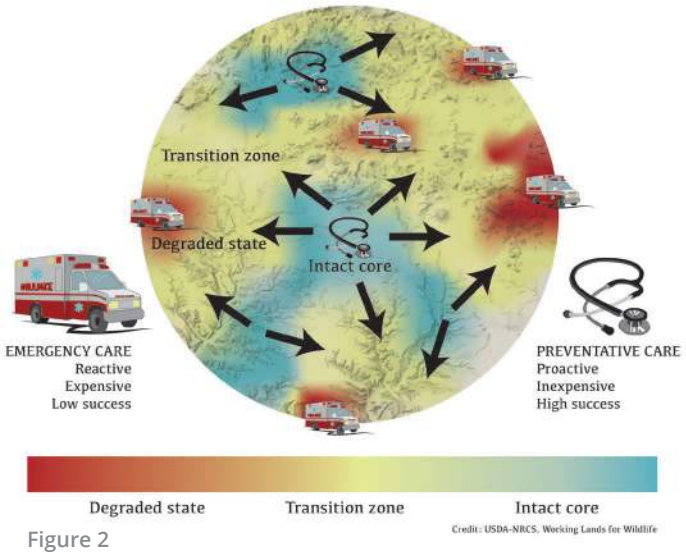


Figure 2

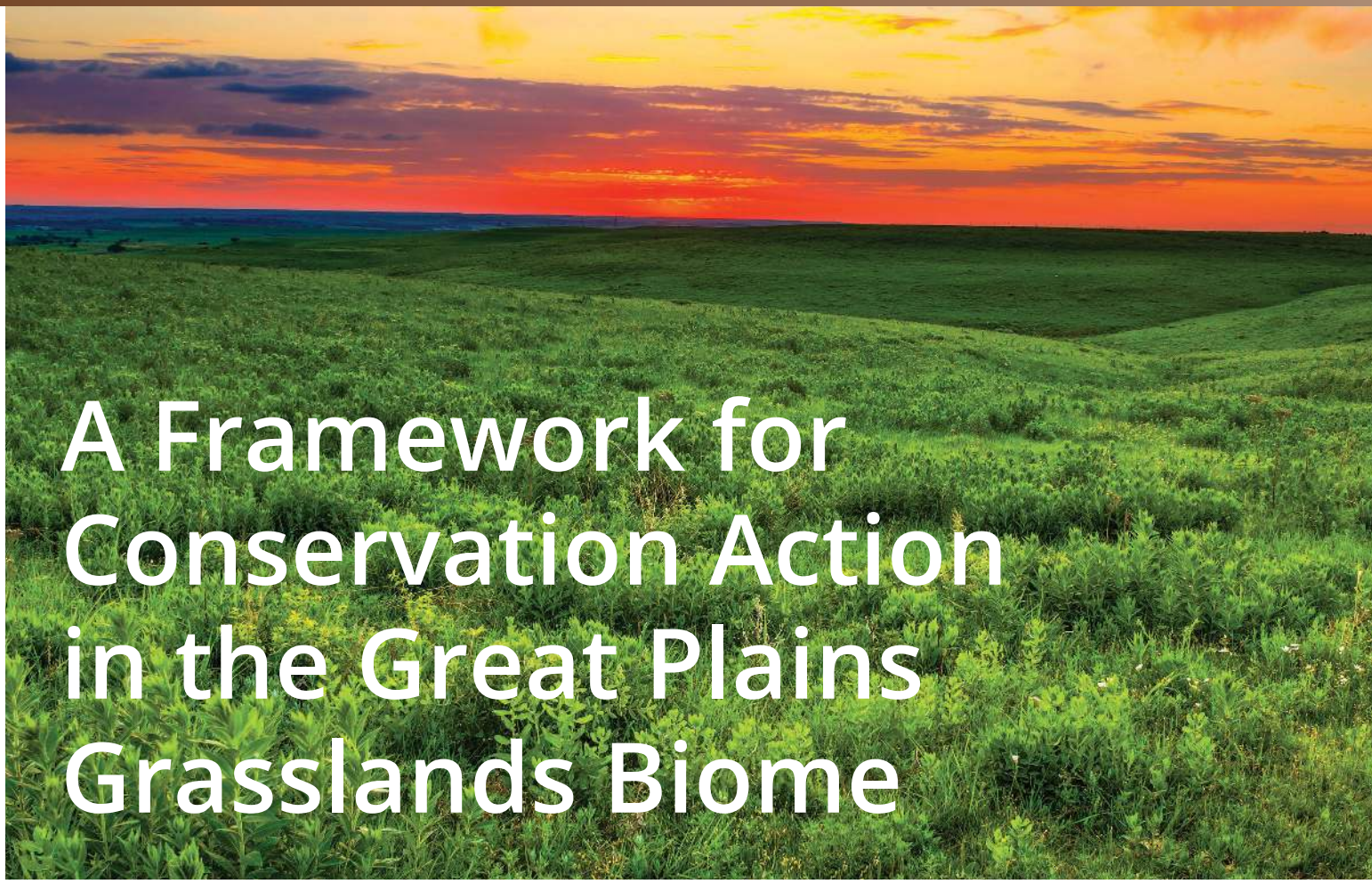


Figure 3



Photo: Shutterstock/Rob Palmer Photography

WLFW maximizes outcomes for wildlife and working rangelands by focusing efforts in core areas where local data shows there are wildlife strongholds, and where communities are willing to participate in conservation efforts.



