VI OBSERVATIONS AND RECOMMENDATIONS

The variables in a fire scenario are when the fire will occur, and where. Communities in the wildland urban interface cannot "prevent wildfires", but they can be prepared to survive fires with the least damage possible. They must become Fire Adapted Communities.

Traditionally, the home ignition zone or HIZ includes the home and the surrounding 100 to 150 feet, but this traditional model does not apply well to CORA. Structures in the campgrounds are so closely spaced that the concept of zones surrounding individual structures is not a useful concept. Rather each campground should be viewed as its own entity



and wildfire protection should apply to the campgrounds rather than to individual structures.

There are three ways that a wildfire can transfer itself from natural vegetation, or burning structures, to other structures. They are through radiation, convection, and embers.

RADIATION: Wildfires can spread to a home by radiating heat in the same way a wood stove heats a room. Although the fire is contained within the stove, the heat radiates through the air. In a wildfire, radiant heat is capable of igniting combustible materials from 100 feet away,

and the function of defensible space is to keep radiant away from a home.

CONVECTION: Direct contact with flames, or the wildfire's convective heat column—the hot air and gases rising from the flames--will also ignite a home. Low intensity wildfires may ignite a home if the flames directly contact parts of the structure. This will most likely occur when trees, debris or landscaping near a structure ignite and the flames touch a flammable part of the structure. Maintaining a five foot noncombustible barrier around the home is critical to prevent convective ignitions.

EMBERS: In most cases, the flame front passes quickly, but a blizzard of embers fall on a structure before and after the flame front passes. Embers carried by winds from strong convection drafts of a wildfire can ignite structures when a fire is a mile or more away.



The unburned trees behind this home, destroyed in the Black Forest Fire, prove it was not engulfed by a wall of flame. Rather, windborne embers ignited the home and caused the loss.

Most of the home ignitions in a wildfire are from windblown embers (firebrands). Autopsies of burned homes show that 40 to 90% of destroyed homes are ignited by embers, not radiant heat or convection.

FIREWISE RECOMMENDATIONS

During a large wildfire, there are never enough fire engines to defend every home. When adequately prepared, a house can likely withstand a wildfire without the intervention of the fire service. When the surrounding forest is well managed, it too will survive a wildfire with minimal damage. The Firewise/USA program is designed to enable communities to achieve a high level of protection against WUI fire loss even as a sustainable ecosystem balance is maintained.

The RVs all have one or more propane bottles. Many of them are not properly mitigated, and this creates an extreme hazard within the community, and may prevent firefighters from defending the camp. Residents should understand this hazard and take simple steps to mitigate it. The recommendations apply to all propane tanks regardless of size.

Most propane bottles are attached to the tow bar of the RVs, but several larger bottles and some larger tanks were observed at some camp sites. Many residents have gas grills that also create a hazard. Many of these are close to wildland fuels.

The tanks are heavy gauge metal, and would not rupture unless exposed to intense direct flame in a wildfire, or if the structure burns and exposes the tanks to direct flame. Therefore, it is important to keep any source of high intensity flame at least 15 feet away from a tank. Keep propane tanks away from fuels by placing them within a noncombustible barrier and mow grass at least 15 feet around the tank.



Propane bottles should be separated from wildland fuels to keep radiant heat away, and reduce the threat of explosion. The barrier here should be supplemented by keeping vegetation mowed for 15 feet around the tank.

Radiant heat would not likely be intense enough to rupture the tank, but it may be sufficient to melt the rubber hoses connecting the tank with the appliances inside the RV. If a wildfire threatens, homeowners should turn off the valves at the tank when evacuating, and they should always turn off the valves when leaving for extended periods.

Overfilling tanks is another dangerous practice. Tanks should never be filled to more than 80% of their capacity, since overfilled tanks are more likely to explode when exposed to intense radiant heat.

Another hazard is an improperly functioning pressure relief valve. If the valve does not open to vent pressure from the tank, it may explode. If the valves becomes dirty or corroded, it will not properly release the pressure as the tank heats up. The valves should be checked by a qualified technician at each fill up. If they are defective, replace the tank or the valve.

Some tanks in CORA are either rusted or painted a dark color. Rusted tanks should be replaced because the strength of the tank may be compromised. Light colored tanks will reflect heat rather than absorb it, and any dark tank should be replaced with one of a lighter color.

