

# **Monitoring Protocols for Measuring Forest Composition and Health**

## **San Juan Headwaters Forest Health Partnership**

**August 23, 2013**

### **Introduction**

The San Juan Headwaters Forest Health Partnership (SJHFHP) is a community organizations composed of Federal Agencies, non-profit organizations, private land-owners, and local businesses. The organization was built around community interest in healthy forests, concern about fire management, and resource management practices. The organization has grown from an initial conference that was held in 2009.

Five statements describing the group's purpose were developed during the initial meetings (Burns et al. 2012):

- ✓ Sharing and strengthening our understanding of appropriate methods of improving forest health and long-term resilience in the mixed-conifer landscape;
- ✓ Broadening our knowledge of current conditions, conservation needs, and opportunities;
- ✓ Developing a set of management approaches, actions, and projects;
- ✓ Initiating projects that address high-priority needs and opportunities for management; and
- ✓ Establishing follow-up monitoring methods to guide adaptive management.

The SJHFHP has identified among its goals and areas of interest a vision of regional forests that (Burns et al. 2012)

- ✓ include a healthy and appropriate mix of species, and size and age classes
- ✓ can tolerate and withstand insect and disease outbreaks
- ✓ are resilient (resilience is the capacity of a system to absorb disturbance and still retain its basic function and structure)
- ✓ offer a diversity of economic development opportunities that enable the people living in the surrounding communities to make a living
- ✓ enable wildlife to thrive
- ✓ are not fragmented and are left in more wild states the further away from residential communities and rural subdivisions
- ✓ offer a balance of human uses and natural processes and conditions
- ✓ are healthy for generations in the future
- ✓ are part of a wider, healthy watershed system that supports human and natural needs

Efforts to achieve the goals and initiatives SJHFHP includes a selection of projects that (Burns et al. 2012):

- ✓ Protect public water resource quality.
- ✓ Mitigate wildfire impacts to life and property.
- ✓ Achieve multiple resource benefits and objectives.
- ✓ Address landscapes that fall to the greatest degree outside the "historic range of variability" (HRV).
- ✓ Increase the opportunities for medium-size wildfires to occur safely in the backcountry.
- ✓ Improve wildlife habitat.
- ✓ Reduce the potential for epidemic outbreaks of disease and insect damage.
- ✓ Use mechanical work in roaded areas.
- ✓ Protect recreation opportunities.
- ✓ Recover economic benefits to offset the costs of treatment and monitoring.

Keeping these goals and initiatives in mind, the SJHFHP has begun to progress into Phase II, the implementation of projects. The organization has contracted Mountain Studies Institute (MSI) to monitor changes associated with project implementation on public and private lands in Archuleta County and the Rio Grande National Forest. Monitoring will measure forest stand composition before and after thinning with the ability to measure changes over the long-term. The monitoring is designed to be repeatable and comparable within and across treatment areas. It will identify changes in stand density, species composition, canopy layering, presence of ladder fuels, and overall stand health.

## Monitoring Design

The primary goals of the monitoring are to assess changes in stand density, composition, and character over time. MSI is proposing a monitoring program that is simple, repeatable, and comparable. The monitoring program includes Designated Permanent Photo Points, Point Center Quarter Transects, and Shrub Density Transects. The start and end points for the transects will be recorded using a GPS unit and marked with capped rebar.

### *Designated Permanent Photo Points*

Photo points will be located in areas that provide a visual representation of typical forest cover and treatment type, as well as areas determined to demonstrate clear visual impacts from treatment activity in high traffic areas. Photo point locations will be recorded using a GPS. A tripod will be used to steady the camera. Photos will also be taken at both ends of the survey location, looking towards the center of the transect.

### *Point Centered Quarter Survey*

Transects will be established within each treatment area. The number of transects and length of transects will be determined by the dimensions of the treatment area.

The overall length of each transect will be set at 25m increments in order to ease finding and resampling during future monitoring. A Point Center Quarter (PCQ) survey will be conducted every 25m along the transect. At each point, the closest tree in each quarter will be identified and the distance to the tree recorded. Measurements will also include the diameter at breast height (dbh), species, height, crown height, and crown class. Tree canopy diameter will be calculated using equations developed for the species. Trees smaller than 10cm dbh will not be included in the survey. Should the transect need to be shortened due to space restrictions, the 25m spacing of the PCQ surveys will be retained.

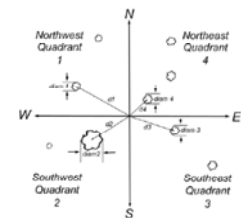
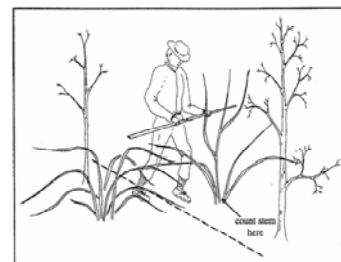


Figure 1. Point to plant distances and plant diameters in each of four quadrants

It is possible that the PCQ surveys might occur after treatment. Pre and post treatment stand densities can still be calculated. In this case, two measurements will be taken; for pre-treatment, the closest tree or stump will be measured for each quarter; for post-treatment, only the closest tree would be measured for the quarter. Stumps will be measured as a basal diameter rather than dbh. All basal diameters will be converted to a dbh estimate to ensure proper density calculations via the PCQ method.

### *Shrub and sapling survey*

The initial 100m of the transect will be used to conduct the shrub and sapling survey. The degree and direction of slope will be recorded. Surveyors will walk the transect and tick the number of shrub species (including gambel oak and saplings less than 3cm dbh) that fall within 2 feet on either side of the transect. Sapling, and shrub density is measured along the length of the transect line and extend 5 m to either side of the line.

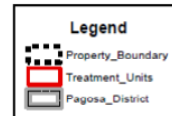
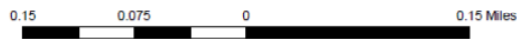


Each tree, sapling, and shrub within the quadrat is counted and identified by species. The results of this survey will be used to calculate shrub and sapling densities for the plots.

#### *Surface Fuels*

Using the initial 100m of the transect, all woody debris that crosses the transect will be recorded, including a size category and degree of decomposition (i.e. dead needles or leaves, no needles or leaves, small branches, large branches, no branches). Only sound wood will be included in the survey, not wood that is rotten. Additionally, an estimate of bare ground will be calculated along the transect.

# Cloman Park Thinning Units



## Treatment Areas:

Unit 1 is the restoration treatment

Unit 2 is traditional thinning for timber production

Unit 3 is restoration and dwarf mistletoe management

Unit 4 is no treatment

**Literature Cited**

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