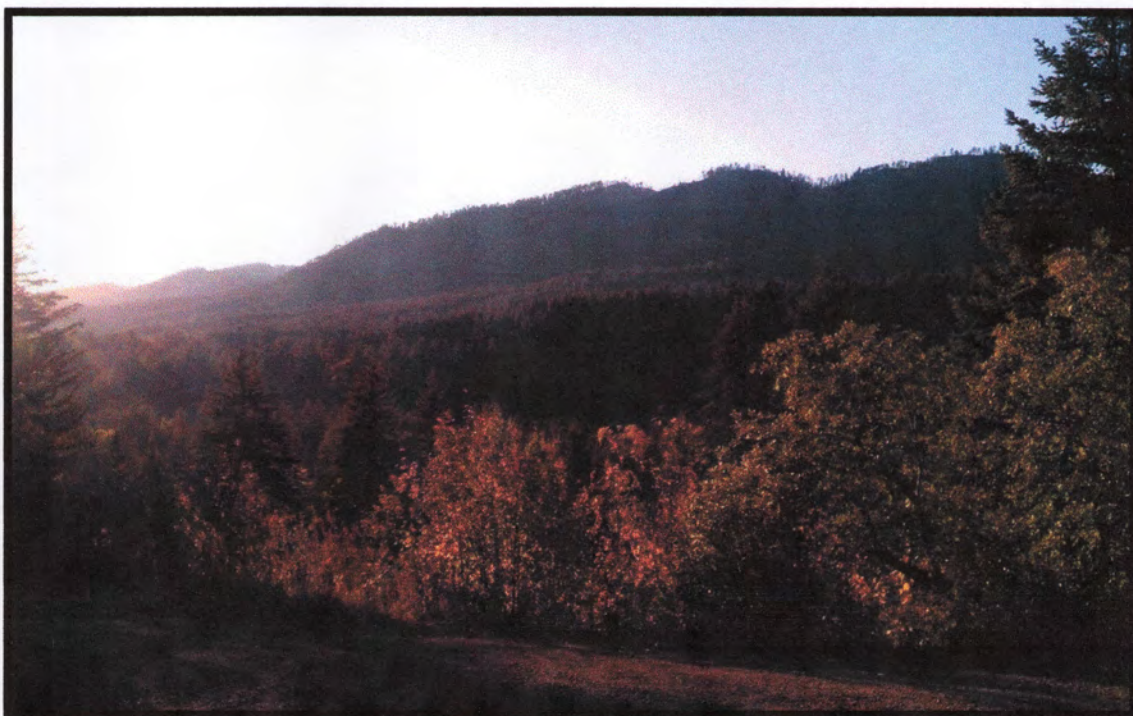


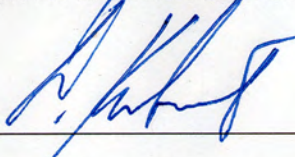
Forrest Groves Estates Subdivision Community Wildfire Protection Plan



April 2015



The Durango District of the **Colorado State Forest Service** has reviewed this Community Wildfire Protection Plan and approves its content and certifies that it meets or exceeds CSFS Community Wildfire Protection Plan minimum standards.



D. Kent Grant, District Forester

5/4/15

Date

Colorado State Forest Service, Durango District

The following entities have reviewed this Community Wildfire Protection Plan and agree with the content and recommendations.

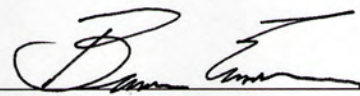


Jennifer Williams, Secretary

4/16/15

Date

Forrest Groves Estates Homeowners Association

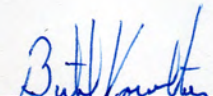


Bruce Eyans, Chief

5/18/2015

Date

Upper Pine River Fire Protection District

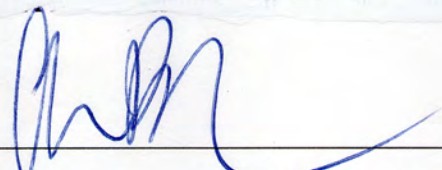


Butch Knowlton, Director

May 26 2015

Date

La Plata County Office of Emergency Management



Chris Barth, Fire Mitigation & Education Specialist

5/27/2015

Date

USDI Bureau of Land Management, Montrose District

Prepared For:

Forrest Groves Estates Homeowners Association (FGEHA)
Durango, Colorado 81301

In Cooperation with:

- Upper Pine River Fire Protection District
- FireWise Southwest Colorado

Prepared By:

Forrest Groves Land Stewardship Team:

- JoAnne Hibbard
- Jen Williams

Maps Prepared By:

- Scott Wagner, USFS, San Juan National Forest
- Lindsay Gartner, Colorado State Forest Service

Collaborative Support:

- Kent Grant, Colorado State Forest Service
- Pam Wilson, FireWise of Southwest Colorado
- Travis Wright, Upper Pine River Fire Protection District

Neighborhood Support:

- Mary Dunlap – Forrest Groves Estates Homeowners Association (FGEHA) President
- Joe Stegner – FGEHA First Vice President
- Sue Plvan – FGEHA Second Vice President
- Stan Dunlap – FGEHA Treasurer
- Jennifer Williams – FGEHA Secretary

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Introduction

The devastating fire season of 2002 forced many La Plata County residents to recognize the potential danger of catastrophic wildfire. Like many of the subdivisions during that time, Forrest Groves Estates (FGE) was on alert status for evacuation during the Missionary Ridge Fire. Although Forest Groves Estates was not directly impacted by the fire, it became evident that without a planned and vigorous effort to reduce the wildfire risk and contain the spread of wildfires should they occur, FGE is definitely vulnerable to this ever-present threat.

Then again in 2012, after yet another active and devastating wildfire season, concern mounted among FGE residents, which led to the formation of the Land Stewardship Team (LST), comprised of three FGE homeowners. The LST began working in conjunction with the Forrest Groves Estates Homeowners Association (FGEHA) officials, land management agencies, Fire Wise, and the Colorado State Forest Service (CSFS) to craft the FGE CWPP.

The FGE CWPP's main goal is to provide guidance to FGE residents and community agencies in order to reduce the risk to life and property due to wildfire.

The objectives include but are not limited to:

- Becoming a recognized Fire Wise Community/USA site
- Promoting on-going cleanup of slash piles and other combustibles
- Establishing/enhancing fire breaks
- Improving defensible space
- Identifying high-risk areas and recommend mitigation strategies
- Providing incentives for fuels reduction
- Increasing public awareness of fire-related risks, remedies, and advantages
- Developing and communicating a community evacuation plan
- Actively seeking grant funding for on-going fire mitigation and education
- Constructing subdivision protection capabilities such as: building an appropriately-sized turn-around to accommodate emergency vehicles, and retrofitting existing water storage tank for use in fire suppression

Community Identification and Description

Forrest Groves Estates Community

FGE is a residential subdivision in La Plata County approximately 10 miles east of Durango, Colorado, on the south side of County Road (CR) 240, also known as Florida Road. It is located in the Florida River Valley with the Florida River running through the subdivision. It abuts the Vosberg Pike which creates steep and heavily wooded terrain for much of the subdivision.

This CWPP covers FGE and its defined Wildland-Urban Interface (WUI). FGE has a total of 127 residents at present on 56 lots with 22 full-time owner-residents, 12 full-time rentals, 13 part-time owner-residents, 2 vacation rentals, 3 vacant homes that are currently for sale, and 4 undeveloped lots. Lots average from .5 to 3 acres in size. FGE was initiated in 1979, but cannot expand at this time due to limited lot availability and necessary infrastructure such as water taps.

The subdivision has one entrance off CR 240, High Trails Drive, which runs through the subdivision to the very top lots. There are two other roads: Forrest Groves Lane and Verde Lane. All three are dead-end roads.

