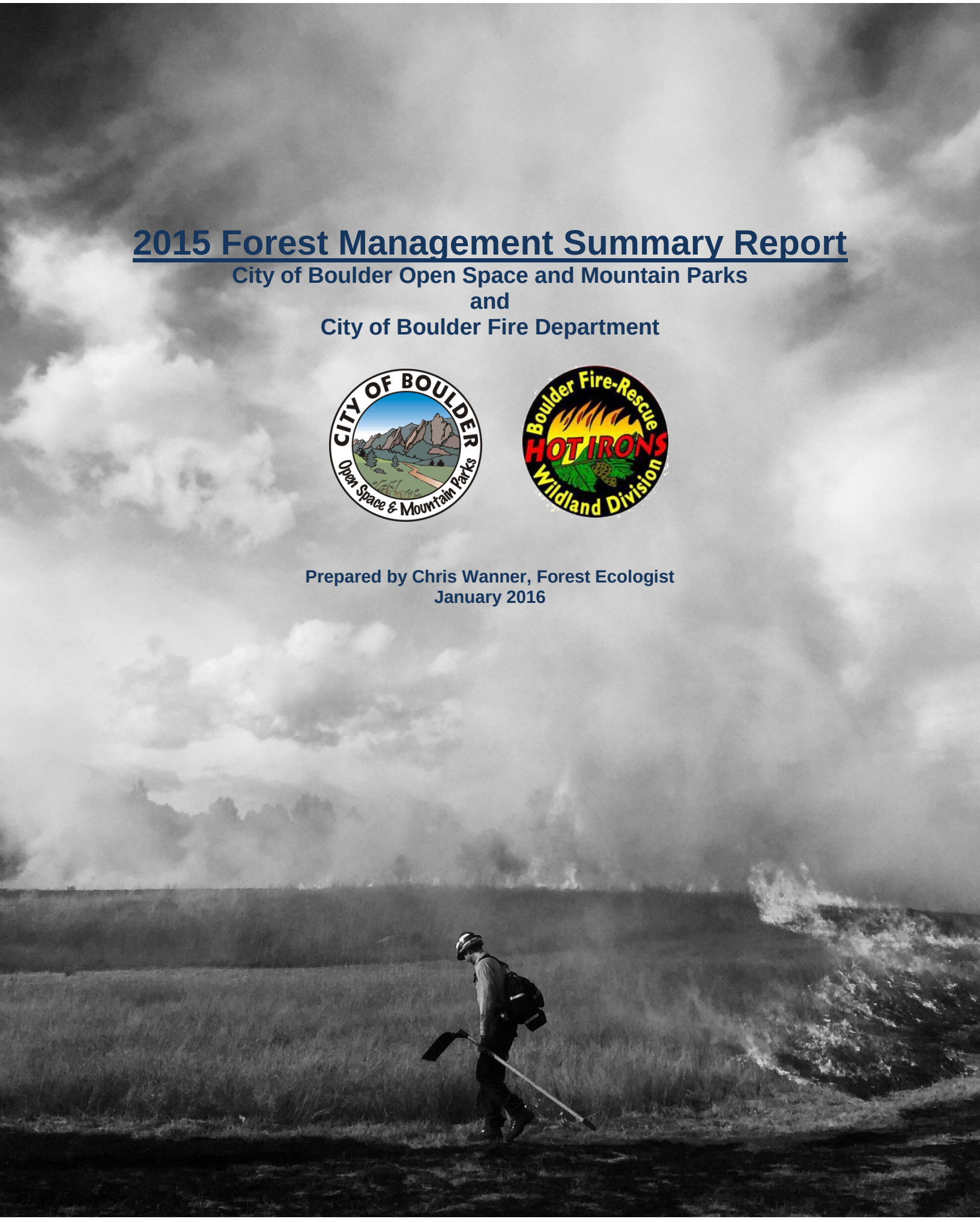
2015 Forest Management Summary Report

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

Prepared by Chris Wanner, Forest Ecologist
January 2016



Cover photo by Chris Dirolf. An OSMP Forest Restoration Crew member works ignitions during the Watertank prescribed fire on October 19, 2015.

