Managing biome-scale threats

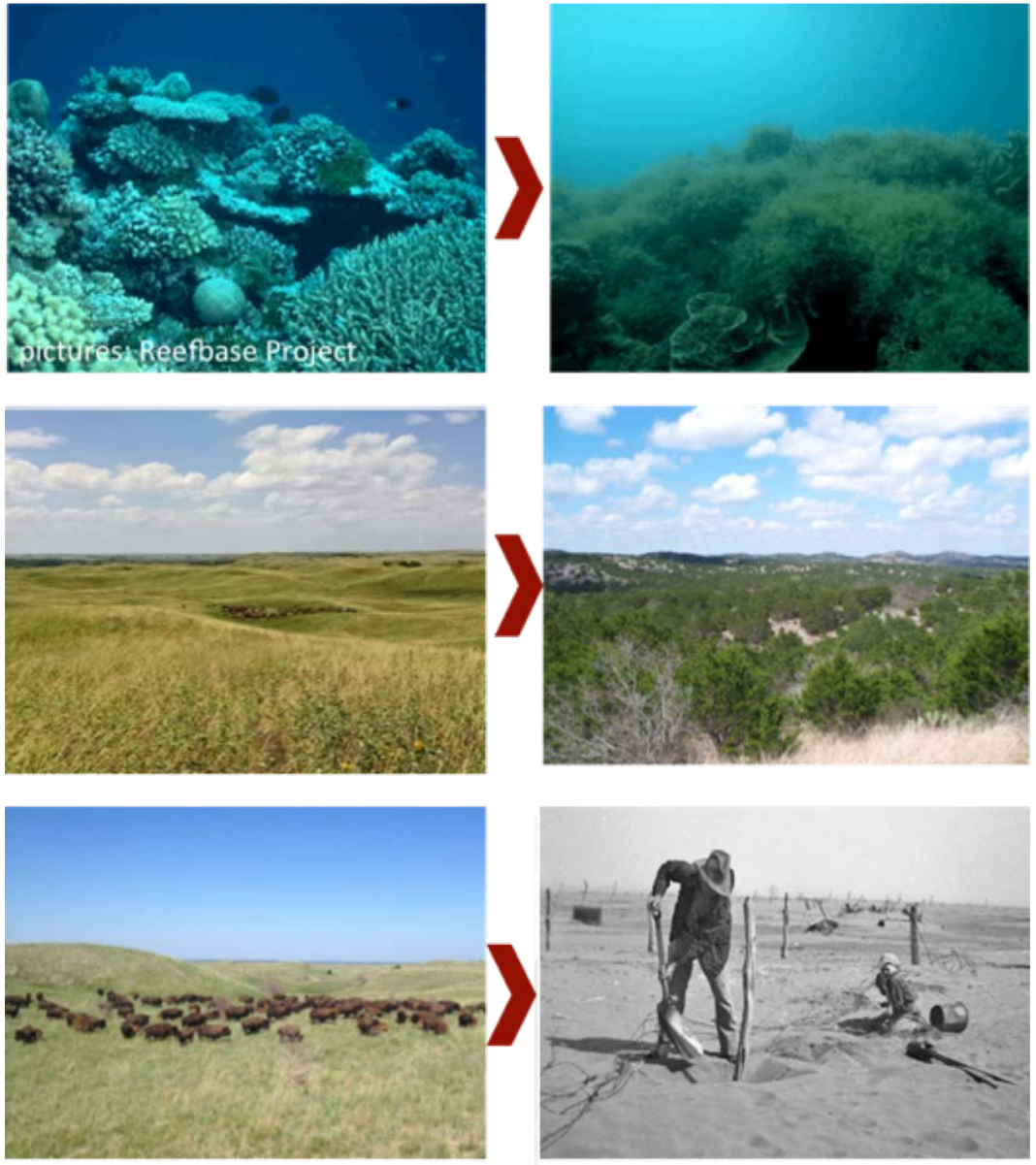
NRCS

University of Nebraska Lincoln

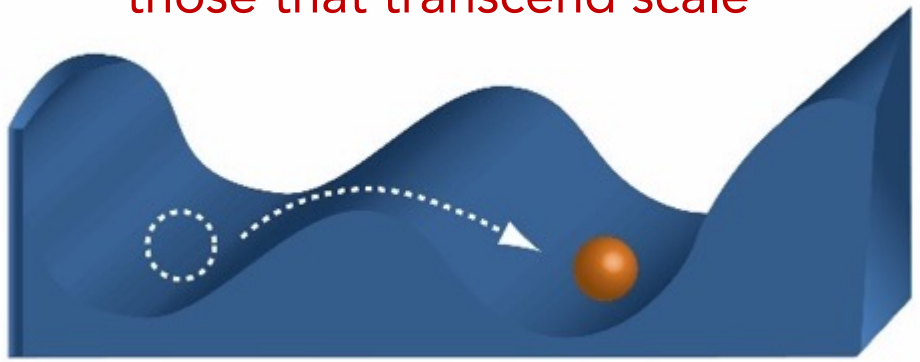
University of Montana

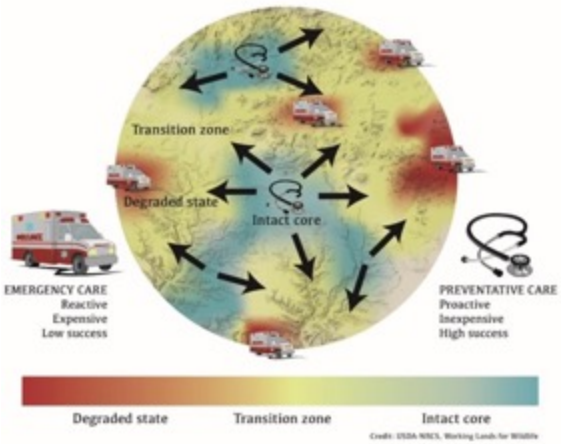
Working Lands for Wildlife

A grand challenge for the 21st century is to avoid transitions in nature that are so severe their consequences go beyond the traditions of any single discipline.