Fire History and Characteristics

Numerous large fires have occurred in the vicinity of Forrest Groves Estates subdivision. Most notable is the Missionary Ridge Fire which started on June 9, 2002 north of Durango on the east side of the Animas Valley. The year 2002 was the driest on record for southwest Colorado. The fire quickly spread up Missionary Ridge and a Type 2 Incident Management Team took over the fire on June 11 but was replaced by a Type 1 Team a day or two later as the fire grew in intensity and size. On June 12, a northwest wind pushed the fire to the southeast and threatened subdivisions on the north side of Florida Road, directly adjacent to Forrest Groves Estates. All subdivisions on the north side of Florida Road were evacuated. The fire did not cross Florida Road, but subdivisions on the south side were put on pre-evacuation notice. The Missionary Ridge Fire continued to burn for the next six weeks and eventually covered over 70,000 acres and burned 57 structures.

From 1991 through 2012 there were a total of 447 recorded fires on San Juan National Forest and BLM lands in La Plata County, an average of 20 per year. During the same time period there were 154 public land fires within a 10-mile radius of Forrest Groves Estates subdivision. This data only includes fires on or near National Forest or BLM lands. It does not include fires on private land or Southern Ute Tribal Land to the south and west of the subdivision. It can safely be assumed that equally

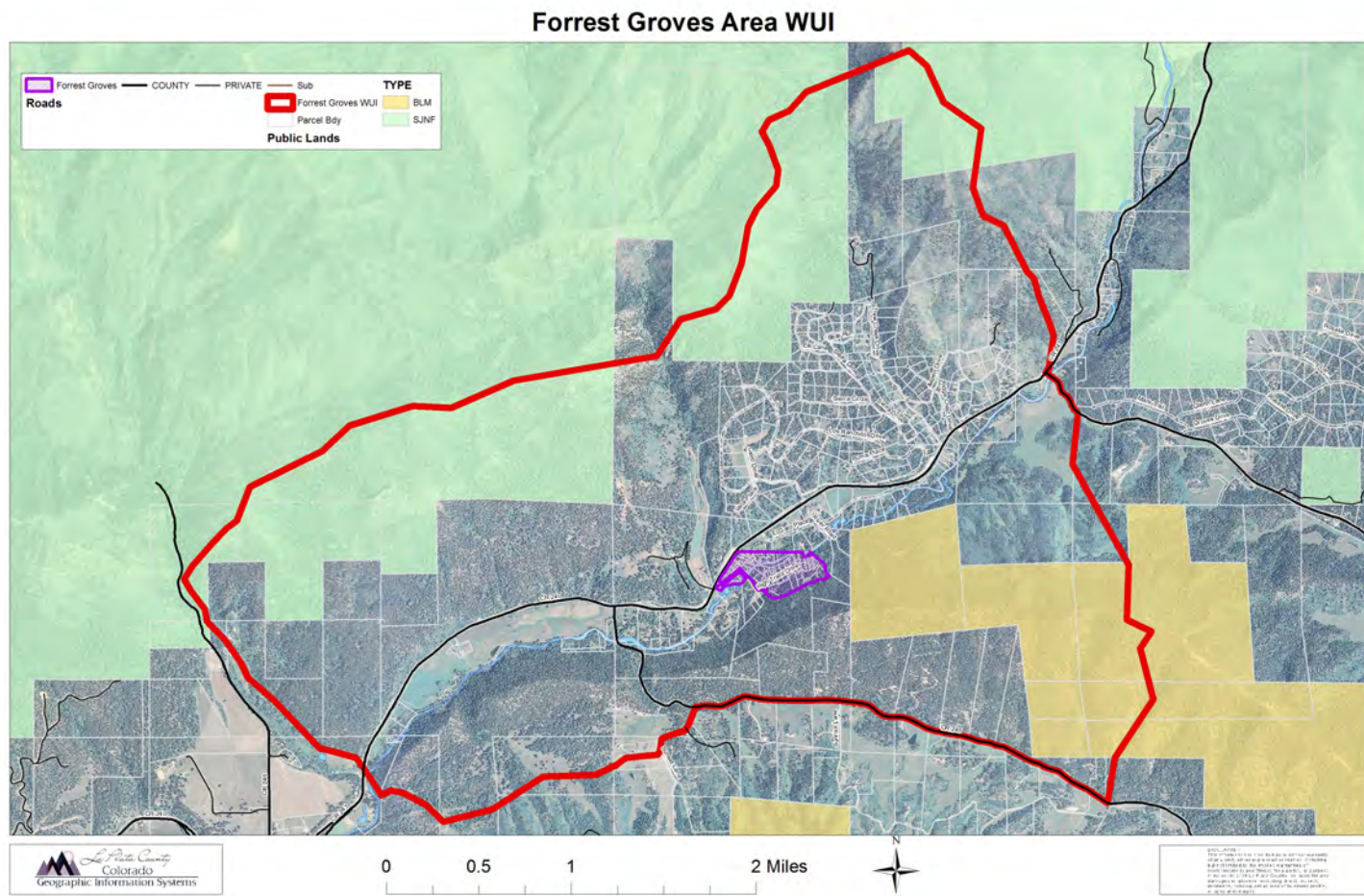
as many fires occurred on private and Southern Ute lands as occurred on public lands during this same time period as there is about an equal amount of private land as public land. During the summer of 2012 there was a 4-5 acre wildfire on the Vosburg Pike just south of Forrest Groves. Table 1 contains a list of the largest fires in La Plata County since 1991.