A Framework for Conservation Action in the Great Plains Grasslands Biome

Photo: Shutterstock/Tommy Brison

The Great Plains of North America are home to some of the world's largest remaining and most intact grasslands.[6] For example, the Sandhills grassland of Nebraska is one of the most intact prairie ecoregions in the world, second only to the Serengeti Volcanic Grasslands. In the U.S., private landowners hold the key to prairie conservation since 90% of the Great Plains is privately owned. As valued grazing lands in mixed agricultural operations, these working grasslands are the backbone of the U.S. beef industry.

This region is also rich in wildlife, particularly birds. Whooping and sandhill cranes, shorebirds, and hundreds of other migratory species rely on the Central Flyway of the Great Plains. The American prairie is a stronghold for grassland songbirds, a mid-continental duck factory, and a mecca for upland game hunting, which benefits rural economies. Plus, retaining and restoring grasslands represents the largest natural opportunity to reduce carbon emissions in rangelands.[7]

But all is not well—the Great Plains are the world's most imperiled and least conserved ecosystem.[8] This biome is experiencing greater proportions of biodiversity loss than any other biome.[9] Woodland expansion and land use conversion are the two primary threats driving large-scale grasslands losses in the Great Plains (Figure 4). The magnitude of these combined threats is causing a biome-scale collapse that threatens both the livestock industry and wildlife.

The Great Plains produces half of all U.S. beef production—this industry brings in $58 billion annually.

