Establishing a large scale forest dynamics monitoring plot to advance forest management

By Dr. Wade Tinkham

Natural resource managers are increasingly required to simultaneously balance the management of multiple resources while considering future changes in the environment and altered disturbance regimes. To meet these objectives recent research has highlighted the importance of managing our forests as multi-level, interconnected patchworks. However, much of our understanding of how to manage forests focused on the use of plot level sampling (e.g. a network of 0.1 -1.0 acre plots) on 3-5 year intervals to characterize stand scale processes and dynamics. While

the knowledge provided from such approaches has been and remains useful, it unfortunately does not provide the knowledge required to address many of the emerging questions related to managing forest patterns, processes and dynamics across multiple scales. To address these emerging questions, scientists and land managers around the world have recently incorporated large spatially explicit monitoring plots that are sampled annually in addition to plot level monitoring.

During the summer of 2016, researchers from Colorado State University (Dr.'s Wade Tinkham, Chad Hoffman, Seth Ex, Michael Falkowski and Jane Stewart) along with scientists from the USDA Forest Service Rocky Mountain Research Station (Dr.'s Paula Fornwalt and Mike

Battaglia) collaborated with the USDA Forest Service Rocky Mountain Region and the Pike's Peak Ranger District of the Pike/San Isabel National Forest to establish a large-scale, long-term forest dynamics research site (referred to as the Pike Forest Dynamics Plot hereafter). The selected site is slated for a future restoration treatment and captures a range of common forest types found throughout Colorado including ponderosa pine dominated dry-mixed conifer system on southern aspects and mesic-mixed conifer system on northern aspects that include Engelmann spruce and subalpine fir. With the assistance of eight dedicated undergraduate technicians, locations were mapped and species,
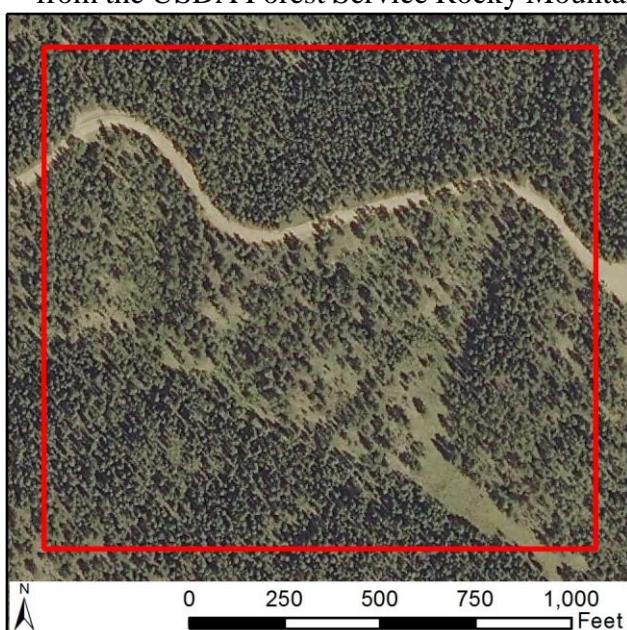
diameter at breast height, total height, and crown base height were recorded for nearly 18,000 trees across the 43.5 acre plot. The cover and species composition of understory plant communities, surface fuel loading, and seedling densities were also inventoried across the site.

The long-term vision for this site is to develop new knowledge that improves forest management and restoration strategies within the Rocky Mountains. More specifically these efforts will: 1) develop new understanding that closes existing knowledge gaps regarding the forces controlling on forest growth and dynamics, 2) increase our understanding of long-term forest health and resiliency in a changing climate 3) develop novel forest inventory and monitoring methodologies including remote sensing and field based approaches; and 4) provide educational and training opportunities for current and future professionals, and the broader public throughout the region. Ultimately, the knowledge generated through this project will close existing knowledge gaps related to forest stand dynamics, forest health, and long-term forest resiliency leading to improved forest management within the region and beyond.

For further information about the site or its use, please contact Dr. Wade Tinkham (Wade.Tinkham@colostate.edu) or Dr. Chad Hoffman (C.Hoffman@colostate.edu).