Table 1: Major Fires in La Plata County since 1990.

Year	Fire	Total Acres
1994	Black Ridge	14,064
1994	Cox Canyon	404
1994	Mitchell Lakes	401
1999	Valencia	76
2002	Missionary Ridge	70,121
2002	Valley Fire	392
2003	Bear Creek Wildland Fire Use*	1,869
2006	Black Ridge	489
2012	Vallecito Fire	1,372
2012	Air Park	519
2012	State Line	337

*Wildland Fire Use (term no longer used) are fires that were managed for resource benefit.

CWPP Area



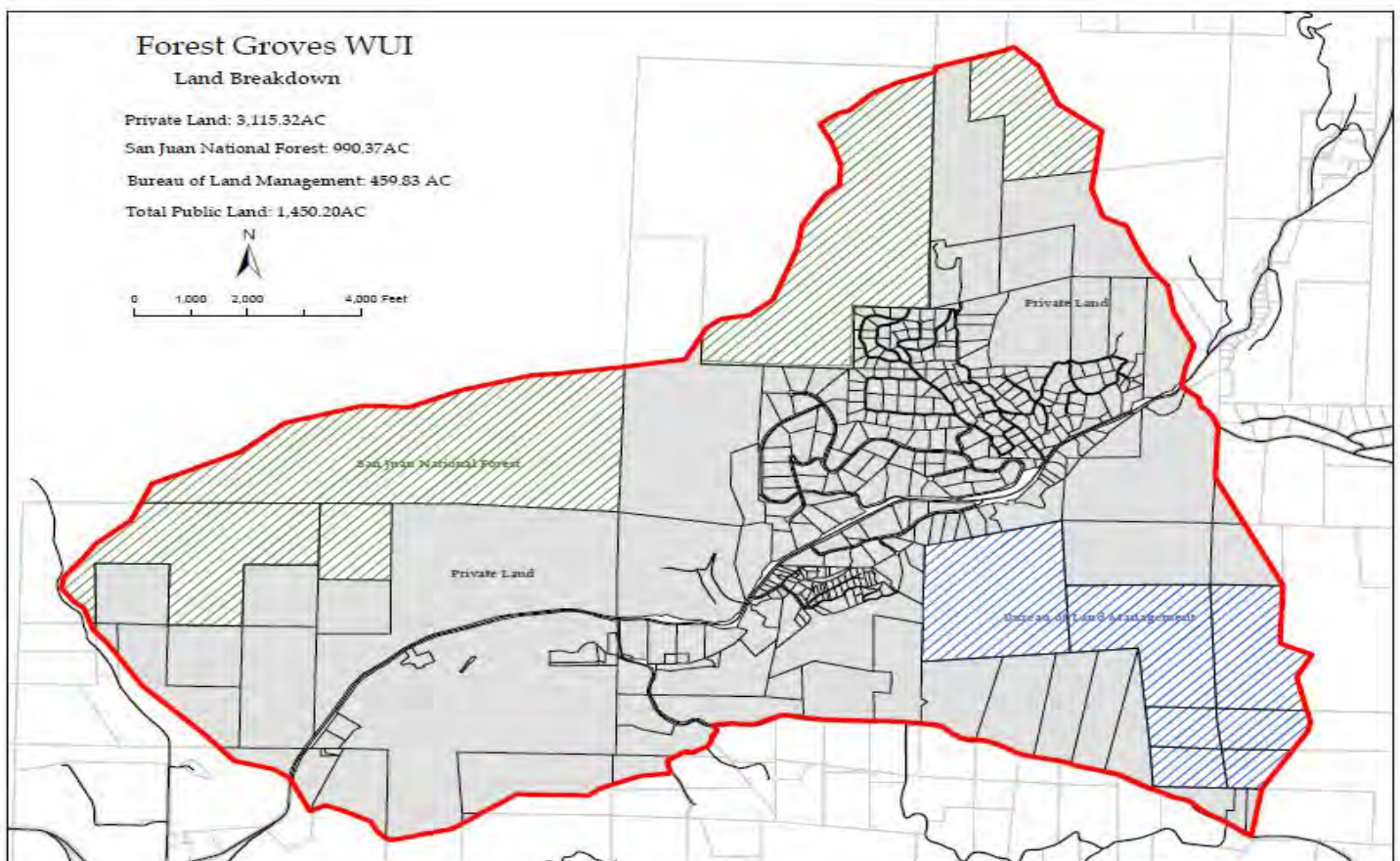
Boundaries

The CWPP covering the WUI area was developed collaboratively with the Forrest Groves Estates Homeowners Association, the FGE Land Stewardship Team, the Colorado State Forest Service, La Plata County Office of Emergency Management, Upper Pine River Fire Protection District, FireWise of Southwest Colorado, the San Juan National Forest and the Bureau of Land Management.

The WUI boundary was determined by looking at how quickly a wildfire could reach the subdivision during a single burning period during high fire danger conditions if pushed by 20 mph winds

The FGE WUI boundary begins on CR 240/Florida Road at the confluence of Red Creek and the Florida River. It follows Red Creek to the 9000' elevation of Missionary Ridge and follows said ridge north/northeast to encompass US Forest Service land east of Trew Creek. It then heads south crossing CR240/Florida Road at Helen's Corner and continues southward over Vosburg-Pike to CR245/Sweetwater Springs Road where it then turns west. It follows CR 245 before turning southwest to encompass the private land off of CR 247 before turning north to its point of origin.

The total acreage of the WUI area is 6,015.72 acres (see map below), broken into the following characteristics:



Private Land Characteristics

