Sagebrush Steppe
SageSTEP
Treatment Evaluation Project

SageSTEP is an interdisciplinary, long-term research program evaluating ways to improve the health of sagebrush rangelands across the Great Basin. The purpose of SageSTEP is to conduct research and provide improved information about restoring sagebrush rangelands degraded by conifer encroachment or exotic grassland invasion. This information will help resource managers make restoration management decisions with reduced risk and uncertainty. The project is a collaborative effort among researchers and land managers in a variety of disciplines from five universities, six federal agencies and one non-profit organization in six states in the Great Basin. Treatment options—including prescribed fire, mechanical thinning of shrubs and trees, and herbicide applications—are being evaluated to learn how to create healthy and diverse plant communities that will be more resilient to fire and resistant to weed invasion. All treatments were implemented in the same year at each site in the fall of 2006, 2007, or 2008. Baseline data were collected at all sites prior to treatment, and post-treatment data have been collected through 2014. Less frequent, longer-term monitoring will help researchers more fully understand treatment impacts.

SageSTEP Network map

Multidisciplinary Data Collection

Vegetation and Fuels: 10-, 100-, and 1000-hour fuel samples, along with other vegetation and fuel measurements are collected in both the understory and overstory. Vegetation measurements will allow scientists to learn more about how the plant community responds to prescribed fire and other management treatments.

Soils: Soils are sampled for chemical analyses and soil profile descriptions to tell scientists more about the effects of treatments on the availability of essential plant nutrients and to help explain vegetation response.

Hydrology: Rainfall simulations are conducted on small ($0.5m^2$) and large ($35m^2$) plots, and measurements are taken to help scientists better understand relationships between changes in vegetation/ground cover and runoff/erosion.

Wildlife: Wildlife data collection focuses on the effects of treatments on migratory songbirds.

Insects: Butterflies are surveyed for biodiversity, and ants are studied for their importance in seed dispersal and predation in sagebrush-steppe systems.

Additional Data: Yearly standard photographs are taken, and multiple soil moisture sensors, and a climate station are present at each site.

Economics: Environmental valuation study will identify and measure changes in environmental benefits (such as recreation and ranching) resulting from ecosystem changes caused by treatments.

Sociopolitical: Studies focus on understanding the social acceptability of management practices as well as factors that influence managers' willingness to use them.
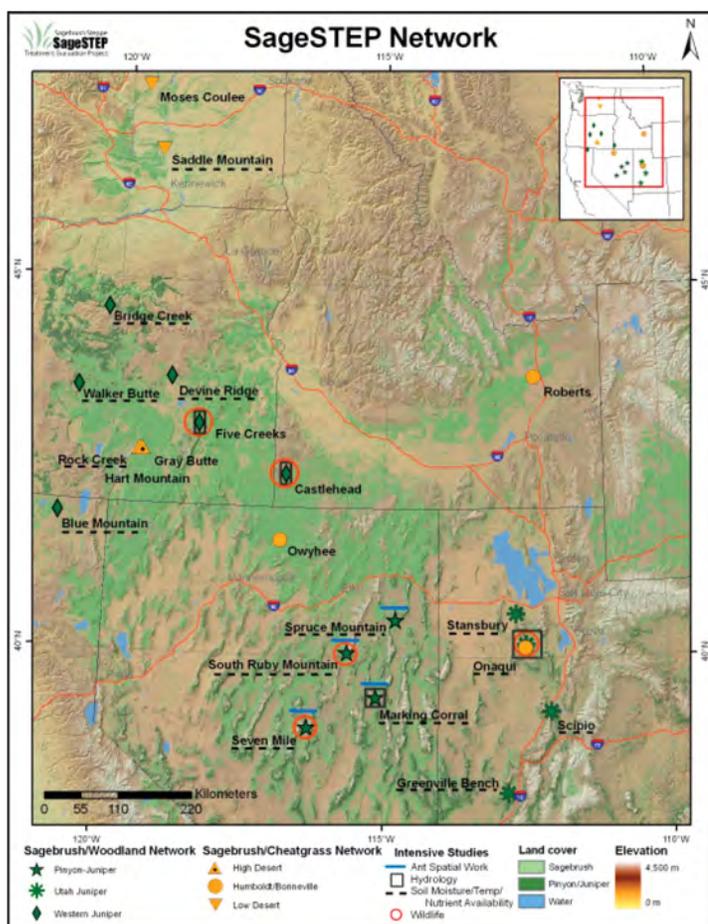
Experiments focus on woodland encroachment and cheatgrass invasion:

Woodland Experiment:

Sites are located in sagebrush communities threatened by woodland encroachment, and the effects of three options are studied:

- prescribed fire
- mechanical removal of trees (chainsaw cutting and tree mastication using a Bull Hog™ in Utah only)
- control (no management action)

The objective is to find out how much native sagebrush and bunchgrasses need to be present at the time of treatment in order for managers to improve land health without having to conduct expensive re-seeding.

Cheatgrass Experiment:

Sites are located in sagebrush communities threatened by cheatgrass invasion, and the effects of four land management options are studied:

- prescribed fire
- mechanical thinning of sagebrush by mowing
- herbicide application (tebuthiuron) to thin old, unproductive sagebrush plants and encourage growth of young sagebrush and native understory grasses
- control (no management action)

An additional herbicide application (imazapic) to control cheatgrass has been applied within portions of each treated area. The objective is to find out how much native perennial bunchgrasses need to be present at the time of treatment in order for managers to improve land health without having to conduct expensive re-seeding.

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