EXECUTIVE SUMMARY

The 2015 field season was the twelfth consecutive year Open Space and Mountain Parks (OSMP) committed full time resources to the implementation of the Forest Ecosystem Management Plan (FEMP). In total, 174 10-hour days were spent on forest management by the OSMP forest restoration crew between March 30 and December 18. As a result of these efforts, 146 forest acres were thinned and 15 acres burned in 2015. The field season also included a continued emphasis on vegetation monitoring, data modeling, mapping, and analysis, and collaborative projects with neighbors, local fire protection districts and the Colorado State Forest Service.

BACKGROUND

In June of 1999, Boulder City Council approved 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. 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 2015. 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. In addition to collaborative projects, OSMP has been able to secure a number of grants to help supplement project costs and further extend the crews effectiveness. Over the past seven years, OSMP has benefited from over $250,000 in state and federal grants administered by the Colorado State Forest Service. This money has helped extend seasons and increased the amount of work completed.

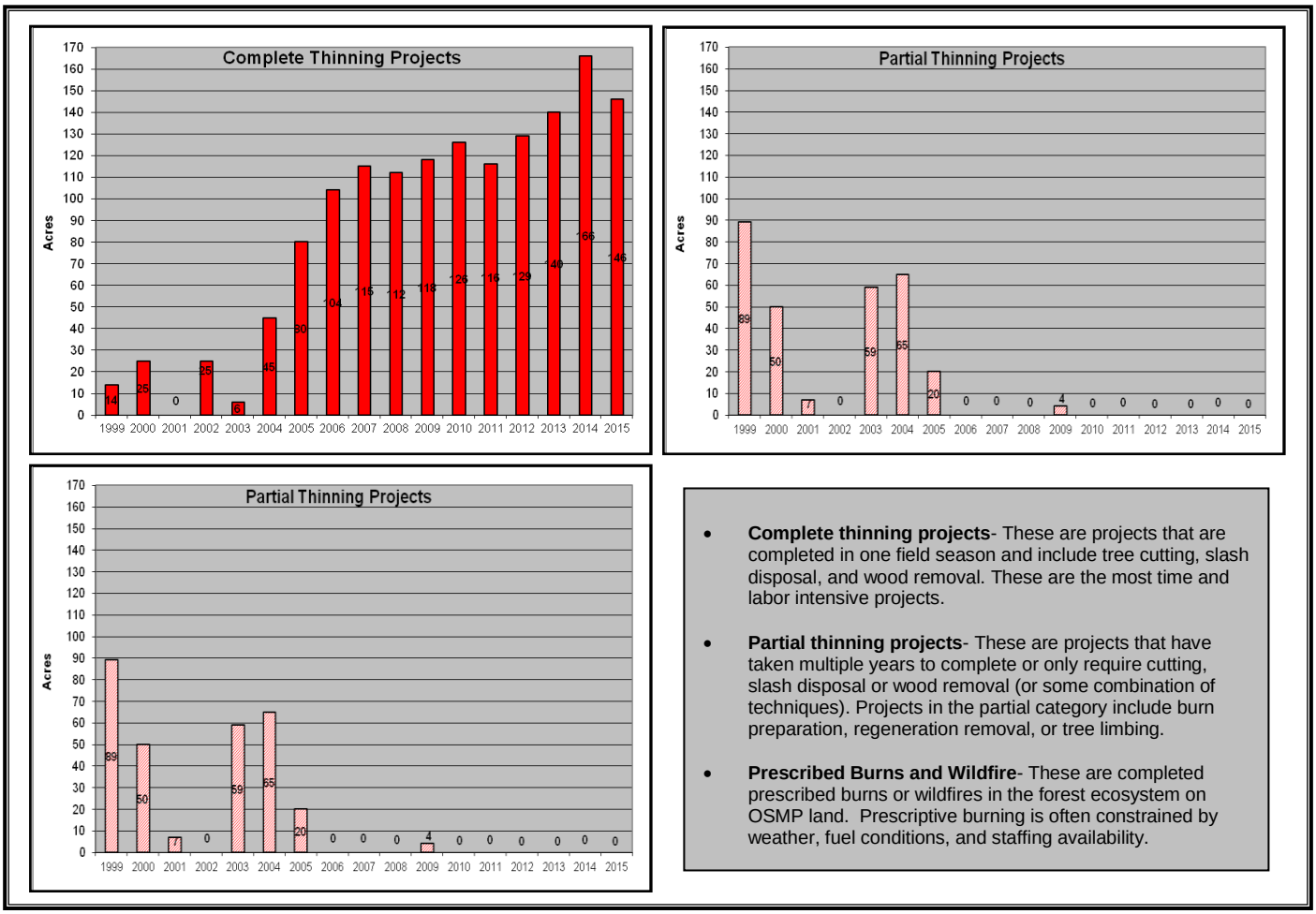


Figure 1: Annual forest management progress on OSMP

2015 FOREST MANAGEMENT CREW

Most of the implementation of the Forest Ecosystem Management Plan is carried out by a dedicated, hard working seasonal crew. During the 2015 season OSMP hired a forest crew of eight for a total of nine months. The crew spent 174 work days (up slightly from 172 work days in 2014) 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 hazard tree removals and training. The forest crew is an important OSMP resource for training staff on the safe use of chainsaws. The crew spent a total of 10 days in 2015 working with and training other OSMP seasonal staff.

