

# Using Felled Western Juniper to Exclude Willows from Herbivory

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## Introduction

Willow communities are critical components of riparian ecosystems and serve to provide habitat for numerous wildlife species, aid in maintenance of stream channel structure and stability, and provide shade for the aquatic environment. Restoring willow communities in areas where populations have declined or are absent is often difficult because of willow consumption by both livestock and wildlife species. Herbivory is especially problematic for young plants that have not yet produced leaves out of reach of browsing animals. A common solution to herbivory-related problems is to use fencing to exclude riparian areas from herbivores; however, this can be an expensive option and may not complement desirable grazing strategies. An alternative to fencing may be the use of structures that limit access to streamside willows but don't necessarily exclude use of the overall riparian area. Our objective was to evaluate the use of felled western juniper as a herbivory barrier for young willow plants.

## Experimental Protocol

The study site was located on Steens Mountain in Harney County, Oregon, within a mountain meadow at approximately 6,800 ft elevation. The meadow was bisected by a small (less than 6 ft wide), second-order stream that had intermittent populations of small-stature willows, generally less than 2 ft high.

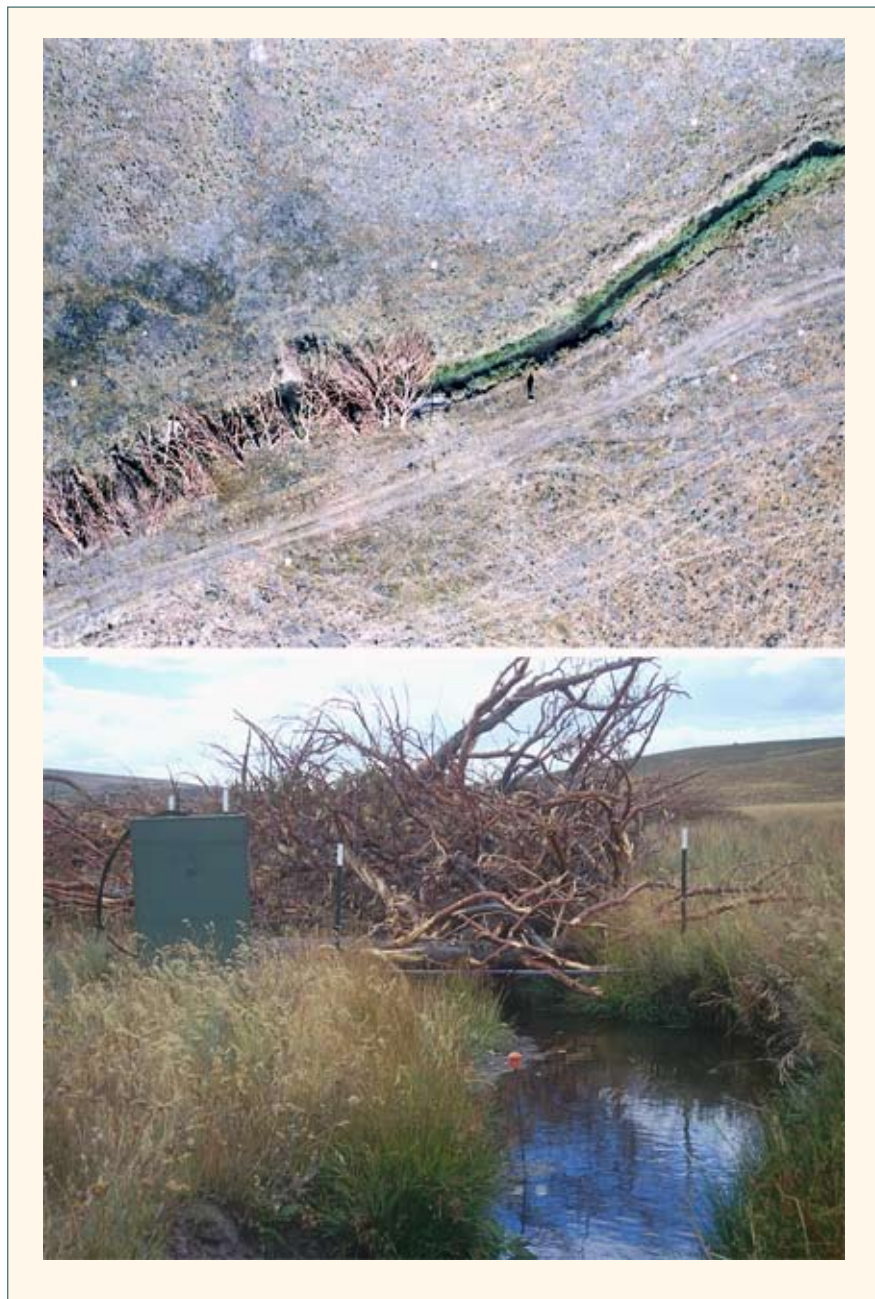


Figure 1. These images depict the transition between an open treatment and one covered with felled western juniper; Steens Mountain, Oregon.

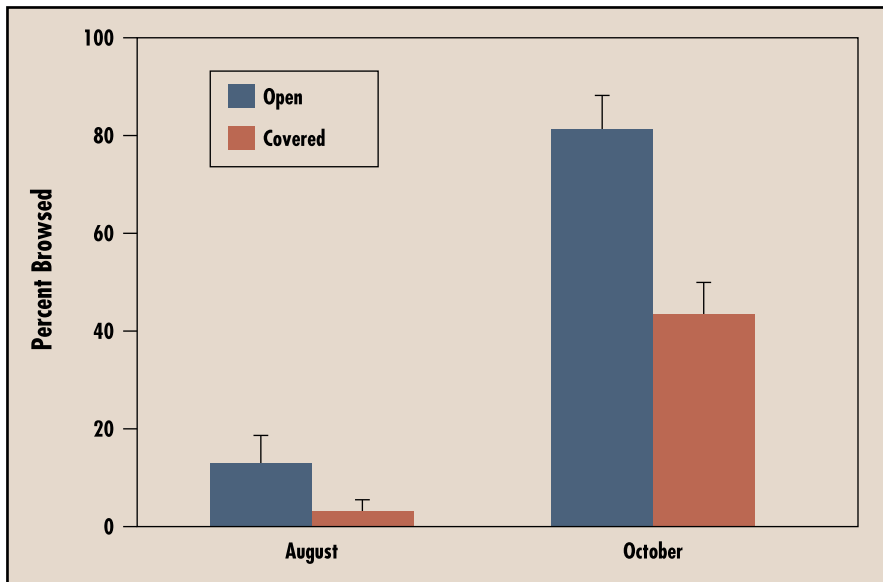


Figure 2. Percentage of willow plants browsed in open treatments versus those covered with felled western juniper for August and October 2003 sampling periods, Steens Mountain, Oregon.

