

# SageSTEP

## Sagebrush Steppe 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 each subsequent year through 2009. Less frequent, longer-term monitoring will help researchers more fully understand treatment impacts.



### 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 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<sup>2</sup>) and large (35m<sup>2</sup>) plots, and measurements are taken to help scientists better understand relationships between changes in vegetation and ground cover and runoff and erosion.

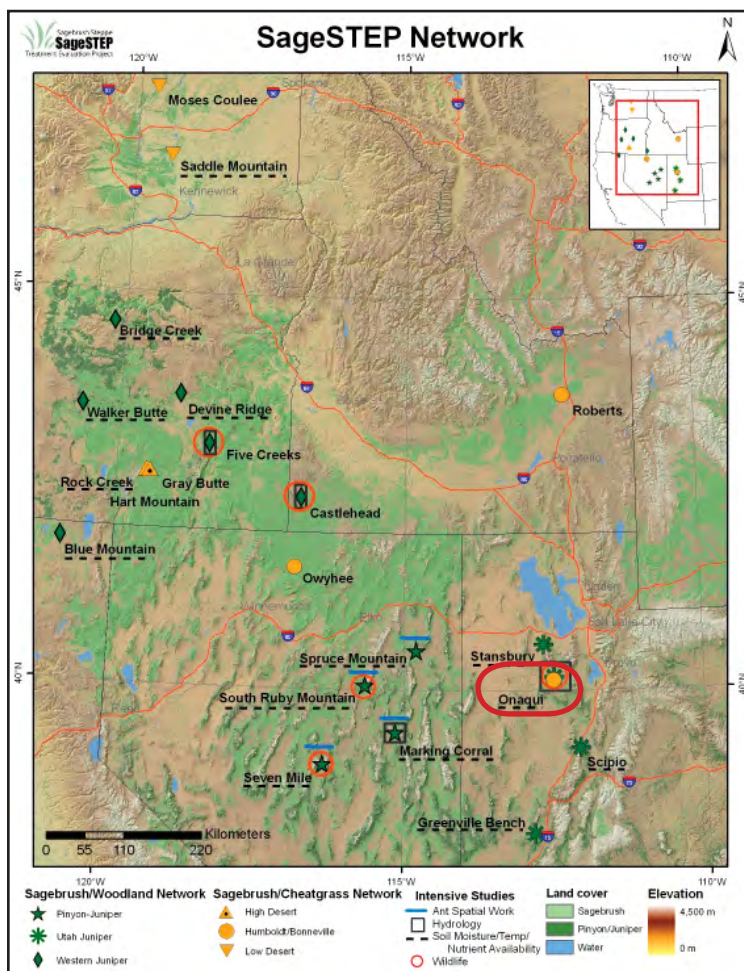
**Wildlife:** Wildlife data collection focuses on the effects of treatments on migratory songbirds.