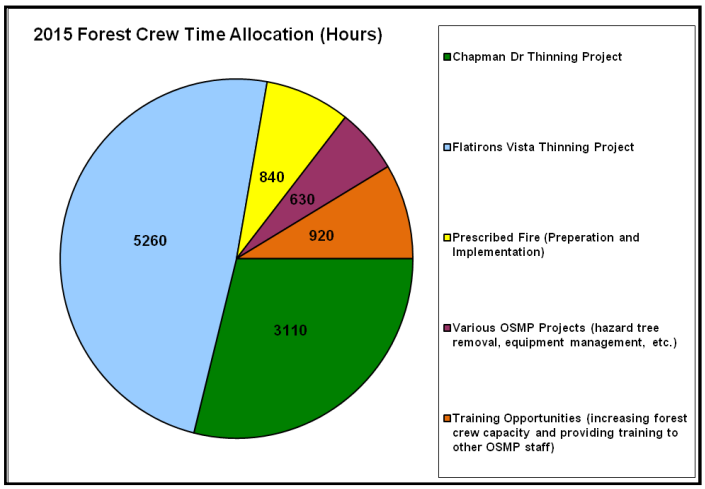


Figure 2: Time spent on 2015 projects by the OSMP forest crew.

In addition to the forest management work completed by OSMP staff, The Fire department's Wildland Division (Fire) worked closely with OSMP staff to meet the goals of the FEMP. In 2015, OSMP and Fire worked to develop and carry out a prescribed burn in the Shanahan Ridge area. Fire staff was instrumental in coordinating resources, helping complete prep work, and serving as overhead during all phases of the burn. The burn wasn't completed fully during 2015 due to weather factors but collaborative efforts will continue with the goal of completing the burn in 2016. Fire staff also conducted numerous training courses that directly benefited OSMP crews including conducting annual red card refreshers for all qualified OSMP staff and arranging advanced chainsaw trainings for the OSMP forest crew.

2015 FOREST MANAGEMENT PROJECTS

A total of 142 days were spent by the OSMP forestry crew on thinning projects in 2015. Staff implemented two projects at the same time with two independent crews of four. This setup proved efficient for the size and complexity of projects planned for the season. Nineteen days (up from 12 in 2014) were spent working with volunteer groups, OSMP Junior Rangers and jail crews. Each group included 8 to 12 individuals who helped complete some of the most difficult forest management work including chipping, dragging slash, and loading smaller logs. OSMP and Fire staff also completed 15 acres of prescribed burning on city forest land.