Do not store tanks in sheds or the RV. They are invisible to firefighters.

The greatest threat to structures in CORA is from ember ignitions and structure to structure ignitions. This threat is serious in all of the campgrounds, even those in grass fuels. Fuel reduction and structural

hardening to prevent ember ignitions should be the highest priority.

Most of the homes lost to wildfires are not engulfed by a wall of flame. Rather, they are ignited by the blizzard of windborne embers, or firebrands, that fall from the sky when the fire may be a mile or more away.

Structures in CORA are particularly vulnerable to firebrands. The RVs in the campgrounds are closely spaced



and the campgrounds are not always mitigated properly. The concept of a 100 foot zone of fuel reduction around each structure is designed to keep high intensity fire and radiant heat away from the structure.

Firebrands may still fall into defensible space and ignite low intensity fires. Embers will fall directly on the structures themselves or on attached decks. Therefore, protecting the

Closely spaced structures and untreated fuels in the campgrounds are a dangerous combination that must be addressed. Firebrands carried by the wind into the campgrounds will ignite fires when the flames are far away. structures from ember ignitions, a process called structural hardening, is as important as defensible space in the forest fuels.

When a structure burns, there is a large amount of radiant heat that is capable of igniting nearby structures. The RVs are often in such close proximity that the traditional concept of a 100 foot defensible zone around each structure is not applicable. Each campground should be viewed as a single unit and fuel reduced throughout each campground.

Recreational vehicles are lightly built and not as ember resistant as a traditional building. The

"Combustible debris on a roof may ignite from firebrands and start the home on fire.

tiny homes are constructed more like a traditional structure, but are still more vulnerable than single family home. Buildings like the community center and maintenance buildings are of traditional construction. Common structural hardening practices will protect the RVs, tiny homes and traditional buildings. The information as presented below follows the standard structural evaluation used by the National Fire Protection Association, and homeowner's can use the information to evaluate their structures.

Roofs and Gutters

Roofs and gutters are extremely vulnerable parts of a home, and if either burns, the home will be lost. They are most likely to catch windblown firebrands. Wind currents form eddies that trap debris around irregular surfaces, such as gables or dormers, found in roofs. These same areas will accumulate firebrands in wind currents during a wildfire.

Fire resistant roofs are extremely important. Roof material with a class A rating indicates the best resistance to fire. The community buildings and tiny homes all have class A roofs, while the RVs have aluminum roofs, and the aluminum is noncombustible.

No matter what the roof type is, all are vulnerable to embers and should be properly maintained. The most important item is to keep the roof—and gutters--free of debris. Combustible debris on a roof, such as leaves and pine needles, may ignite from embers and burn a home even with a fire resistant roof. Loose and missing shingles allow embers to directly contact the plywood sub-roof. It is particularly important to keep the aluminum roofs of RVs free of combustible material. Heat from burning debris is quickly transferred through the aluminum to the wooden framing below.

Gutters will also accumulate debris, and combustible debris should be removed anytime it accumulates. Gutters and downspouts should be metal since plastic may burn.

The eaves (the extension of the roof over the outside wall) are also vulnerable areas. Vents, in roofs and foundations, are areas of vulnerability, but are necessary to ventilate attics and crawl spaces to prevent moisture accumulation. During a wildfire, heated gases and firebrands can enter attics or crawl spaces through vents. Vents covers on RVs are plastic and will melt. All vents should be screened with 1/8 inch metal screening.

Top Of The Exterior Wall To The Ground

In addition to the roof, decks are extremely vulnerable to fire. The deck surface is exposed to firebrands and firebrands will collect underneath decks. The worst mistake any homeowner can make is to store any combustible material beneath a deck. Countless structures have been lost because of firewood, scrap lumber, even gasoline stored under a deck. Even motorized equipment, when left under a deck with gas in the tank, has caused home losses during fires.

