

THE FRONT RANGE FUELS TREATMENT PARTNERSHIP

COLORADO STATE FOREST SERVICE • NATIONAL PARK SERVICE • USDA FOREST SERVICE



2009 ANNUAL REPORT



INTRODUCTION

In 2009, Front Range Fuels Treatment Partnership (FRFTP) agencies treated 38,907 acres, bringing our six-year total to 187,222 acres.

The 2009 forest health aerial survey results confirmed that mountain pine beetle (MPB) continued as the dominant forest pest in Colorado. Evidence suggested a high potential for an MPB outbreak in ponderosa pine as beetles move into forests in which ponderosa and MPB-infested lodgepole pine adjoin, a condition that impacts the Front Range.

This condition is occurring in areas such as Estes Park and parts of Rocky Mountain National Park in Larimer County, near Eldora in Boulder County, and near Empire, Georgetown and Idaho Springs. Foresters

also discovered an MPB outbreak in ponderosa pine forests near Virginia Dale in northern Larimer County.

To help with this and other issues, the Colorado General Assembly passed seven bills in 2009 to address forest health, fuels mitigation and public safety.

In addition, both the Colorado State Forest Service and the U.S. Forest Service Rocky Mountain Region received American Recovery and Reinvestment Act (ARRA) funding for forestry-related projects that will create and retain jobs.

SUMMARY OF

ACCOMPLISHMENTS:

Six-year Fuels Treatment Total Reaches 187,222 Acres

In 2009, partnership agencies treated 38,907 acres, bringing our six-year total to 187,222 acres (31,023 acres were treated in 2008; 30,777 in 2007; 34,629 in 2006; 24,908 in 2005; and 26,978 in 2004). Following are the 2009 highlights of accomplishments.

COLORADO STATE FOREST SERVICE

In 2009, The Colorado State Forest Service (CSFS) treated a total of 11,568 acres on state and private land along the Front Range.

The passage of the Healthy Forests Restoration Act in 2003 expanded benefits for communities that create a Community Wildfire Protection Plan (CWPP) to help reduce wildfire hazards in the wildland-urban interface (WUI). Currently, Colorado has more than 150 CWPPs in place, half of which apply to communities along the Front Range.

2009 FORESTRY-RELATED LEGISLATION

This year, the Colorado General Assembly passed seven bills that address forest health, fuels mitigation and public safety.

The passage of these bills shows the importance and value of Colorado's forests. The legislation is aimed at promoting healthier, more diverse forests that are resilient to insect and disease epidemics for the benefit of present and future generations. For more information about the bills, visit www.csfs.colostate.edu.

AMERICAN RECOVERY AND REINVESTMENT ACT

In addition, the CSFS received American Recovery and Reinvestment Act of 2009 (ARRA) funding from the U.S. Forest Service through a competitive grant process. Funding will create and retain forestry-related jobs that help implement high-priority forest restoration and fuels mitigation projects, as well as jobs affiliated with local wood products industries and CWPP development and planning projects. Interested organizations competed for sub-grants by writing project proposals, per guidelines and requirements set forth in the Requests for Proposals. Interdisciplinary review panels evaluated the proposals.

Nearly \$5 million of the total \$10.7 million received was awarded for projects along the Front Range. The

following organizations were selected to receive ARRA funds for projects along the Front Range: Anchor Point Group, Boulder County, Coalition for the Upper South Platte, Colorado Youth Corps Association, Denver Mountain Parks, El Paso County Sheriff's Office, Perry Park Metropolitan District and the Town of Winter Park.

BOULDER DISTRICT

In 2009, the Boulder District treated a total of 1,210 acres in numerous projects throughout Boulder and Gilpin counties. Total acres treated included 441 acres of fuels thinning.

More than 10 Community Wildfire Protection Plans are in place, including a 2009 countywide plan for Gilpin County that addresses wildfire protection plans for numerous towns, subdivisions and critical watersheds and associated infrastructure.

BROOMFIELD OFFICE

In 2009, the Broomfield Office staff of the Colorado State Forest Service continued to provide co-leadership in FRFTP operations and management of FRFTP grants. Staff also were involved in joint efforts to protect Front Range watersheds from severe wildfires. The office has an ongoing partnership with Colorado State Parks to provide support for fuels treatment projects on park land. FRFTP funds, primarily provided through State Fire Assistance (SFA) grants, along with Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation and Great Outdoors Colorado (GOCO) funds enhance the effectiveness of treatments on state parks along the Front Range.

FORT COLLINS DISTRICT

In 2009, the Fort Collins District treated a total of 793 acres, including 241 acres of fuels thinning. More than 20 CWPPs have been developed in Larimer County.

FRANKTOWN DISTRICT

The Franktown District treated a total of 764 acres in 2009; total acres treated included 46 acres of fuels thinning.

GOLDEN DISTRICT

In 2009, the Golden District treated 1,807 acres that included 605 acres of fuels thinning. In addition, approximately 15 CWPPs exist in the district.

The Harris Park CWPP is one example of an ongoing project involving various agencies and landowners to accomplish cross-boundary fuels treatment efforts (See story on page 3).

GRANBY DISTRICT

In 2009, the Granby District completed fuels treatment on a total of 3,220 acres.

Ongoing hazardous fuels treatments on the YMCA Snow Mountain Ranch illustrate one of the major accomplishments in the Granby District (See story on page 4).

WOODLAND PARK DISTRICT

The Woodland Park District completed 3,774 acres of fuels mitigation through various programs on the district. Additionally, nearly 20 CWPPs are in place. The Majestic Park mountain subdivision was the first community in Colorado to complete the goals established in its CWPP (See story on page 4).