Chapman Drive Thinning Project

This project area followed the extent of Chapman Drive for 2.5 miles from Flagstaff Rd. down to the Red Lion Inn at Boulder Canyon Drive. The entire project covers 83 acres and roughly 75% was completed during the 2015 season. This project was designed to create a landscape level fuel break in the area and improve Chapman Drive as an emergency egress route. The treatment builds on previous work done along Flagstaff Rd. and near the Flagstaff summit to create a more fire resistant landscape and improve important evacuation routes in the area. The larger scale benefit of this project led to funding from the state in the form of a $79,000 Colorado State Forest Service grant.

Thinning along Chapman focused on removing small and medium diameter trees in the understory of the larger trees and decreasing the heavy ladder fuels along the road. Cutting and skidding extended 50 to 200 feet from both sides of the road. Removals focused on trees in the 2" to 8" diameter classes and decreased the overall basal area by about 25% from 90 sq. ft./acre to 70 sq. ft./acre. The canopy base height increased from an average of 2-3 feet to 10-15 feet, making the area more resistant to a running canopy fire (figure 3).

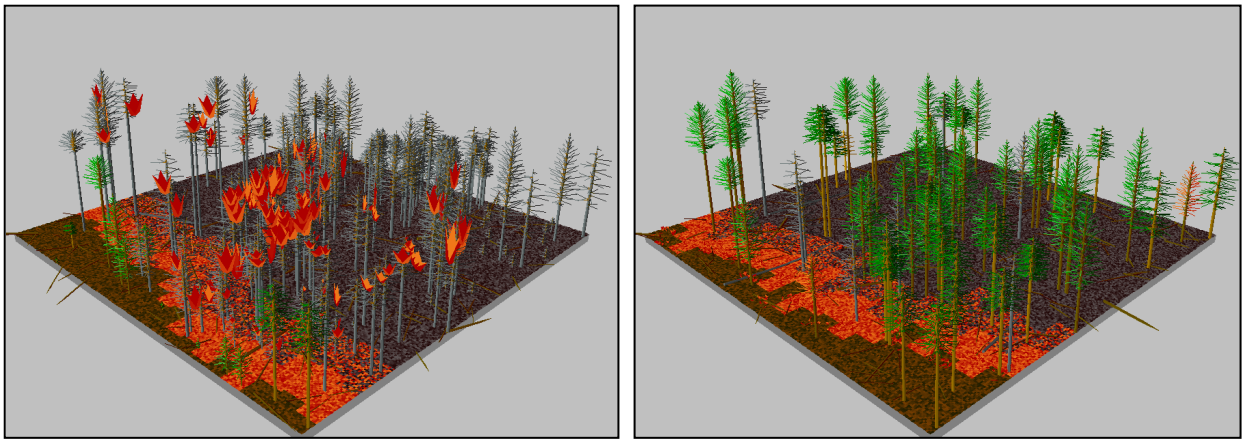


Figure 3: Modeled fire behavior in the Chapman Drive project area. The picture on the left shows pre-thinning conditions and the one on the right shows post-thinning with 25% of the basal area removed. Both were "burned" with identical model inputs that closely matched the weather and fuel conditions during the Fourmile Canyon Fire. The Chapman Drive thinning project changed the modeled fire behavior from a running canopy fire to a fire that primarily stays on the ground.

Flatirons Vista Thinning Project

The Flatirons Vista project area was located between the Flatirons Vista North and Prairie Vista trails and east of the power line. The thinning in 2015 covered 82 acres and built on previous thinning work completed over the past six years. The area is dominated by relatively young ponderosa pines that have encroached into the grasslands over the past 60-70 years. This project is adjacent to a large, open grassland block that provides important habitat for ground-nesting birds. The focus of the thinning was to remove a large proportion of the trees and restore a more open grassland structure.

Thinning targeted all tree size classes and approximately 75% of all the trees were removed to shift the area from dense woodland to much more open grassland with small, widely spaced patches of trees. After thinning, the average basal area in the stand decreased from 120 to 30 sq. ft./acre and the average trees per acre decreased by 143 (Figure 4). Future treatment of adjacent stands in the Flatirons Vista area is planned to further restore open grasslands and prescribed burning will be used to promote native plant composition and density.