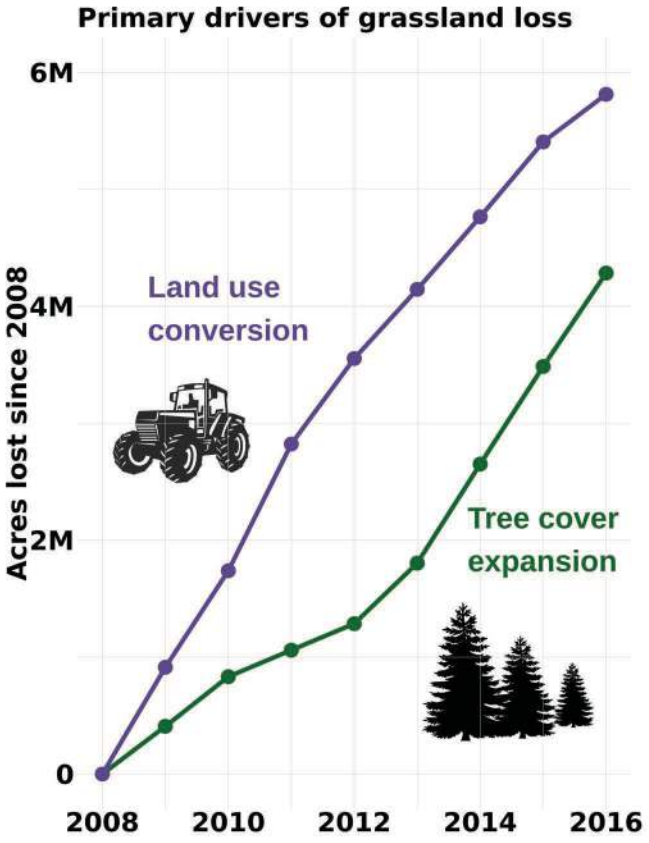


Figure 4

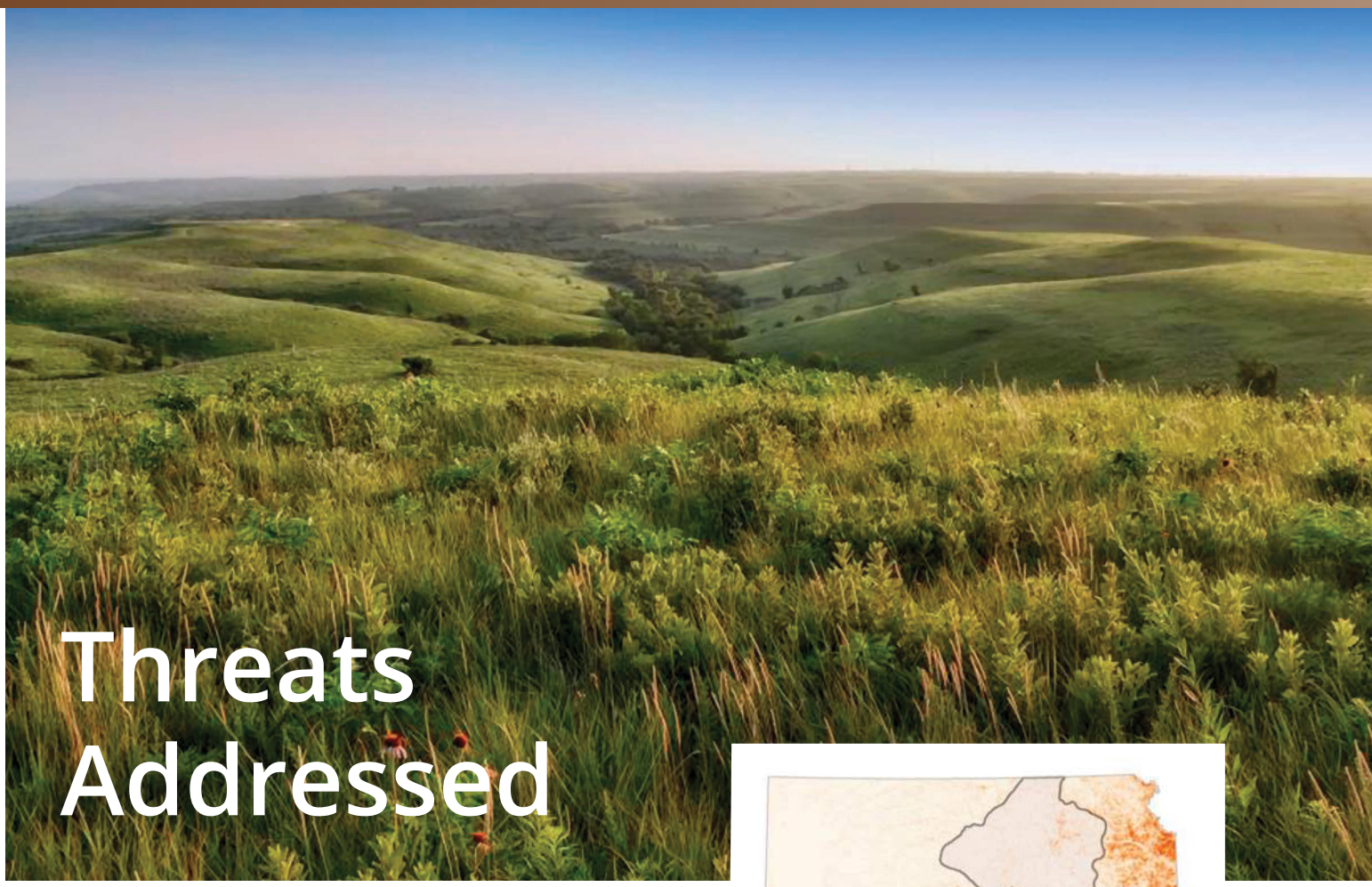
Crop cultivation and woodland expansion are the primary threats to the Great Plains biome. New technology shows that we are losing grasslands to these threats at nearly the same rate.[1]

This action-based framework is the culmination of a collaborative, areawide planning effort to conserve Great Plains grasslands at a biome scale. This framework also serves as NRCS' contribution to the International Central Grasslands Roadmap coordinated by the Bird Conservancy of the Rockies. Since they face the same cross-boundary threats, NRCS staff across ten western states collaborated to create this shared vision for conservation action.

The WLFW team—as part of NRCS' Areawide Planning, Science and Technology, and Outcomes branches—crafted an overarching approach, provided emerging technologies and spatial data, and led technical sessions for the Great Plains. NRCS State Conservationists and staff, in consultation with wildlife and agricultural partners, subsequently hosted strategy sessions emphasizing preventative conservation actions within the last remaining, and increasingly vulnerable, intact grassland regions. Local partnerships identified threats to address, honed geographic focus areas, and generated estimates of acreage goals and resource needs.

The results of the planning effort are reflected in this framework as an all-programs approach to conserving resilient rangelands. As states implement their strategies locally, the WLFW team supports them with annual tracking and reporting of milestones, additional assistance in spatial targeting, and ongoing science-based assessments of conservation outcomes.

Grassland Threats



Threats Addressed

Photo: Manhattan Convention and Business Bureau

WLFW uses Farm Bill resources to help landowners voluntarily implement conservation actions that reduce threats facing producers and wildlife. **This action-based framework addresses the two most severe and large-scale threats to the Great Plains biome: woodland expansion and land use conversion.**

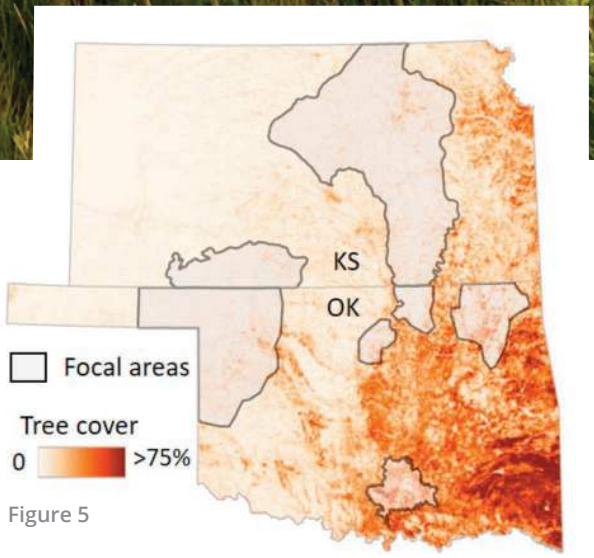


Figure 5

Each primary threat has a geographic focus, conservation objective, strategic approach and anticipated outcomes. Once working rangelands are stable and intact, a variety of locally identified threats can be addressed as part of a whole-ranch plan.

