Defending Core Rangelands Against Invading Annual Grasses

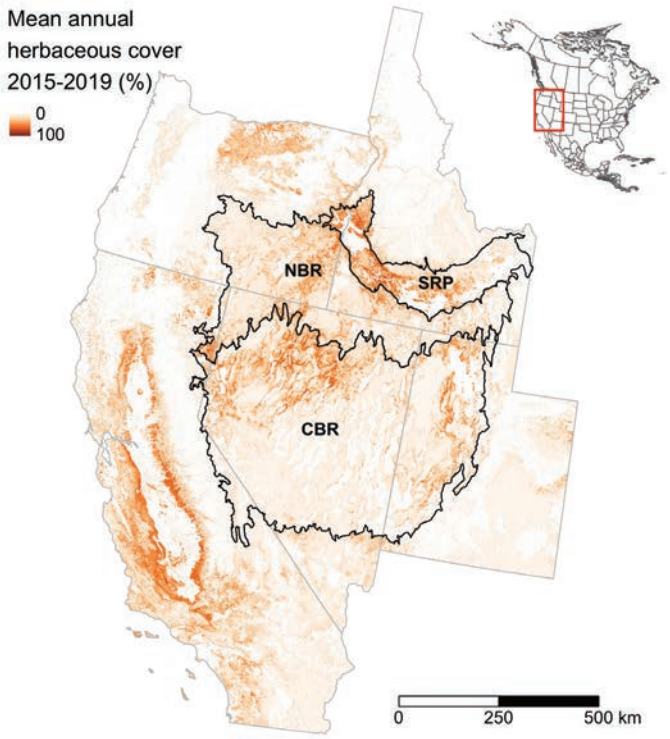
Photo: Jeremy Roberts/Conservation Media

Invasive annual grasses represent one of the largest threats to the health and resilience of western rangelands.[1] Invading annual grasses increase wildfire risk and shorten return intervals, exacerbate drought, reduce forage for wildlife and livestock, and have long–term negative implications for carbon and climate.

Past efforts to control invasive annual grasses were often done reactively, at small scales, in areas of intense infestation, and void of regional context, ultimately hindering long–term success. Working Lands for Wildlife (WLFW) has developed spatial tools to help conservation planners better mitigate risks using soil data.[2] WLFW science has also quantified the elevational ascent and spread of annual grassland transitions, showing movement upslope at 200 to 330 feet per decade.[3] This ascent and spread contribute to an alarming six–fold increase in annual grassland area from 1986–2019 in the U.S. Great Basin.

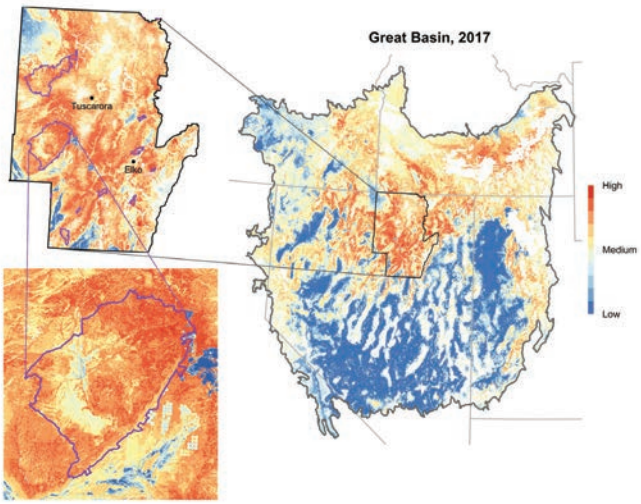
In Brief: WLFW science has spurred biome–wide application of geospatial data to proactively address the conversion of native rangelands to annual grasslands.

Fire probability maps built on data from the Rangeland Analysis Platform (RAP) demonstrate fine fuels like annual grasses are a primary predictor of large fires. Fire activity in the Great Basin is largely predictable based on accumulating fuel conditions and drought.[4] Over the last three decades, about 80 percent of burned area has occurred on a quarter of the Basin and the annual burned area is increasing in some areas. This science supports a call to action where accelerated intervention is critically needed to conserve rangelands in the face of an ever–growing distribution of annual grasses fueling megafires.[5] WLFW, with public and private partners, has introduced an innovative approach to tackle this problem and address the conversion of sagebrush rangelands to annual grasslands.

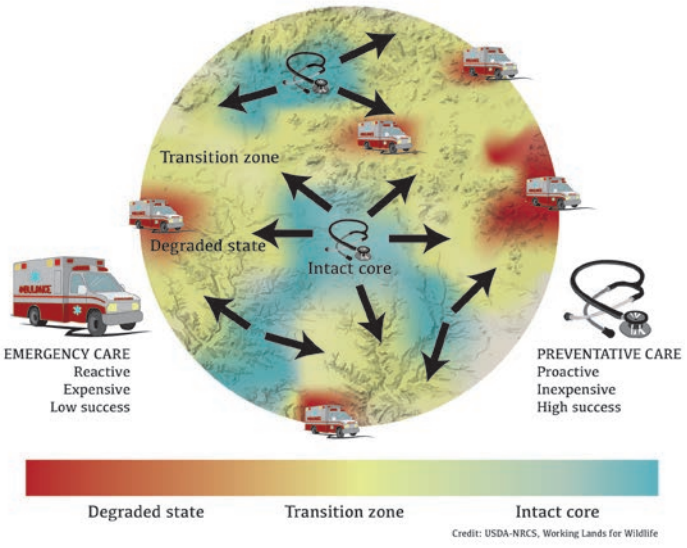


The Rangeland Analysis Platform has mapped invasive annual grasses across western grazing lands (1,3).