Historically, the meadow had been grazed during the growing season by cattle and sheep and was populated by a variety of wild herbivores including mule deer, pronghorn antelope, and elk. For purposes of the experiment, we did not partition relative use of willows within the study area by livestock and wildlife species. The study design incorporated four 1,000-ft-long blocks of stream. We counted and marked all streamside willows within the study reach in August of 2002 using aluminum tags and survey tassels. An individual willow was defined as having a unique above-ground

base that was separated from other plants by no less than 4 inches. In September of 2002, felled juniper were placed over the stream channel in an alternating covered/open arrangement, resulting in one covered and one open (500 ft) treatment per block (Fig. 1). Marked willows were located again in August and October of 2003 and scored as browsed or unbrowsed. Data presented here represent initial results of a long-term research effort.

## Results and Discussion

Our study population included 100 willow plants, with 62 in covered treatments and 38 in open treatments. Most of the herbivory in the study area appeared to take place very late in the growing

season. In August, only seven plants had been browsed, with all but two located in open treatments (Fig. 2). However, by October, 58 willows had been browsed and plants within open treatments were about twice as likely to be browsed compared to those in covered treatments (Fig. 2). This suggests that covering willows with felled juniper provided an effective deterrent to herbivory in the year following treatment application. The timing of willow use may relate to forage conditions in the surrounding meadow and uplands. Green grasses, sedges, and forbs were present within the meadow during the August data collection. By October, remaining herbaceous vegetation began to senesce, perhaps leading to increased browsing of willows.

## Management Implications

We will continue collection of data in order to evaluate long-term implications of the covered treatments. If covered treatments increase the likelihood of willows attaining sufficient height (approximately 6 ft or greater) to escape the serious detrimental effects of herbivory, such treatments ultimately may result in a sustainable streamside willow community.