States are working within their boundaries and across their borders to address these threats. For example, Kansas and Oklahoma collaborated to focus their efforts where woody expansion is threatening relatively intact grassland cores that cross state lines (Figure 5).

9.8 Million Acres

Our top priority is conserving resilient and intact working rangelands. To achieve this outcome we must halt threats before they begin, reinstate fire back into the system, and work at scales that matter.



Photo: Shutterstock/Max Voran



Photo: Dirac Twidwell



Photo: Jeremy Roberts/Conservation Media

LOCALIZED THREATS

Once working grasslands are stable and intact, 1.4 million acres of locally identified threats can be addressed to reduce grassland degradation. Mitigating localized threats will improve the health and productivity of grassland landscapes. These include: restoring degraded riparian areas and wet meadows, and treating nonnative weeds that were once introduced as forages.

- Cool-season introduced grasses, such as smooth brome and kentucky bluegrass, are prevalent throughout the north
- Cheatgrass is emerging as a local resource concern in northwest arid prairies
- *Sericea lespedeza,* a noxious weed in multiple states, is local but persistent in the central Plains
- Old world bluestem, renowned for outcompeting native grassland vegetation, is a major nuisance in the south

Threats Addressed



Woodland Expansion

Photo: Christine Bielski

Woodland expansion takes rangeland out of agricultural production and displaces rangeland wildlife.[10] Scattered trees in grassland ecosystems may look harmless to a casual observer, but the expansion of woody plants erodes resilience and increases risk to wildlife and producers.

GEOGRAPHIC FOCUS

Woodland expansion is most prevalent in the southern and central Great Plains, but is emerging as a local problem in western and northern regions of the biome.

CONSERVATION OBJECTIVE

Arrest woodland expansion through preventative management and target restoration within priority landscapes.

STRATEGIC APPROACH

The inherent productivity of the Great Plains facilitates the rapid dispersal, recruitment and expansion of woody species. Woody expansion continues unabated despite large investments because treatments are solely focused on slowing the spread of existing trees (Figure 6). This framework provides a set of guiding principles that when

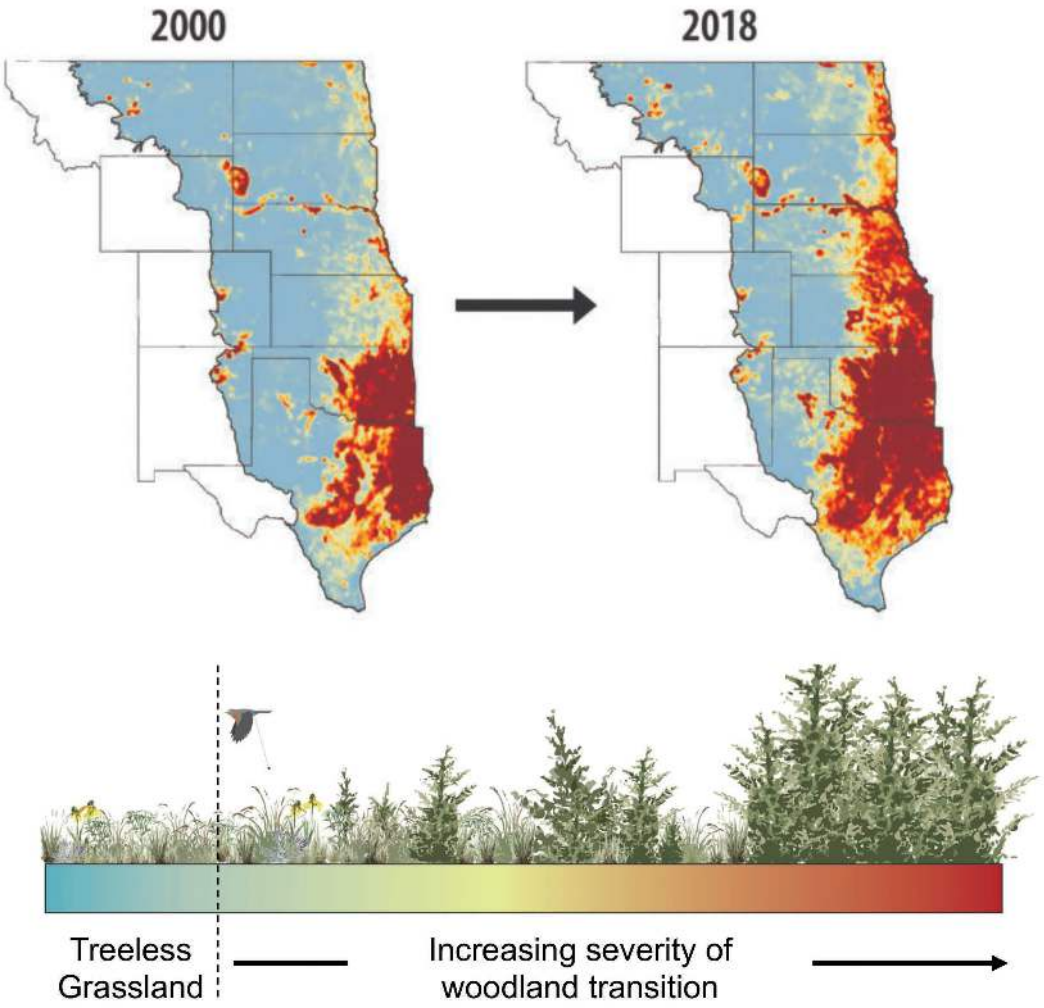


Figure 6

used together can match the pace and extent of expansion by getting management ahead of the threat (Figure 7). The same principles hold true for strategically addressing the two primary species, Eastern redcedar in the north and honey mesquite in the south.