FUELS TREATMENT HIGHLIGHTS

GOLDEN DISTRICT AND PARTNERS SHARE FUELS TREATMENT STRATEGY ACROSS BOUNDARIES: THE HARRIS PARK CWPP

The CSFS Golden District and the USFS South Platte Ranger District invited multiple stakeholders to devise a comprehensive approach for the development of the Harris Park Community Wildfire Protection Plan in 2004. The core stakeholder group that completed this process included the CSFS Golden District, Elk Creek Fire Protection District (FPD), Jefferson County Emergency Management, Park County Land Use Planning, Platte Canyon FPD and the South Platte Ranger District of the U.S. Forest Service.

The CSFS and partners designed the Harris Park CWPP to protect 22 wildland-urban interface communities, and more than 5,000 homes and associated values at risk from wildfire. The project is within the CSFS Golden District service area southwest of Denver along U.S. Highway 285 between the communities of Conifer and Bailey. It overlaps portions of Jefferson and Park counties, includes Staunton State Park and borders the Pike National Forest.

Since implementation began, project partners have treated 3,096 acres identified in the Harris Park CWPP. A breakdown of fuels treatment accomplishments by landownership and funding source are provided in the next section. This data represents a composite of activities that have occurred from 2006-2009.

Staunton State Park: 1,020 total acres treated

- 668 acres were treated with FEMA Pre-Disaster Mitigation Grant funds at 75 percent; Colorado State Parks provided a 25-percent match through GOCO funds

- 352 acres were treated with FRFTP funds at 50 percent; Colorado State Parks provided a 50-percent match through GOCO funds

Platte Canyon FPD: 920 total acres

- 920 acres were treated with FRFTP funds at 50 percent; Platte Canyon FPD provided a 50-percent match

State Land Board: 246 total acres treated

- 246 were treated with FRFTP funds at 50 percent; State Land Board funds provided a 50-percent match

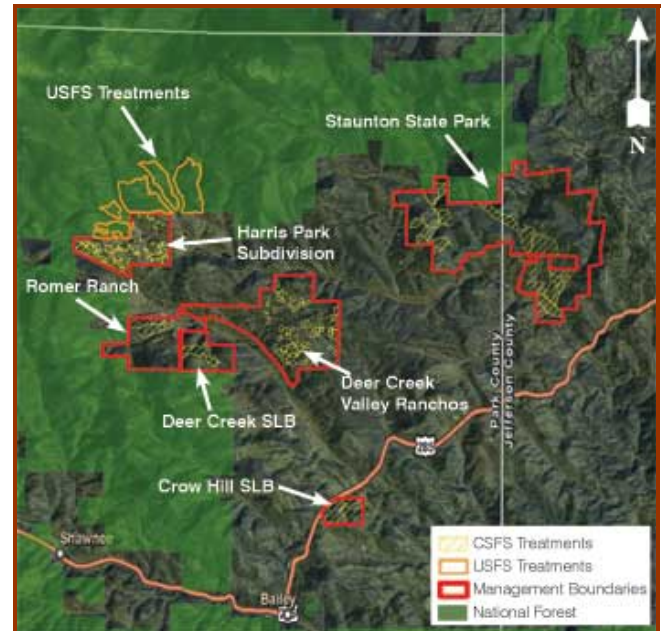
Private Land: 120 total acres

- 120 acres were treated with FRFTP funds at 100 percent

USFS: 790 total acres treated

- 790 acres were treated with federal funds at 100 percent on the Pike National Forest adjacent to communities in the CWPP

Interagency fuels treatments accomplished throughout the Harris Park CWPP have leveraged the efforts of the individual agencies and have helped with successful implementation of cross-boundary fuels management projects. The partnership also enhances future funding capabilities that increase the efficiency and scale of the entire project.



The map of the Harris Park CWPP area depicts fuels treatments by agencies (CSFS treatments are outlined in yellow; USFS treatments are outlined in gold; management boundaries are red).

GRANBY DISTRICT: Y FIRE DEMONSTRATES FUELS TREATMENT EFFECTIVENESS

In the early summer of June 2007, three teenagers playing with gasoline and matches on the YMCA Snow Mountain Ranch near Granby, Colo., started an intense forest fire. The fire quickly jumped into the tinder-dry crowns of the surrounding beetle-killed lodgepole pines and was poised to burn a huge footprint into history.

Yet the fast-moving Y Fire would ultimately consume only 50 acres, sparing the YMCA's cabins and all other structures in the area – including 100 homes in an adjacent subdivision. The reason the fire died down as quickly as it ignited was a 200-foot-wide fuelbreak finished only weeks before.

“When the Y Fire reached the fuelbreak, it dropped to the ground and firefighters were able to get a handle on it,” said Granby District Forester Ron Cousineau. “The fire behaved exactly as we hoped it would.”



Recent tree cutting to reduce forest fuels at the YMCA Snow Mountain Ranch near Granby, Colo., and a fast, coordinated response by firefighters kept people and buildings safe.

The fuelbreak at the YMCA ranch was largely funded by SFA grants – tangible proof that these grants are helping to protect lives, property and forestlands in Colorado.

“If this work had not been completed, we likely would have lost some, if not all, of our buildings in the immediate area of the fire,” said Julie Watkins, center director for the 5,000-acre Snow Mountain Ranch.

The Y Fire not only proved that previous project work funded by SFA grants was successful, but also motivated Watkins to seek additional SFA funds in 2008 and 2009 to continue improving forest health on the ranch. CSFS Forester Paul Cada of the Granby District says the ranch continues to compete successfully for funding each year because of a proven ability to

efficiently complete projects using grant money, and a track record of exceeding the required 50-percent SFA match every year.

The 2008-2009 SFA grant projects have been completed, resulting in 157 newly treated acres on the ranch. The projects have resulted in defensible space around the Homestead Museum and water treatment plant, and hazard tree removal along the trail system. Since 2006, the ranch has completed fuels mitigation treatments on 765 acres of the 5,000-acre campus.

Currently, the ranch is in the process of treating additional acreage using grant funding. In 2010, the ranch will continue to widen the boundary-line fuelbreak to offer more protection to both the YMCA and the adjacent subdivision.