Ideally, the underside of decks should be screened by a non-combustible material, metal or metal screening. Covering the area under a deck with stone, concrete or rock mulch will make the deck safer. When decks are rebuilt use fire resistant decking such as cement board. Firewise USA has developed fact sheets for deck construction and other topics and these can be found on the web at:

https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA/Firewise-USA-Resources/Research-Fact-Sheet-Series

Fire resistance of windows and doors should be considered. Intact window glass transmits little radiant heat into the interior, but absorbs heat unevenly causing the glass to break. If window glass breaks, firebrands will enter the house. The most fire resistant glass is low emissivity, multipane tempered glass which withstands the heat of a fire for the longest period. Double pane windows resist breaking longer than single pane when exposed to the heat of a fire.

Window frames are also important. Metal frames offer the best protection. Vinyl frames usually do not burn but can warp if exposed to high radiant heat, and wooden frames can burn. Metal screening on the outside of windows offers additional protection, but most windows are sold with nylon screening that will melt. Solid metal shutters offer the best protection, assuming the homeowner has the opportunity to close them before evacuating.

Wooden doors are obviously able to burn during a fire. The thicker the door the more resistant it will be. Metal doors are superior, and glass in doors is subject to the same vulnerabilities as window glass. Well maintained weather stripping will prevent firebrands from entering a home.

RV owners should pay particular attention to windows and doors. The light construction of the RVs is usually single pane glass and the door may not fit tightly. The vehicles are particularly vulnerable to cracked glass and ember intrusion around doors.

To prevent ember intrusion through broken glass, screen all windows and vents with 1/8 metal screen. The screens will prevent ember intrusion even if the glass breaks. Nylon screening used in most RVs will melt from radiant heat and offer no protection.

Doors of RVs often do not fit tightly, especially if the weather stripping is worn, and embers will reach the interior of the structure through the unsealed door. Maintain good weather stripping around the doors. The screen door would offer additional protection, but only if the screening is metal. As for windows, replace the screens with $1/8^{\text{th}}$ inch metal screen.

Caulk around windows, vents and door frames to seal gaps between the window or door frames and the aluminum siding. Check where wires, plumbing or gas penetrate the aluminum skin for gaps that would allow ember intrusion, and seal them with caulk. The aluminum skin of RVs is thin and easily damaged, check the siding for any tears or holes, and seal them.

From The Foundation To The Immediate Landscaped Area

The term landscaped area in this context refers to the five feet immediately adjoining the structure, including a deck. То prevent a low intensity fire from smoldering directly to the foundation, a deck or beneath decks, maintain a five foot barrier of bare dirt or noncombustible mulch in these areas. Under no circumstances use anv wood or bark mulch. Avoid planting or maintaining woody shrubs in the barriers, well-watered but herbaceous flowers pose little hazard.

Like a deck, any combustible material beneath a trailer or tiny home is a great threat. Never use the underside of a RV to store any



Woodpiles are ember traps. Should embers or a low intensity fire ignite the woodpile, the entire campground is endangered. Woodpiles in the campgrounds should be small, and located thirty feet away from all structures.

combustible material. Metal skirting around tiny homes and RVs that are not moved will offer the best protection from low intensity fire and embers. RVs that are moved frequently should have nothing beneath them but bare dirt.

Campfires are part of the ritual of camping, but there are campfire rings in CORA that are not safe. Many campfire pits are constructed of rock rings directly in combustible fuels. Fire rings should be surrounded by ten feet of bare dirt or gravel. The fire itself should be small, no bonfires, and residents should observe all fire bans and restrictions enacted by Park County.

From The Landscaped Area To The Extent Of The Home Ignition Zone

Defensible space is defined as an area around a structure where existing vegetation is modified to slow the rate and intensity of an advancing wildfire, and should extend a minimum of 100 feet from a structure. The prescriptions consider each campground as one defensible space. Each campground differs based on fuels and topography. Fuels are reduced according to prescriptions for each campground.

Silverton Northern Campground: This campground is at the greatest risk with respect to the amount and arrangement of the fuels and the topography. There is an abundance of ladder fuel beneath the larger trees that would carry a fire from the ground to the forest canopy. Topography also contributes to the hazard. The campground sits on a ridge, and fires below would tend to burn towards the

campground. The steep hillside to the north and below the fuel break is densely forested. The fuelbreak gives protection from a high intensity wildfire, but the fire would produce large amounts of firebrands that upslope wind would carry towards the campground.