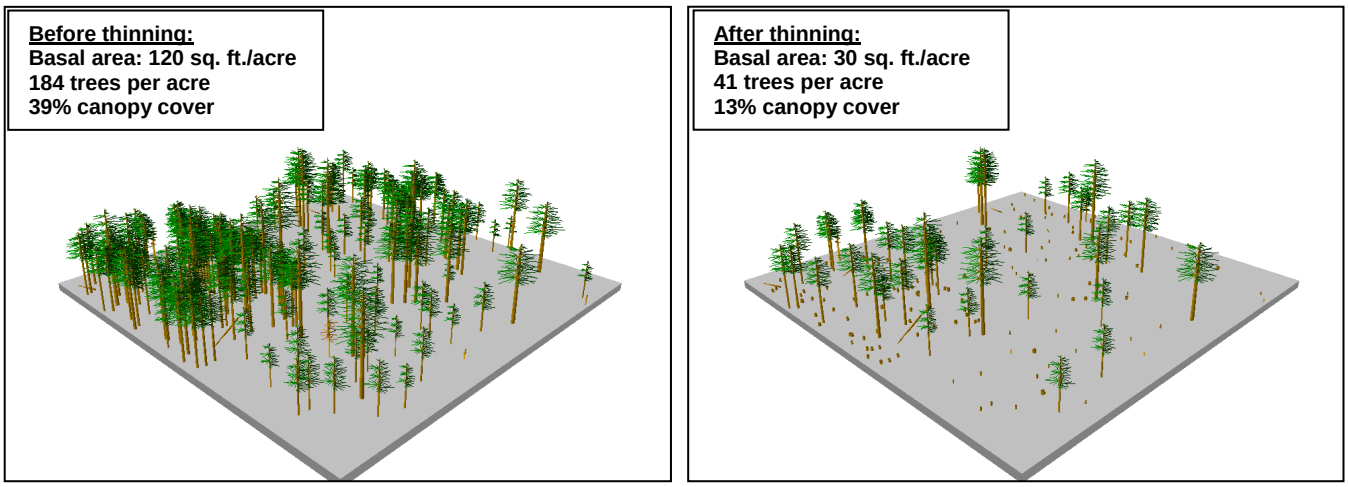


Figure 4: Flatirons Vista overstory structure change due to thinning.

Watertank Prescribed Burn

The Watertank prescribed burn has been on the OSMP work plan for over seven years but it hasn't been implemented for a variety of reasons. Getting the right combination of fuel conditions, weather, and available fire fighting resources has been challenging in this area. During the 2015 season, fall conditions met the prescriptions in the burn plan and OSMP and Fire staff made a push to implement the burn. Planning and coordination started in September and more than three weeks were spent in late September and October on preparations that included weed whipping the entire fire perimeter for fuel breaks, creating extensive hose lays, and coordinating with fire fighting resources across the county. Planning efforts also included press releases, outreach to the adjacent neighborhoods, and trail signage.

The prescribed burn area covers 85 acres between the Shanahan South Fork, Big Bluestem and Big Bluestem Connector trails. In 2015 a total of 15 acres of the larger burn area were completed near the junction of Big Bluestem and Big Bluestem connector. This piece formed an important fuel break and holding buffer for the larger burn. Unfortunately, air quality was poor for the remainder of the burn window and no additional burning was permitted. Completion of the burn is planned for 2016 and preparations completed this season will serve to accelerate the process when conditions are met.