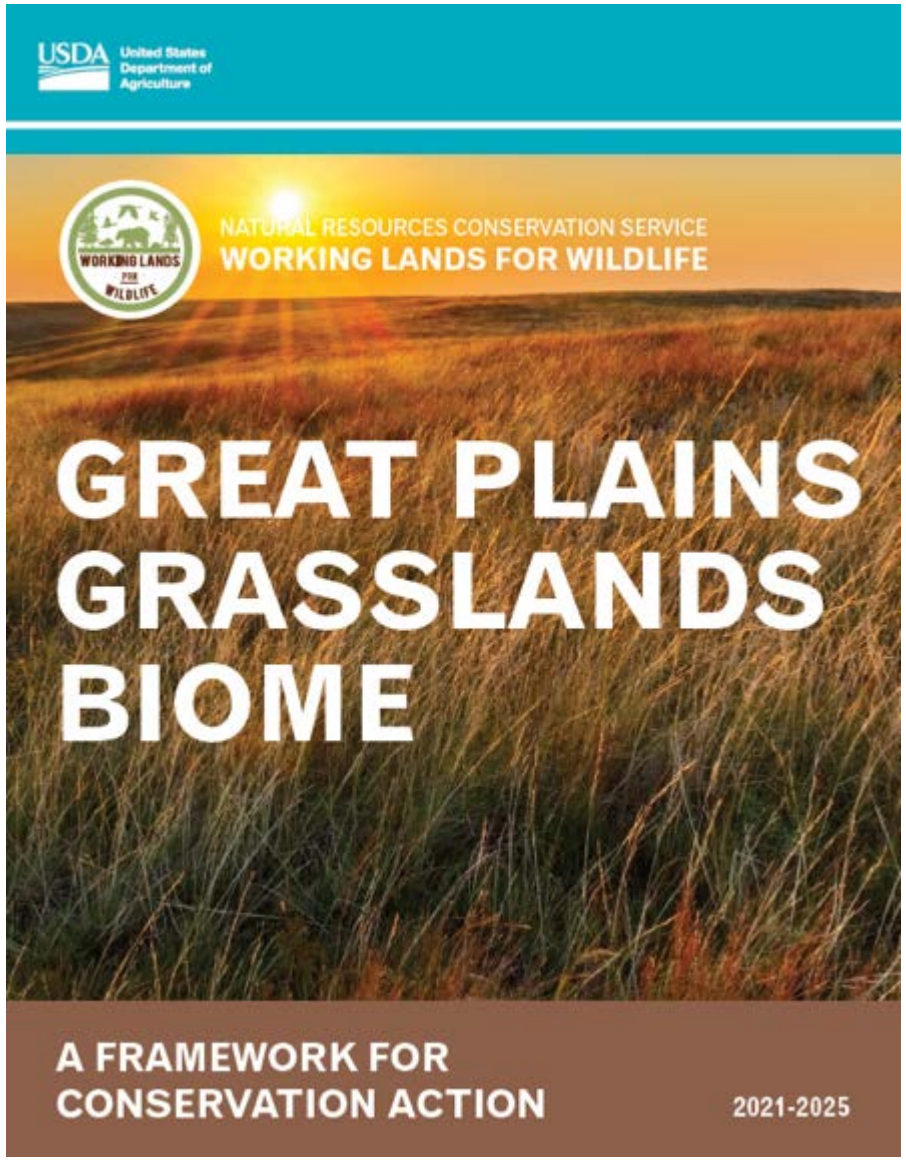


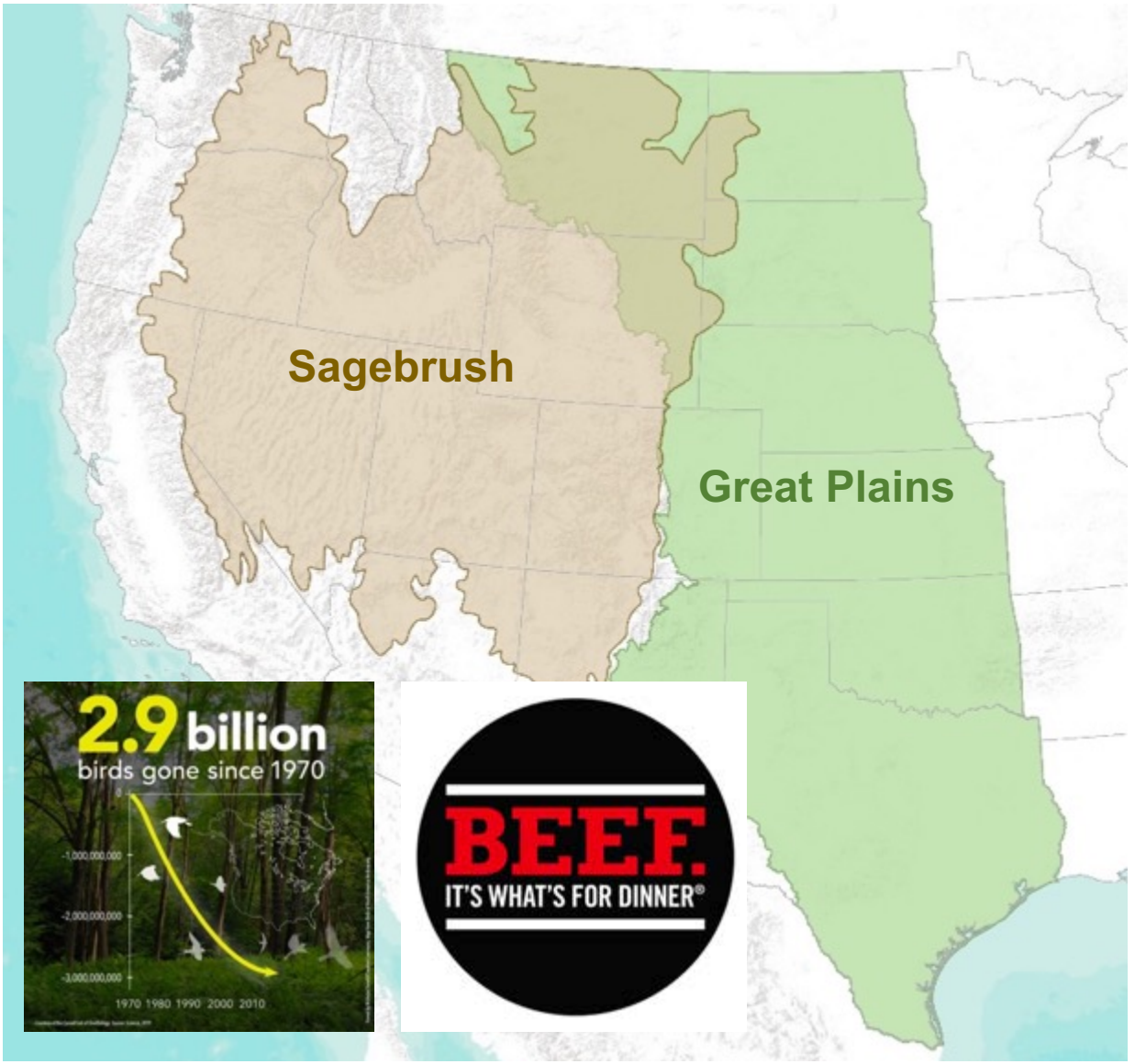
Scientists now hypothesize that the most catastrophic transitions are those that transcend scale



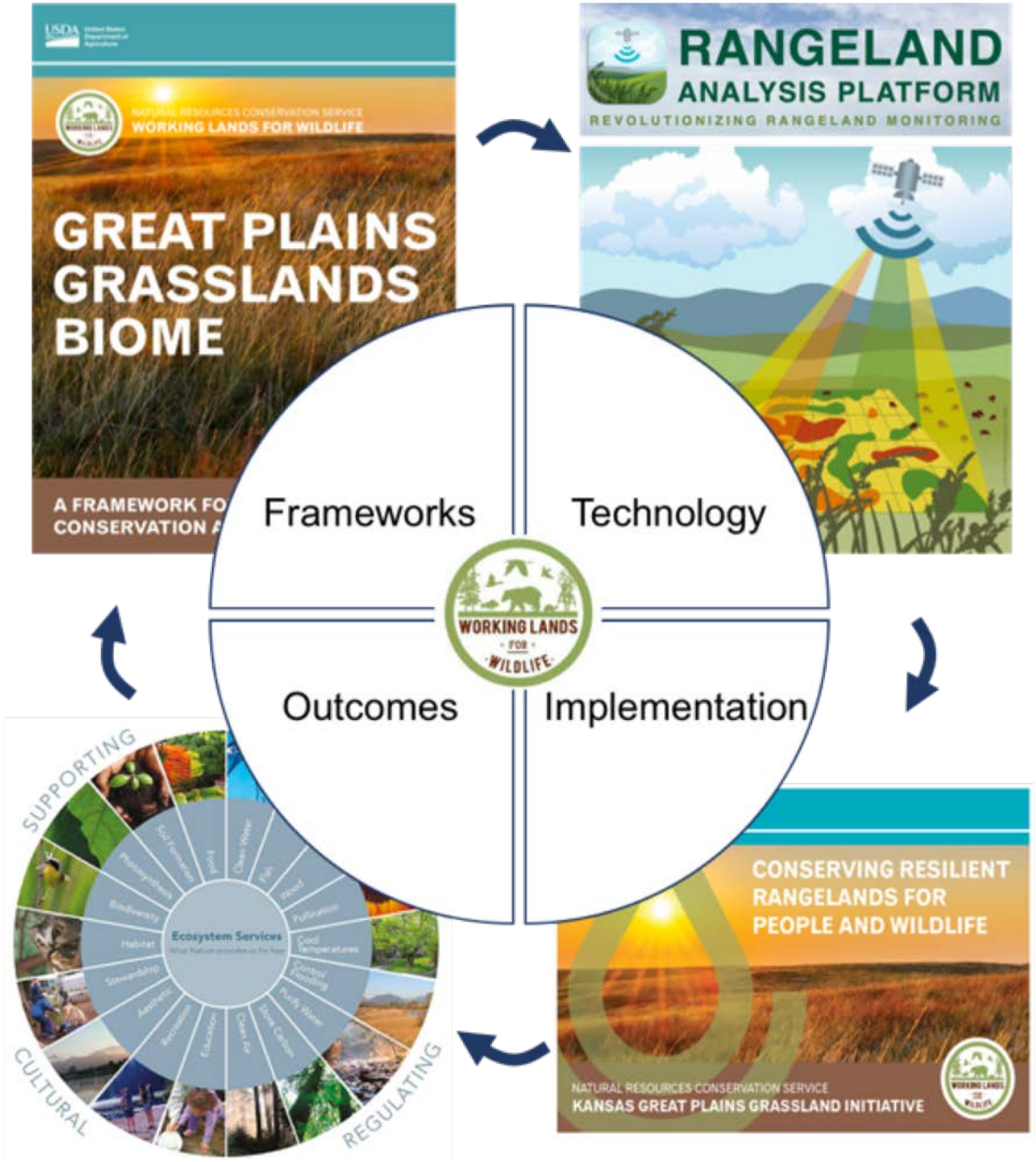


The Science and Technology Behind the NRCS's First Biome-Scale Framework for Conservation Action in America's Grasslands

