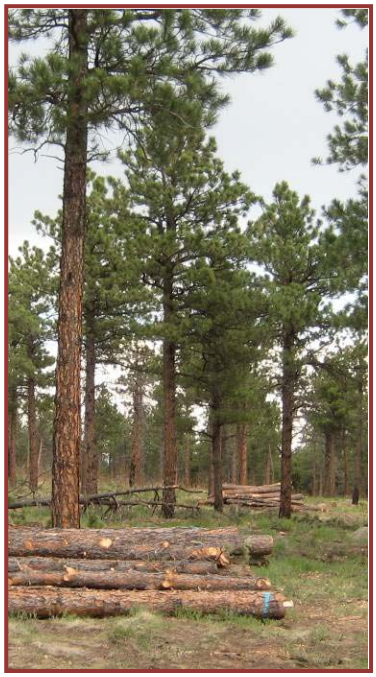
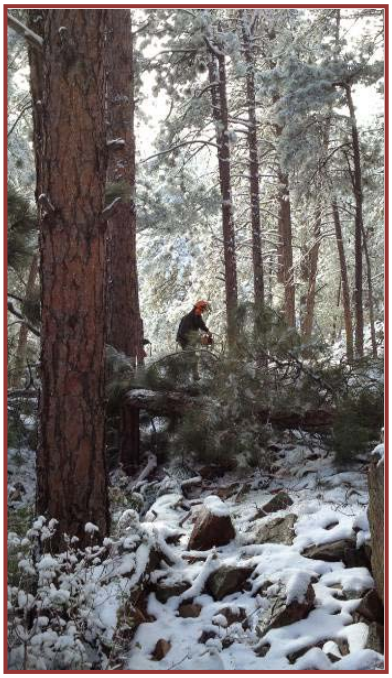
2013 Forest Management Summary Report

City of Boulder Open Space and Mountain Parks
and
City of Boulder Fire Department





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January 2014

EXECUTIVE SUMMARY

The 2013 field season was the tenth consecutive year Open Space and Mountain Parks (OSMP) committed full time resources to the implementation of the Forest Ecosystem Management Plan. This season saw the expansion of the OSMP forest management program through the addition of staff and equipment. In total, 184 10-hour days were spent on forest management by the OSMP crew between March 4 and December 20, 2013. As a result of these efforts 140 forest acres were thinned in 2013, more than in any previous season. The field season also included extensive work related to the September floods and a continued emphasis on vegetation monitoring, data modeling, mapping, and analysis, and collaborative projects with local fire protection districts.

BACKGROUND

In June of 1999, Boulder City Council approved part one of the City of Boulder Forest Ecosystem Management Plan (FEMP). The plan established a framework, policy guidelines, and management direction for forest ecosystem management on City lands. The FEMP focuses on two primary goals:

- Maintain or enhance native plant and animal species, their communities and the ecological processes that sustain them
- Reduce the wildfire risk to forest and human communities

FOREST MANAGEMENT PROGRESS

Forest management on OSMP has shifted over the years from smaller, partial projects to larger complete projects (Figure 1). This shift can be attributed to better equipment, broader scale planning, and more committed staff time. Large complete projects are more efficient because less time is spent on layout and logistics and they do not require follow-up work in future seasons. Larger projects also have ecological benefits. Impacts are greatly decreased by doing one large project instead of a series of smaller ones (one access road, one pass with the skidder, etc.). Large projects also have a more dramatic impact on the landscape by improving more habitat for wildlife and understory plants, increasing vigor and health of entire stands of trees and by decreasing the threat of large catastrophic fire events.

OSMP has been able to extend its effectiveness by working collaboratively with other local groups with similar goals. In 2005, OSMP and the City Fire Department Wildland Division developed the first Service Level Agreement (SLA) to define the annual work plan for both crews. Crew coordination and a strong working relationship with City Fire has continued through 2013. The SLA was expanded in 2012 to an eight year agreement and included commitments by the Fire Department to spend at least 100 days per year on OSMP projects and for OSMP to fund a portion of the new City wildland facility. OSMP staff has also partnered with local fire protection districts, Colorado State Forest Service, and Boulder County to complete larger scale forest management projects in the past few years.

OSMP has also increased its internal capacity by adding equipment and staff dedicated to implementing the FEMP. Over the past five years OSMP has purchased a new tractor, two chippers, and a log trailer to add to the fleet dedicated to forest management work. Since 2004 when the first dedicated OSMP forest management crew was hired, staffing has also increased.

