Ecological Restoration Institute

Fact Sheet: *Ecological and Social Implications of Diameter Caps*

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Ecological and Social Implications of Employing Diameter Caps at a Collaborative Forest Restoration Project Near Flagstaff, Arizona

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Introduction

The issue of implementing diameter caps continues to permeate collaborative land management discussions and treatment decisions on public lands throughout the western United States. In the Southwest, this typically means not cutting ponderosa pine trees 16 inches or greater in diameter. Proponents of diameter caps believe that size limits are ecologically and socially necessary in order to protect "old growth" trees from being harvested during restoration thinning operations. Opponents typically view diameter caps as arbitrary and, at times, restrictive in terms of reducing excess fuels and reaching forest restoration goals, including emulating natural or historic forest structural and functional patterns. Collaborative efforts have become an influential process to deal with such controversial land management issues. Collaborative partnerships can provide stakeholders a place to discuss ecological and social concerns and, in many cases, increase the chance of successful project implementation.

Old-growth forest in the Fort Valley Experimental Forest. *Photo by Don Normandin*

A Flagstaff-based collaboration, known as the Greater Flagstaff Forest Partnership (GFFP), emerged in 1996 in response to unprecedented, stand-replacing fires that scorched tens of thousands of nearby forest. The premise of the collaboration was to identify approaches to forest management that could reduce the hazard of stand-replacing wildfires and restore resilient forest conditions on U.S. Forest Service-managed lands at the Fort Valley Experimental Forest. Members of the collaborative developed a project to test alternative restoration treatments. The first phase of the project did not employ a diameter cap. This sparked a controversial public debate between restoration proponents and several environmental groups about the validity and appropriateness of restoration efforts and the proposed restoration treatments for Phase II. Ultimately, the collaborative group agreed to implement a 16-inch diameter cap as part of the thinning prescription for the second phase of what became known as the Fort Valley Ecosystem Restoration Project.

The Ecological Restoration Institute monitored the ecological results of the project (Phase I) and also studied the social aspects of the collaborative effort. This fact sheets presents some of the key findings of that effort to understand the ecological and social results of the Fort Valley Ecosystem Restoration Project.

Key Questions and Findings

1. Are there differences in forest structure between capped and non-capped restoration treatments?

Comparisons of forest structure (basal area and tree density) between conditions simulated with a diameter cap and stands without a diameter cap had mixed results. The data suggested that site history played a role in how a diameter cap would affect the stand structure in terms of tree density and tree size. For example, in a recently logged ponderosa pine stand with large, but not particularly old, trees, the 16-inch diameter cap increased both

the tree density (8%) and basal area (13%) by limiting the number of trees available for thinning (Figure 1). The 16-inch diameter cap had little effect on forest structure where there were numerous small-diameter trees growing in a matrix of large trees like the conditions found in the Fort Valley Experimental Forest when logging ceased in the early 1900s.

2. Were the fears and concerns of the environmental groups that proposed the diameter cap, in fact, warranted?

Results from the Fort Valley Ecosystem Restoration Project (Phase I, no diameter cap) indicated a 16-inch diameter cap was not necessary to protect old-growth (those established before 1877) ponderosa pine trees, suggesting distinctive old growth characteristics outweighed a 16-inch diameter cap in terms of protecting old pine trees (less than 0.2 trees per acre were cut, or approximately 2% across the entire experiment).

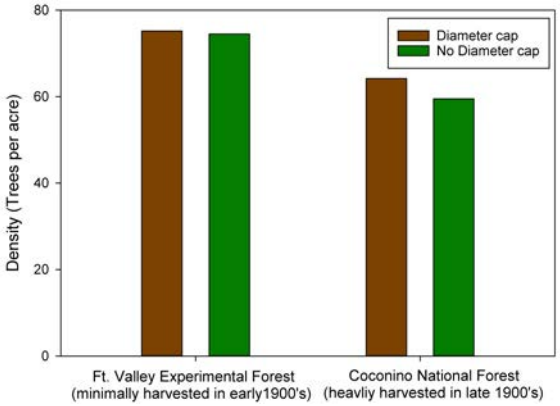

Figure 1. *Tree density following alternative restoration treatment shows no difference between capped and non-capped stands in the experimental forest, whereas in a recently logged forest there was an 8% increase in tree density in a capped stand compared to a non-capped stand.*

3. What were the perceptions of the collaborative group to implementing a diameter cap?

In response to one of several survey questions, 62% of interviewees agreed that the implementation of a diameter cap helped avoid litigation. However, in response to a separate question, 75% believed that the idea of implementing a diameter cap created factions within the collaborative (Figure 2). The stakeholder surveys indicated that while the discussion of diameter caps caused tension within the collaborative group, the overall goal of forest restoration was not compromised.

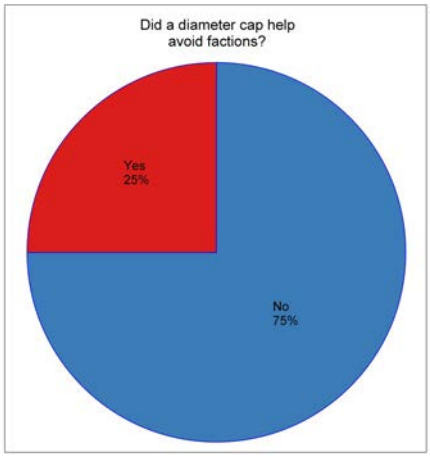

Figure 2. *Three-quarters of the respondents agreed that implementation of a diameter cap did not avoid factions, but instead revealed factions within the collaborative group.*

Conclusions and Management Implications

The outcome of this study strongly suggests that if a decision is made to implement diameter caps, this approach should not be used as a "one-size-fits-all" solution. Diameter caps have varying results on forest structure, depending on initial conditions. Finally, while decisions to implement diameter caps are ultimately derived from the values and attitudes of stakeholders, the results of this study indicated that the fears and concerns of environmental groups and other concerned citizens over the loss of old growth trees were not realized at Fort Valley, where approximately 2% of old growth was lost to thinning.

Recognizing a need to move beyond the historical debate and move forward with landscape-scale restoration, the Four Forests Restoration Initiative (4FRI) now underway in Arizona has taken a different and more nuanced approach to large-tree retention. That stakeholder group produced a "Large-Tree Retention Strategy" that urges protecting trees greater than 16 inches in diameter while allowing the removal of larger diameter trees in situations where their removal is deemed necessary and acceptable to achieve ecological goals and reduce the risk of unnatural fire. As was the case with the Fort Valley Ecosystem Restoration Project, the success of any forestry-related collaboration is partially due to addressing existing fears and concerns, and, ultimately, finding a workable balance between social and ecological perspectives.

This Fact Sheet summarizes information from the following publication:

Egan, D., M. Stoddard, and A. Formanack. 2015. Ecological and social implications of employing diameter caps at a collaborative forest restoration project near Flagstaff, Arizona, USA. *Forest Policy and Economics*, http://dx.doi.org/10.1016/j.forpol.2014.11.013

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