Cameron Peak Fire at Shambhala Mountain Center

Fire Effects in Forest Restoration Treatment by Fort Collins Conservation District

SMC's central meadow and a tributary of the Manhattan Creek experienced fire on September 26, 2020 due to hot and dry conditions combined with 90th percentile fuel moisture conditions.

Disclaimer: There are too many variables in play for any given wildfire to be able to say, with 100% certainty, that a forest treatment changed the course of a fire. That said, there are some widely-accepted truths about forest management, and this document is designed to talk specifically about the Cameron Peak Fire and its behavior on the Shambhala Mountain Center property in Red Feather Lakes.

Background

Shambhala Mountain Center (SMC) participated in a mechanical Forest Restoration Treatment on 118 acres of their ponderosa pine and dry mixed conifer stands in 2018. The average stand basal area was reduced from 90 sq. ft./acre to 30 sq. ft./acre, mostly by removing Douglas-fir advanced regeneration and 8-12" ponderosa pine trees in areas with little evidence of old (>200 year old) pines. Trees were cut with rubber-tired and tracked feller-bunchers, skidded to central landings, whole-tree chipped, and hauled off site. Though there were small amounts of "activity fuels" on the surface from

limbs breaking during harvest, there was very little surface fuel-loading post-treatment due to the chosen slash management strategy of chipping and hauling.

SMC has many scattered structures throughout the property, used as staff and guest housing, cafeterias, meditation retreats, bath houses, etc. In addition to the structures, one treated hillside contained 50+ wood tent platforms.

Fire Weather Conditions

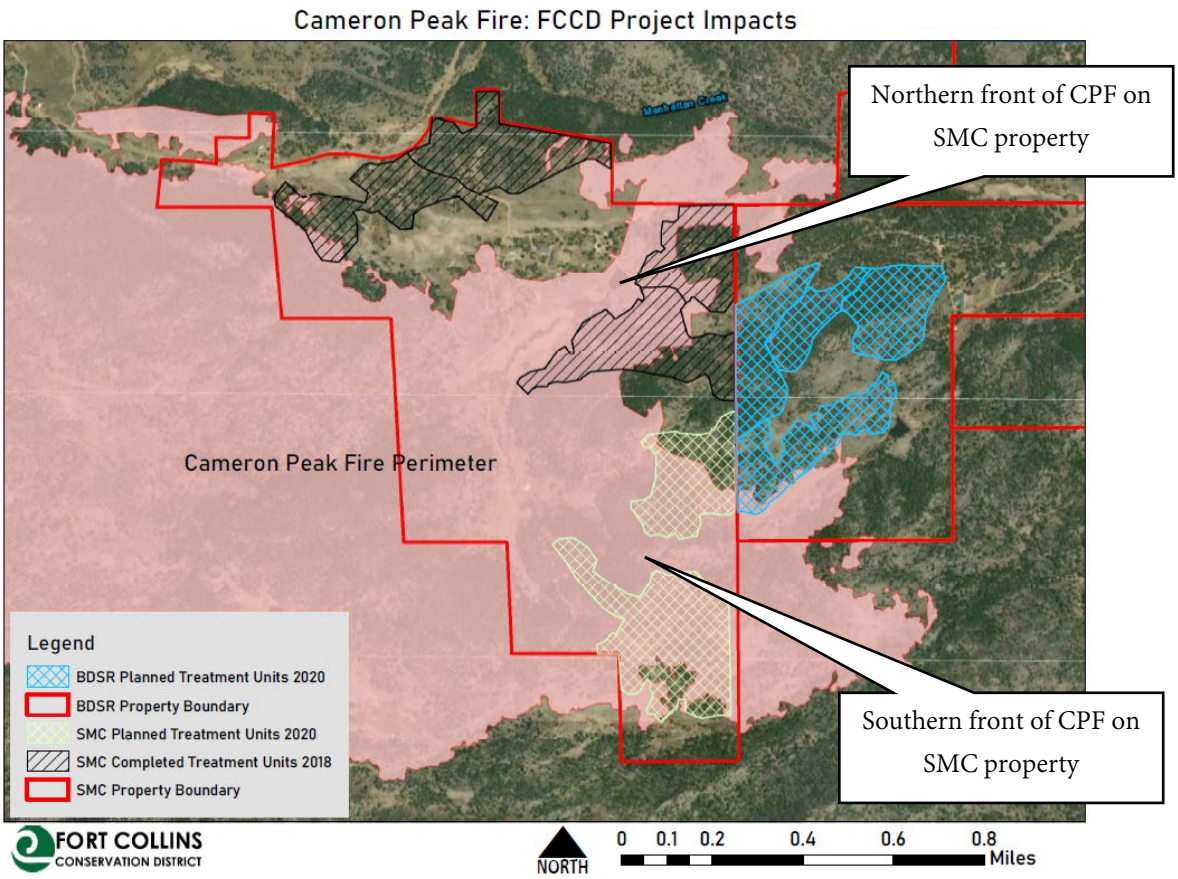
On September 26, 2020 the Cameron Peak Fire was making a large run to the east, fueled by excessive fuel-loading, hot and dry weather, 90th percentile fuel moisture, and 40-60 mph winds. As the fire reached its eastern-most extent on SMC property and National Forest at about 8pm, the weather changed to lower wind speeds, allowing the fire front to slow down and eventually be stopped.