In 2013 the crew size doubled to eight crew members for roughly nine months of the year. OSMP also hired a permanent forest management technician to coordinate crews and oversee much of the field work.

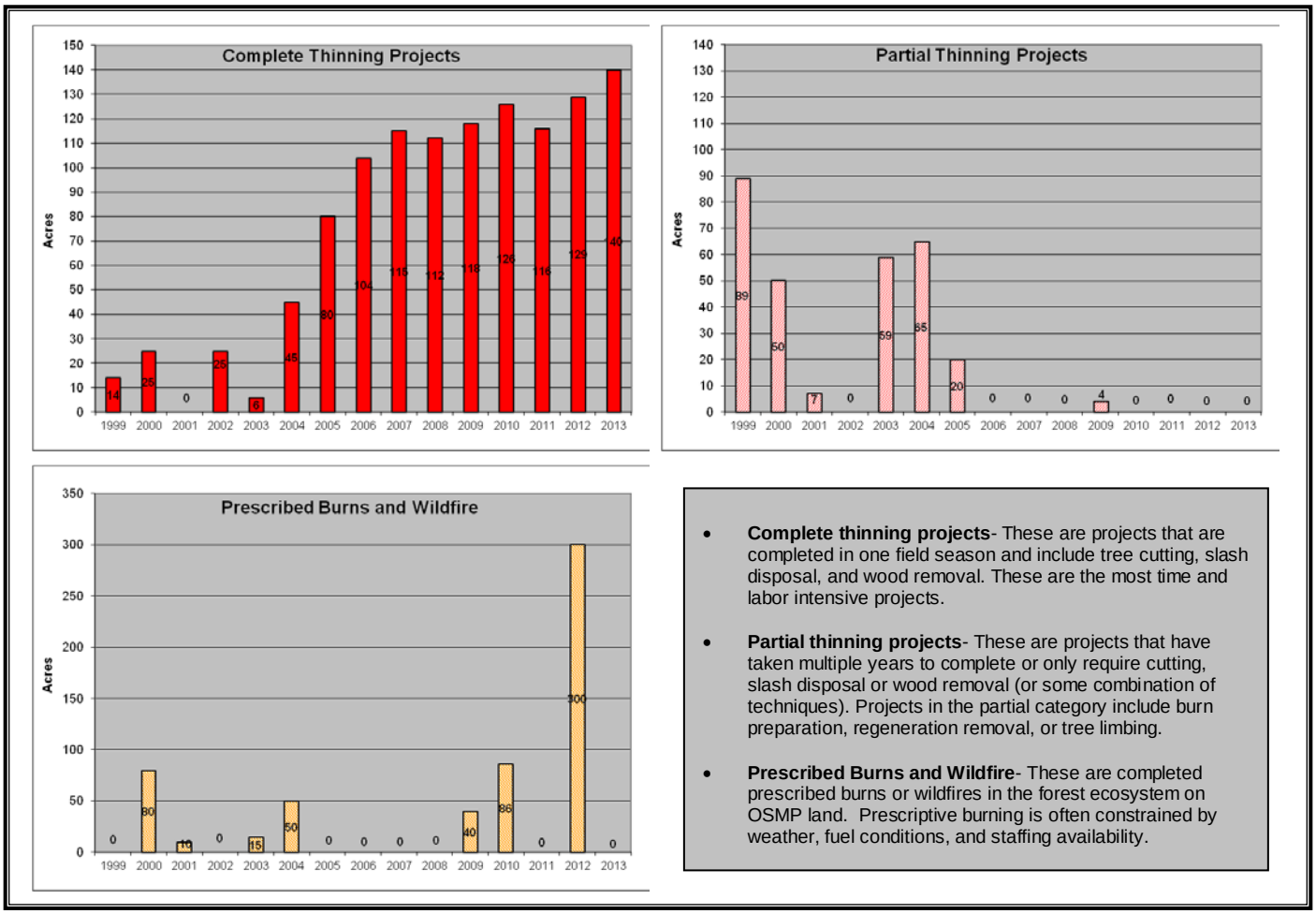


Figure 1: Annual forest management progress

Major Forest Management Projects by Year:

2013: S3, Upper Flagstaff, Kineman (Bison Dr), Knollwood
2012: Bison Dr, Flatirons Vista, Upper Flagstaff, Pine Needle Notch, Canyonside, Flagstaff Fire
2011: Flagstaff Summit, Flatirons Vista, Abbey Pl., Kneale Rd.
2010: Anemone Hill thinning, Watertank thinning, Dome wildfire
2009: Enchanted Mesa thinning, S3 prescribed burn, Flatirons Vista Grassland restoration
2008: Shanahan Ridge (four units east of Mesa Tr.)
2007: Flagstaff Road Corridor, Pinebrook Fuel Break, Marshall Mesa
2006: Lindsay/Jeffco-NE, Marshall Mesa, Lindsay/Jeffco-SE
2005: Lindsay South, Olson/McIntosh, Daman, Enchanted Mesa Reservoir, Lindsay Road
2004: S3 Cutting and Skidding, McIntosh, Conda Meadow, Watertank/FLVI Burn Prep, Lindsay Meadow Burn
2003: S3 Cutting, Volunteer Regen Cutting, Conda Meadow, Lindsay North Burn (3)
2002: ST3, Shanahan/Devils Thumb Neighborhood Thinning
2001: Lindsay North Burns (1, 2), Wittemyer Fuel Break
2000: Lindsay North, Enchanted Mesa, Shanahan Burn
1999: Lindsay North, Enchanted Mesa, Flagstaff Top Shop

2013 FOREST MANAGEMENT CREW

Most of the implementation of the Forest Ecosystem Management Plan is carried out by a dedicated, hard working seasonal crew. In previous years OSMP has hired a crew of three to four crew members for six to nine months depending on available budgets. In 2013 staffing was doubled to include a crew of eight for almost 10 months. OSMP also added a new permanent Forest Management Technician to oversee the expanded crew and help develop and manage forest management projects. The crew spent a total of 184 work days (up from 163 work days in 2012) on various OSMP projects with most of the emphasis on forest thinning (Figure 2). The forest crew also spent time on other departmental priorities including substantial time on flood recovery work.

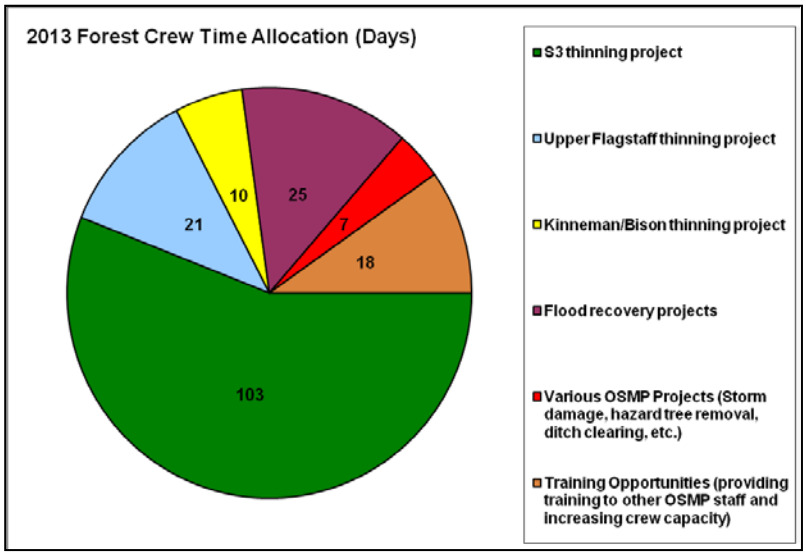


Figure 2: Time spent on 2013 projects by the OSMP forest crew.

To support the increased crew size and expanded work plan in 2013, OSMP also expanded its fleet of equipment. The department added a new John Deere tractor with forestry specific accessories as well as a new trailer and chipper. The new equipment allowed crews to work on multiple projects at the same time and be more efficient with time and resources.

In addition to the forest management work completed by OSMP staff, Fire department crews also helped meet the goals of FEMP. In 2013 OSMP and Fire worked to develop a thinning project with a flexible schedule that could be completed by Fire staff throughout the summer. A project in the Knollwood area was developed and completed from start to finish by Fire department staff. This proved to be a very effective way to manage projects because OSMP and Fire crews could work according to their respective schedules and address other priorities as they arose. Fire staff also worked on a number of other smaller mitigation projects along the wildland/urban interface at the base of Flagstaff Mountain and conducted numerous training courses that directly benefited OSMP crews.