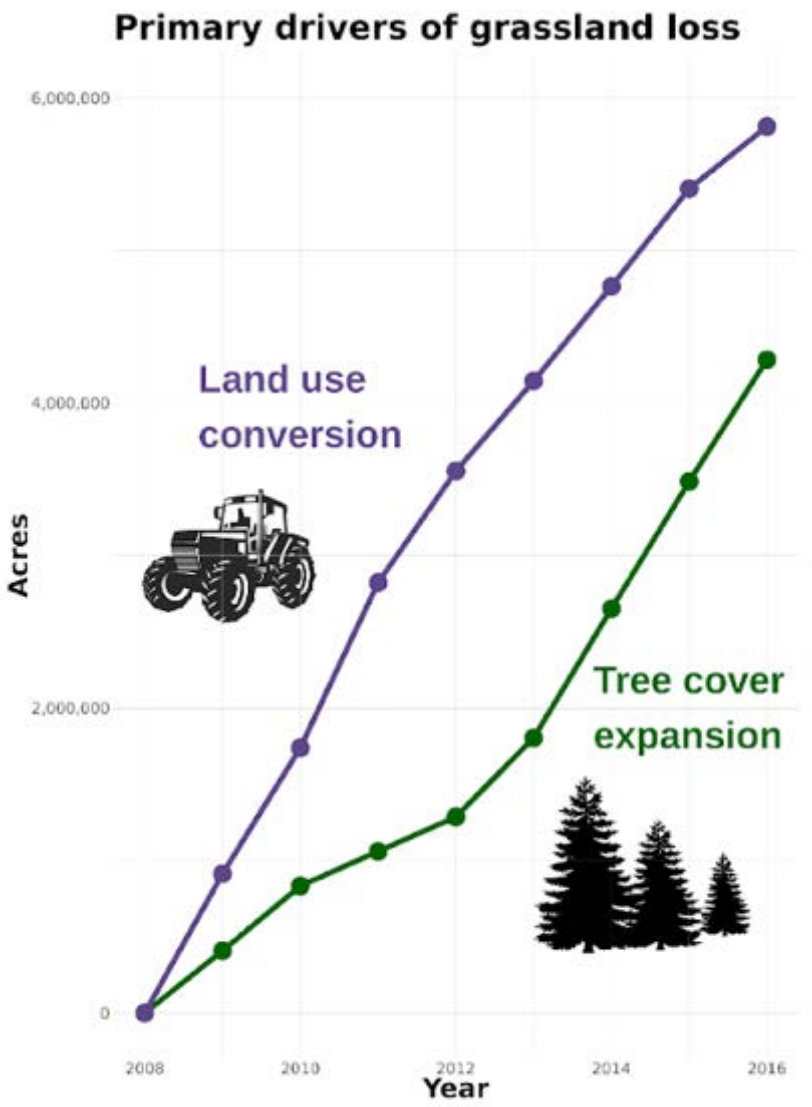


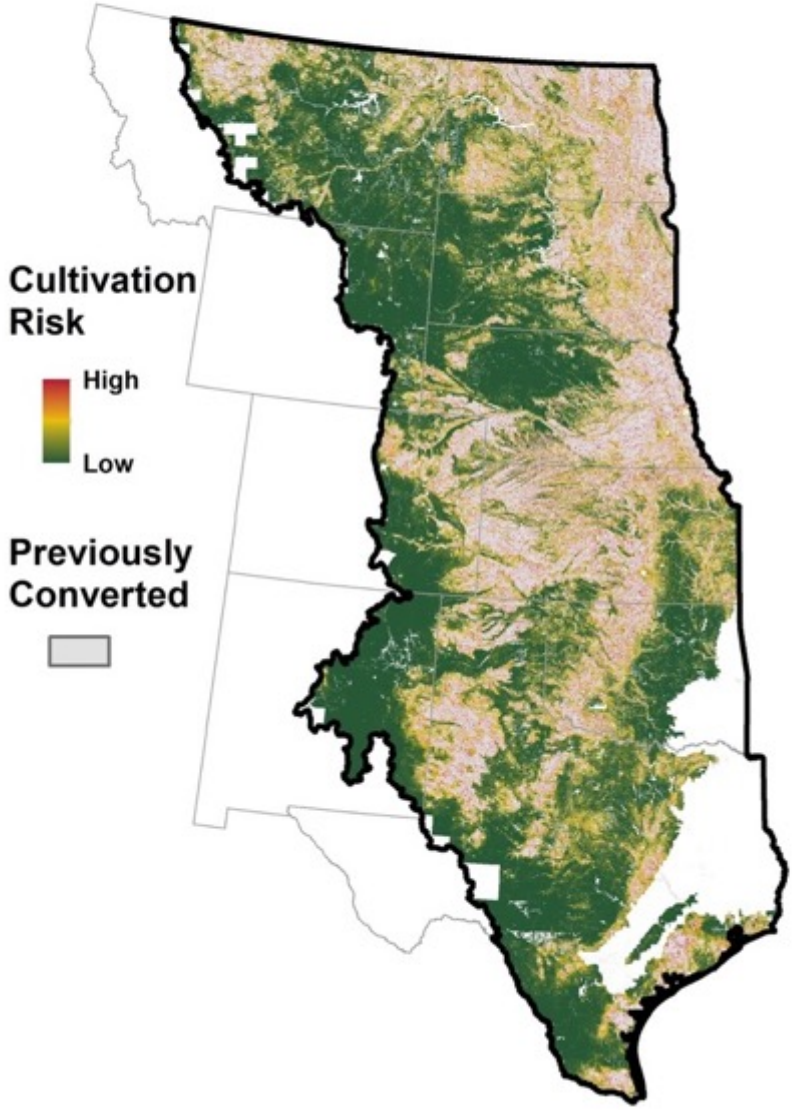


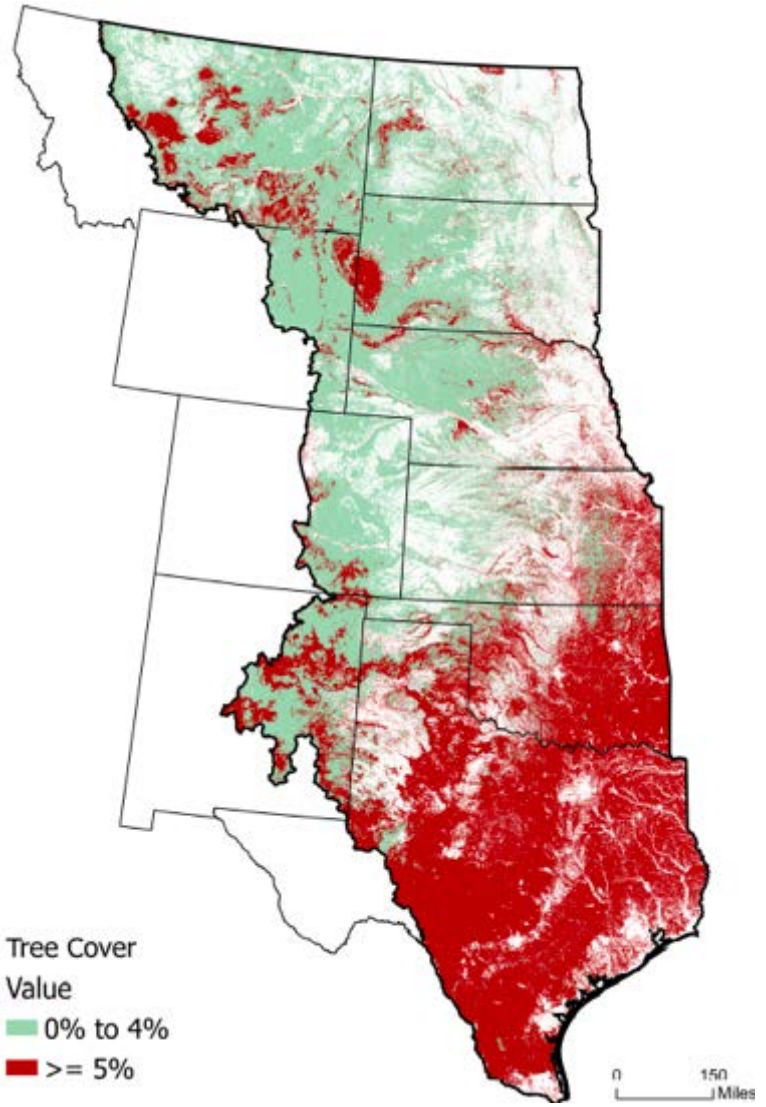
Science is well-positioned to support the scaling-up of conservation in the Great Plains



The Top Threats to the Great Plains Grassland Biome:
Land Use Conversion & Woody Encroachment