**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.

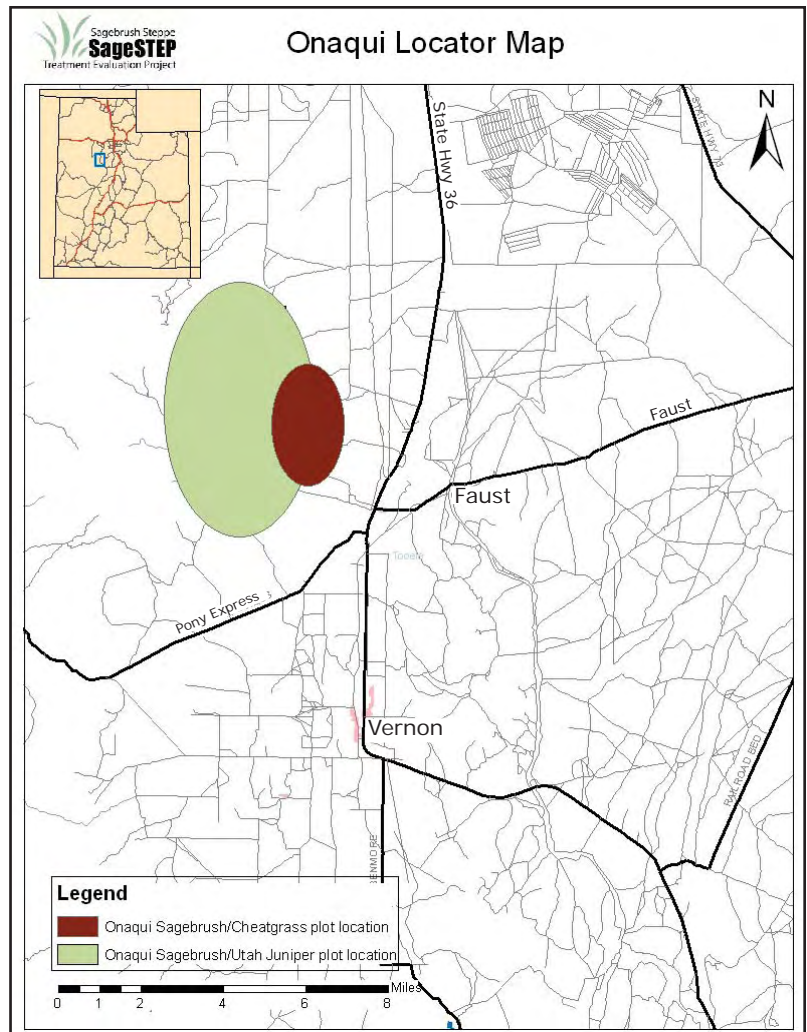


## Onaqui Research Sites

Two of the SageSTEP study sites are located in Rush Valley, Utah, just 90 minutes from Salt Lake City. The nearest towns are Vernon (~5 miles) and Tooele (~25 miles), and the land is managed by the Bureau of Land Management (BLM) Salt Lake Field Office. Onaqui is the only SageSTEP network location with two sites of different vegetation composition adjacent to each other: a sagebrush/cheatgrass site, and a sagebrush/Utah juniper site.

Each site consists of four core plots which contain numerous sub-plots from which data are collected. The Onaqui sage/Utah juniper site is one of only three sites in the network that also includes a larger “extensive” burn plot with a paired control plot used to accommodate the study of hydrology and wildlife.

The Onaqui site is located on an active grazing allotment, and plots have been fenced for the duration of the study to exclude livestock. Grazing is not being tested in this study since there is no single grazing treatment that could be applied identically across such a wide network of sites. Arrangements have been made for the permittee to use other grazing land throughout the course of this study.



### Sage/Utah Juniper Site Quick Facts

**Plots:** Four 50-acre core plots (Control, Burn, Mechanical, and Bull Hog™) and two 1000-acre extensive plots (Control and Burn)

**Elevation:** 5500-6200 ft.

**Topography:** 2-30% slope, E aspect

**Common Vegetation:** Utah Juniper, Wyoming big sagebrush, black sagebrush, bluebunch wheatgrass, Sandberg bluegrass, Indian ricegrass, cheatgrass, and various native wildflowers.

**Soils:** Gravelly loam and sandy loam

**Fire Regime:** Historically ranging from 20 to >100 years. Woodland invasion suggests that the majority of these communities have not burned since the late 1800s. As woodlands gain dominance, the fire regime shifts to infrequent, high-intensity fires.

**Representative Land Base:** Several million acres in western Utah, northeastern Nevada, and southern Idaho.

### Sage/Cheatgrass Site Quick Facts

**Plots:** Four 75-acre plots (Control, Burn, Mechanical, and Herbicide)

**Elevation:** 5400-5500 ft.

**Topography:** 3-4% slope, E aspect

**Common Vegetation:** Wyoming big sagebrush, shadscale, viscid rabbitbrush, Sandberg bluegrass, squirreltail, Indian ricegrass, bluebunch wheatgrass, basin wildrye, and cheatgrass.

**Soils:** Fine-loamy

**Fire Regime:** Historically, several decades. Many of these communities experienced an increased fire return interval with settlement and overgrazing. Cheatgrass invasion can cause larger fires and reduce this interval to 10 years or less.

**Representative Land Base:** Several million acres in western and central Utah, southern Idaho, northern Nevada, and eastern Oregon.

## Land Management Treatments

Treatments were implemented at the Onaqui site in fall 2006. The primary objective of both studies is to find out how much native sagebrush and/or 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.

### Sagebrush/Utah Juniper Site

This site is part of the study of woodland encroachment into sagebrush communities.

- Prescribed burn: blackened ~70% of core plot and ~40% of larger extensive plot
- Chainsaw: all trees >0.5m tall were cut and left on site
- Bull Hog™: all trees mulched and left on site
- Control: untreated



### Sagebrush/Cheatgrass Site

This site is part of the study of cheatgrass invasion in sagebrush communities.

- Prescribed burn: blackened ~70% of plot
- Mowing: mow height of ~12-15" throughout plot
- Tebuthiuron (Spike 20P) Herbicide Application: aerial application of pellets at ~1.5lbs/acre
- Control: untreated

Plateau pre-emergent herbicide treatment was crossed with the four main treatments on half of the site's subplots to achieve cheatgrass control.

### Questions about this site?

Contact outreach coordinator Lael Gilbert at [lael.gilbert@usu.edu](mailto:lael.gilbert@usu.edu) or site manager Maggie Gray at [maggie.gray@usu.edu](mailto:maggie.gray@usu.edu).