The first priority is to reduce ladder fuels in the campground. Ladder fuels are any fuel such as lower limbs, grass or shrubs that would allow a ground fire to climb into the larger trees. The larger trees in the Silverton Northern Campground are not so dense as to form a closed canopy, and they are part of the ambiance of the camping experience. Remove understory trees that are within ten feet of the longest branches of the larger trees.

Ponderosa pine are shade intolerant trees, meaning that the trees sprout and grow after a fire or disturbance creates an opening with direct sunlight. All the trees in the new stand are the same age. As the trees grow, the most vigorous outgrow the weaker trees. Therefore, the smaller trees in the stand are not young trees, but are merely suppressed. Removing the weaker trees in the understory reduces the fire hazard, and improves forest health.

Small trees near structures should also be considered for removal. These trees would bring a fire into direct contact with a structure if they burn. Larger trees within 15 feet of structures are less hazardous if they are properly pruned. Most trees in the campground are within 15 feet of a structure. Prune such trees to ten feet above the structure's roof whenever possible. As many green branches should remain as possible. If pruning a larger tree would remove more than 50% of the green branches, it should be removed.

Within the campground there are scattered aspen that are desirable trees for their fuel properties and for aesthetics. Aspen retain large amounts of water and do not pose a wildfire threat. Thev should be retained, and new sprouts encouraged. Aspen are sun loving trees and thrive in openings. Whenever possible, encourage aspen by removing conifers beneath the trees and surrounding the aspen clumps.

There is a safety issue as well, especially when any tree, even those that appear to be small, is dropped. Every tree in the campground is in close proximity to structures, personal property, and



The grass and shrub fuels should not be ignored. Create a 50 foot fuelbreak of mowed grass around the campground, and prune trees in the fuelbreak.

especially people. Tree falling is imprecise with many factors influencing where a tree might fall. In close quarters like the campground, even an experienced faller would approach the task with trepidation. Any tree greater than six inches in diameter should be cut by an experienced faller. Chainsaws are dangerous machines. No one should ever operate a saw without proper personal protective equipment: a hard had with a face screen, ear protection, and cutters chaps.

Slopes on the other sides of the campground are steep as well but they are predominantly grass or grass shrub fuel models with less hazard of ember production. Fires in these fuel types would be driven by wind and move quickly.

Mitigation in the grass fuels is simple. A fuel break of mowed grass (to four inches or less) within 50 feet of the campground will provide adequate protection. Grass should be mowed as needed to maintain the four inch standard. Grass should be mowed in the fall to be certain that no long, dry grass is available as fuel during the winter and spring months. "Fire season" is every day of the year, and if there should be a fire during the colder months, it would most likely burn in dry grass on south facing slopes.

Fuel reduction in the grass shrub fuel type is similar to the grass fuel type. Grass would be the fuel that carries the fire since the shrubs are fairly sparse and open, but shrubs pose a higher risk of firebrands. A 50 toot fuelbreak of mowed grass will give adequate protection. Larger clumps of shrubs can be separated by removing some of the plants, but this is not critical given the sparse nature of the shrubs.

Ironically, many grass fires have been started by well-intentioned landowners mowing the grass during hot and dry weather. Grass dries quickly after a rain, and sparks from a mower striking rocks will easily ignite grass. It is best to mow when the grass is green, shortly after a rain or in the early morning when the humidity is higher. Avoid mowing during hot, dry and windy conditions.

There are scattered trees within the grass and grass shrub fuel models. Within 200 feet of the campground, prune the lower limbs to prevent a grass fire from climbing into the tree tops. There is little risk from radiant heat if these trees burn, but burning trees will produce firebrands near the campground.

Trees taller than thirty feet should be pruned to eight feet from the ground. Small trees should have at least two third of the green limbs remaining on the tree even if pruning is less than eight feet.

Rio Grande Southern Campground: Next to the Silverton Northern campground, the Rio Grande Southern presents a challenge for fuel reduction. Like the Silverton Northern, the Rio Grande Southern is adjacent to dense forest fuels, and steep terrain. But there are differences as well.

Most of the forest fuel within this campground is aspen, and as noted previously, aspen do not present a severe wildfire threat. The best fuel reduction here is to maintain the aspen. Remove smaller, shade tolerant Douglas-fir or spruce from the understory. The conifers are flammable and eventually they overtop the aspen, shading them out.