WOODLAND PARK DISTRICT: MAJESTIC PARK FIRST TO IMPLEMENT CWPP GOALS

Majestic Park, a rural neighborhood of ponderosa pine and vistas of Pikes Peak, is the first community in Colorado to complete the goals established in its Community Wildfire Protection Plan. This means a significantly reduced risk of catastrophic wildfire sweeping through the subdivision and into the neighboring city of Woodland Park.

Approximately 150 acres were ultimately treated. FRFTP cost-shared the first project, a 25-acre fuelbreak along the boundary with the Pike National Forest.



Dave Root, assistant district forester for the CSFS Woodland Park District, surveys a fuelbreak in the Majestic Park mountain subdivision.

Curt Grina, author of the plan, persuaded his neighbors to implement the CWPP in part by explaining the benefit of cost-sharing. “Every region has some disaster threat. Ours is unique, because we can do a lot to mitigate wildfire hazard,” he said.

Denny King, homeowners’ association secretary and treasurer, is confident that the subdivision now is much better prepared for a wildfire. Besides a shared confidence that the fuelbreaks will protect the

community, Grina and King say residents appreciate the appearance of the treated forest and suggest that it attracts more wildlife.

NATIONAL PARK SERVICE

ROCKY MOUNTAIN NATIONAL PARK

During 2009, the fire and fuels management crew completed several fuels reduction projects in the wildland-urban interface at both Rocky Mountain National Park and Florissant Fossil Beds National Monument. A total of 831 acres were treated at both park units, including 150 acres of broadcast burning.



Beetle-impacted trees in Rocky Mountain National Park.

2009 HAZARDOUS FUELS REDUCTION PROJECTS

- **Beaver Meadows Broadcast Burn: 150 acres**
150 acres were burned in the fall
- **Large Pile Burns: 165 acres**
Two separate large pile burns were conducted disposing of previously hauled hazardous fuels material
- **Glacier Basin Campground: 40 acres**
Forty acres in Glacier Basin Campground were thinned, piled and burned in the winter
- **Broadcast Burn Prep: 87 acres**
Park staff thinned 87 acres in preparation for broadcast burning on four different burn units
- **Beetle-Kill Crown Removal: 4 acres**
Four acres of beetle-killed lodgepole pine were treated in a pilot project utilizing prescribed fire to remove the red needles from beetle-impacted trees
- **Florissant Fossil Beds: 26 acres**
Twenty-six acres of piles were burned at Florissant Fossil Beds

RURAL FIRE ASSISTANCE GRANTS

Fiscal Year 2009 - \$25,300 in grant funding was distributed to local volunteer fire departments for basic wildland fire safety equipment, tools, supplies and training

- \$10,900 to the Estes Park Volunteer Fire Department
- \$6,000 to the Glen Haven Volunteer Fire Department
- \$8,400 to the Grand Lake Fire Protection District

COMMUNITY OUTREACH AND EDUCATION

The park conducts an active fire education program that raises awareness among the general public, and facilitates collaborative efforts with adjoining private landowners, local municipal, county and state governments.

U.S. FOREST SERVICE

ARAPAHO AND ROOSEVELT NATIONAL FORESTS

The Arapaho and Roosevelt National Forests (ARNF) treated a total of 15,812 acres. Of the total, 13,962 acres were treated mechanically and 1,850 acres were treated with prescribed fire. The Stimulus Bill (American Recovery and Reinvestment Act) authorized funds for a number of purposes including wildland fire management projects and was signed by the President in 2009. The ARNF received more than \$1.5 million in funding related to this bill, which allowed for a substantial increase in acreage treated to reduce hazardous fuels. Personnel from the ARNF and the Pike National Forest and the Rocky Mountain Regional Office completed development of a 10-year Long-Term Stewardship Contract, which was awarded to West Range Reclamation in July of 2009. This contract will enhance efforts to reduce hazardous fuels. Forest personnel continued to assist local communities and the Colorado State Forest Service in developing Community Wildfire Protection Plans. Planning was completed for almost 20,000 acres of hazardous fuels reduction treatments.

The ARNF, along with the White River and Routt National Forests and numerous other cooperators, continued efforts associated with the Colorado Bark Beetle Cooperative to address the mountain pine beetle epidemic occurring in north central Colorado. Treatments on the Sulphur Ranger District are planned in an integrated manner to support the goals and objectives of both the Front Range Fuels Treatment Partnership and the Colorado Bark Beetle Cooperative.

In 2009, the mountain pine beetles continued to expand substantially east of the Continental Divide. ARNF personnel are participating with personnel from Boulder, Clear Creek, Gilpin, Jefferson, and Larimer counties, the Colorado State Forest Service and Rocky Mountain National Park on the Northern Front Range Mountain Pine Beetle (NFRMPB) Working Group to coordinate treatment efforts.

SOUTH ZONE FUELS PROGRAM (BOULDER & CLEAR CREEK RANGER DISTRICTS)

In 2009, hazardous fuels reduction treatment was accomplished on 4,816 acres within the wildland-urban interface. Of these acres, 4,566 were accomplished through mechanical thinning and 250 through prescribed fire. In addition, a decision was made to reduce hazardous fuels on almost 1,650 acres.

Sugarloaf Fuels Reduction Project — The Sugarloaf Fuels Reduction project covers approximately 5,000 acres. The project decision notice was signed in January 2004. Located just west of Boulder, the Peak-to-Peak Scenic Byway defines the western boundary of the project area. Crews continued operations in the project area in 2009. In 747 acres were treated or are under contract to be treated. Treatments include forest thinning and piling and prescribed burning.

James Creek Fuels Reduction Project — The decision notice for this project was signed in September 2004 and includes 6,402 acres of treatment. Treatment on approximately 2,185 acres was accomplished in 2009.