Woodland expansion is resulting in direct grassland loss at a rate equivalent to that of cultivation (Figure 4), and its cumulative impacts are driving a biome-scale collapse spanning 108 million acres of formerly intact grazing lands.

- Nesting songbirds decline as trees increase in density[13]
- Prairie-chickens avoid otherwise suitable grasslands at just two trees per acre,[11] and stop breeding altogether as infestations continue[12]
- Producers experience a 75% decline in forage production as grasses are replaced by bare ground under trees[10]
- Tree expansion into state 'school trust' lands that impacts grazing receipts in turn reduces K-12 funding for school kids in urban and rural communities[14]

***For a full accounting of impacts of tree expansion in the Great Plains visit the University of Nebraska-Lincoln's** Eastern Redcedar Science Literacy Project.*

GUIDING PRINCIPLES FOR TACKLING WOODLAND EXPANSION

- Maximize distance between intact grasslands and seed sources to prevent establishment of woody plants
- Eliminate seedlings to prevent the next generation from repopulating after initial treatment
- Implement prescribed burns to consume seeds dispersing into grassland cores
- Coordinate management across property boundaries

WLFW's approach for tackling this threat relies on statewide maps identifying large, intact grasslands with relatively low, or no, woodland expansion. Intact grasslands serve as anchor points for conservation action and inform a proactive strategy for management: Defend the Core, Grow the Core, Mitigate Impacts. Specific actions to reduce this threat vary with landscape context and condition but generally include some combination of fire, herbicides, and mechanical removal.

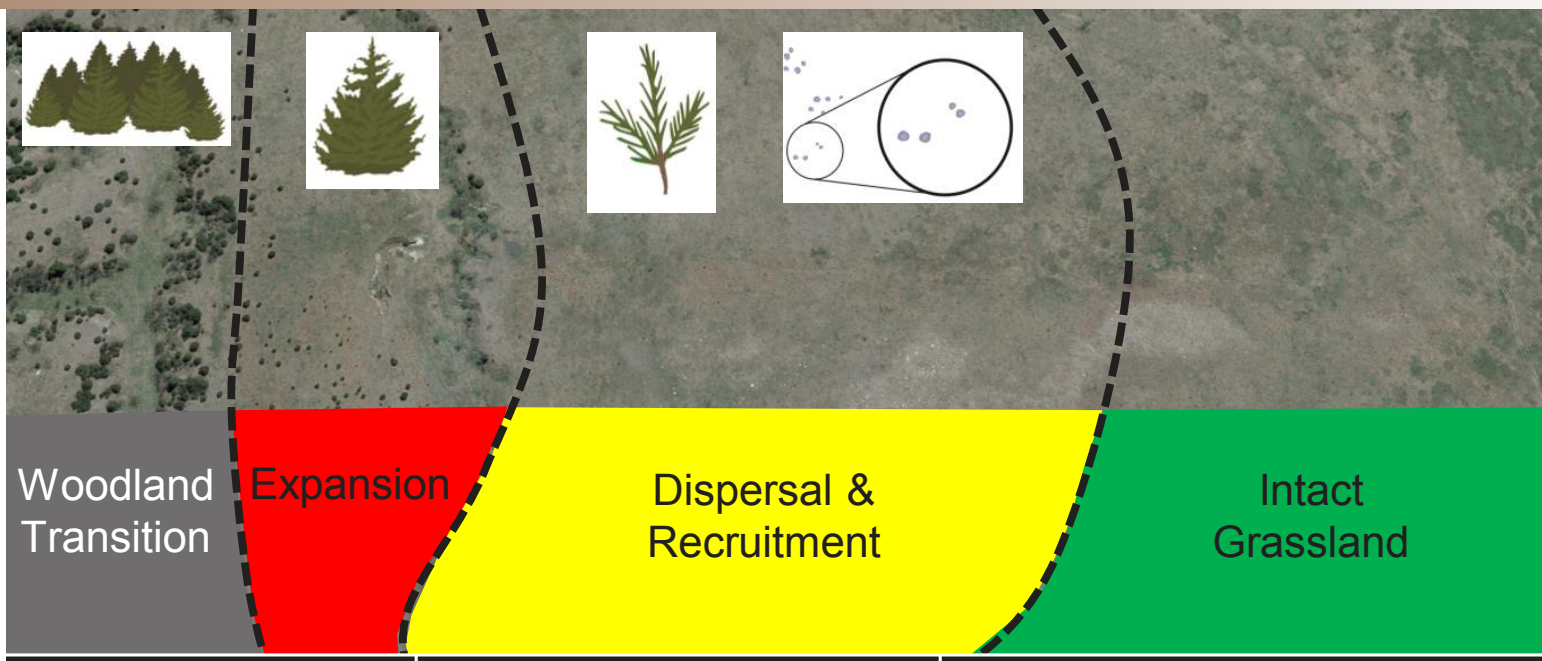
Defend the Core: This is a top priority with strategies that include detection and prevention of early invasions, prescribed fire, and targeted herbicide use to keep out or eliminate dispersing seeds and recruitment of young woody plants.

