

Northwest Science Notes

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Demise of an Isolated Buckwheat Stand by Repetitive Wildfires

Abstract

Wildfires burned across permanently-marked study plots placed in a low elevation, small, isolated rock buckwheat stand three times between 1983 and 2001. With the passage of each wildfire, the number of buckwheat shrubs diminished until there were no living shrubs. Self-recovery of buckwheat by natural seed dispersal will likely be a slow process.

Introduction

Rock buckwheat (*Eriogonum sphaerocephalum*) occurs on stony ridge crests scattered throughout the semi-arid interior Columbia River Basin of eastern Washington (Daubenmire 1970). Sandberg's bluegrass (*Poa secunda*), a small perennial grass, characteristically dominates the sparse understory, making buckwheat stands somewhat resistant to wildfire compared to stands of big sagebrush (*Artemisia tridentata*) growing on normal soils that typically support cheatgrass (*Bromus tectorum*) or bluebunch wheatgrass (*Pseudoroegneria spicata*) as understory dominants. Buckwheat stands tend to be isolated from neighboring stands. Buckwheat does not readily sprout after burning thus wildfires are a significant threat. Fire may also encourage the spread of alien invasives such as cheatgrass that further encourages the ignition and spread of fire (Soll et al. 1999). This work describes the impact of repetitive burnings on rock buckwheat shrubs on the Arid Lands Ecology (ALE) Reserve, a 30,000 ha research natural area located in the Rattlesnake Hills 26 km northwest of Richland in Benton County, Washington.

Methods

Buckwheat density was determined by counting individual shrubs rooted inside four 3 m x 15 m

(45 m²) plots distributed across a 1 ha rock buckwheat stand at 180 m elevation on the ALE Reserve. Shrubs were counted in 1983, 1985, 1986, 1988, and 2001. Canopy cover of shrubs and herbs was ocularly estimated on ten 0.5 m x 1.0 m microplots spaced at 3-m intervals along a 30-m tape line in this same stand in April 2000 and in spring 2001. The stand was burned by a massive wildfire ignited by an automobile accident in late June 2000. Previous wildfires were ignited by lightning strikes.

Results

In 1983, mean rock buckwheat density was 60 shrubs per 45 m² (Table 1). After burning in 1984, shrub density was reduced to 21 and 22 in the first and second growing seasons. A second wildfire in 1987 burned through the same study plots and shrub density in the 1988 growing season was 3.2 shrubs per 45 m². A third fire burned in summer 2000 and in the 2001 growing season there were no surviving rock buckwheat shrubs.

Canopy cover of 13 species of herbs and shrubs measured in the spring of 2000 before burning averaged 54%, of which 13% was contributed by rock buckwheat (Table 2). In 2001, only five species were recorded in the same

TABLE 1. Mean density and range of values of living rock buckwheat shrubs in permanently-marked plots in the year before and after three burnings between the years 1983 and 2001 (after Rickard 1989).

Year	Status	Mean density/45m ²	Range
1983	Pre-burn	60	48-77
1984	Burned		
1985	Burned +1	21	12-37
1986	Burned +2	22	12-42
1987	Burned		
1988	Burned +1	3.2	1-5
2000	Burned		
2001	Burned +1	0	0

TABLE 2. Mean canopy cover (%) by species at a rock buckwheat stand on the ALE Reserve in south-central Washington in April 2000 and 2001 before and after passage of wildfire.

	2000		2001	
	Pre-burn	Post-burn	Pre-burn	Post-burn
Perennials				
<i>Eriogonum sphaerocephalum</i>	13	0		
<i>Poa secunda</i>	29	17		
<i>Lomatium gormanii</i>	0.5	0.9		
<i>Erigeron poliospermus</i>	0.2	0		
<i>Lomatium macrocarpum</i>	0.1	0.1		
Annuals				
<i>Bromus tectorum</i> (A)	8.7	4.3		
<i>Draba verna</i>	1.0	0.2		
<i>Sisymbrium altissimum</i> (A)	0.9	0		
<i>Holosteum umbellatum</i> (A)	0.4	0		
<i>Microsteris gracilis</i>	0.2	0		
<i>Plectritis macrocera</i>	0.1	0		
<i>Epilobium paniculatum</i>	0.02	0		
<i>Descurainia pinnata</i>	0.02	0		
Total Cover	54	23		
# of Species	13	5		
# of Annuals	8	2		
# of Perennials	4	3		

(A) = Alien invasives

Literature Cited

- Daubenmire, R. 1970. Steppe vegetation of Washington. Washington State Agricultural Experimental Station Bulletin 62, Pullman, Washington.
- Rickard, W. H. 1989. Response of round-headed buckwheat to summer burning. *Northwest Science* 63:144-145.

plots and contributed a total canopy cover of only 23%. Six of the eight species not found in 2001 were annuals. None of the buckwheat shrubs survived the fire (Table 2).

Discussion

Rocky ridge crests occupy relatively little of the total area of ALE, but they contribute greatly to species richness. Most of the buckwheat stands are located along ridge crests at elevations between 400 and 1000 m above sea level. These high elevation crests support perennials not found at the low elevations, e.g. thyme buckwheat (*Eriogonum thymoides*), rosy balsamorhiza (*Balsamorhiza rosea*), narrowleaf goldenweed (*Haplopappus stenophyllus*), desert yellow daisy (*Erigeron linearis*), and Hood's phlox (*Phlox hoodii*). Two permanently-marked study plots had been established at higher elevation ridge crests prior to the 2000 wildfire, but these plots were not burned. After three burnings, the low elevation stand that we studied has not been aggressively invaded by cheatgrass and supports native Sandberg's bluegrass as the understory dominant with cheatgrass, spring whitlowgrass (*Draba verna*), and two species of desertparsley (*Lomatium* spp.) as subordinates (Table 2).

A better understanding of the long-term impact of wildfire on rock outcrop plant communities will require systematic monitoring of a number of permanently-marked study plots at various elevations and information on all species including non-vascular plants.

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- Soll, J., J. A. Hall, R. Pabst, and C. Soper. 1999. Biodiversity inventory and analysis of the Hanford Site, Final Report: 1994-1999. Nature Conservancy, Seattle, Washington.

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