St. Vrain Project — This Healthy Forest Restoration Act (HFRA) project decision identified approximately 2,650 acres of proposed treatment. The project gives priority to community and neighborhood protection with some emphasis on wildlife habitat and forest restoration in specific areas. Treatment on approximately 798 acres was accomplished in 2009.

Yankee Hill Project — The project is an Integrated Landscape Design to Maximize Fuel Treatment Effectiveness Pilot project. The team formulated areas consisting of 1,000 to 3,000 acres for potential treatment that focused on neighborhood/community protection with special attention given to watershed and recreation resource protection. The planning effort was completed in 2007 and identified almost 1,500 acres for treatment. Implementation began in 2009 with 50 acres treated.

CANYON LAKES RANGER DISTRICT

In 2009, hazardous fuels reduction treatment was completed on 9,304 acres, all within the wildland-urban interface. Of these acres, 8,028 were treated through mechanical thinning and 1,276 acres through

prescribed fire. In addition, decisions were made to reduce hazardous fuels on nearly 16,000 acres.

Crystal Lakes Fuels Reduction Project — Located north and west of the community of Red Feather Lakes, the Crystal Lakes subdivision has been recognized as a Firewise Community/USA. The decision document was signed in 2004, and treatment areas were completely laid out. Treatments include forest thinning, prescribed burning and biomass removal. In 2009, 581 were treated to reduce hazardous fuels.

Sheep Creek 1 — The last portion of this project was implemented with the award of the Front Range Long-term Stewardship contract. A task order for treatment of 800 acres was issued in 2009.

Sheep Creek 2 — The project area plan decision notice was signed in 2004. The project includes mechanical treatment and prescribed fire on 4,200 acres. In 2009, 870 acres were treated.

Stringtown West Fuels Reduction Project — At approximately 4,062 acres, this project was analyzed with a categorical exclusion (CE). The project complements previous projects that were completed in the area on National Forest System land and extends work being done by the Colorado State Forest Service in conjunction with homeowners in the area. A decision on this project was made in 2006. A lawsuit in a California district court challenging the use of categorical exclusions on these types of projects has required that this project be re-analyzed in 2009. A new decision was made in 2009 and implementation will begin in 2010.

Lone Tree Fuels Reduction Project — The project involves approximately 2,400 acres. A decision on this project was made in 2006. A lawsuit in a California district court challenging the use of categorical exclusions on these types of projects has required that this project be re-analyzed in 2009. A new decision was made in 2009 and 590 acres were treated.

Pingree Hill Fuels Reduction Project — The project involves approximately 2,400 acres. This is a wildland-urban interface project that includes numerous acres of private land. A decision on this project was made in 2007. A lawsuit in a California district court challenging the use of categorical exclusions on these types of projects has required that this project be re-analyzed in 2009. A new decision was made in 2009 and 997 acres were treated.

Estes Valley Fuels Reduction Project — This project surrounds the community of Estes Park and is a Healthy Forests Restoration Act (HFRA) project. A decision was made in 2005 to treat more than 7,500 acres to reduce hazardous fuels. The wildland-urban interface project includes numerous acres of private land. Many private

landowners are currently engaged in fuels reduction activities guided by the Colorado State Forest Service. Treatment on private land is being integrated into the planning of this project on National Forest System lands. Implementation continued in 2009 with treatment on approximately 1,594 acres.

Browns Park Beetle Salvage Project — The project involves treatment of approximately 249 acres to reduce hazardous fuels and hazard trees resulting from tree mortality associated with the mountain pine beetle epidemic. This project is a result of significant tree mortality caused by mountain pine beetles in the Laramie River Valley. A decision on this project was made in 2008. Implementation began in 2009 with treatment of all 249 acres as a task order issued for the Front Range Long-term Stewardship contract.

Red Feather Fuels Reduction Project — Planning was completed on this project in 2008. There are several approved CWPPs in the project area, including Red Feather Lakes, Magic Sky, Ben Delatour Scout Ranch, Livermore Fire District, Rustic and Manhattan Creek. More than 23,000 acres of National Forest System lands were analyzed for treatment, and hazardous fuels reduction treatments were identified on more than 15,800 acres. Implementation began in 2009 with 44 acres treated.

SULFUR RANGER DISTRICT

In 2009, hazardous fuels reduction treatments were accomplished on 1,692 acres, and a substantial portion was in the wildland-urban interface. Of these acres, 1,368 were accomplished through mechanical treatments and 324 through prescribed fire. In addition, a decision was made to reduce hazardous fuels on more than 2,400 acres. The on-going mountain pine beetle epidemic continues to increase the hazardous fuels workload.

Willow Creek Salvage / Fuels Reduction Project — The project area, located northwest of Granby and north of Hot Sulphur Springs, will reduce hazardous fuels and treat the effects of an ongoing mountain pine beetle epidemic. The project, initiated in 2007, analyzed the need for treatment on 70,000 acres. A decision was signed in 2009 to treat more than 2,400 acres. Implementation will begin in 2010. A second decision to treat several thousand acres with prescribed fire is pending.

Arapaho National Recreation Area Forest Health Project — Located within the Arapaho National Recreation Area, the project will reduce hazardous fuels and treat the effects of an ongoing mountain pine beetle epidemic. A record of decision (ROD) addressing areas outside of inventoried roadless areas was signed in 2004.

In 2005, a ROD addressing treatment within inventoried roadless areas was signed. Implementation of this project continued in 2009 with treatment of 585 acres of hazardous fuels.

Developed Sites Hazard Mitigation — The ongoing mountain pine beetle epidemic has killed numerous trees in high value recreation sites. The number of dead trees created circumstances that increase windthrow risk of green trees. This created the need for large-scale hazard mitigation in a number of high value recreation sites.

More than 419 acres were treated to remove the wildland fire and safety hazards created by the mountain pine beetle.

