# An Introduction to the Sagebrush Steppe Treatment Evaluation Project (SageSTEP): Fire Science Research to Inform Land Management Decisions

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Sagebrush rangelands are an icon of the Great Basin and are essential to the economic and ecologic health of the region. However, many factors are changing the face of these landscapes and threatening the livelihoods of those who depend on them. Some of the largest recorded wildfires in the region have occurred in recent years resulting in millions of taxpayer dollars spent annually for firefighting and restoration, an increased threat to property and life, increased soil erosion, decreased water quality, a decline in the forage base for domestic livestock, and decreased habitat for big game and rare wildlife species. Fortunately, many individuals and organizations are working to reverse these trends and improve land health in the region.

## What is SageSTEP?

The Sagebrush Steppe Treatment Evaluation Project (SageSTEP) is a federally-funded research program designed to evaluate two of the greatest threats to sagebrush rangelands—cheatgrass invasion and pinyon and juniper woodland encroachment—and the resulting changes in wildfire patterns. The project includes collaborators from five universities, six federal agencies and one non-profit organization in six states. SageSTEP began in 2005 with pre-treatment data collection, and fuels treatments were implemented at 20 sites across the Great Basin from 2006 to 2008. We have collected yearly data following treatments to evaluate their impact on vegetation, fuels and a host of other ecosystem components (soils, wildlife, water erosion and runoff, etc.). We have also conducted studies related to the economic and social aspects of wildfire and fuels treatments.

Our study sites can be divided into two groups, sagebrush rangelands threatened by 1) cheatgrass invasion (sage-cheat sites); and 2) woodland encroachment (woodland sites). At the sage-cheat sites, we have been studying the impacts of prescribed burning, mowing and application of the herbicide tebuthiuron (Spike 20P) to thin sagebrush stands and encourage growth of native understory vegetation. The pre-emergent herbicide imazapic (Plateau) was applied in some areas to study the impact on cheatgrass. At the woodland sites, researchers are evaluating the use of prescribed burning, tree removal by chainsaw cutting, and tree removal by mastication using a Bullhog$^{TM}$. Researchers are examining the ability of sites to recover

without expensive restoration activities like seeding, and so none of the study plots have been seeded.

Short-term post-treatment trends are starting to emerge. For example, researchers studying the use of imazapic have learned that in the first two years post-treatment the herbicide appears to be quite effective at controlling cheatgrass. However, at our sites it also caused a decline in native forbs, which could adversely affect some wildlife species including sage grouse. We are planning to continue monitoring the SageSTEP study plots on a less-frequent basis to learn whether or not this type of trend continues in the long-term.

Another example of our short-term results is information about the availability of moisture in the soil following prescribed burns and mechanical treatments that remove encroaching trees. We wanted to know if additional soil moisture resulting from tree removal would cause an increase in cheatgrass. Results show that in areas where there was a strong perennial grass presence prior to treatment, those species were able to compete with cheatgrass for the extra soil moisture and other resources (such as increased nitrogen after burning). However, in areas where woodlands had encroached to the point that little of the native perennial understory remained, cheatgrass was more likely to win the competition for resources following restoration treatments. These results indicate that land managers should evaluate the health of the understory vegetation of an area before deciding whether or not to remove trees.

## Research Information and Private Landowners

We know that at times research information can seem abstract and difficult to interpret. However, when used appropriately it can be an invaluable resource for landowners and managers making decisions to improve land health for a variety of uses. SageSTEP was funded to provide research information directly to practitioners, and our outreach program is dedicated to providing information formats that are most useful to individuals and organizations making decisions that affect land health. Many other projects and organizations in the Great Basin are currently working to do the same. As private landowners work to incorporate scientific data into their decisions, along with other information sources such as anecdotal evidence and personal experience, success of restoration activities may improve and time and resources can be saved.

We are sometimes asked why the effects of grazing are not being evaluated as part of the SageSTEP study since grazing takes place on most public rangelands in the Great Basin. Due to variation in season, length and type of grazing use, a uniform grazing component could not be effectively applied at all of the study sites across the network. Thus all of our study plots have been fenced for the duration of the project to ensure uniformity across sites. In time, we may decide to remove fences to evaluate how recovery proceeds within the context of grazing.

# Outreach Products for Improved Decision-Making

Over the past few years we have distributed several outreach products that can be helpful for private landowners. Free copies of these products can be ordered by sending an email to summer.c.olsen@usu.edu with your name, mailing address and desired number of copies.

***SageSTEP DVD: Restoring Sagebrush Rangelands in the Great Basin***

In 2008, we released a DVD entitled *Restoring Sagebrush Rangelands in the Great Basin: An Introduction to Alternative Land Management Practices*. Funds to create the DVD were provided by Western Sustainable Agriculture Research and Education (SARE), and the primary audience of the disc is agriculture professionals who work with private landowners. The DVD's feature provides information about threats to sagebrush rangelands in the Great Basin and land management treatments that can be implemented to encourage the restoration of healthier systems. The disc also includes bonus tracks with additional information about sagebrush restoration provided by scientists, private landowners, and public land managers. A booklet insert provides information about the disc contents and how to use them as well as information about the SageSTEP study.

***Western Juniper and Piñon-Juniper Field Guides***

SageSTEP has released two field guides for evaluating rangelands threatened by woodland encroachment. These guides contain the latest information about these systems and how they are known to respond to available management treatments (prescribed fire, mechanical treatments, etc.). They are pocket-sized guides intended to be taken into the field to assess a site and begin the process of deciding whether or not to treat an area and which type of treatment might be most effective. Content of the two guides is similar, and guides should be requested based on the woodland type(s) you work in.

***Pocket Guide to Sagebrush Birds***

SageSTEP was one of many partners who supported the Rocky Mountain Bird Observatory and PRBO Conservation Science to develop and print the *Pocket Guide to Sagebrush Birds*. This guide emphasizes 40 bird species that utilize sagebrush habitats and includes tips on species identification, biology, and conservation status. Because not all of these species require similar habitat types and not all sagebrush is managed for the same goals, this guide discusses how avian needs can be incorporated into land management plans. This guide is a tool for raising awareness with landowners and resource professionals and help open doors for voluntary efforts and conservation partnerships throughout the West.

***Guide to Legal and Institutional Resources for Restoration and Management of Great Basin Rangelands***

The use of fuels treatments can be complicated by the wide range of political, economic, social and ecological considerations that come into play. Various rules and regulations have been enacted to ensure that vegetation treatments are used responsibly and guidelines and best management practices have been developed to help land managers make good decisions. To help navigate these rules, regulations and guidelines we compiled a guide to online resources to serve as a starting point when considering fuels treatment implementation. This guide can be accessed through our website using the following link: http://www.sagestep.org/pubs/leg_inst_res/index.html.

## For More Information…

We look forward to providing more detailed information about SageSTEP study results of interest to private landowners in future issues of this publication. Additionally, more information about SageSTEP can be found on our website at www.sagestep.org or by sending an email to summer.c.olsen@usu.edu.