Morford et al. in review

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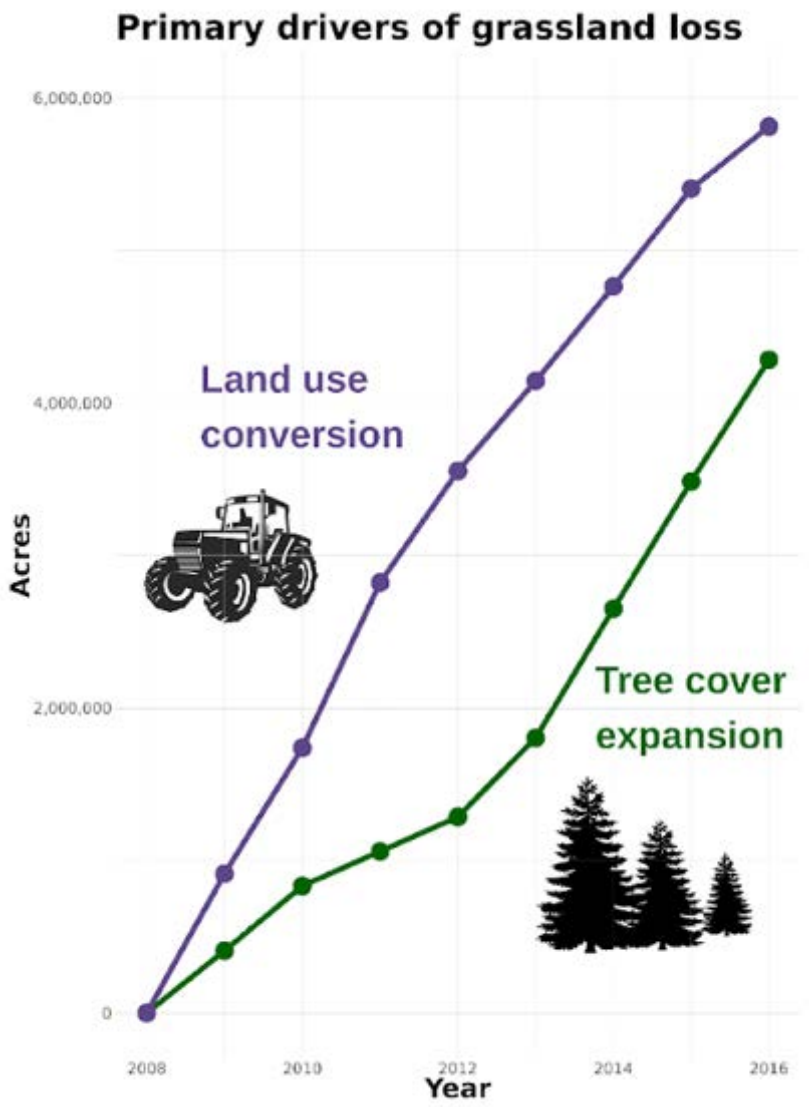

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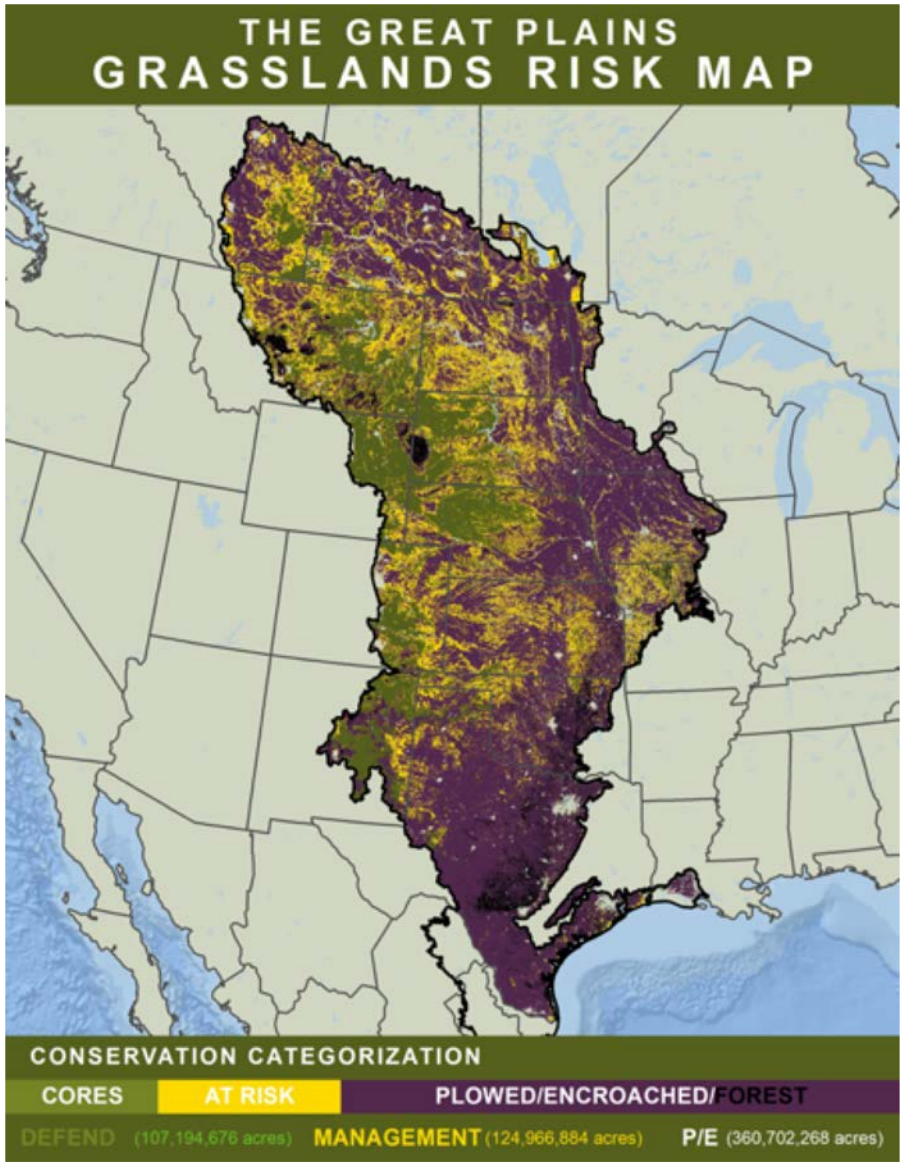
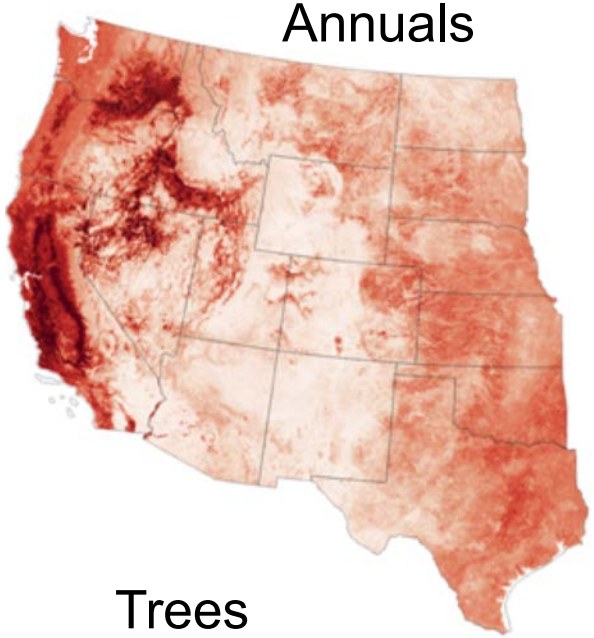


WWF, WLFW Collaborative Product

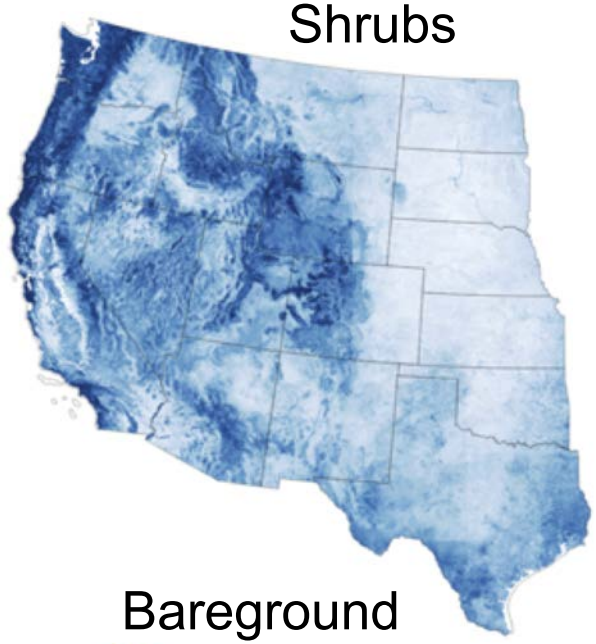
The potential to track dynamic transitions at large scales only recently became possible