PIKE NATIONAL FOREST

The Pike National Forest collaborates with land managers, fire managers, emergency managers, community groups and private landowners throughout the Front Range. The administrative unit encourages strategic planning to identify the most appropriate methods for reducing wildfire risk and engaging diverse stakeholders within the planning process.

This year, 10,696 acres were treated on the forest. Following is the breakdown by ranger district:

PIKES PEAK RANGER DISTRICT

In 2008, the Roundtable launched the Woodland Park Healthy Forest Initiative (WPHFI) in an effort to demonstrate the effectiveness of focusing the attention and resources of multiple organizations on achieving community protection and ecological restoration, across boundaries, in a high priority landscape. The initiative has become a model for landscape-scale forest management that improves community protection; restores watershed, wildlife and other ecological values; and provides economic opportunities for local residents and businesses. Some notable accomplishments include more than doubling acres treated in a one-year period (from about 2,000 across public and private lands in 2008 to over 5,156 acres treated on National Forest System lands in 2009).

Following is a summary of the acres treated on projects within Pikes Peak Ranger District. ARRA funded the Skeleton and Manchester projects.

Trout West 3,781 Acres (includes 25 acres of prescribed fire)

Skeleton 255 Acres

Tornado 120 Acres

Manchester 1,000 Acres

Total Acres 5,156 Acres

In 2010, the district will work on an Environmental Impact Statement (EIS) for Catamount (approximately

122,000 acres). In addition, an Environmental Assessment (EA) for Trout West Phase II (approximately 4,000 acres) has an estimated completion date of September 2010.

SOUTH PARK RANGER DISTRICT

The South Park Ranger District treated a total of 3,166 acres in 2009. Of the total, 1,033 acres were treated through prescribed fire (FS crews), 383 acres through mechanical treatment (FS crews), and 1,004 acres through an “indefinite deliveries and indefinite quantities” stewardship contract. Another 746 acres was awarded within the long-term stewardship contract. Howard 1 and Messenger were ARRA (Stimulus) funded stewardship projects which totaled 1,004 acres.

All work was completed in WUI areas of the Sledgehammer and Rocky Messenger project area southwest of Lake George. The project includes a critical South Platte River watershed, one of only two remaining areas in the montane zone on the South Platte River that has not been burned in a wildfire. The heavily used Eleven Mile Canyon Recreation Area and numerous subdivisions are located throughout the area.

In addition, the district laid out more than 5,000 acres for treatment through future stewardship contracts in the Rocky Messenger project area just outside Lake George and on the South Platte and Pikes Peak Ranger districts. The district dozer completed numerous roller-chopping, crushing and piling projects across the Pike and San Isabel National Forests.

District personnel also participated in all other broadcast burns on the Pike and San Isabel National Forests, as well as the Comanche National Grasslands.

SOUTH PLATTE RANGER DISTRICT

In 2009, the South Platte Ranger District accomplished 2,374 acres of hazardous fuels reduction treatments, primarily within the wildland-urban interface. Prescribed burning was completed on 89 acres and mechanical treatment was completed on 2,285 acres. The A/G Ranch project was an ARRA (Stimulus) funded project, totaling 210 acres.

Prescribed Fire

Forest Service crews accomplished 89 acres of prescribed fire by igniting large “brush” piles or concentrations that remained after trees were cut. Broadcast area burns were safely accomplished in Miller Gulch and Trumbell. The applications for smoke permits and implementation of approved permits continue to require a significant effort due to the proximity of these projects to the Denver air shed.



Prescribed burn piles on the Pike National Forest.

Mechanical Work

Contracts for mechanical treatments were awarded with fiscal year 2009 funds for mastication of 332 acres within the Upper South Platte Watershed Restoration and Protection project. One contract was awarded under the Bureau of Land Management Indefinite Delivery, Indefinite Quantities Contract. Another 563 acres was awarded within the long-term stewardship contract. The prescription for mastication generally is thinning from below to reduce the average basal area of live trees at least 20 percent in diameter class 0-14 inches. In addition, forest crews hand-thinned 610 acres within the Little Scraggy and Rampart Range areas.



One of the mastication machines used for fuels treatment work on the Pike National Forest.

The Pike National Forest dozer mechanically rearranged — crushed, piled and scattered — fuel on 200 acres within the Trumbell area. Fuel wood was removed by permit from 200 acres on the Wigwam fuel wood area and from 380 acres on the Gun Barrel fuel wood area.

ROCKY MOUNTAIN RESEARCH STATION

2009 RMRS Science Update

ECOLOGICAL TYPE CONVERSIONS ALONG AN ELEVATIONAL GRADIENT IN COLORADO MIXED CONIFER FORESTS DRIVEN BY DISTURBANCE AND CLIMATE

Laurie S. Huckaby, Merrill R. Kaufmann, and Brian Kent
USDA Forest Service, RMRS, Fort Collins, Colorado

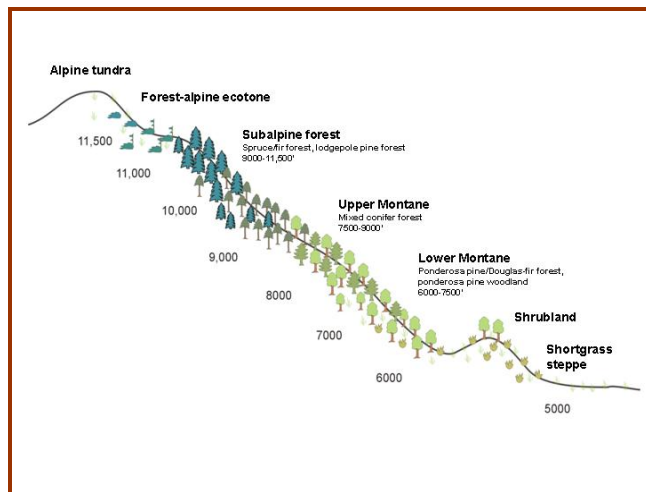
Mixed conifer forests in the Colorado Front Range are complex mosaics of species composition and stand age, due to steep elevational gradients, complex topography, and histories of disturbance that are highly variable in both space and time. Reconstructions of stand age and fire history from tree rings suggest that upper elevations of mixed conifer now dominated by lodgepole pine and infrequent mixed and stand-replacing fire regimes, were dominated by ponderosa pine and surface fire regimes during the Medieval Warm Period (~800-1300 AD). These stands shifted in composition during the cooler, wetter Little Ice Age (~1300-1850 AD), but often with a lag of centuries before stand-replacing disturbance occurred.



