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THE EFFECT OF LARGE FIRE ON ASPEN RECRUITMENT

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ABSTRACT

This study explored the effect of large scale disturbance (fire) on Aspen (*Populus tremuloides)* recruitment. The 2000 Oldroyd Fire- a 1,329 acre managed fire in Central Utah, suffered complete Aspen clone failure due to grazing. The 1996 Pole Creek Fire- a 7,113 acre wildfire twenty miles west of the Oldroyd Fire, was studied to determine if a larger disturbance area resulted in more Aspen recruitment. This information was critical to land managers who needed scientific data for management decisions but wanted to avoid the risks associated with trial and error at large scales.

INTRODUCTION

Aspen (*Populus tremuloides*) is an important part of our forests in the Western U.S. In contrast to conifers, Aspen stands have a diverse understory of vegetation beneficial to wildlife and numerous other organisms (DeByle, N.V., 1985). Fire is important to Aspen, because fire is a catalyst that initiates new Aspen growth. Due to the fire suppression strategies of the last century, many Aspen stands have become overgrown with conifers choking out the Aspen and the beneficial understory vegetation associated with it (Bartos & Campbell, 2006). Efforts to restore fire to the landscape have encountered several obstacles (O'Brien et al, 2010). Due to numerous regulations associated with managed fires by federal agencies, most efforts to restore fire to the landscape have been limited to small areas. The majority of these fires are less than 1,500 acres. Wildlife and cattle are attracted to burn areas because of the lush, palatable vegetation that is initiated after a fire (Kay & Bartos, 2000).

The 2000 Oldroyd Fire, a 1,329 acre managed fire in Central Utah, suffered complete Aspen clone failure due to grazing by elk. In response to this failure, the Monroe Mountain Working Group was formed. The Monroe Mountain Working Group is a collaboration of stakeholders with interests associated with Aspen recruitment in Central Utah. The operating hypothesis for this collaboration was:

> Large disturbances in seral Aspen, repeated over multiple years, can overwhelm herbivory and allow stems to successfully recruit

Although several research projects have resulted from this working group, the effect of disturbance scale had not been scientifically addressed. Addressing this issue was the catalyst for this study.

METHODS

One of the concerns associated with large disturbances was how to scientifically determine the effect of a large disturbance without risking failure on a large scale through trial and error. This study addressed this concern by conducting research on an existing large-scale wildfire. Although managed fires have been limited to small-scale treatments, there have been several large-scale wildfires in Central Utah.

The Pole Creek Fire area was selected for its proximity to the Oldroyd Fire. The Pole Creek Fire was a 1996 lightning caused wildfire approximately twenty miles west of the Oldroyd Fire. There were 7,113 acres within the fire boundary.

An inventory of Aspen recruitment areas in the Pole Creek Fire area was conducted in the summer of 2013. This inventory utilized the "stand" or "patch" inventory model. Stands of Aspen recruited to a height two meters or greater were visually identified on the ground and mapped using a Trimble® GeoXT GPS unit.

Geographic information system software (ArcGIS®) was employed to establish potential Aspen recruitment acres post-fire. The Aspen recruitment areas identified on the ground were imported into the GIS software and overlaid over pre-fire (1993) aerial photos of the fire area. Pre-fire areas of Aspen or Aspen/conifer vegetation within the fire boundary which were not accounted for in the ground identified Aspen recruitment areas were compared to post-fire aerial photography and classified as either "unburned" or "no Aspen recruitment". The software calculated the acreage of all areas. The ground identified areas of post-fire Aspen recruitment totaled 2,164 acres. The pre-fire Aspen or Aspen/conifer areas which were burned but had no Aspen recruitment post-fire totaled 887 acres. These areas were added together to calculate potential post-fire Aspen recruitment acres (3,051 acres).

The post-fire Aspen recruitment acreage (2,164 acres) was compared to the post-fire potential Aspen recruitment acreage (3,051 acres). The ratio of post-fire Aspen recruitment compared to post-fire potential Aspen recruitment was calculated to be 0.709 or 71%.