Grow the Core: This secondary priority includes restoring early-invaded grasslands in the transitioning zone, which often requires prescribed fire and mechanical removal.

Mitigate Impacts: Finally, perpetual management will be required in certain woodland-dominated regions to mitigate the most severe impacts of catastrophic wildfire on life and property.



Photo: Scott Carlton



Stages	Description	Management
Woodland Transition	Woody plant dominance	Heavy machinery - mechanical removal, fire
Expansion	Scattered producing trees	Hand tools, heavy machinery - mechanical removal, fire
Dispersal & Recruitment	Intact with seedlings or incoming seed	Fire, hand cutting, haying, mechanical removal, browsers
Intact Grassland	Treeless with no seed	Avoid introducing seed

Figure 7

This framework aims to strategically remove seed sources and reinstate prescribed fires to reverse woodland expansion. This integrated approach removes the source of risk and prevents the future proliferation of seeds and saplings.

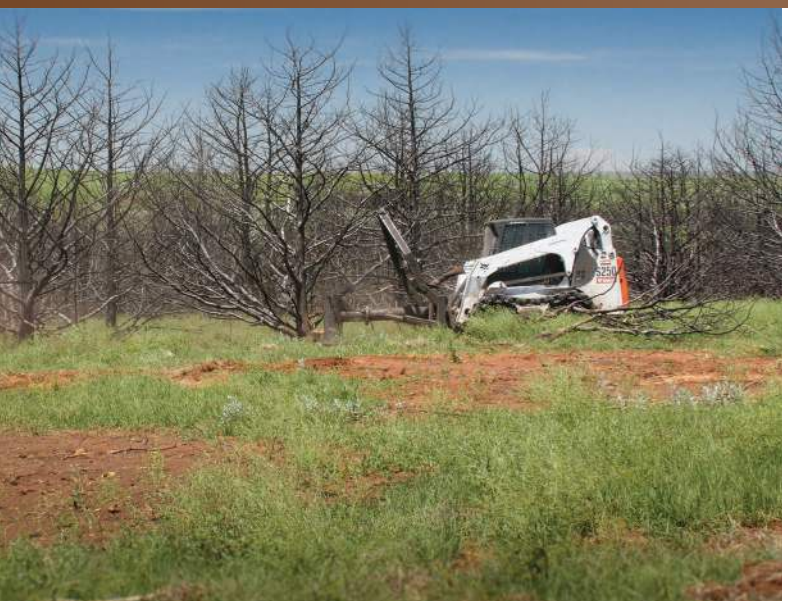


Photo: Jeremy Roberts/Conservation Media

ANTICIPATED OUTCOMES

- ***Create a network of large-scale demonstration sites.*** Few proven examples exist to demonstrate how to conserve large-scale rangelands threatened by woody expansion. A series of demonstration sites are needed across the biome to show how to sustainably manage the remaining grassland regions experiencing woody expansion.[15]

- ***Prevent loss of rancher income.*** Grassland biomass declines 75% once redcedar dominates a site,[10] which reduces forage available for livestock and rancher profitability. Management that prevents woodland expansion sustains ranch income and livestock carrying capacity.

- ***Maintain populations of grassland wildlife.*** Populations of game and nongame species are negatively impacted by transitions to Eastern redcedar woodlands.[16-18] Restored grasslands provide the diverse and intact habitat needed for wildlife to flourish.

- ***Reduce wildfire danger.*** Wildfire suppression tactics become ineffective when grasslands transition to redcedar woodlands.[19] Preventing volatile fuels from redcedar expansion reduces wildfire intensity to aid firefighter suppression capabilities.

- ***Prevent core area transitions.*** Large-scale monitoring indicates that management can maintain and even expand the size of grasslands in priority landscapes.[20]

Success Spotlight

Scaling Up Collaboration

Since 2005, the Loess Canyons Rangeland Alliance has grown from a handful of visionary producers to an entire community committed to reinstating fire to save their grazing lands from the onslaught of redcedar invasion. This volunteer-based prescribed burn association provides a rare example in the Great Plains of successfully halting the transition of a rangeland ecoregion to woodlands. Backed with support from NRCS, Pheasants Forever, and Nebraska Game & Parks Commission, this partnership has helped Loess Canyons grasslands stabilize, benefiting livestock production and species like bobwhite quail and the imperiled American burying beetle.



"We didn't want our kids to say, 'Why didn't Dad take care of those cedars when he had the chance?' So we decided to come together as a community and do something about it."

— Scott Stout, N-N Ranch Inc. and President of Loess Canyons Prescribed Burn Association, NE.