Aspen have short life spans, and dead trees tend to collect on the ground. Dead aspen build up over time and create large amounts of fuel on the forest The aspen forest in the RGS campground is prone to low intensity wildfires, but structural hardening is still necessary to protect the homes from embers.

floor. Remove the dead wood as it accumulates.

Homeowners should not attempt to "thin" aspen as the term applies to conifers. Aspen have thin bark that is easily wounded by falling trees. The wounds are then invaded by several different fungi that will kill the trees. Simply leave the aspen to their own devices.

A few larger conifers are mixed with the aspen, and these may be desirable trees for the homeowner. The widely separated trees do not pose the threat of a crown fire, but conifers near structures could burn and bring the fire directly to the structure. The best action is to remove ladder fuels, especially pruning lower branches using the same height guidelines as in the Silverton Northern campground.

Wildfires burn on the ground beneath aspen stands with low intensity, so structural hardening is essential in the Rio Grande Southern campground. Follow the same guidelines as for the Silverton Northern campground, especially mowing grass, non-combustible barriers and removal of man-made fuels.

On the hillside south of the campground, the aspen changes to a mixed conifer forest of ponderosa pine, Douglas-fir and some aspen. The specter of an intense crown fire increases greatly in the conifer where the forest canopy is closed and there are abundant ladder fuels. A fuel break similar to the one protecting the Silverton Northern campground is a high priority. CORA has been awarded a cost share grant



from the Denver Water Board's Forests to Faucets Program to begin this work. The specific prescription for the fuelbreak follows in the next section.

Denver, South Park & Pacific and the Colorado & Southern Campgrounds: Both of these campgrounds are situated in the grass fuel model and on flat terrain. They are similar enough to be considered together.

Mitigation of the grass fuel is a relatively easy task. Simply mow grass within the campgrounds and around a 50 foot perimeter to less than four inches. There are scattered conifer within both campgrounds, and these should be pruned as indicated for the other campgrounds. The five



foot noncombustible barriers around structures are necessary in both campgrounds.

Within the campgrounds, there are the same man-made hazards as other areas. Woodpiles, propane bottles, and other issues noted earlier

should be addressed.

• Second to structural hardening, and defensible space, fuel reduction on the slope between the RGS and Silverton Northern campground is a priority.

The fire in unmowed grass on the right stopped when it reached the mowed grass on the left.

When this Community Assessment was conceived the HOA developed the goals and objectives for the plan. One of the objectives simply said, "Protect our slice of heaven".

Merely saving structures is not enough. Saving structures, but losing the surrounding vegetation will devastate the community. Wildfire is one threat, but there are others. Currently western spruce budworm is damaging Douglas-fir on the property. Other insects or diseases, mountain pine beetle, for example, are present, but not at damaging levels.

Insects and diseases will always be present. Good forest management does not make them disappear, but it creates healthy forests that withstand the attacks with no major

damage. The forests on the CORA property are overstocked and not resilient to wildfire, insects or disease.



When managed to be fire adapted, forests, like communities, survive wildfires with minimal damage. Aside from some scorched needles, there is little to indicate this area burned in the Black Forest Fire one month earlier. The highest priority is always to protect human life, both residents and firefighters. Second is to protect property. Done properly, forest thinning to meet the first two objectives will create resilient forests, protect soil and benefit wildlife.

At this writing, CORA has received \$20,000 in cost share money from the Denver Water Board to create a shaded fuelbreak at the base of the hill south of the Rio Grande Southern campground. The fuel break should be a first step in a project that reduces fuels on most of the hillside between the two campgrounds. Work on the fuelbreak may be possible as early as the fall of 2020, but the situation with the COVID19 virus makes any date a wild guess.

Beyond fuelbreaks, the goal should be to restore the forest to a healthy condition. After a century of fire suppression, most of Colorado's forests support far more trees than in the past. More trees is not a desirable situation since water, sunlight and nutrients are limited. Intense competition for limited resources leaves trees weak and vulnerable, and the results are apparent in the massive insect epidemics and wildfires of recent decades.

Beyond the home ignition zone, the goal is to thin the forest primarily to improve forest health. This management will obviously remove fuel and reduce fire intensity, but there is less emphasis on tree spacing and more on retention of vigorous trees. Tree distribution is more clumpy than regular. Some spaces should still be made in the canopy and ladder fuels removed, but great variation in the size of clumps and openings is desirable.