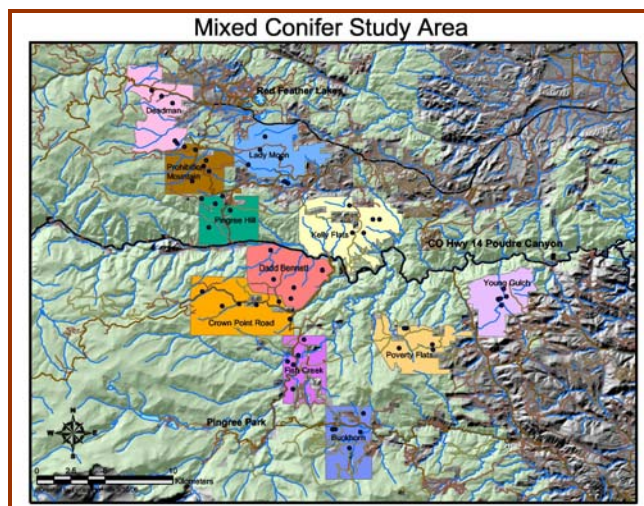
Mixed-conifer forests on Colorado's Front Range are complex mosaics of species composition and stand age.

Though ponderosa pine-dominated forest now extends to the plains at around 5,000 ft., distribution of remnant wood pre-dating 1400 AD suggests that the lower extent of forest occurred at around 8,000 ft. during the latter Medieval Warm Period. Trees expanded downslope into grassland and shrubland during several cool, wet periods of widespread tree establishment in the early 1300s, the mid-1500s, and the late 1700s-early 1800s. These recent climate-driven shifts in species dominance and distribution of forest indicate that the mixed conifer zone presently located between 7,500 and 9,000 ft. elevation is a climate-sensitive, disturbance-mediated dynamic ecotone.

Mixed conifer forest is a buffer zone between montane forests at lower elevations and subalpine forests at higher elevations that can move up and down the elevational gradient, with temporal lags between climate and vegetation changes. The complexity of the landscape provides refugia for species from both above and below, facilitating species migration. The complexity and widespread distribution of this community makes it likely to be one that will persist more or less intact despite future dramatic changes in climate, but its sensitivity to change will make it one of the first places where change will be detectable.



In the northern Front Range of Colorado, the two dominant tree species in mixed conifer forests are ponderosa pine, characteristic of lower elevations, and lodgepole pine, characteristic of higher elevations. Below 7,500 ft., Douglas-fir is the only significant stand component in addition to ponderosa pine.



Our study area is located in the upper montane zone in Larimer County, between 7,500 and 9,000 ft. elevation, both north and south of the Cache la Poudre River Canyon. Native Americans lived in the study area

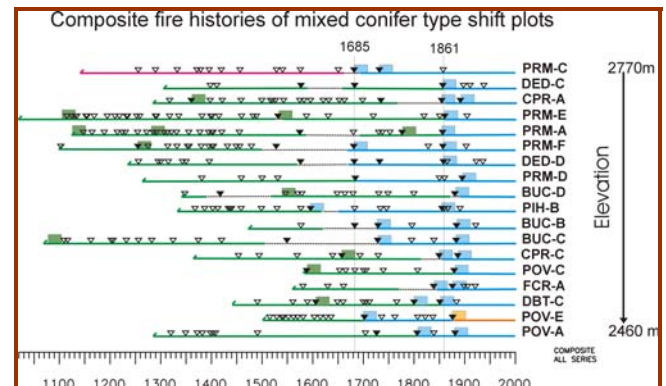
for at least 9,000 years, until around 1880. Localized logging and widespread grazing occurred during the settlement era from 1860 onward, intensifying after 1880. Because very little mineral wealth was discovered and no railroad was built, most of the study area was remote ranch land until the road up the Poudre Canyon was completed in 1920. Logging, grazing, recreation and urban development have accompanied fire suppression during the 20th century.

Between 2003 and 2005, we collected data from an approximately 300 square mile study area. We used a stratified random method to select a total of 58 plots within 11 4-7 square mile study sites. From each circular half acre plot, we collected a complete inventory of all trees living and dead by species and DBH; a minimum of 27 cross-dated cores from randomly selected live trees for age, plus all pre-settlement trees; all fire scars on living and dead trees and remnant wood within the plot and within 1 radius outside, and from representative dead trees and remnant wood for establishment and death date; a survey of understory vegetation by species and percent cover; and topographic information.

We built a tree-ring chronology from the 2,445 cross-dated pith ages, of which 1,767 were from live trees and 678 were from remnant wood. A total of 1,038 samples recorded identifiable fire scars that were cross-dated. The earliest pith date was 1020 AD; six remnant trees had pith dates before 1100 AD, 54 trees dated to before 1300 AD, and 121 trees dated to before 1400, an extraordinary chronology for ponderosa pine. The length of individual plot chronologies varied considerably, from 417 years to 983 years. The earliest fire recorded by scars occurred in 1107 AD. Fires ceased around 1900 AD; some lower elevation sites burned through the 1930s, after which time anthropogenic fire suppression became widespread and effective.