On-site Fire Behavior

The main head of the Cameron Peak Fire came from the ridgeline just west of the property, and was propelled by 40-60 mph winds. As the fire came down the hillside, it split into two fronts: the northern front traveled westward through first untreated and then treated forest stands before stopping just shy of the Ben Delatour Scout Ranch on SMC property. The southern front, which traveled through stands that were either untreated or treated >10 years ago, was able to move further east, and died down just south of the Scout Ranch on National Forest near the Kelly Flats Rd. This document will focus on the northern front of the Cameron Peak Fire as it traveled through SMC property.

Once the fire was split into the two fronts, some of the energy "diffused" as the north front spread across the central meadow on SMC property. However, due to the fine, flashy fuels, the fire front was still moving at a good clip as it re-entered the forest around the campgrounds treated in 2018.

SMC's central meadow in the foreground. This photo was taken one week after the fire swept through. The soil burn severity was very low, encouraging new grass growth almost immediately.



Fire behavior in the untreated portion of the property was largely dictated by surface fuel-loading and slope aspect in relation to wind direction. For example, many portions of SMC property experienced high-severity fire due to high fuel loading as well as having the wind direction align with the slope direction. Other untreated portions of SMC experienced little to no fire. Fire behavior (or the lack thereof) in these stands can be attributed to the lack of surface fuels due to the sites being extremely rocky and unproductive, as well as a cross-slope wind.

The slope and ridgeline in the background of this photo demonstrate a high-severity burn area on SMC and adjacent National Forest. The fire behavior on these slopes can be attributed to high fuel-loading and wind speeds.

An area on SMC's property that experienced high burn-severity. This is an area that was scheduled for a restoration treatment, but was not treated in time. High tree densities and strong winds contributed to the fire effects on these acres.

A rocky, unproductive hillside with minimal surface fuels, despite the high tree density. The fire did not burn much of this hillside, despite burning through the treated area below.

In the treated portion of SMC property, we saw low- to moderate-severity fire behavior across the board, with highly variable results from acre to acre. We can attribute this to the patchiness of fuels, both in the understory and overstory, as well as microsite topography and wind speed/direction. Treated portions of the property experienced some scorching and torching of individual trees and small groups of trees, however there was no running crown fire or widespread torching.

This stand was treated in 2018 by a ground-based heavy mechanized forest restoration approach. The fire largely stayed on the surface, while occasionally jumping into a tree to scorch it. We expect some mortality in this stand. The surface grasses, needle-cast, and shrubs contributed to the scorching of trees.

This photo shows a group of five ponderosa pines that experienced heavier scorching in a treated stand. Where you see the group of people standing is where there had been a dense cluster of deciduous shrubs and trees including mountain maple and aspen. The density and dryness of those fuels most likely contributed to these pines scorching more heavily than surrounding trees.

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Lessons Learned

- Forest treatments won't stop fire under extreme fire weather events, however they can greatly increase the chances of saving resources.
- If you want to save it, cut it or burn it. Make your work count.
- You're never going to save every tree under extreme fire weather conditions.
- What some consider more aggressive treatments such as mechanical forest restoration are what firefighters "look for". They provide a "comforting place to hang out" during a fire. A similar project up the road in Red Feather Lakes was what the firefighters tied into to create a fuel break west of the town. There was "a lot of discussion" during the Cameron Peak Fire about how mechanical forest restoration treatments should be more widespread in order to help communities be more resilient to wildfire.
- Aircraft fire suppression is more effective in the more open canopies of a restoration treatment. The open canopy structure allows retardant to reach the surface fuels more effectively.
- Surface fuels are the most important thing that we can and should control in our treatments. Any time slash, a chip bed, or masticated wood fiber is left on the ground, it can lead to much more deleterious fire effects. Not only will the surface burn hotter, leading to soil sterilization and the creation of a hydrophobic layer, but surface fuels support crown fire. Independent crown fires with the absence of surface fuels don't exist in the wild. With that said, preferred slash management techniques include pile and burn (so long as piles are burned before a wildfire), and whole tree removal.
- An effective fire break is at least 3-4x the width of potential flame lengths. Some natural openings enhanced by a forest restoration treatment can achieve this.
- Balancing landowner objectives with an ecology-based tree mark has its pros and cons. At SMC, one of the stands that experienced higher tree mortality and burn severity was located within a campground area, where there were 50+ tent platforms scattered throughout. SMC understandably requested more shading and cover in that unit for the comfort of their staff and guests residing in the campground. The treatment balanced those objectives with an ecology-based approach, and we were able to witness the downside of this approach. In the event of a fire, the higher density of trees combined with the fuels of the tent platforms, created worse fire behavior than stands with fewer compromises. It's worth noting that this higher severity fire behavior could have been caused by other abiotic factors such as slope angle in relation to wind, wind speed, etc.