2013 THINNING PROJECTS

A total of 134 days were spent by the OSMP forestry crew on thinning projects in 2013. The crew also benefited from the help of other work groups. Nine days were spent working with

AmeriCorps, volunteer groups, OSMP Junior Rangers and jail crews. Each of these groups usually included 8 to 12 individuals. A total of 140 acres were thinned in four treatment areas during the 2013 season.

S3

The S3 thinning project covered approximately 82 acres east of the Mesa Trail between the South Fork of the Shanahan and the Big Bluestem trails. This project was a continuation and expansion of a project started in 2003. The thinning work also builds on the extensive work OSMP has done in other parts of the Shanahan Ridge area. The OSMP forest crew spent a total of 103 work days between March and December on this project which included cutting, skidding, chipping and hauling. The forest crew also worked with IPM staff to treat patches of myrtle spurge and Canada thistle in the area.

For a large portion of this project the thinning was a second entry that followed initial cutting done in 2003 and 2004. The 2013 thinning was focused on removing a portion of the trees in the 6" to 12" diameter classes and breaking up the homogonous nature of the stand. Decreasing the overall tree density, increasing forest openings, and creating patches of snags and wildlife trees were all key goals in the project prescription. On average the thinning efforts in S3 decreased the overall stand basal area from 95 sq ft/ acre to 75 sq ft/acre. In S3 this density translates to a decrease from 188 trees per acre to 95 trees per acre and an increase in average diameter from 9.8" to 12.3" (Figure 3).

The creation and preservation of wildlife habitat was an important objective in this treatment area. In advance of the cutting in S3, wildlife staff surveyed the entire stand and identified potential Abert's squirrel nest trees. These nest locations were integrated into the treatment by maintaining higher densities of "leave" trees around nest trees. The stand also had a low density of snags prior to thinning, with less than one large snag (over 12" diameter) per acre. Forest management staff used axes to girdle 152 trees in the stand to create snags. Additionally, 30 trees were cut and left on the ground to create down woody material for wildlife habitat.

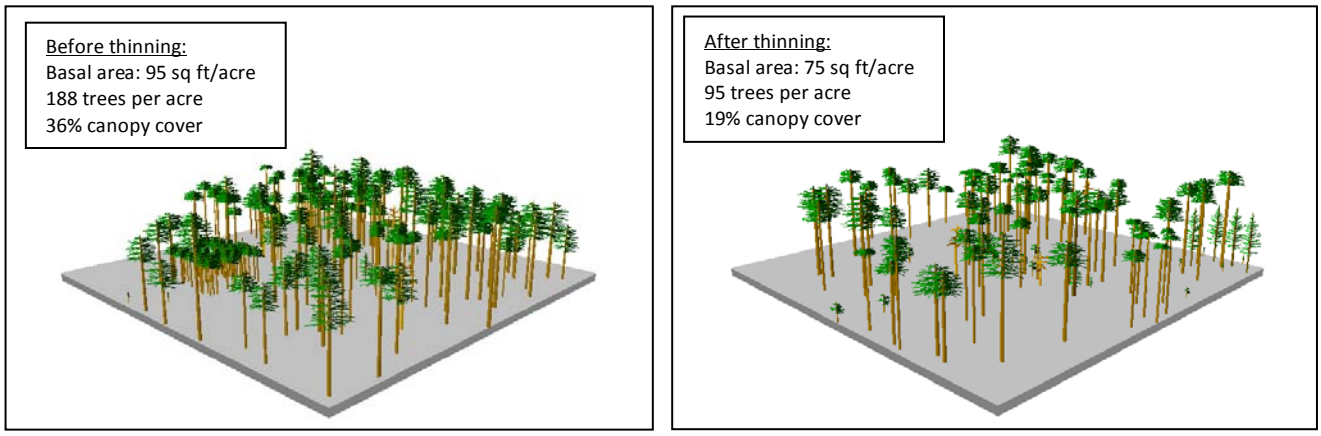


Figure 3: S3 overstory structure change due to thinning.

Upper Flagstaff

The upper Flagstaff thinning project was split between two units covering 40 acres located near the 5-mile mark of Flagstaff road. Unit one was along the Flagstaff Road corridor and stretched from the upper Long Canyon Trailhead to the western property boundary of Mountain Parks.

Unit two was near the junction of the Green Mountain West Ridge Trail and the Green-Bear Trail. This project built on work done by OSMP in 2007 with the goal of improving the Flagstaff Road corridor as a landscape level fuel break and enhancing access and egress for fire fighters and residents in the event of a wildfire. Work on the project in 2013 took place between October and December.