2015 FOREST MONITORING PROJECTS

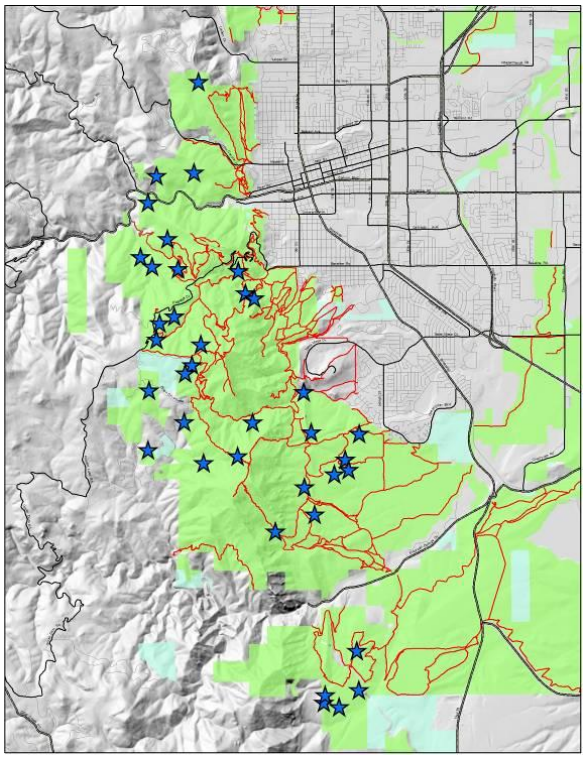
Understory Vegetation Monitoring

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 forestry projects. Over the past ten 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 (Figure 5). Previous monitoring efforts have shown a dramatic increase in vegetation cover after thinning with native cover almost doubling in treated areas.

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.

Figure 5: Understory monitoring plot in a thin and burn treatment area on Shanahan in 2012 (L) and 2015 (R).

During the 2015 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 2015 was completed by OSMP staff between June 25 and September 9. A total of 18 days were spent by one to three staff members on this monitoring project in 2015.



Map 1: Understory monitoring sites sampled in 2015.

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 species composition. Across the treatment areas in 2015, 20 permanent photo points were established. Each point was located using GPS, marked with a tree tag, and the direction of the photo was recorded. Photos for the 2015 projects are attached to this document as Appendix A.

Quantitative data is collected through overstory inventories. OSMP has 337 forest stands mapped across the system. This data is an essential part of OSMP's forest management and provides detailed information about forest structures and overall forest health. Forest overstory data provides the baseline information for all forest prescriptions. In the past two years staff has increased efforts to re-sample large portions of the system and update

inventories that are over ten years old. In 2015 a total of 66 stands and 431 plots were re-inventoried in the areas of Sanitas, Anemone, Shanahan, Eldorado Springs, and Chautauqua.

2016 WORKPLAN

In 2016, OSMP's forest management will continue at a similar pace to previous years. In addition to thinning efforts, staff will continue to conduct understory monitoring, overstory inventory efforts, vegetation mapping across all OSMP forested areas, and continue collaborative efforts with other local forest and fire managers.

Forest management projects in 2016 will focus on completing projects that were started in 2015 as well as areas of the system that haven't been treated for many years. Priorities will include the completion of the Chapman Dr. thinning project and the Watertank prescribed burn. Both of these projects will be weather dependent, but the goal will be to complete them early in the season. Additional thinning projects will focus in the Lindsay area south of Eldorado Springs.

Monitoring efforts to track treatment effectiveness and overall forest health will continue during the 2016 season. The 37 understory monitoring sites will be resampled in July and August. Staff will also continue efforts to resample overstory inventory sites. In addition to the forest specific monitoring, staff will continue to revisit OSMP vegetation mapping efforts. Portions of the mapping are over ten years old and staff will map large portions of forested areas to the association level.