Invasive species control is more effective and cost–efficient when done early, before infestations become widespread, and when management is informed by the surrounding landscape. This science spurred WLFW's new spatial targeting strategy for tackling this threat; a proactive management approach—Defend the Core, Grow the Core, Mitigate Impacts—that is embedded in WLFW's Sagebrush Biome Framework for Conservation Action.



Fire probability in 2017 for the Great Basin. These largely RAP–based seasonal fire probability maps help managers prepare for where and when ignitions are likely to result in large and damaging wildfires. Insets depict in purple the perimeters of wildfires >1,000 acres that burned in 2017 (4).



Invasive species control is more effective and cost–efficient when done early and at biologically large scales. Mapping of invasive grasses in the Rangeland Analysis Platform spurred a new spatial targeting strategy of 'Defend the Core, Grow the Core'.

Exotic Annual Grass Invasion

Core areas with minimal annual grass invasion serve as anchors for conservation where efforts are most likely to be successful and cost–effective. Defending and growing those cores through conservation actions and partnerships is prioritized and invasion impacts are mitigated in areas where annual grasses have a strong foothold. This spatial strategy relies on comprehensive geographic data of annual grass cover and interannual variability, and WLFW's early investment in remote sensing and mapping technologies is paying dividends.

No state has been hit harder by cheatgrass than Idaho, which is why USDA's Natural Resources Conservation Service (NRCS) in Idaho worked closely with ranchers and partners to launch the Cheatgrass Challenge, a proactive strategy for tackling exotic annual grasses. Using RAP data and considering assessments of sagebrush ecosystem resilience and resistance,[2] the strategy identified relatively uninvaded areas in Idaho and guided conservation efforts. Following Idaho's lead, the Western Governors' Association–appointed Western Invasive Species Council convened a cheatgrass committee. The committee stretched across agencies, created an integrated annual herbaceous cover map,[6] and developed a new toolkit for invasive annual grass management across the West that incorporated WLFW's spatial targeting strategy and RAP data.

Photo: Jeremy Roberts/Conservation Media

Capitalizing on a network of partners, new geospatial data from RAP, and insights from cutting–edge science NRCS and WLFW have spurred uptake and application of this new innovative strategy to address the deterioration of sagebrush rangelands.

WLFW–SUPPORTED SCIENCE PUBLICATIONS:

1. Jones, M.O., D.E. Naugle, D. Twidwell, D.R. Uden, J.D. Maestas, and B.W. Allred. 2020. Beyond inventories: Emergence of a new era in rangeland monitoring. Rangeland Ecology and Management 73:577–583.

2. Maestas, J.D., Campbell, S.B., Chambers, J.C., Pellant, M., Miller, R.F., 2016. Tapping soil survey information for rapid assessment of sagebrush ecosystem resilience and resistance. Rangelands 38:120–128.

3. Smith, J.T., B.W. Allred, C.S. Boyd, K.W. Davies, M.O. Jones, J.D. Maestas, S.L. Morford, and D.E. Naugle. 2021. The elevational ascent and spread of exotic annual grasslands in the Great Basin, USA. bioRxiv https://doi.org/10.1101/2021.01.05.425458

4. Smith, J.T., B.W. Allred, C.S. Boyd, K.W. Davies, M.O. Jones, A.R. Kleinhesselink, and D.E. Naugle. 2021. Where there's smoke, there's fuel: Predicting Great Basin rangeland wildfire. bioRxiv https://doi.org/10.1101/2021.06.25.449963

5. Murphy, T., D.E. Naugle, R. Eardley, J.D. Maestas, T. Griffiths, M. Pellant, and S.J. Stiver. 2013. Trial by fire: Improving our ability to reduce wildfire impacts to sage–grouse and sagebrush ecosystems through accelerated partner collaboration. Rangelands 35:2–10.

6. Maestas, J., M. Jones, N.J. Pastick, M.B. Rigge, B.K. Wylie, L. Garner, M. Crist, C. Homer, S. Boyte, and B. Whitacre. 2020. Annual herbaceous cover across rangelands of the sagebrush biome: U.S. Geological Survey data release https://doi.org/10.5066/P9VL3LD5

RECOMMENDED READINGS:

Chambers, J.C., J.L. Beck,; J.B. Bradford, J. Bybee, S. Campbel,; J. Carlson, T.J. Christiansen, K.J. Clause, G. Collins, M.R. Crist, J.B. Dinkins, K.E. Doherty, F. Edwards, S. Espinosa, K.A. Griffin, P. Griffin, J.R. Haas, S.E. Hanser, D.W. Havlina, K.F. Henke, J.D. Hennig, L.A. Joyce, F.M. Kilkenny, S.M. Kulpa, L.L. Kurth, J.D. Maestas, M. Manning, K.E. Mayer, B.A. Mealor, C. McCarthy, M. Pellant, M.A. Perea, K.L. Prentice, D.A. Pyke, L.A. Wiechman, and A. Wuenschel. 2017. Science framework for conservation and restoration of the sagebrush biome: Linking the Department of the Interior's integrated rangeland fire management strategy to long–term strategic conservation actions. Part 1. Science basis and applications. General Technical Report RMRS–GTR–360. Fort Collins, Colorado. U.S. Department of Agriculture, United States Forest Service, Rocky Mountain Research Station. 213 pages. https://www.fs.usda.gov/treesearch/pubs/53983

Chambers, J.C., J.D. Maestas, D.A. Pyke, C.S. Boyd, M. Pellant, and A. Wuenschel. 2017. Using resilience and resistance concepts to manage persistent threats to sagebrush ecosystems and Greater sage–grouse. Rangeland Ecology and Management 70:149–164.