The prescription for this area focused on removing a large portion of small trees that dominated the understory. Prior to treatment, this area had over 150 trees per acre smaller than 8 inches in diameter. The larger trees in the area were well distributed with ages approaching 150 years, but the dense understory trees were creating competition and a heavy fuel load. After thinning, the average basal area decreased from 80 sq ft/acre to 60 sq ft/ acre which translates to a change from 248 trees per acre to about 70 (Figure 4).

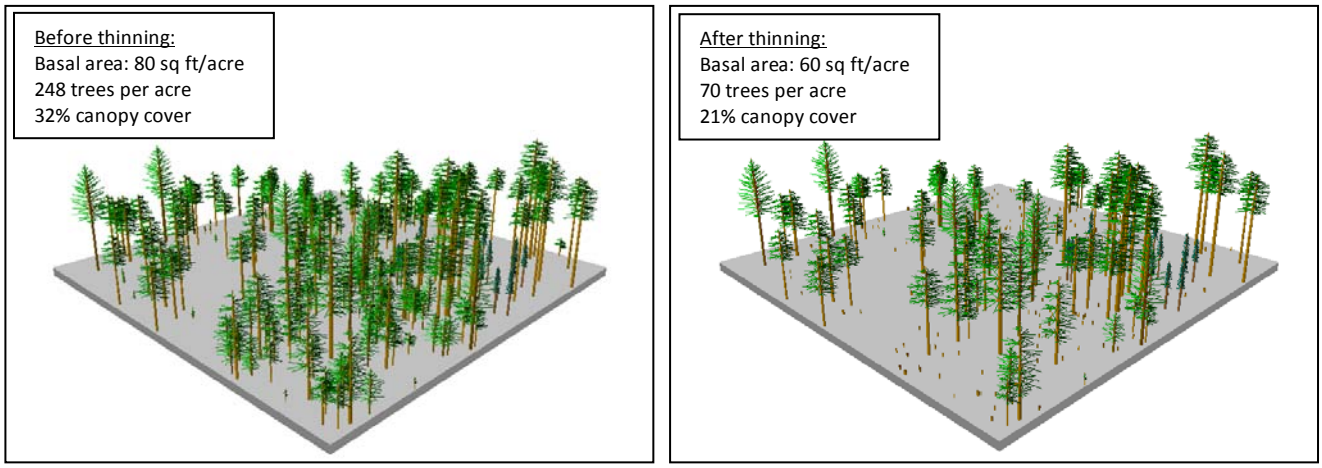


Figure 4: Upper Flagstaff overstory structure change due to thinning.

Kineman (Bison Drive)

The Kineman project area is located about three miles south of Flagstaff Road along Bison Drive. This treatment area was identified by private property owners adjacent to OSMP in early spring 2013 as a project that could help protect the Bison Drive neighborhood and build on fire mitigation work that had already been done by OSMP, Rocky Mountain Fire (RMF) and private property owners. OSMP staff partnered with Rocky Mountain Fire staff to design and implement the project in late July and early August. The project covered about 10 acres on OSMP land and RMF thinned an additional 10 acres on the adjacent private property.

Thinning in this area focused on removing patches of dense small diameter trees and decreasing tree density along Bison Drive to improve the road as a fuel break. This project also builds on larger landscape mitigation efforts done in the past few years. Thinning on the OSMP portion of the project decreased the overall basal area from 88 sq ft/acre to 60 sq ft/acre and the trees per acre decreased from 323 to 101 (Figure 5).