Another desirable objective is to increase the amount of aspen in the forest. As noted earlier, aspen require direct sunlight to flourish. Fire suppression allows shade tolerant conifers sprout, overtop and shade out aspen stands. Wildfires in aspen burn with low intensity and on the ground, and an aspen stand is a forested fuelbreak. The hillside between the Rio Grande Southern and Silverton Northern campground has scattered remnants of aspen.

It is wise to remove conifers beneath the remaining aspen clumps, and to remove conifers from the edges of aspen clumps to encourage aspen sprouting. Creating openings of 0.1 to several acres in the conifer will enable aspen to colonize the openings.

Forest management should increase the diversity of the forest. Aspen pose the smallest wildfire threat, followed by ponderosa pine. Douglas-fir, lodgepole pine and spruce pose the greatest wildfire risk, but eliminating any tree species is not a wise objective. Maintain a diversity of species and ages within the forest. Each species of tree has its own diseases and insects, and they are susceptible to different insects



Beyond the HIZ, isolated standing dead trees and down logs provide good wildlife habitat, and should remain

or diseases at different ages. Maintaining diversity prevents a single insect or disease from killing the entire forest.

A few clumps should be left with branches touching the ground to provide some thermal cover for wildlife. The low branches do slightly increase the hazard, but some simple guidelines will minimized this hazard while benefiting animals.

- Make thermal cover clumps as far away from structures as possible. Clumps should not be within 200 feet of any structure.
- Try to surround the thermal clumps with 20 to 30 feet of open space or aspen. If a fire should ladder into the thermal clump, the surrounding space will minimize the risk of a crown fire.
- Landowners are often uncertain about the threat posed by standing dead trees and down wood in their forests. Standing dead "wildlife" trees are valuable habitat, and some should remain beyond defensible space. Good rules of thumb for retaining wildlife trees are: first, the tree should be larger than ten inches in diameter measured at 4.5 feet above the ground; second, no more than five widely spaced wildlife trees per acre should be retained; third no wildlife tree should pose a threat of falling on anyone or anything.
- Within the forested areas there is an abundance of down wood, much of it left from the railroad tie cutting a century ago. There are also rules of thumb for down wood. Large concentrations of wood, such as brush piles or jackstrawed logs pose a threat, and should be removed. Isolated down logs, however, are beneficial habitat, and do not pose a significant wildfire threat. The effort of removing

isolated decaying logs from the forest floor is largely wasted, and would be more effectively applied to removing ladder fuels and opening the forest canopy.

Methods of treatment and slash disposal: The most economical treatment method for the hillside is to shred the removed trees into chips using a tractor with a grinding attachment called a Fecon head. The heads attach to tractors of various sizes ranging from a skid steer to a D-9 Cat. A of two or three crew workers can treat acres quickly and efficiently. The machines are capable of grinding trees to fine



Commonly known as a "bull hog", this machine moves through the woods shredding trees. It is the most economical way to treat large areas, but may not be able to treat slopes over 30 degrees. This area survived the Black Forest Fire six months after it was treated. shreds, nearly as small as a chipper. Grinding to a finer material requires more time and increases the expense.

These machines are limited by the steepness of the slope and other factors, especially rocks. As a rule of thumb, slopes above 30 degrees may be inoperable.

Steeper areas of the hillside may not be operable by machine, and would need to be treated by hand crews. A hand crew of five workers may be able to complete two acres a day, and the labor is costly. The steepest areas of the hillside are not adjacent to structures, and could be done as a lower priority after more accessible areas are complete.

Hand work requires that the branches and unusable material, or slash, be properly treated as a separate step after the Burning requires a permit from the Northwest Park County Fire Protection District. The Fire District should be contacted in the planning stage of the project.

cutting. Improperly treated slash is unsightly, and may make the wildfire hazard worse than no treatment. There are several ways to hand treat slash, but they have advantages and disadvantages.

Hand chipping, or feeding the slash through a chipper, is the most common means of slash disposal. It is labor intensive, and expensive. After the trees are cut and limbed, the slash must be hand carried to the chipper and fed through the machine. Most chippers are towed behind a vehicle, so slope and access are limiting factors. There are self-propelled chippers that are able to work steeper remote areas.