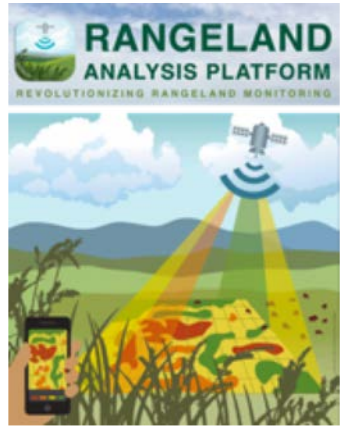
Perennials

Annuals



Shrubs





Trees

Bareground

1984-Present
30m resolution

http://rangelands.app

Allred et al. 2020

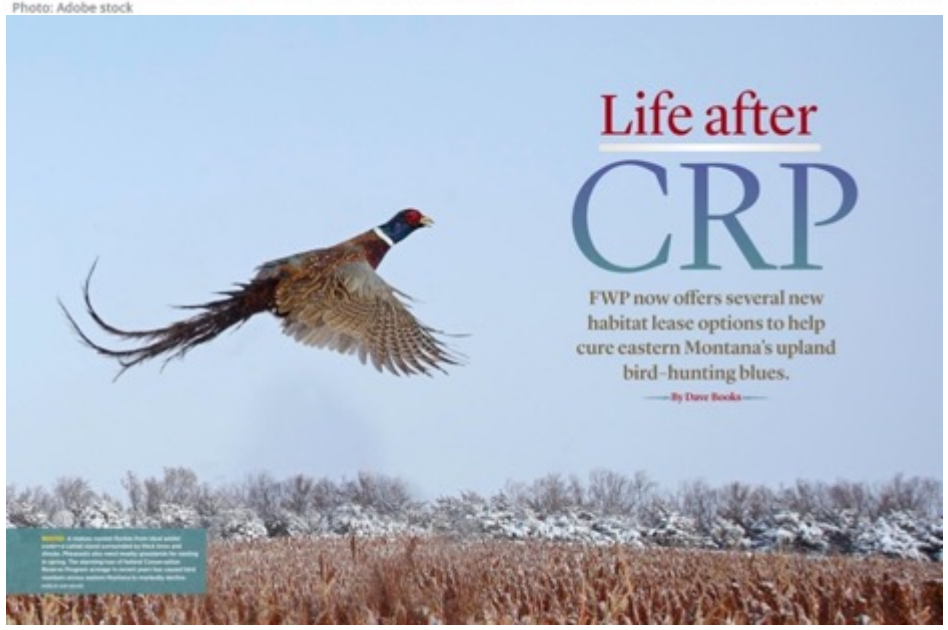
NRCS State Leadership Responded Overnight to Insights from New Technology

Photo: Shutterstock/Max Voran

Photo: Dirac Twidwell

Photo: Jeremy Roberts/Conservation Media

Photo: Adobe stock



Conservation Reserve Program

PROS

- Since 1985 CRP has incentivized grass re-establishment
- Communities benefit from $2B infusion from set-aside payments
- CRP conserved 4.5M songbirds, and met recovery goals for 8 species

CONS

- Still losing a million acres of grassland annually in U.S.
- With federal acreage caps declining, competition is intense to stay in program
- More than half of willing landowners are unable to re-enroll expiring fields

Outlook concerning because acreage exiting CRP is the largest source of grassland loss in the nation

Improving CRP retainment and transitioning to working grasslands

- 58% rate of grassland retention a decade after CRP expiration – revealing high landowner interest

- Retention rates are twice as high in lower productivity landscapes and where grazing cultures persist in a more intact grassland matrix

NRCS Strategy in GP Framework:

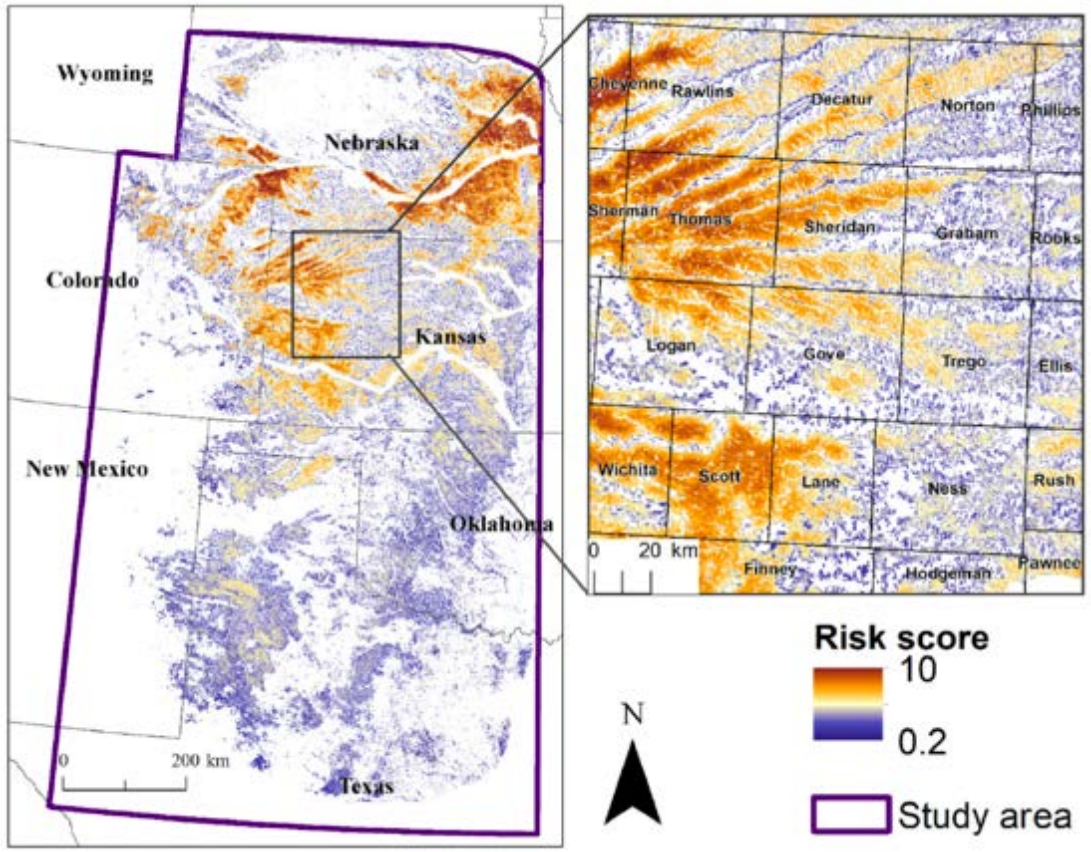
Retain grassland exiting CRP by replacing lost annual payments with revenues from livestock grazing (ACOGS)

Contents lists available at ScienceDirect
Biological Conservation
journal homepage: www.elsevier.com/locate/biocon

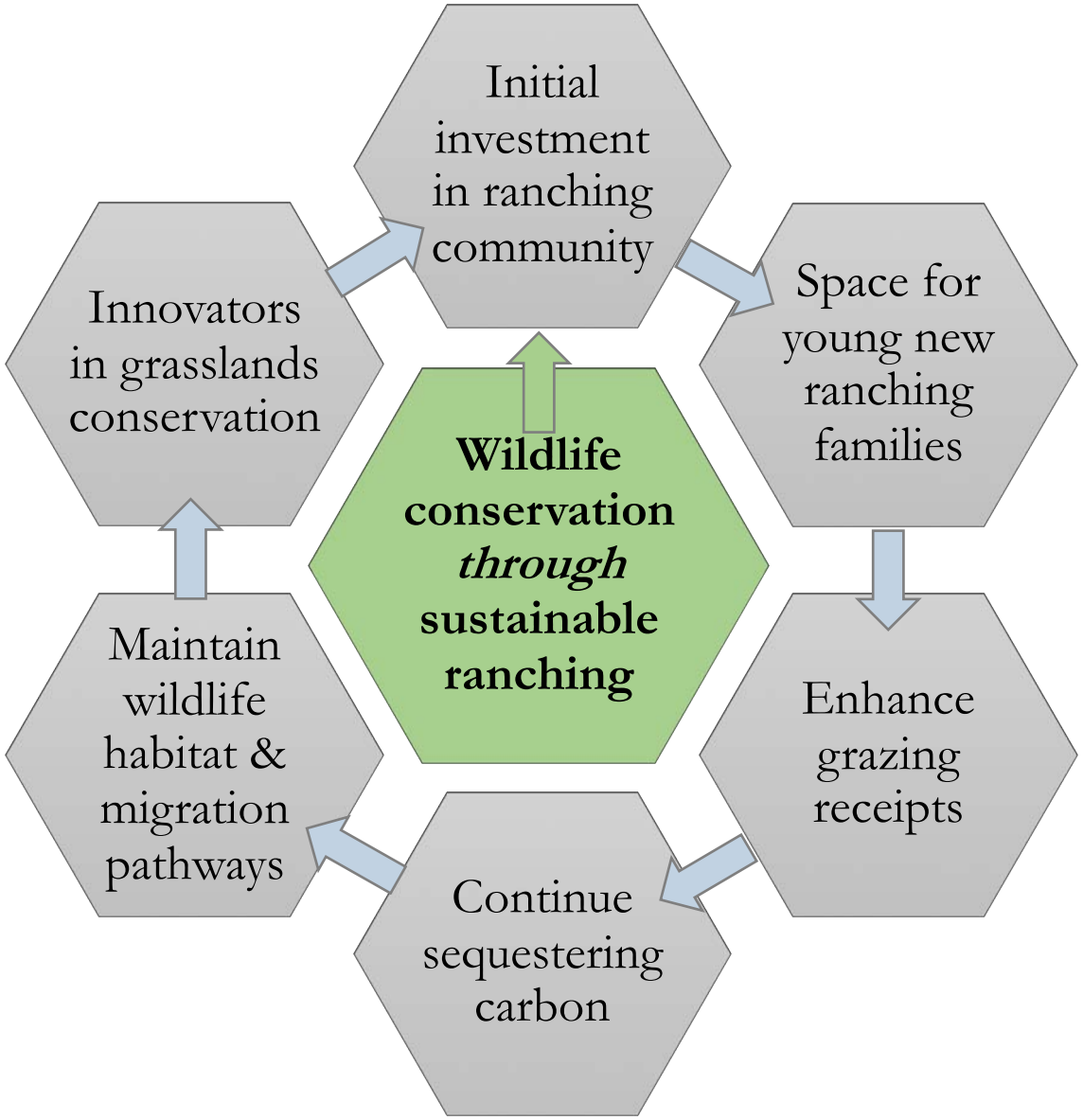
Policy analysis

Increasing durability of voluntary conservation through strategic implementation of the Conservation Reserve Program