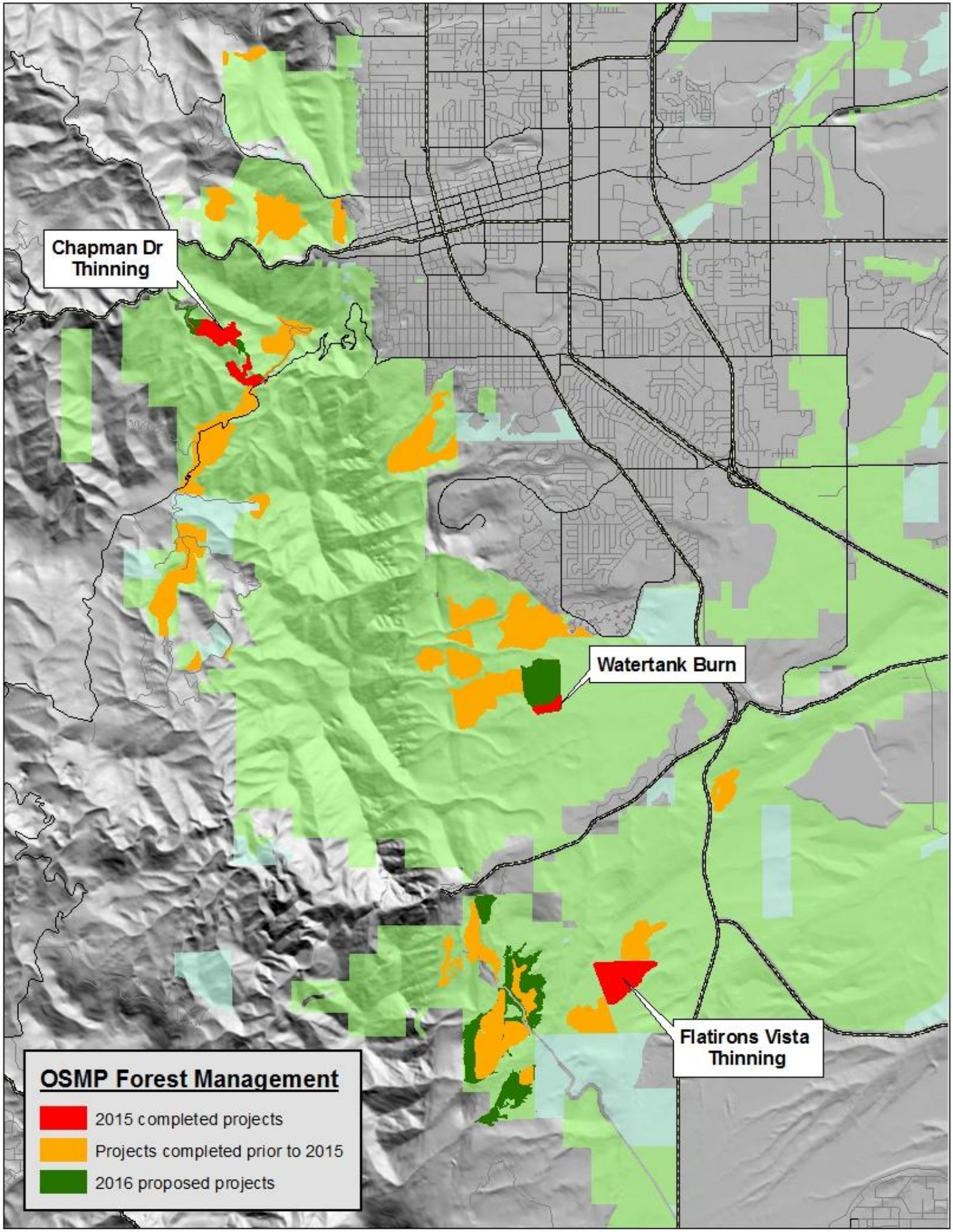
RELATED DOCUMENTS

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: http://static.colostate.edu/client-files/csfs/documents/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


Chapman Dr Thinning
Watertank Burn
Flatirons Vista Thinning
OSMP Forest Management
2015 completed projects
Projects completed prior to 2015
2016 proposed projects

Appendix A: Photo Point Monitoring

Chapman Dr

Chapman 1: April 30, 2015

August 31, 2015

Chapman 2: April 30, 2015

August 31, 2015

Chapman 3: April 30, 2015

August 31, 2015

Chapman 4: April 30, 2015

August 31, 2015

Chapman 5: April 30, 2015

August 31, 2015

Chapman 6: April 30, 2015

August 31, 2015

Flatirons Vista

Flatirons Vista 1: May 14, 2015

November 16, 2015

Flatirons Vista 2: May 14, 2015

November 16, 2015

Flatirons Vista 3: May 14, 2015

November 16, 2015

Flatirons Vista 4: May 14, 2015

November 16, 2015

Flatirons Vista 5: May 14, 2015

November 16, 2015