Of all slash disposal methods, chipping is the most aesthetically pleasing. The ships are small and lay on the ground in a compact layer. Chip depth should never exceed four inches. The fuel is not eliminated, it remains on the ground, but the compact arrangement would only smolder during a fire. Wildfire intensity would be very low and no firebrands would be produced.

Lop and scatter is the simplest way to treat slash. The sawyer simple cuts the unusable material into small pieces, scatters it on the ground and leaves it to decompose. Colorado State Forest Service guidelines for lop and scatter in fuel reduction projects call for pieces less than 24 inches long and no more than 12 inches high. In timber sales on the Antero Junction that generated a moderate amount of lopped and scattered slash, decomposition took around five years.

Until the slash decomposes, it can fuel for a fire, but the fire is on the ground where it will burn with less intensity and generate fewer firebrands. It is also unsightly. Lop and scatter should be used only where other slash disposal methods are impossible, and where the amount of slash will be small.

Piling the slash to burn is another option. Burning requires a permit from the Northwest Park County Fire Protection District. If burning is contemplated, the Fire District should be contacted in the planning stage of the project. Slash piles are burned when there is at least a foot of snow on the ground.

To completely burn, piles must be properly constructed. **[Get burn pile dimensions]** To ensure complete burning, piles should not be too compacted with plenty of air circulation. Avoid making piles close to the remaining trees. It is unlikely that a burning pile would ignite an adjacent tree, but heat from burning piles will scorch nearby trees, so piles are best located in openings. Do not make piles on top of cut stumps. There have been instances where the burning pile ignited the stump which smoldered through the winter, igniting a wildfire the next spring.

After the burn, piles should be checked several times a day until there is no longer any evidence of heat.

Once burned, the fuel is gone, but there are disadvantages with this method as well. The largest issue is that during dry winters there may not be enough snow to burn the piles. Then the dry piles sit thorough the next (or next several) burn seasons, posing a threat.

Smoke can be irritating to residents and neighbors with respiratory health problems, and smoke may frighten neighbors. Advance notification of a burn is necessary if at all possible. Burning piles during a snowstorm greatly reduces smoke issues.

• The 20 year old fuelbreak below the Silverton Northern campground is still effective and needs only minor maintenance. Increasing the width of the fuelbreak will give greater protection to the campground.

Forests are never static, and they will need continued management over time. Landowners should follow the maintenance routine below.

- Every spring, walk the property and check for damaged or broken limbs, snow bent trees or dead trees. Remove or prune damaged trees as needed. Also do any pruning of ladder fuel removal to keep defensible space intact.
- In October, check trees for bark beetle signs (see the information in Appendix A for signs and symptoms of attack). Bark beetle attacks end after the first hard frost. Infested trees may not turn brown until spring, but homeowners have the most treatment options when trees are detected early.
- Every five years, evaluate the fuelbreak and defensible space and remove any trees as needed to maintain an open canopy. If new trees have become established, thin them as necessary to maintain the defensible space.

Many homeowners in CORA have marked their homes with reflective address markers. Every home in the community should have markers.

Address signs with reflective numerals at least three inches high will help firefighters find homes in the dense smoke of a wildfire, but medical response is a more important reason for proper address markings. Without obvious address for each lot, medical responders will find it difficult to locate a particular RV in CORA. Precious time will be lost while first responders search for the right home. The HOA should require reflective markings be posted at each site in such a manner that they are easily visible from the roads.

• In the event of a wildfire, access into, out of and within CORA could be hazardous.

The section of Boxcar Loop from the Silverton Northern campground to Watertank Circle is the most hazardous due to the steep slopes and heavy forest fuels. Eventually a shaded fuelbreak extending 200 feet below the road and 100 feet above the road should be completed. Given the steep terrain, this would be a costly process, but can be done in stages. Given that fires burn uphill, the area below the road is a higher priority than the area above.

Initially, removal of the shrubs adjacent to the road, tree pruning and small ladder fuels removal will improve the safety of the evacuation. Slash can be pulled 50 feet from the road and lopped and scattered or chipped. This could be accomplished as a community project by residents using hand tools. Little chainsaw work would be required. As funds permit, contractors can remove larger diameter trees.