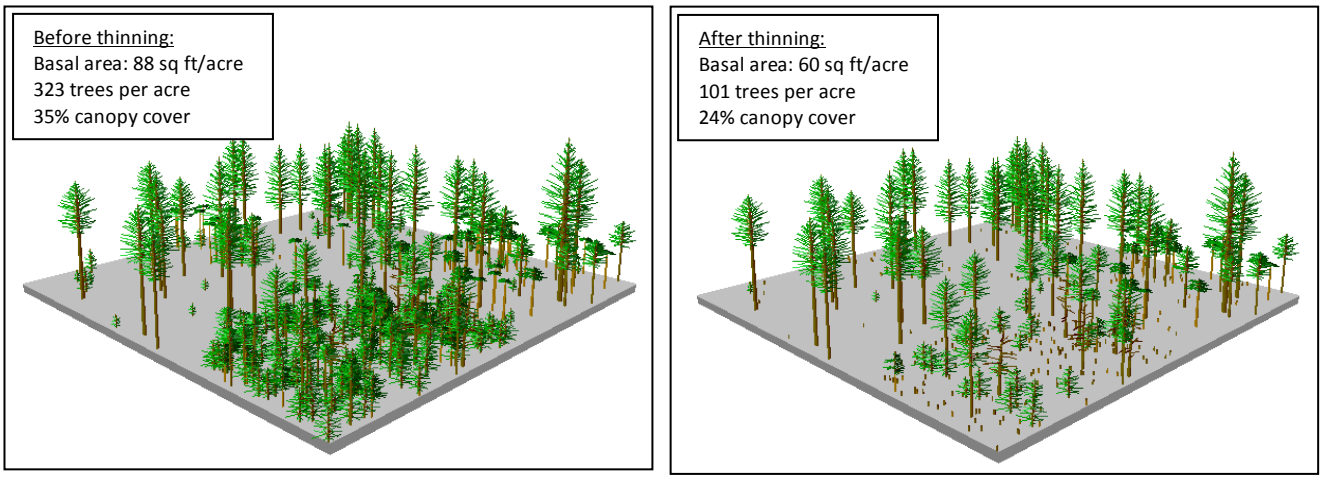


Figure 5: Kineman (Bison Dr) overstory structure change due to thinning.

Knollwood

The Knollwood thinning project is located at the mouth of Sunshine Canyon near the Centennial Trailhead and the Knollwood neighborhood. This project was designed as a fire mitigation project to create a fuel break between OSMP land and the city. The thinning completed in 2013 covered about 8 acres and was completed by staff from the City Fire Department's Wildland Division. Fire department staff spent roughly 20 days on the project between June and the end of August.

Thinning in this area focused on the removal of primarily small diameter ponderosa pine and some medium sized trees to open up the canopy. In the event of a wildfire this area could be used as a fire break directly adjacent to the city. The open canopy could help reduce fire intensity and allow for slurry drops to reach the ground and be a more effective suppression tool. Additional thinning to the south of this project area will be completed in upcoming seasons.

2013 FOREST MONITORING PROJECTS

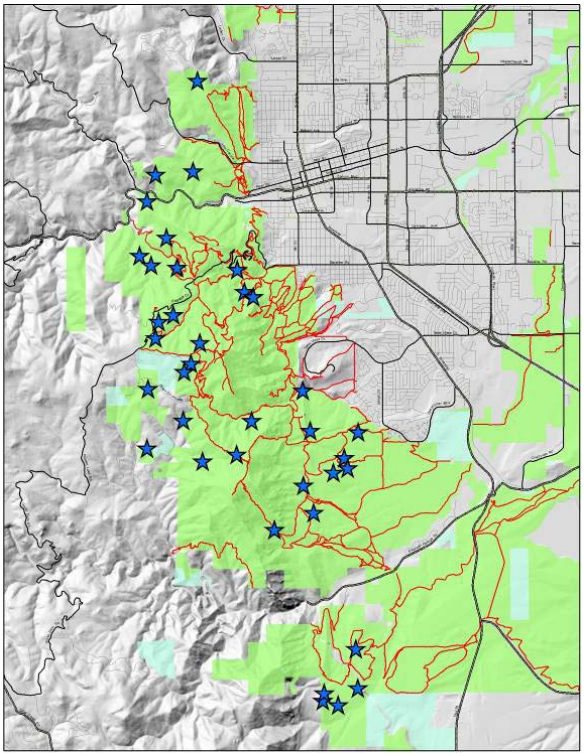
Understory Vegetation Monitoring

Forest understory monitoring has been a consistent part of OSMP's forest management. Tracking and quantifying the impacts of thinning on the understory vegetation is an essential part of assessing the success of forest management. Over the past eight years OSMP staff has established numerous monitoring sites in treatment areas across the system's low elevation ponderosa pine stands. These monitoring sites have been used to measure the vegetation cover and composition before and after thinning treatments are implemented.