Daniel S. Sullins [a,*], Meghan Bogaerts [b], Bram H.F. Verheijen [c], David E. Naugle [d], Tim Griffiths [e], Christian A. Hagen [f]



Systems-Level Outcomes for Ranching, Wildlife, and General Public

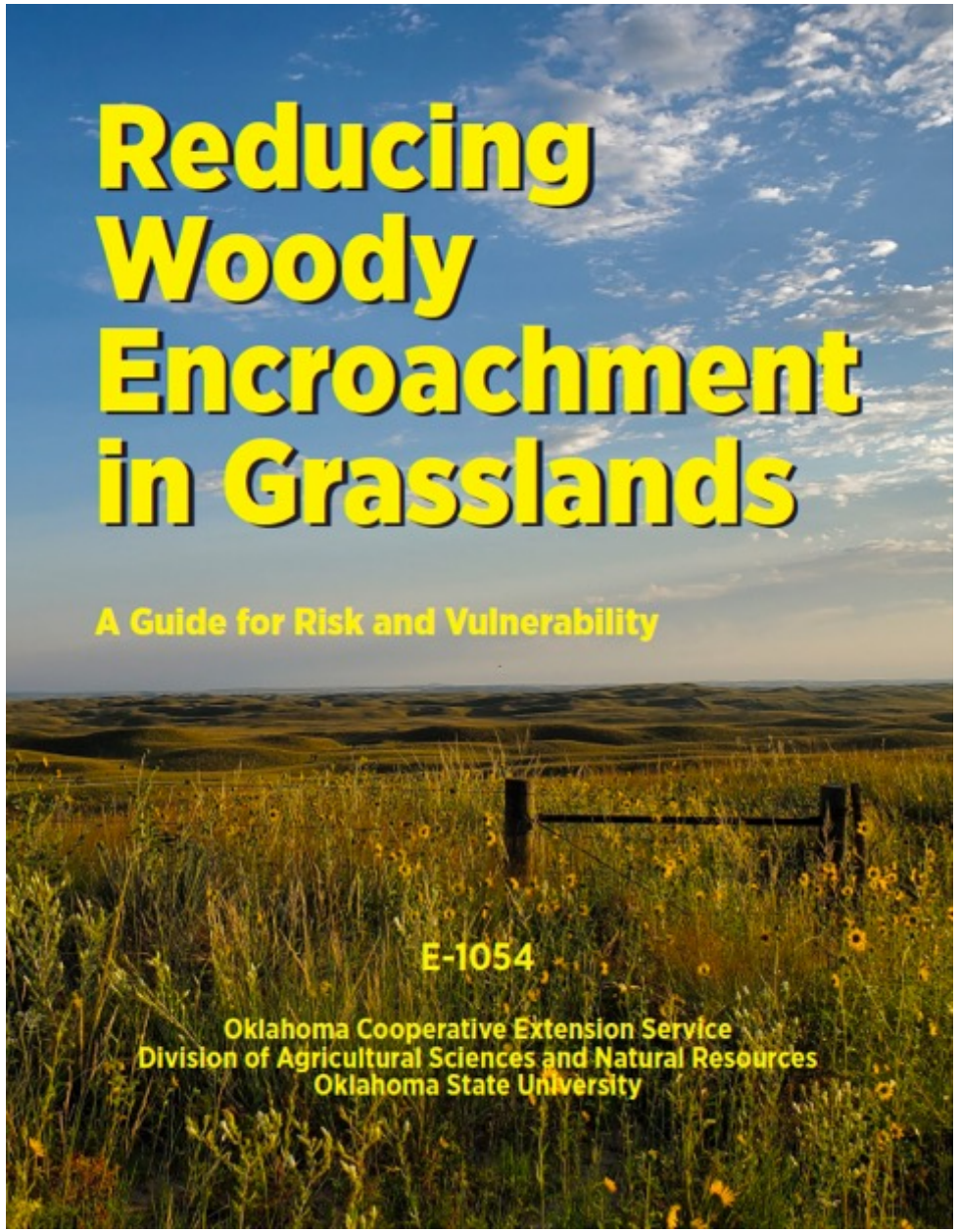


Threats Addressed

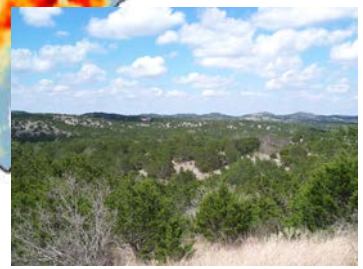
Photo: Christine Bielski

NRCS Strategy in GP Framework:

Arrest woodland expansion through preventative management and targeted restoration



2000



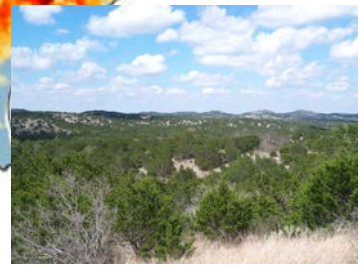
The Great Plains Biome is Collapsing

$177M spent in last Farm Bill

Southern Plains:	$164.5 M
Southern Mountain:	$59.6 M
Pacific:	$25.9 M
Northern Plains:	$12.5 M
Northern Mountain:	$8.5 M