Roads through grass fuels require fuel reduction to make the safe evacuation or access routes. Mowing grass within 50 feet of the road edge should provide adequate protection.



Address markings should be reflective, three inches high and mounted on a noncombustible post.

VII SUSTAINING A FIREWISE PROGRAM

After reviewing the contents of this assessment and its recommendations, CORA's Firewise Committee in cooperation with the CSFS and North-west Fire Protection District will determine whether or not it wishes to continue seeking Firewise Communities/USA recognition.

If the site assessment and recommendations are accepted and recognition will be sought, CORA's Firewise Board will create agreed-upon, area-specific solutions to the Firewise recommendations and create an action plan in cooperation with the CSFS.

Assuming the assessment area seeks to achieve national Firewise/USA recognition status, it will integrate the following standards into its plan of action:

- Sponsor a local Firewise organization (board, task force, committee, etc.) that maintains the Firewise Community program and status.
- Develop and publish a Firewise/USA Community Assessment and Action Plan that includes actionable and achievable local solutions.
- Invest a minimum of \$25.43 annually per dwelling in its Firewise/USA program. (Work done by municipal employees or volunteers, using municipal or other equipment, can be included, as can state/federal grants dedicated to that purpose.)
- Observe a Firewise Day each year that is dedicated to a local Firewise education or project.
- Submit an annual report to Firewise/USA. This report documents continuing participation in the program.

Wildfire Education: The first step toward action is an awareness within CORA that the community is at risk, and more importantly, that the community can reduce the risk with individual and cooperative action. The Firewise Committee will partner with the CSFS, and the Fire Protection District to increase homeowner and community awareness of how wildfire risk reduction relates to effective forest stewardship. The focus of the effort will include all aspects of forest stewardship including insect and disease, watershed preservation and forest health. The information included in this assessment has of necessity been brief and general in nature. For further information, the websites in Chapter Eight will be useful.

Developing a Successful Firewise Program: Social science studies of how communities adopt any new idea show that residents can be divided into three categories:

- Early adopters who are on board with new ideas from the start. CORA's Firewise committee, of course, fits into this group. These people compose roughly 20% of any community.
- Fence sitters who are open to the new idea, but are not yet convinced. These are approximately 60% of a community.
- The unalterably opposed. These are the remaining 20%. Short of coercion, they will not participate.

The most successful Firewise programs first target the fence sitters, those who can be persuaded. As the program builds, and becomes a larger part of the community's life, some of the unalterably opposed will join. Neighboring Firewise Sites are good resources for newly participating communities. Ranch of the Rockies, Wildwood Recreational Village, Stagestop, Indian Mountain and Lost Park are Firewise Sites in South Park.

Red Rock Ranch, a Firewise Site south of Palmer Lake, is a participant in a Firewise/USA pilot project called *Sites of Excellence*. Several communities in other states are also participants in the project which is designed to invest resources in the communities and study what activities lead to effective participation. The project can be followed on the Firewise/USA website.

Dave Betzler, the Red Rock Ranch, Firewise Resident Leader offered some interesting thoughts about why homeowners are often seem reluctant to do fuel reduction. In a recent project update on the Firewise/USA website, Betzler identified three challenges encountered by the Red Rock Ranch Firewise Committee:

- Burdened Homeowners: Creating even one acre of defensible space is a daunting challenge. Added to other responsibilities in a homeowner's daily life, the task can seem overwhelming. Often breaking the whole into smaller tasks helps. Small, high priority tasks like cleaning gutters or removing high hazard plants in a landscape are less intimidating. Like it or not, Fire Adapted communities are created over years, not in a single weekend.
- 2) Resource Limitations: Homeowner associations have a multitude of responsibilities and small budgets. Neighbors working together and community sponsored projects like chipping days or Firewise work days help reduce the burdens for homeowners.

Cost share programs often help reduce the expense by reimbursing landowners for part (usually 50%) of their fuel reduction expenses. These grant programs are highly competitive, and projects that demonstrate a landscape level effect have priority for funding. Regional organizations like The Coalition for the Upper South Platte have been successful in combining the cost share requests from HOAs into competitive, regional applications.

3) Volunteer Availability: Family responsibilities and emergencies, age and physical limitations often limit the availability of community volunteers. Often community service groups, church organizations will assist communities.