Photo: Dirac Twidwell

Threats Addressed



Land Use Conversion

Photo: Adobe stock

Past cultivation of the most productive soils has enabled the Great Plains to become one of the most agriculturally productive regions of the world, supporting corn, soybeans and sorghum, and more than half of all U.S. wheat production. Cropland expansion continues to consume more than one million acres of grassland annually across the U.S.[1]

A secondary land use conversion is the transition of grasslands to urban or suburban areas. While the impacts from constructing homes, roads, or other buildings are more localized, the habitat destruction is more severe and impossible to restore.

GEOGRAPHIC FOCUS

Risk of land use conversion is most prevalent in regions with a history of crop agriculture, and where expanding housing developments are spreading locally from population centers.

CONSERVATION OBJECTIVE

Avoid further land use conversion within grassland cores and strategically restore marginal croplands back to grassland.

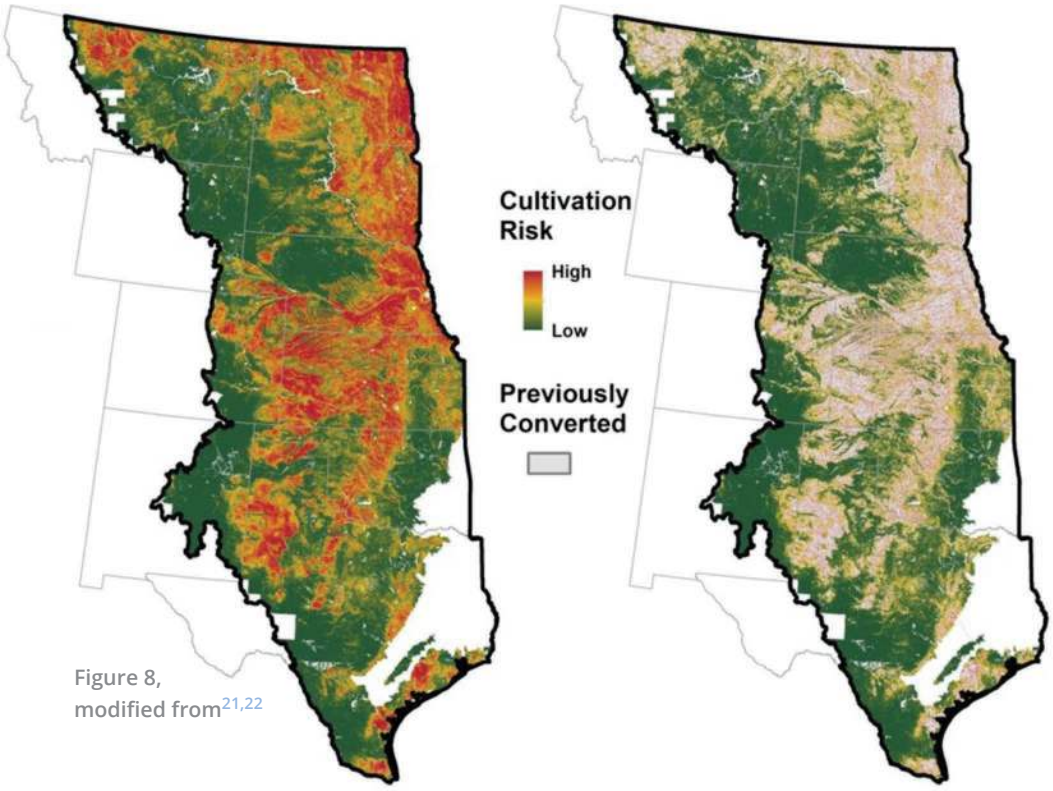


Figure 8, modified from[21,22]

The most productive soils in the Great Plains have already been converted to cropland (Figure 8, left). Ongoing conversion continues today in marginal soils (Figure 8).[1]

- Reduced crop yields (-6.5%) on marginal soils come at a high cost to wildlife[1] carbon,[2] water quality, and soil health.
- Rates of grassland loss in the Prairie Pothole Region of the Great Plains rival those of deforestation in the Brazilian Amazon.[23]
- An estimated 700 million birds have been lost from North America's grassland biome since 1970.[24]

THE CONSERVATION RESERVE PROGRAM

Pros: Since 1985, the Conservation Reserve Program (CRP) has enrolled private landowners in 10- to 15-year contracts for re-establishing grasses on former cropland in exchange for annual rental payments. Rural communities benefit greatly from the annual infusion of $2 billion in CRP payments,[25] as do wildlife,[26] water quality[27] and soil productivity.[28] The CRP has helped to conserve 4.5 million grassland songbirds in the southern Great Plains, and met or exceeded the population recovery goals for 8 of the region's most imperiled species.[29]

Cons: With federally-set acreage caps declining, competition is intense to stay in the program. In recent sign-ups, more than half of willing landowners are unable to re-enroll expiring CRP fields.[30] This outlook is concerning because the acreage exiting CRP is the largest source of grassland loss nationally.[31,32]

Acreage exiting CRP is the largest source of grassland loss in the nation.

