

Juniper Control Using Combinations of Cutting and Prescribed Fire

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Introduction

During the past 20 years in eastern Oregon, western juniper has primarily been controlled by cutting and by prescribed fire. Chainsaw cutting is commonly used to remove trees in plant communities that lack sufficient fuel to carry fire through a stand. These woodlands are in mid- to late-successional stages where juniper competition has eliminated the shrub component and reduced understory production. Burning has been used in stands where sufficient ground fuels remain available to carry fire through the woodland and remove the majority of trees. Burning is most successfully applied in early to mid-woodland successional stages. Recently, Bureau of Land Management (BLM) districts in Alturas, California, and Burns, Oregon, have employed combinations of cutting and fire to remove juniper in later successional woodlands. The cutting is used to create a fuel base to carry prescribed fire through the remainder of the juniper stand.

Experimental Protocol

We developed three cooperative cutting, prescribed fire studies with Burns BLM, private landowners in Oregon and Idaho, and Idaho State Department of Lands. Projects are ongoing but our preliminary data are of value. The projects include Kiger Aspen Recovery, Upland Response to Cutting and Fire in Kiger Canyon, and South Mountain Idaho Juniper Control.

Steens Aspen Recovery: Aspen stands below 7,000 ft are being replaced by western juniper in

the northern Great Basin. Aspen woodlands are important for many wildlife species and aesthetically are part of the historical landscape. In a joint project with Burns BLM and Otley Brothers Ranch, we are assessing two juniper control treatments to recover aspen in Kiger Canyon, Steens Mountain, Oregon. Treatments include cutting one-third of the trees followed by early fall burning (Fig. 1) and cutting one-third of the trees followed by early spring burning. The project has evaluated the effectiveness of treatments at removing all junipers from seedling to mature trees. We are monitoring aspen recruitment, and shrub and understory cover and density response to treatment. Cutting followed by fall burning was completed in two stages. In the first stage, trees were cut in winter 2001 with fall burning applied in October 2002. In the second stage, trees

were cut in spring 2003 with fall burning applied in October 2003. For the spring burning treatment, trees were cut in winter 2001 with burning applied in March 2002.

Upland Response to Cutting and Fire in Kiger Canyon: The objective of this study was to establish long-term monitoring of vegetation succession after fire in mountain big sagebrush communities. There is little long-term information available about vegetation dynamics after fire in areas previously dominated by juniper. Because the understory and shrub layers have been suppressed and depleted by competition with juniper, it may take longer for sites to recover than after historical fire disturbances. A joint project with Burns BLM and Otley Brothers Ranch was developed to assess juniper cutting and prescribed fire effects in five mountain sagebrush plant community types. All sites



Figure 1. Kiger Canyon prescribed fire, October 2001. Every third tree was cut to develop a fuel base to carry fire through the remainder of the woodland.



Figure 2. Fall burned aspen plot the first growing season after fire in Kiger Canyon.

were dominated by post-settlement juniper. Cutting was done in spring 2003, and involved dropping one-third of the trees to develop a fuel base. Pretreatment vegetation measurements were completed in July 2003. The area was prescribed-burned in October 2003.

South Mountain Idaho Juniper Control: The project involved three levels of cutting followed by prescribed burning. Cutting manipulations were chainsaw cutting 25 percent, 50 percent, and 75 percent of mature post-settlement trees (trees are less than 100 years old). The objective of the prescribed fire was to kill as many remaining live trees as possible using the cut trees as a fuel base. Study sites were set up along the Juniper and Corral creek drainages on South Mountain, Idaho, in summer 2002. Sites were located on lands with private and

public (Idaho Department of Lands) ownership. Two plant community types were selected. They included Western snowberry-mountain sagebrush/Idaho fescue-western needlegrass (deep soil sites) and Mountain sagebrush/western needlegrass (dry soil sites).

Pretreatment measurements of understory and overstory vegetation were completed in summer 2002. All sites were dominated by post-settlement juniper woodlands (trees are less than 100 years old) and lacked ground fuels to carry a fire without cutting. Uncut control woodlands were located adjacent to cut areas. Juniper trees were cut in October 2002. Temporary livestock exclusion fences were built around plots in May and June 2003. Prescribed fire was applied October 21–22, 2003. Burn conditions corresponded to typical BLM fire prescriptions. We established several seeding trials to test and compare natural recovery versus augmented rehabilitation. Seeding trials were developed on both

plant community types, and we are evaluating establishment of three native grass species and three native forb species, alone and in combination, at rates of 15, 20, 25, and 30 lb/acre.

Results

Steens Aspen Recovery: Fall burning eliminated remaining juniper trees (seedling to mature trees) and resulted in the loss of most of the understory except for plants with growth points below ground and with fire-resistant seed (Fig. 2). Aspen response has been highly variable. The number of new aspen stems varied from 1,300 to 9,500 stems per acre. Aspen response appears to have been dependent on the condition and density of the pretreatment aspen stand.

Spring burning, which was a cooler burn, was not as successful at eliminating remaining juniper trees (10–20 percent of the mature trees remain). In addition, about 50 percent of the juniper seedlings survived the spring burn. There are enough seedlings present to redominate these stands in 70–80 years. The understory remained largely intact and growth was stimulated by removal of overstory competition.

Upland Response to Cutting and Fire in Kiger Canyon: Fire removed most of the remaining live trees. Post-treatment measurements will begin in summer 2004. Results will focus on herbaceous colonization, diversity, and production; shrub dynamics; and speed of juniper reinvasion.

South Mountain Idaho Juniper Control: Regardless of cutting treatment, the fire application was

uniformly successful at removing remaining live junipers. We estimate that on the deep soil sites, the fire killed all remaining live trees. On the dry soil sites, we estimate that the fire killed 90–100 percent of the remaining live trees. Results indicate that cutting about 25 percent of mature trees was sufficient to remove the rest of the stand with fire. Post-fire vegetation monitoring will begin in summer 2004.

Management Implications

In areas where understory fuels are lacking, partial cutting of juniper to increase ground fuels, combined with prescribed burning in the fall, was extremely successful at removing remaining live trees. Results suggest that cutting 25–33 percent of the trees is sufficient to provide necessary fuel loads to carry fire

through a stand. The amount of cutting required to develop ground fuels was 30–50 trees per acre. On our study sites, slopes were between 10 and 60 percent, which helped carry the fire upslope. More cutting may be required if working in areas that are flat. If the objective is to eliminate juniper, with minimal cutting, then we recommend communities be fall burned. If the objective is to maintain the shrub understory and keep a few mature junipers in the mix, then cooler spring burning is recommended. Spring burning may be especially useful in areas where the understory is depleted and needs to be maintained to promote more rapid recovery. However, with spring burning, follow-up management will be necessary to remove young junipers that are missed in the initial treatment.