

# Land management options outlined to address cheatgrass invasion

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This intact rangeland community, some distance from water, has little cheatgrass but abundant native bunchgrasses and forbs that help resist cheatgrass invasion.

Credit: Oregon State University

A new study suggests that overgrazing and other factors increase the severity of cheatgrass invasion in sagebrush steppe, one of North America's most endangered ecosystems.

The research found that overgrazed land loses the mechanisms that can resist invasion. This includes degradation of once-abundant native bunchgrasses and trampling that disturbs biological soil crusts. The work was published today in the *Journal of Applied Ecology* by researchers from Oregon State University, Augustana College and the U.S. Geological Survey.

"We think there are ways to assess the risks these lands face to reduce the impact of [cheatgrass](#) invasion," said Paul Doescher, professor and head of the OSU Department of [Forest Ecosystems](#) and Society, and co-author on the study.

"In the future we should work cooperatively with [ranchers](#) and [land managers](#) to promote a diverse sagebrush and bunchgrass ecosystem," Doescher said. "That type of community will protect the native plant and [wildlife species](#) and benefit sustainable rangeland use at the same time."

Researchers suggested that one of the most effective restoration approaches would be to minimize the cumulative impact of grazing, by better managing the timing, frequency of grazing and number of animals.

The researchers also determined that, contrary to some previous suggestions, grazing does not reduce cheatgrass abundance. Cheatgrass was found by this study to be extremely tolerant of even intensive grazing, and the findings "raise serious concern" about proposals to use cattle grazing to help control its spread in areas where native bunchgrasses still persist.

The study outlines the complex [ecological processes](#) that can promote cheatgrass invasion and the indirect role [overgrazing](#) plays in that process. Increasing gaps and connection of gaps between once-abundant native bunchgrasses allow "a dramatic increase" in cheatgrass invasion,

the study concluded. Such gaps could serve as a valuable "early warning indicator" and allow for management approaches that could help conserve and restore the land.



Cattle grazing in a rangeland site near water has led to reduced native bunchgrasses and a higher level of cheatgrass invasion. Credit: Oregon State University

Cheatgrass threatens vast regions of the American West, especially the Great Basin in Nevada and surrounding states. These are areas which were once carpeted by millions of acres of native sagebrush, perennial bunchgrasses and associated wildlife that had evolved with little herbivore pressure. Cheatgrass displaces native grasses and wildlife, can increase fire frequency and ultimately cause an irreversible loss of these native shrub-steppe communities.

This also has grazing implications: cheatgrass is a short-lived annual grass that dries out quickly and provides lower quality forage for much of the year, compared to perennial bunchgrasses.

"Cheatgrass changes the fire regime, and as it spreads, can reach a tipping point," said Michael Reisner, now an assistant professor at Augustana College who led this study as a doctoral student at OSU.

"After you cross that threshold, a major rangeland fire will come through that takes out the sagebrush, and in most cases the native ecosystem never recovers," Reisner said. "Many of the plant and animal species that were there can disappear, mostly replaced by cheatgrass that offers poor forage for cattle."

In a more resistant system, abundant native bunchgrasses can limit the size and connectivity of gaps, which minimizes the water and nutrients available to cheatgrass. Using data from 75 study sites, researchers found that high levels of cattle grazing were associated with reduced bunchgrass cover, with wider and more connections between the gaps that provided an opportunity for cheatgrass to invade.

Cattle trampling also appeared to disturb biological soil crust that offers a second defensive barrier against cheatgrass, and further speeds the invasion. Impacts are greater on the drier and warmer sites within this region.

If the level and amount of gaps indicates that it's necessary, changes in grazing could help restore bunchgrass cover, maintain a diversity of native grass species and provide much better resistance to cheatgrass invasion, the study concluded. Continued research is needed to quantify the threshold levels of [cattle grazing](#) that would still maintain a healthy native ecosystem.

Provided by Oregon State University

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