In 2011 staff decided to reevaluate the forest monitoring and shift the objectives to a broad scale. The current goals of the understory monitoring are to determine the status and trends of understory vegetation, provide data to better understand the dynamic nature of forest systems, and provide a means of measuring progress towards performance goals. At each monitoring site information on vegetation species and cover, tree density, canopy cover and litter depth is

collected to get a complete picture of the sites vegetation characteristics. The new forest vegetation monitoring project was implemented in 2012 and continued in 2013.

During the 2013 field season a total of 37 sites were inventoried across all OSMP forest areas (Map 1). The sites were stratified by forest type to create a representative sample of all OSMP forests. Each sample site will be revisited in future years to account for variations in moisture, temperature and growing season length. All of the sampling in 2013 was completed by OSMP staff between late June and August. A total of 14 days were spent by two to three staff members on this monitoring project in 2013.



Map 1: Understory monitoring sites sampled in 2013.

Overstory and Photo Point Monitoring

Monitoring of forest stand structure and composition is done with permanent photo points and overstory inventories. Photo points have proven to be an effective way to show differences prior to and following treatment. While they are less quantitative than other forms of monitoring, photos can be useful in displaying changes in tree density, understory density, and non-native composition. Across the treatment areas in 2013, over 25 permanent photo points were established. Each point was located using GPS, marked with a tree tag, and the direction of the photos were recorded. The photos for the 2013 projects are attached to this document as Appendix A.

Quantitative data is collected by overstory inventories. OSMP has 337 inventoried forest stands with 2125 sample points. In 2013, overstory inventories focused on post-treatment sampling to measure the effectiveness of thinning as well as on areas of the system where existing inventories are over 10 years old. Inventories included measurements of tree characteristics and understory composition as well as qualitative assessments of fuel loads, wildlife habitat, and non-native plant establishment. The results of the post management inventories are summarized in the “2013 Thinning Projects” section of this report.

2014 WORKPLAN

The 2014 field season will continue the expansion of OSMP’s forest management efforts. The increased crew size of eight members will be retained and the equipment purchased at the end of 2013, including the late addition of a new, larger chipper and a new log trailer, will be utilized throughout the upcoming year. In addition to thinning efforts, staff will continue to conduct understory monitoring, expand overstory inventory efforts, conduct vegetation mapping across all OSMP forested areas, and continue collaborative efforts with other local forest and fire managers.

A number of thinning projects were postponed in 2013 due to trail damage caused by the September flooding. Treatments along the North Fork of the Shanahan Trail and in the area of

Bear Canyon and the Mesa Trail were suspended when vehicle access to the sites was destroyed by flood water. In 2014 restoration to portions of the trail system should make these projects accessible and will be a priority for completion. Other project areas for 2014 will include the Flatirons Vista area where multiple years of grassland restoration efforts have already taken place and continued work along Flagstaff Road. OSMP staff will also continue to work with the City Fire Department on thinning efforts near the Knollwood neighborhood and other areas along the western edge of the city in the wildland/urban interface.

Monitoring efforts to track treatment effectiveness and overall forest health will continue during the 2014 season. The 37 understory monitoring sites will be resampled in July and August of 2014. Staff will also expand efforts to resample overstory inventory sites. This work will focus in the Shanahan Ridge, Anemone, Enchanted Mesa, and Lindsay areas. In addition to the forest specific monitoring, staff will continue to revisit the OSMP vegetation mapping efforts. Portions of the mapping are over ten years old and staff will focus on mapping large portions of forested areas to the association level.

