Restoration of Ponderosa Pine and Erosion-Control Treatment at the Rogers Research Site Following High-Intensity Wildfire

Mollie Herget1,2, Stephen Williams1,3, and Robert Waggener4

Introduction
Wildfires have been an important part of the evolutionary history of most forest ecosystems in the West. Within this region, ponderosa pine (Pinus ponderosa) dominates many forests of the semiarid areas. The post-fire restoration of these forests pose a major task for national, regional, and local governing agencies, land managers, and landowners, but there is still a significant lack of knowledge on the best management practices. In 2012, the lightning-caused Arapaho Fire burned nearly 100,000 acres in the Laramie Mountains of southeast Wyoming, including the University of Wyoming-owned Rogers Research Site (RRS), which was heavily forested by P. ponderosa at the time.

Objectives
To test the best management practices for a post-fire ponderosa pine restoration site, this study set out to determine: (1) if seeding a native grass mixture on the burned site will aid in controlling soil erosion; (2) which method of introducing P. ponderosa to the burned site is most effective for forest regeneration; and (3) which cutting treatment of standing dead P. ponderosa is most effective for forest regeneration.

Materials and Methods
To test the experimental objectives, Mollie Herget, a UW master’s student and lead field researcher at the time, directed other employees during this project in establishing four blocks of treatments within the ~320-acre RRS (Figure 1). Each experimental block replicated 18 plots, each measuring 50 meters × 50 meters (164 feet × 164 feet). Every plot received a combination of three treatments to test the three study questions. The treatments included (1) seeding a native grass mixture on the burned site as compared to not seeding; (2) planting ponderosa pine seedlings, planting ponderosa pine seed, and no planting (natural regeneration); and (3) cutting all standing dead trees and removing timber from the plot, cutting all standing dead trees and leaving slash behind, and no cutting. All treatments were completed during the 2015 growing season (May into August).

Results and Discussion
A preliminary survey of survival was performed on the planted tree seedlings from August 18 through August 26, 2015. Results indicated that 83% of the seedlings were still alive at the end of the 2015 summer season. This project, along with preliminary results, will be presented in an upcoming RRS bulletin. That bulletin and others in the RRS series will be posted at www.uwyo.edu/uwexpstn/centers/sarec/ (click on the “Rogers Research Site” link).

During the 2017 growing season, Linda T. A. van Diepen and John Derek Scasta, assistant professors in the UW Department of Ecosystem Science and Management, and others will gather additional data about the survival rates of planted ponderosa pine seedlings, the success rates of plots that were planted with ponderosa pine seed, the success of natural ponderosa regeneration, native grass restoration, and soil microbial dynamics. Additionally, UW master’s student Stephanie Winters, working under the supervision of van Diepen, will study the abundance of invasive weeds to help determine if the erosion control treatment with the grass seed mix, for example, reduces the occurrence of weeds.

Acknowledgments
Initial funding and support for this project was provided by the Wyoming Agricultural Experiment Station through the U.S. Department of Agriculture McIntire-Stennis program. Other acknowledgments will be listed in the RRS bulletins.
Contact Information
James C. Hageman Sustainable Agriculture Research and Extension Center at sarec@uwyo.edu or 307-837-2000.

Keywords: Rogers Research Site, ponderosa pine (*Pinus ponderosa*), post-fire research

PARP: not applicable

Figure 1. Mollie Herget, lead field researcher at the time of this project, pauses for a picture at one of her study sites at the Rogers Research Site. (Photo by Michael Curran)

1Department of Ecosystem Science and Management; 2now with the Natural Resources Conservation Service, Elsberry Plant Materials Center, Elsberry, Missouri; 3now retired; 4Wyoming Agricultural Experiment Station.