Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Using recent wildfires to identify the role of fire in tree species migration in the context of climate change

Discipline: Natural Resources
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: Colorado State University
Effective Dates: 7/1/2014 – 12/31/2015
Funding Amount: $14,006

Investigators and Agency Representative:
NPS Contact: Isabel W. Ashton, Director, Continental Divide Research Learning Center, Rocky Mountain National Park 1000 US Highway 36, Estes Park, CO 80517, ph. (970) 586-1302, isabel_ashton@nps.gov

Investigator: Jason Sibold, Department of Anthropology, Colorado State University, Fort Collins, CO 90523; 970/491-4801; Jason.sibold@colostate.edu

Project Abstract: The objective of the proposed research is to investigate the role of ecological disturbance (bark beetle, fire, bark beetle and fire) in the establishment and migration of four conifer species on south-facing slopes of eastern Rocky Mountain National Park (ROMO). The goal is to provide fire and resource managers with information that refines our understanding of the role of fire in facilitating or hindering species migration in the context of climate change. While the proposed work will focus on four species, limber pine (*Pinus flexilis*) will be the central focus of the proposed research. Limber pine is a species of particular concern because of impacts from the recent mountain pine beetle (MPB; *Dendroctonus ponderosae*) outbreak and white pine blister rust (*Cronartium ribicola J. C. Fisch.*), and because it is a critical species for fauna in the region. Limber pine should also be considered a critical species for forest ecosystem adaptation to climate change because its characteristics suggest that it is well suited for future climate. Specifically, limber pine should be expected to expand its range as a result of climate change because of its 1) high degree of physiological plasticity, exemplified by the fact that it is the only species in the Southern Rockies to exist at both upper and lower tree line, 2) avian seed dispersal, which greatly facilitates rapid migration required by rapid rates of change, and 3) high drought-stress tolerance. Understanding the role of fire in the establishment and potential migration of limber pine will enable the development of fire management plans that can facilitate conservation of the species and forest adaptation to climate change. Moreover, this project will provide a field test of species distribution modeling research in ROMO that is being conducted by the NPS I&M Program. Early results from this work suggest that limber pine has already begun to expand in these sites.

Outcomes with Completion Dates: Final Report – September 30, 2015

Keywords: fire, limber pine (*Pinus flexilis*), migration, climate change, Rocky Mountain National Park and Preserve, Colorado State University