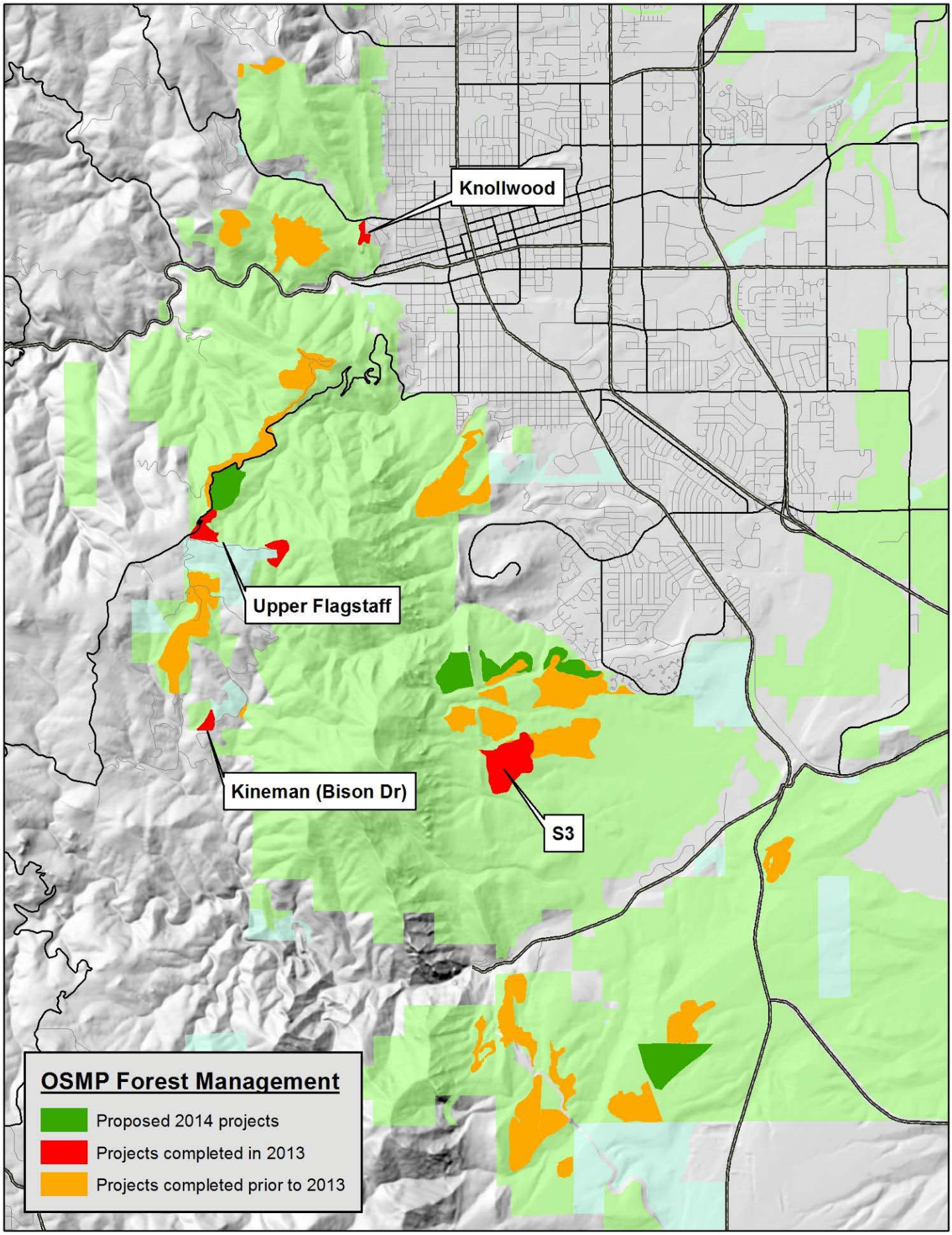
RELATED DOCUMENTS

Anchor Point. (2007). *City of Boulder, Wildland Urban Interface, Community Wildfire Protection Plan*. Report prepared for City of Boulder, Fire Department. Boulder, Colorado.

Available at: www.bouldercolorado.gov/files/Fire/city_of_boulder_cwpp_main_report_final.pdf

City of Boulder. (1999). City of Boulder Forest Ecosystem Management Plan, Part 1, June 1999. City of Boulder Open Space Department, City of Boulder Mountain Parks Division, and City of Boulder Wildland Fire Division, Boulder Fire Department.

Available at: https://bouldercolorado.gov/osmp/forest-ecosystem-management-plan


Knollwood
Upper Flagstaff
Kineman (Bison Dr)
S3
OSMP Forest Management
Proposed 2014 projects
Projects completed in 2013
Projects completed prior to 2013

Appendix A: Photo Point Monitoring

S3 Project

S3 Pt 1: May 14, 2013

October 16, 2013

S3 Pt 2: May 14, 2013

October 16, 2013

S3 Pt 3: May 14, 2013

October 16, 2013

S3 Pt 4: May 14, 2013

October 16, 2013

Upper Flagstaff Project

Flagstaff Pt 1: September 9, 2013

November 4, 2013

Flagstaff Pt 2: September 9, 2013

November 4, 2013

Flagstaff Pt 3: September 9, 2013

November 4, 2013

Flagstaff Pt 4: September 9, 2013

November 4, 2013

Kineman (Bison Dr) Project

Kineman Pt 1: July 19, 2013

August 30, 2013

Kineman Pt 2: July 19, 2013

August 30, 2013