STRATEGIC APPROACH

This framework provides a novel approach for retaining grassland that is exiting the CRP by replacing landowners' lost annual CRP payments with revenues from livestock grazing. Producers revert to cropping their most productive CRP fields once payments end but are open to keeping in grass their less productive fields.[30] Interested landowners can get the help they need to design sustainable grazing systems, including installation of water and fence needed for grazing. Building on past conservation success, this novel approach is complementary to CRP not a replacement for it.

- Opportunity for widespread adoption of this approach is high as only 5% of fields coming out of CRP are enrolled in another conservation program.[30]
- Landowner interest in transitioning to grazing lands is high as evidenced by a 58% rate of grassland retention a decade after CRP expiration.[33]
- Rate of grassland retention is twice as high in lower-productivity landscapes where grazing cultures persist.[33]
- A pilot project in the Nebraska Panhandle successfully helped producers transition 20,500 acres of expiring CRP into working lands by providing grazing infrastructure and technical assistance.[34]

Conservation easements are another effective mechanism for reducing the threats of cultivation or housing by keeping large working grasslands intact. For example, in the Great Plains of eastern Montana, partners—including WLFW—have conserved more than 230,000 acres of intact grazing lands over the past decade. Successful easements require an intentional approach that includes:

- Early dialogue with communities to understand their needs
- Additional investment in people to complete the complex real estate transactions
- Combining diverse funding sources from many partner groups

By stitching back together low productivity grasslands that are better suited for grazing than farming, we have the potential to conserve the Great Plains biome at scale.



Photo: Amy Erickson



Photo: Sandra Petersen Kindle



Photo: iStock/PrairieArtProject



Photo: Jeremy Roberts/Conservation Media

ANTICIPATED OUTCOMES

- ***Transition expiring CRP to working grasslands.*** Grassland retention doubles when efforts are targeted to poor performing croplands that are in proximity to existing grazing lands that support a grazing culture.[33]

- ***Minimize prairie-chicken losses.*** Programs mitigating for large-scale habitat loss and fragmentation help mitigate for population declines of prairie-chickens,[35] and higher levels of grassland have the potential to expand lesser prairie-chicken distribution by as much as 17%.[36]

- ***Drought mitigation for grazing and wildlife.*** Done right, restored grassland provide refugia for some grassland wildlife during severe drought while also providing a security blanket for livestock producers.[37,38]

- ***Restore carbon and minimize future loss.*** Conversion of grasslands to cropland in the Great Plains has completely altered carbon storage. Preventing future land use conversion on 10% of the region's grasslands saves the same amount of carbon as removing 2.5 million cars off the road each year.[39]

Success Spotlight

Building a Herd and Hope

In 2017, a record-setting drought in Phillips County, Montana left many ranchers in a panic, including Heather Martin. Luckily, Martin learned about an opportunity for installing a much-needed water source for her cattle. USDA, National Fish and Wildlife Foundation, the local conservation district, and the nonprofit Ranchers Stewardship Alliance had teamed up to help landowners put expiring CRP into sustainable grazing systems to reduce cultivation risk and maintain grasslands. As a priority habitat for grassland and upland birds, Martin's project was the perfect fit.

The partners provided cost-share funds for Martin to drill a new well, install pipeline, and build two wildlife-friendly water tanks. The new water system allows her to graze pastures in the winter, as well as rest other pastures in the spring and summer to promote fresh re-growth. The reinvigorated landscape is paying big dividends for birds and wildlife, but the most rewarding part is that it gave a young rancher the boost she needed to grow her herd.



"We want her ranching operation to be functional because that makes it functional for wildlife, too."

—Martin Townsend, Soil and Water Conservation District of Montana and the Rancher's Stewardship Alliance

Photo: Laura Nelson/Rancher's Stewardship Alliance

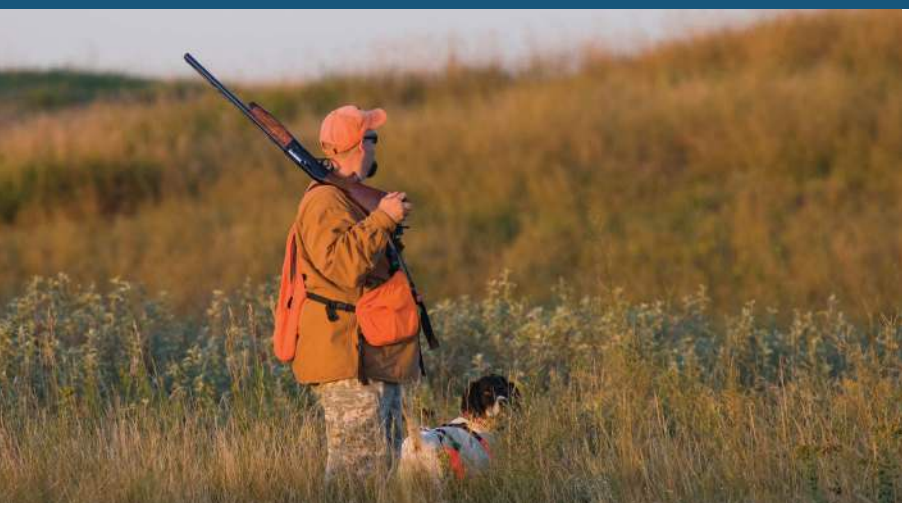


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