



# Ecological Restoration Institute



Fact Sheet: Tassel-eared Squirrels in Managed Forests within the Wildland Urban Interface February 2013

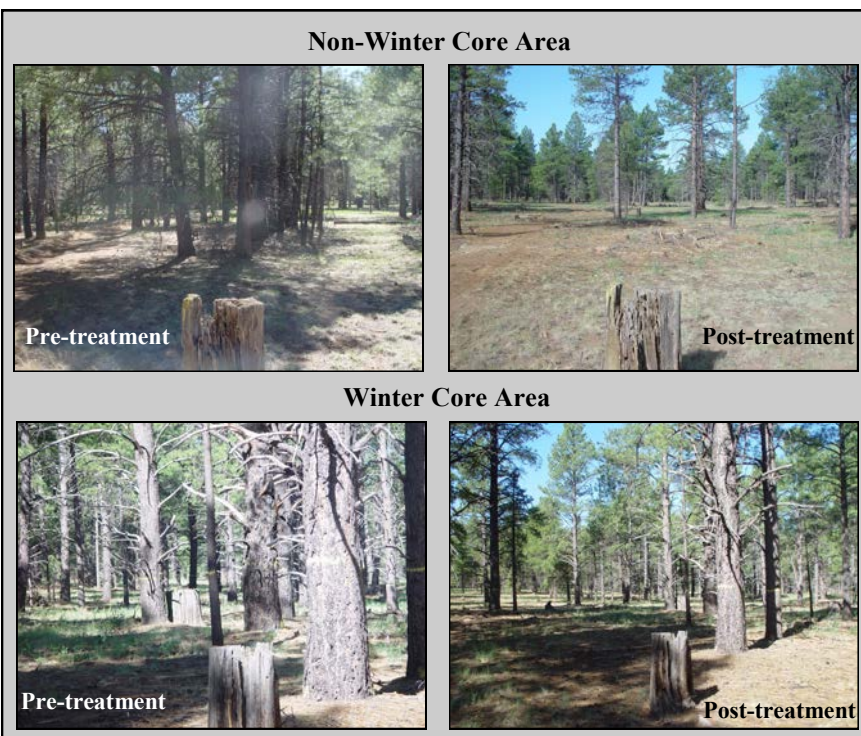
## Tassel-eared Squirrel Habitat Use and Abundance in Managed Forests within the Wildland Urban Interface

By Fenner Yarborough and Chad Loberger, Arizona Game and Fish Department Research Branch

### Introduction

The tassel-eared squirrel (*Sciurus aberti*) is considered a ponderosa pine “obligate” species. Squirrels depend on this ecosystem for most of its life requirements: nest placement, food, escape cover, and movement corridors. They have a preference for interlocking tree canopies. They are a popular wildlife viewing and small game species and are important prey for mammalian predators and hawks, including the northern goshawk. The squirrel may reduce ponderosa pine growth and cone production, while also increasing nutrient availability to the pine by increasing litter fall and dispersing hypogeous, or underground, fungi spores that facilitate nutrient and water uptake; thus, enhancing seedling survival, forest regeneration, and growth.

Contemporary ponderosa pine forests tend to be dominated by relatively homogeneous, dense stands of younger trees with a depauperate herbaceous and shrub understory, and increased vulnerability to high-intensity crown fire. Managers are implementing prescriptions designed to reduce tree density and overstory canopy, while increasing productivity and diversity of understory vegetation. Given the squirrels’ reliance on and contributions to the ponderosa pine, managers need to know what effects broad-scale forest restoration or other fuels reduction treatments may have on squirrel populations. To understand the effects of Winter Core Area (WCA’s) retention on tassel-eared squirrels, the Arizona Game and Fish Department studied squirrel use and abundance in areas that received forest restoration treatments based on non-wildlife management goals (Fort Valley Experimental Forest in Flagstaff, Ariz.) and areas that incorporated wildlife habitat objectives (Flagstaff Pulliam Airport and Mountainaire, Ariz.).



Habitat treatments included establishment of WCA’s, which have high basal area and canopy cover and are specifically set aside to benefit tassel-eared squirrels. The Airport study site enabled analysis of squirrel abundance and habitat use in a 133-acre area of forest that received restoration treatments and incorporated two WCA’s (27 acres total). The Mountainaire project treatment incorporated one larger WCA (100 acres) set aside for squirrels. The prescription on both sites emphasized mechanical thinning to re-create pre-settlement forest conditions, plus retention of WCA’s.

## Research Findings

- Squirrel abundance was higher in areas with higher basal area (>80 ft<sup>2</sup>/acre), canopy closure (>50% ground-based densiometer), and interlocking canopies (i.e., WCA's). These patches were as small as 10 acres and as big as 100 acres.
- Home ranges were larger in non-winter (average=33 acres) compared to winter (average=9.6 acres). These findings are consistent with Loberger et al. (2011), who reported average non-winter and winter home ranges of 34.1 and 12.6 acres, respectively, at Fort Valley.
- During non-winter, squirrels split their time between the relatively smaller Airport WCA's (9–17 acres) and treated areas, while squirrels at the Mountaineer study site mostly used the larger WCA (100 acres).
- During winter months, squirrels at both sites largely restricted their movements to the WCA's or nearby untreated areas.
- Our results suggest that squirrels will disproportionately use small and large WCA's during the winter months and travel from smaller WCA's through treated areas to other untreated patches.

## Management Implications

- Where management objectives include maintaining squirrel populations at or near current levels, the retention of untreated areas or incorporation of treated areas with high canopy cover should be considered.
- Changes in population trends are difficult to attribute solely to treatment due to varying amounts of snow accumulation.
- The identification of feed and nest trees for retention during treatment marking could benefit squirrels.
- WCA's contain important habitat components (e.g., nest sites, foraging opportunities, and travel routes) that are vital to squirrels during winter months.
- During non-winter months, squirrel use of WCA's is a result of WCA size. The larger the WCA, the less likely the squirrel will leave the WCA (e.g., Mountaineer study site).
- More research is needed to determine the optimal size, orientation, shape, and spatial arrangement of WCA's in a treated landscape for maintaining squirrel populations.

### **This Fact Sheet summarizes information from the following publication\*:**

Loberger, C.D., T.C. Theimer, S.S. Rosenstock, and C.W. Wightman. 2011. Use of restoration-treated ponderosa pine forest by tassel-eared squirrels. *Journal of Mammalogy* 92:1021-1027. <http://library.eri.nau.edu/gsd/collect/erilibra/index/assoc/HASH3ed1.dir/doc.pdf>

*\*This Fact Sheet also includes information from unpublished data produced by the Arizona Game and Fish Department during research conducted at the Flagstaff Pulliam Airport and Mountaineer study sites.*

### **Contact**

Fenner Yarborough, [ryarborough@azgfd.gov](mailto:ryarborough@azgfd.gov)