Uden et al. 2020; Twidwell et al. 2021

2018



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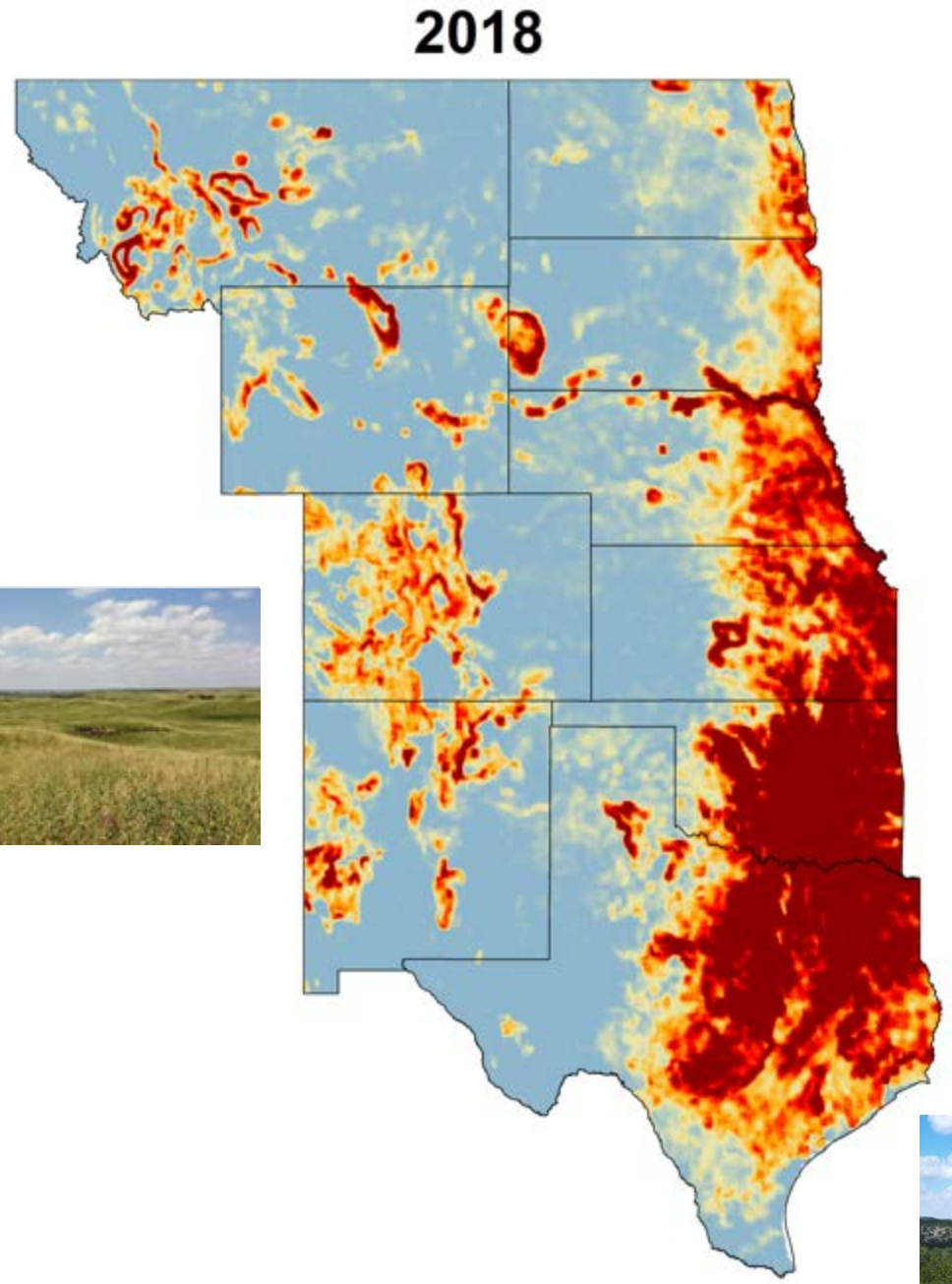
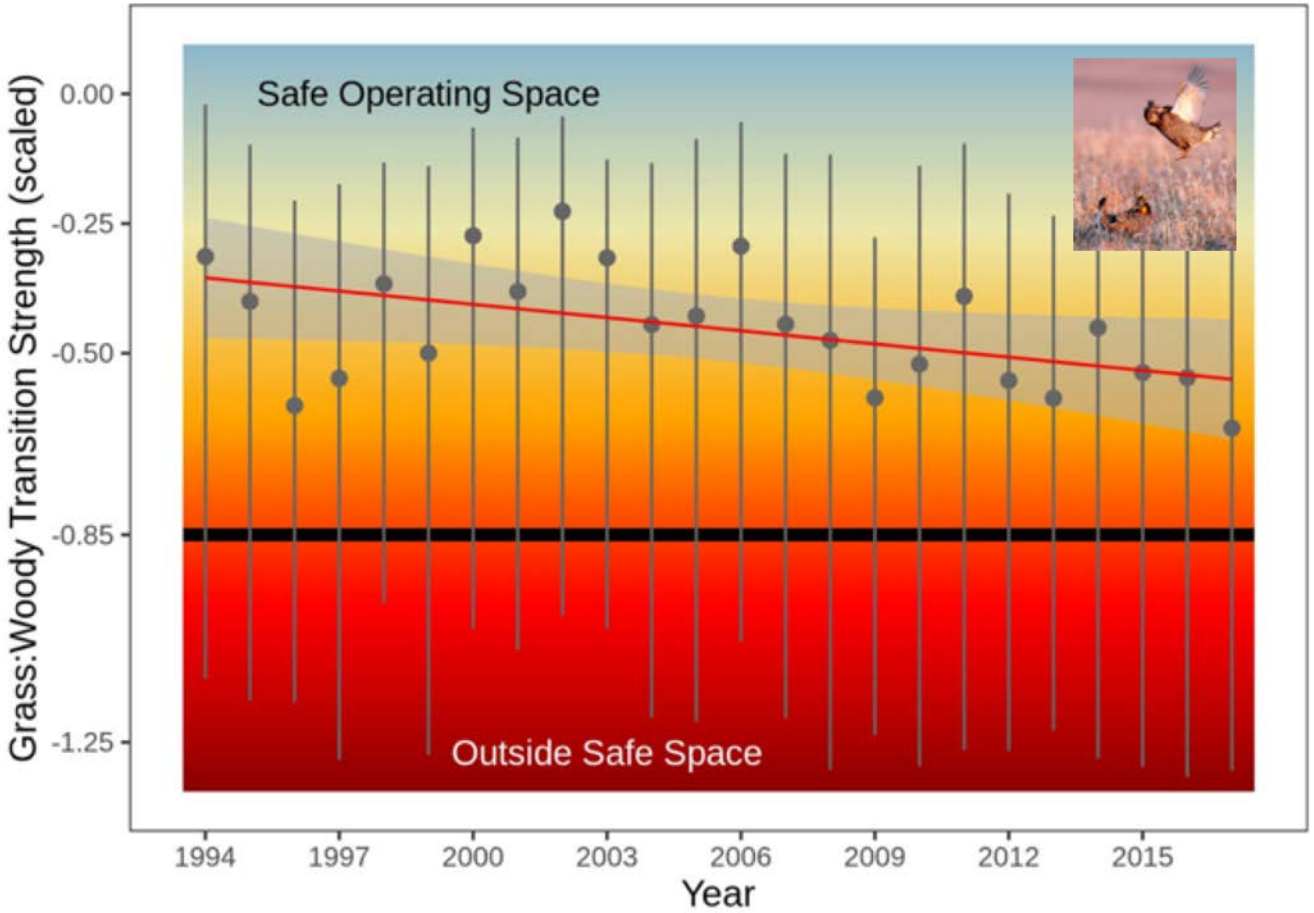


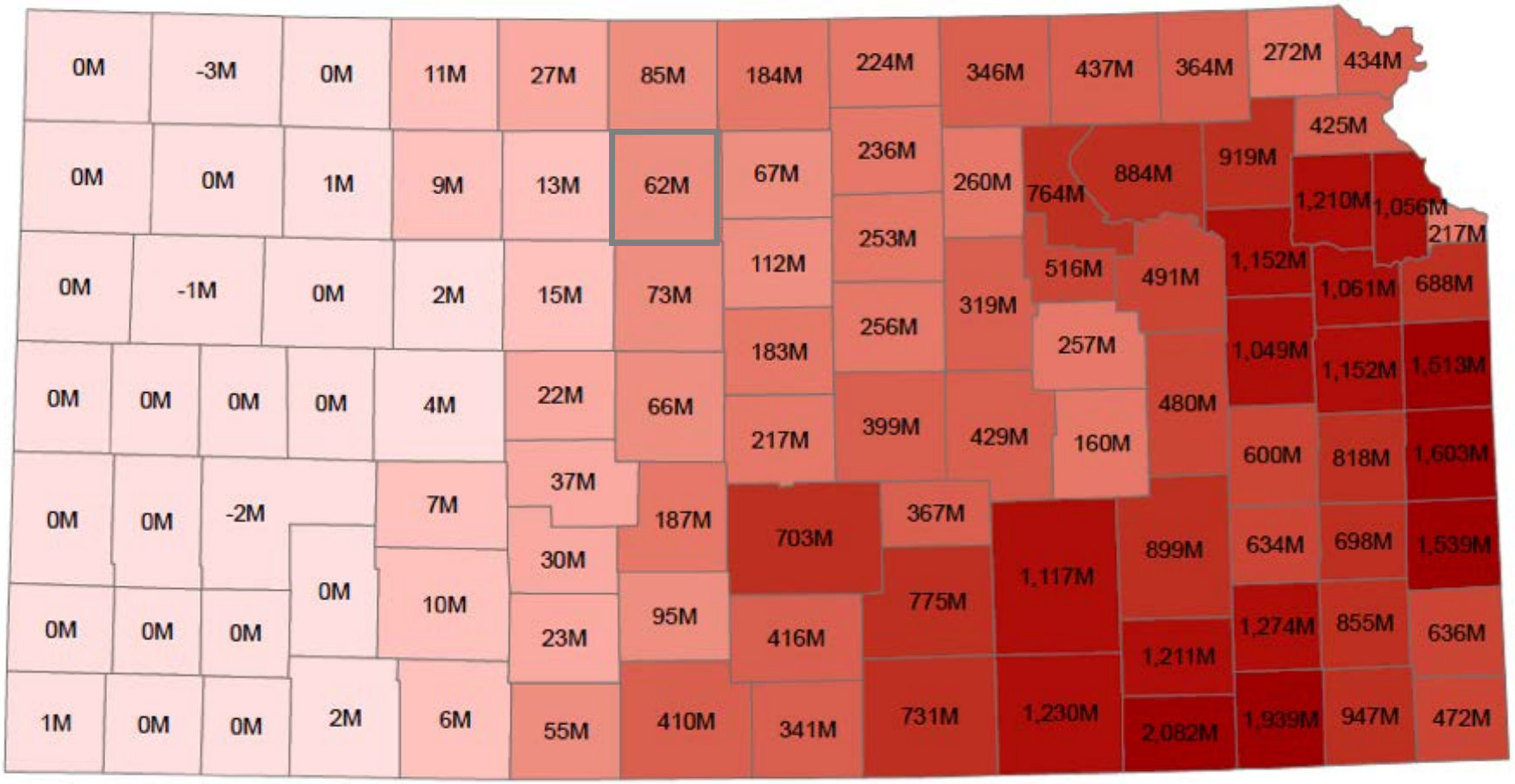
Large-scale vegetation transitions serve as early warning for grassland wildlife



Roberts et al. 2019; 2021

Woodland expansion takes land out of agricultural production

Kansas > 2M tons lost in 2019



**Preliminary model estimates; county values in pounds*

Morford et al. in review

Rangeland production statistics will soon match the rest of agricultural communications

