

## 4.22) Effect of early season burning on cheatgrass abundance and survivorship of native perennial associates in Cedar Grove, Kings Canyon National Parks—a pilot investigation

- Sylvia Haultain, Plant Ecologist, Science and Natural Resources Management, SEKI
- Scott Martens, Plant Ecologist, University of California at Davis

Lead: S. Haultain

### INTRODUCTION

During the late summer of 1998, NPS resource managers became concerned about the apparent spread of cheatgrass (*Bromus tectorum* L.) following prescribed burning in the Cedar Grove Area of Kings Canyon National Park. Prescribed burns were suspended during 1998 and 1999 until information could be gathered on the potential of this highly invasive species to spread in response to fire-related disturbance. In the fall of 1998, preliminary surveys were conducted to assess the distribution and abundance of cheatgrass on the valley floor. As little work has been done on the role of disturbance and cheatgrass spread in a ponderosa pine community located on the west slope of the Sierra Nevada, efforts to obtain research funds were initiated. The pressing need for information coupled with a lack of funds to begin work led us to design the small and informal experiment discussed here. It is our hope that this pilot study will generate preliminary results to inform further investigations as well as any decisions regarding prescribed fire management in the area.

### PROJECT OBJECTIVES

We chose to address two primary questions regarding early season burning and cheatgrass abundance in the westside ponderosa pine community of Cedar Grove. First, we would like to know if burning cheatgrass that has cured just prior to seed drop significantly reduces the seed bank (and thus cheatgrass abundance) during the following year. This leads to the second question, which is whether or not such early season burning has a negative effect on native perennial grasses. If early season burning can be used to manage cheatgrass levels without negatively impacting native associates, it may be possible to conduct fall burns intermittently between spring burns in an attempt to achieve fuel reduction goals while minimizing spread of cheatgrass.

### SUMMARY OF METHODS

**Pre-treatment sampling** - To assess the effect of early season burning on cheatgrass abundance during the following year, we set up one pair of plots just east of the Cedar Grove Pack Station. We chose this site because 1) it was dominated by almost pure cheatgrass, allowing us to use dry weight of above-ground biomass as a response variable, and 2) it was already cleared for burning under an existing burn plan. A central transect was established between the two plots. Ocular estimates of relative cover of cheatgrass and any other associated dominant plant species were recorded in twenty randomly selected 25 x 25 cm quadrats located on either side of this transect. Above ground biomass was clipped and weighed from each quadrat before being returned to headquarters to determine water content.

To assess the effect of early season burning on survival of native perennial grasses, a second pair of plots was located on the north side of the motor nature trail, just east of the NPS housing area. A site was chosen with an even mix of cheatgrass and native perennials (*Eriogonum wrightii*, *Lupinus* sp., *Stipa* sp.)

## 1999 Annual Fire Report on Research, Monitoring and Inventory

---

and that was already included in an established burn plan. The two plots were divided by a central 25 m transect. At each one meter interval along the transect, the nearest individual of each of the three species of interest was tagged and assigned to a size class. Numbered aluminum tags were affixed to a pin flag placed to the west side of each plant; after species and size class data had been recorded, the flags were removed to decrease the visibility of the plot. Cheatgrass abundance was assessed by clipping biomass samples from 20 x 20 cm quadrats at two m intervals along the central transect. Each plot was photographed and georeferenced using the PLGR global positioning system.

**Treatment** - Cedar Grove ranger staff carried out pre-treatment monitoring of cheatgrass seed set. In early June, when the cheatgrass had headed out and conditions were conducive to burning, crews ignited one of each of the pairs of plots. The burns were conducted in such a way as to destroy the cheatgrass prior to seed drop, using torches to ignite those areas that did not readily burn.

### WORK ACCOMPLISHED IN 1999

Two pairs of plots were established in the Cedar Grove area according to the methods described above. One plot out of each pair was then burned during early June in an attempt to destroy the standing crop of cheatgrass seed.

### PLANS FOR THE COMING YEAR

Both sites will be revisited during May of 2000 for re-evaluation. Cheatgrass abundance will be assessed in all four plots through clipping of above ground residual biomass, and survivorship of native perennials will be recorded from the second set of plots. The potential effects of early season burning on subsequent cheatgrass abundance and on survival of native perennials will then be evaluated. These preliminary results may then help guide further investigations into the role of early season burning in the Cedar Grove Area.

### REFERENCES

Caprio, A. C. 1999. Problem evaluation and recommendations: Invasive cheatgrass (*Bromus tectorum* L.) in Cedar Grove, Kings Canyon National Park. Unpublished National Park Service file report, Division of Science and Natural Resources Management, Sequoia and Kings Canyon National Parks.