Eighteen of the 58 plots (31%) show evidence of a change in overstory tree species dominance during the last 1,000 years, following one or more stand-replacing disturbances. Type shifts were indicated by a difference in species composition between the living trees and the remnant wood in the stand, and sometimes also by residual older trees of one species amid a single cohort of younger trees of another species. Most stands are currently dominated by ponderosa pine (19%) or mixes of species with ponderosa pine dominant in the overstory (33%). All of the shifts involved an increase in dominance of lodgepole pine from dominance by ponderosa pine. By the early 21st century, seven of the 18 type shift plots were dominated by pure lodgepole pine (> 80%); 10 were a lodgepole pine-dominated mix, and one was an aspen-dominated mix.

Fire regimes changed in the plots along with the change in vegetation. While overall fire occurrence before and after conversion was highly variable, the number of mixed severity or stand replacing fires changed radically. Very few or no mixed severity fires occurred in stands before the local shift in species dominance, but the majority of fires after conversion were stand replacing or of mixed severity, regardless of when conversion occurred. An increase in overall fire



Composite fire histories of type shift plots recount the unique history in each plot. Horizontal lines are the composite tree-ring chronology in a plot; Green=chronology of ponderosa pine, blue=lodgepole pine, pink=limber pine, gold=aspen. Dotted lines are gaps in the record. Open triangles=surface fires (fire scars); filled triangles=mixed-severity or locally stand-replacing fire dates accompanied by post-fire tree establishment. Colored rectangles=cohorts of 5 or more trees within 25 years. The first mixed severity fire occurred in 1259 in PRM-F but type conversions did not begin until 1552 and went on until 1886. 1685 and 1861 were regional fire years.

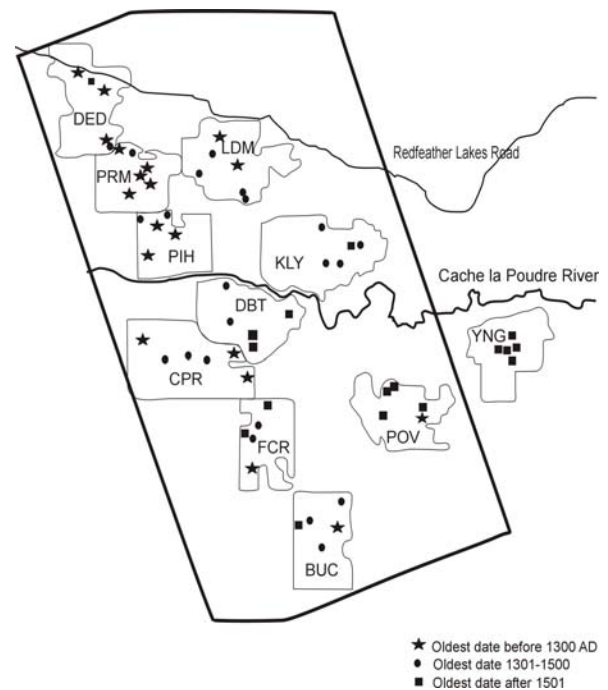
frequency in most plots after conversion was largely the product of the high frequency of fire during the drought in the mid-to-late 1800s. Shifts in species dominance occurred in the upper elevations of the range of mixed conifer vegetation, between 8,000 ft. and 9,000 ft. elevation, during the 334-year period between 1552 and 1886. Though climate began to change in the early 1300s, it may have taken two hundred years for conditions conducive to stand-replacing fire to evolve. Twelve different fire dates precipitated shifts; 1685, a regional fire year, saw six type conversions. Plots north of the canyon experienced type conversions earlier than those located south of the canyon. Nine plots converted during the 19th century (between 1805 and 1886); however, all but three of these occurred before widespread Euro-American settlement in the 1880s.

Periods of increased fire occurrence and increased proportion of mixed severity fire occurred in the late 1300s, the late 1400s-early 1500s, the late 1500s-

early 1600s (the continental megadrought), the late 1600s-early 1700s, and the mid-to-late 1800s. These periods coincide with regional severe drought. Periods of increased ponderosa pine establishment occurred during the early 1300s, the mid-1500s, the early 1600s, the mid-1700s to early 1800s, and the late 1800s into the 20th century—periods of less frequent and less severe fire and also more rainfall.

In addition to shifts in species dominance in the upper part of the range of mixed conifer forest, our data revealed another type conversion at lower elevations. Before 1500, not only was ponderosa pine dominant at higher elevations than at present, but lower treeline — or at least the elevation at which trees became very sparse—was located at higher elevations than at present, too. In the early 21st century, ponderosa pine extends in many places to the ecotone with the shortgrass steppe (and the urban corridor) at around 5,000 ft. When we mapped the plots by their earliest tree-ring dates, the plots with the oldest maximum ages were located at higher elevations and farthest west, while the younger maximum ages occurred at lower elevations and farther east. Their distribution suggests an eastward and downslope migration of trees during the Little Ice Age, beginning during the wet early 1300s. The oldest living trees below 7,000 ft. elevation date to the late 1400s and very little remnant wood predates them. Most of the old trees and remnant wood at lower elevations occur in protected locations on rock outcrops and in canyons and date to the mid-1500s establishment episode.

The living stands we see in mixed conifer forests today are products of the Little Ice Age. The stands that regenerate following the next stand-replacing disturbances will reflect the climate contemporary with the period of regeneration. By the 20th century, many stands above 8,000 ft. elevation had converted from ponderosa pine-dominated to lodgepole pine-dominated, and closed ponderosa pine forest extended to the edge of the shortgrass steppe. As the climate warms, droughts continue and growing seasons and fire seasons expand in the 21st century, forests that regenerate following stand-replacing disturbances in the mixed conifer zone may shift back to ponderosa pine dominance, while stands at lower elevations may not regenerate at all, reverting to grassland and shrubland.



As lodgepole pine is eliminated by the current mountain pine beetle outbreak in the Front Range, ponderosa pine may be the species better suited to regenerate into former lodgepole pine stands created by the stand replacing fires in the 16th-19th centuries. Even if mature ponderosa pines are also killed by pine beetles, advanced regeneration or seed sources for ponderosa pine are readily available to generate stands suited to the warming climate. Aspen is also likely to flourish in post-pine beetle stands, but it will probably play a seral role as it did following 19th century fires and logging.