Rangeland production statistics for Osborne County, KS

Tree cover and herbaceous production summary

Tree cover in 2019	14,217 acres	Figure 1
Tree cover change since 1990	7,598 acres	Figure 2
Tree cover percent in 2019	5.18%	
Herbaceous production in 2019	376,028 tons	
Herbaceous production gains/losses resulting from tree expansion in 2019	-4,425 tons	Figure 3
Herbaceous production gains/losses resulting from tree expansion since 1990	-39,436 tons	Figure 4

Figure 3: Annual herbaceous production gains/losses resulting from tree cover change

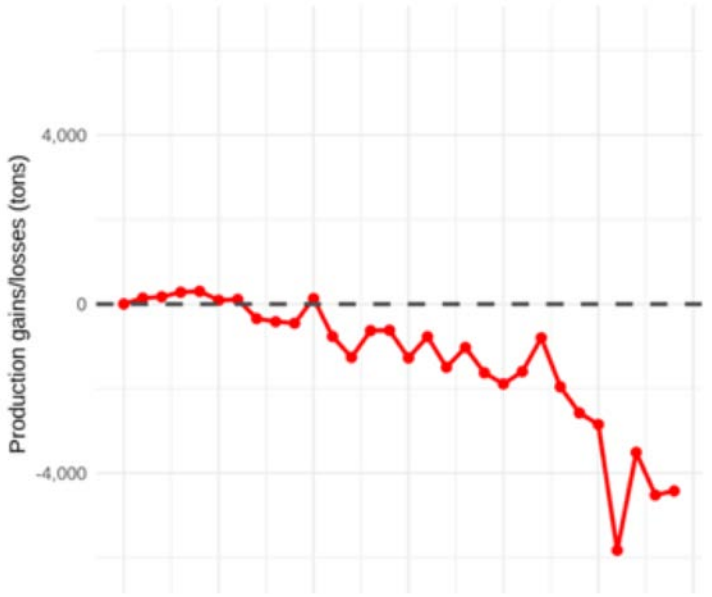
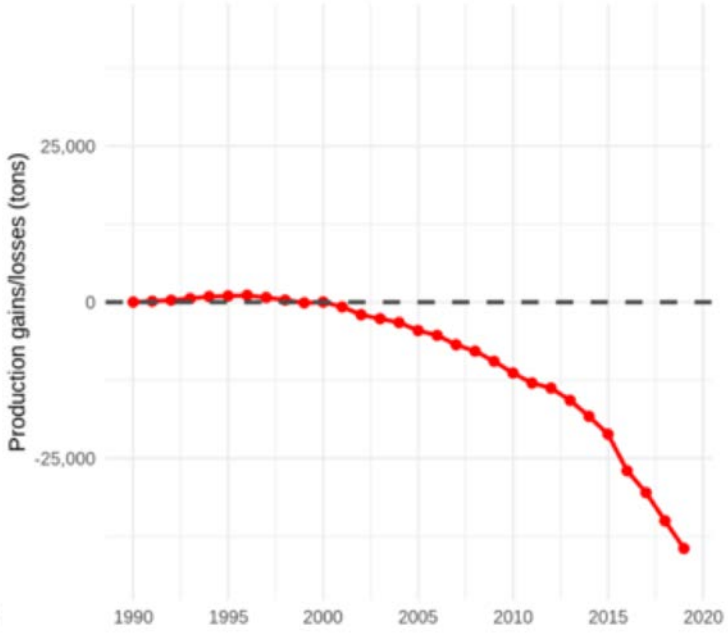
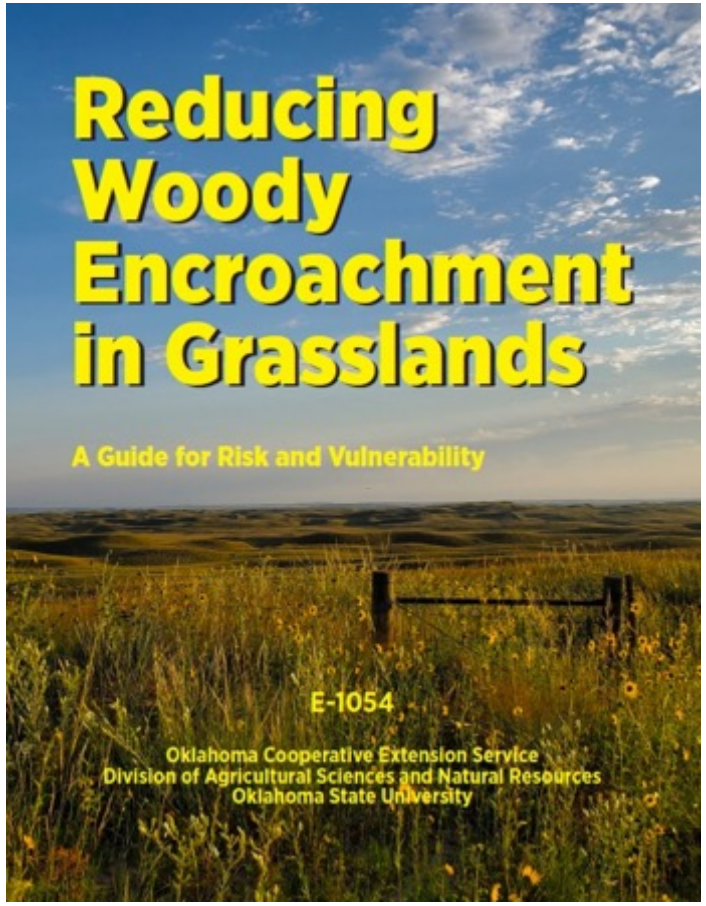


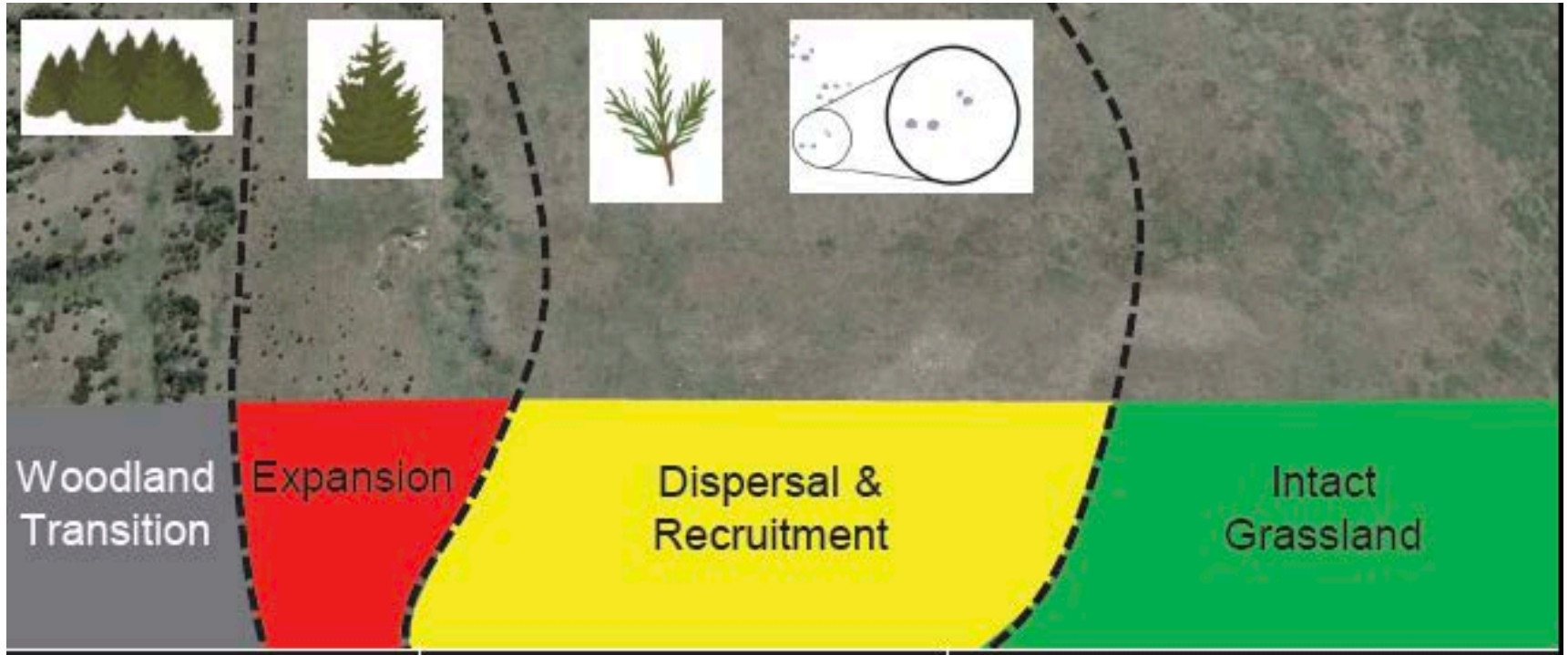
Figure 4: Cumulative herbaceous production gains/losses resulting from tree cover change



Morford et al. in development

Landowner Groups Winning the War are Reducing Risk and Vulnerability





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

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

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.