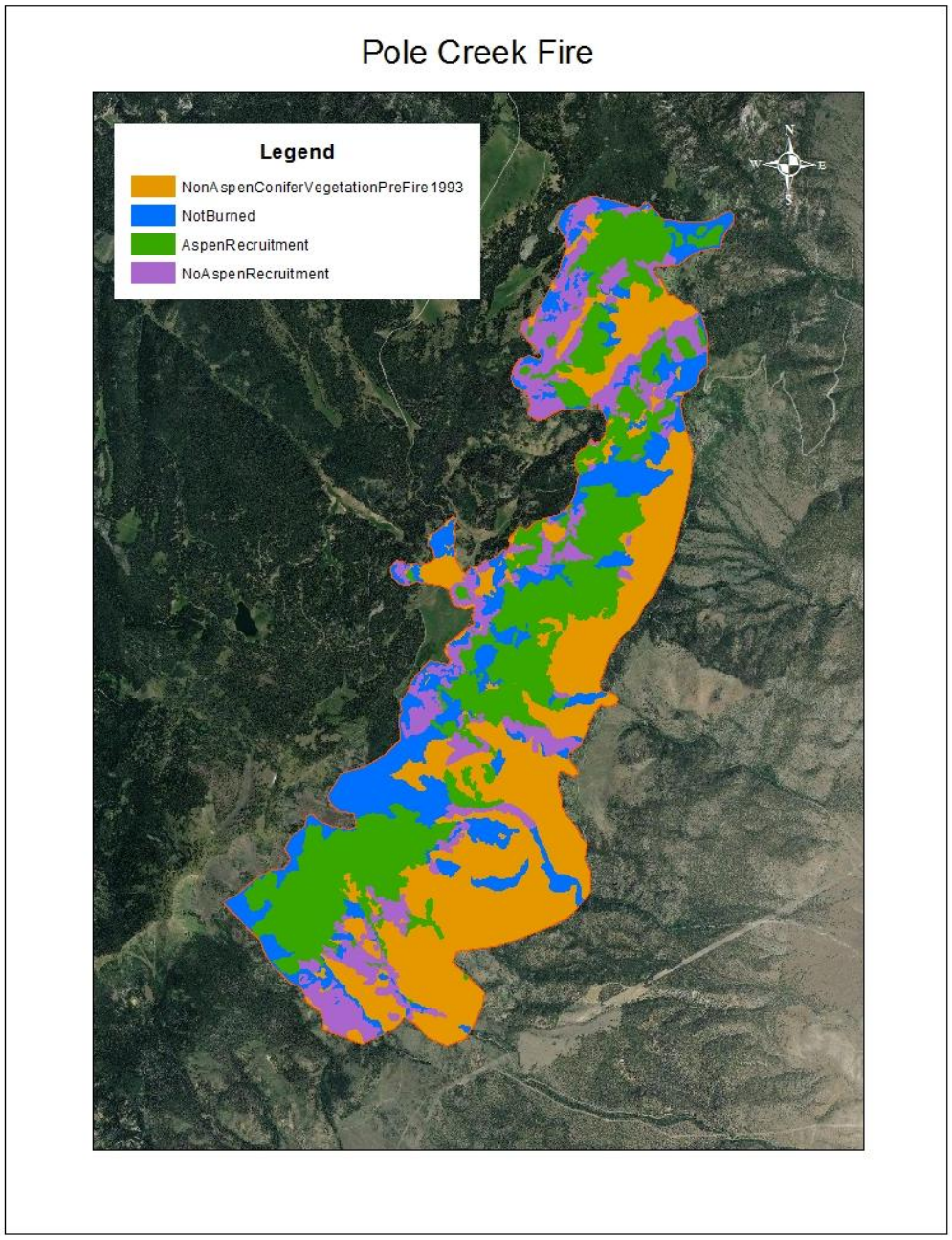

Figure 1. Map of Pole Creek Fire Areas

CONCLUSIONS

The data suggests a correlation between larger disturbances and a significantly higher percentage of Aspen recruitment after a disturbance. This correlation has significant implications to public land managers who have previously lacked current information necessary to make science based land management decisions related to the effect large scale disturbances have on Aspen recruitment post-fire.

It must be noted that 71% Aspen recruitment after a large disturbance is significantly better than complete clone failure on a much smaller disturbance, but it does not completely eliminate the effects of herbivory. Certainly there was a loss of Aspen on some parts of the disturbance area. This loss must be weighed against the costs of inaction.

Inaction has contributed to the loss of Aspen. Thousands of acres of seral Aspen are being threatened by conifer encroachment on an annual basis, but small treatments have proven to be susceptible to clone failure due grazing pressure. The data from this study suggests the use of large scale treatments would allow land managers to address Aspen loss due to conifer encroachment while significantly lowering Aspen loss ratios.

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