Middle elevation forests are likely to be among the first places where the effects of changing climate will be apparent. Mixed conifer forests are “designed” to absorb the shock of climate change. They accommodate change without losing pieces or processes because diverse elements are present within a complex landscape. Our glimpse into the past before the Little Ice Age helps us expand our idea of what Historical Range of Variability in the Front Range really means and how it can advise management during yet another time of transition. Our data from the Medieval Warm Period and the transition to the Little Ice Age has implications for stand and landscape changes with future warming, even if future climate change exceeds past conditions. Spatial and temporal diversity at a landscape scale has made mixed conifer forests adaptable to changes in climate and fire



regimes in the past. Maintaining the landscape complexity that is the hallmark of mixed conifer forest is the key to mitigating fire behavior and the effects of changing climate by maintaining seed sources and refugia, allowing the landscape to adapt and species to migrate.

OTHER PARTNERS

FRONT RANGE WATERSHED WILDFIRE PROTECTION GROUP ASSESSES WATERSHEDS

In September 2007, the Front Range Watershed Wildfire Protection Working Group was established to evaluate ways to reduce the risks outlined in the Pinchot report and protect source watersheds from severe wildfire damage. Three sub-work groups now serve under the guidance of this oversight group.

In 2008 to early 2009, the Data Refinement Work Group (Workgroup), one of the sub-groups, built on the Pinchot report results. They also reviewed additional

data and refined their technical approach for assessing critical sixth-level sub-watersheds with the larger fourth-level source watersheds. Their goal was to prioritize the watersheds for future potential forest treatments that could reduce the severity of wildfires.

In 2009, the Workgroup completed a pilot project in the Upper South Platte (USP) Watershed to test the effectiveness and applicability of the watershed assessment model referenced above. The objective of the test was to finalize a model that could be used in any major Colorado watershed or other watersheds throughout the Western U.S. The technical approach and the pilot USP Watershed assessment are published in *Protecting Critical Watersheds in Colorado from Wildfire: A Technical Approach to Watershed Assessment and Prioritization*, which is available on the Front Range Fuels Treatment Partnership website at www.frftp.org/research.htm.

In March 2009, the Front Range Watershed Wildfire Protection Working Group presented results of the Upper South Platte Watershed assessment test case to key water providers and land management agency leadership. Water providers and agency leadership identified next steps for the work group. The group used these recommendations to develop additional strategies and actions.

Later in 2009, Denver Water, Colorado Springs Utilities, City of Aurora, other water providers, JW Associates, Colorado State Forest Service and the U.S. Forest Service proceeded to assess other Front Range watersheds using the watershed assessment template.

Using the process developed by the Front Range Watershed Wildfire Protection Data Refinement Work Group, additional watershed assessments were completed for the Blue River, Pikes Peak, Saint Vrain and Upper Colorado Headwaters. In 2010, assessments will be completed for the Arkansas and South Platte headwaters. Assessment results can be found at www.jw-associates.org.

As part of bark beetle hazard mitigation efforts by the U.S. Forest Service, assessments also will be provided for the Big Thompson, Cache La Poudre, Clear Creek/Bear Creek, Eagle River, Little Snake, Lower Colorado Headwaters, Medicine Bow, North Platte Headwaters, Roaring Fork, Upper North Platte, Upper Laramie, Upper Lodgepole and Crow, Upper White, and Upper Yampa.

Stakeholder involvement throughout the development of each watershed assessment has been invaluable to the success of the process. The Workgroup developed collaborative support through ongoing communication among large and diverse groups. This engagement has

resulted in a better understanding of the methodology, and will allow watershed stakeholders to use the assessment to achieve their common shared goals relative to watershed protection.

FRONT RANGE MOUNTAIN PINE BEETLE GROUP CONTINUES TO ADDRESS IMPACTS OF THE MPB INFESTATION

Through the Northern Front Range Mountain Pine Beetle Working Group, many agencies continued to coordinate efforts to address mountain pine beetle that are moving into the area's counties. The partnership consists of Boulder, Clear Creek, Gilpin, Jefferson and Larimer counties; Arapaho and Roosevelt National Forests; Colorado State Forest Service; Colorado State University Extension; Rocky Mountain National Park; and the USFS R2 Bark Beetle Incident Management Team.

One of the primary purposes of the group is to provide reliable information regarding mountain pine beetle-related information. In 2009, the partners:

- Developed a public educational website (www.frontrangepinebeetle.org) that provides a centralized source for mountain pine beetle-related information across agencies.
- Developed two informational publications; one for public land campers and other outdoor recreationists; the other for Front Range forest landowners.
- Engaged policymakers in efforts to mitigate the mountain pine beetle problem.
- Continued to collaborate with the Front Range Fuels Treatment Partnership and the Front Range Roundtable.



A lodgepole pine that was attacked by mountain pine beetle; an excreted resin called pitch is a tree's natural defense against beetles and is evident on the bark.

LOOKING AHEAD

Challenges related to forest health; the current mountain pine beetle epidemic; wildfire risk reduction; and watershed, community and infrastructure protection will continue well into 2010 and beyond. Front Range Fuels Treatment Partnership agencies will continue to tackle current and emerging issues, and successfully implement projects to help protect communities and restore forest health on Colorado's Front Range.



Logs from a hazardous fuels mitigation project are stacked for future use by local wood products industries.

ACKNOWLEDGEMENTS

The 2009 FRFTP Annual Report was developed and produced by the Front Range Fuels Treatment Partnership. Special thanks to the staff of these agencies for their contributions to this report.



COLORADO STATE FOREST SERVICE

NATIONAL PARK SERVICE

ROCKY MOUNTAIN RESEARCH STATION

USDA FOREST SERVICE



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