The 3,115.32 acres of private land within the WUI boundary includes the Forrest Groves subdivision with 56 residences. Other subdivisions in the WUI include Aspen Trails with 95 residences and Los Ranchitos with 44 residences. There are numerous other subdivisions and isolated residents located outside the WUI boundary. Parcel sizes range from approximately 0.1 acre to over 250 acres. Many of the private parcels have residences or other structures on them. Land uses are generally residential, agricultural (pasture and hay production) and non-industrial small business.

Public Land Characteristics

Public lands in the WUI consist of 1,450.20 acres within the San Juan National Forest to the north and west of the subdivision and 459.83 acres managed by the Bureau of Land Management located to the south across the Florida River. This area falls within a critical watershed for the city of Durango. The water intake for Durango and Edgemont's water supply is located just downstream of Forrest Groves. Vegetative cover and fuel models are similar to the private lands. Cover includes grass and forbs, ponderosa pine and Douglas-fir, Gambel oak, mountain mahogany and other montane shrubs and scattered piñon pine and Rocky Mountain juniper on exposed south and west slopes.

Fire Protection Area

Structural and wildland fire protection is provided by the Upper Pine River Fire Protection District; other wildland fire resources are available through Durango Interagency Dispatch Center. These resources include engines and crews from the US Forest Service, Bureau of Land Management, Mesa Verde National Park, Colorado Division of Fire Prevention and Control, Bureau of Indian Affairs and the Southern Ute and Ute Mountain Ute Tribes. An air tanker base is located at Durango - La Plata Regional Airport and additional aerial wildfire support can be provided by the Mesa Verde National Park initial attack helicopter at Hesperus, the Ute Mountain Ute initial attack helicopter at Towaoc and the DFPC-contracted single engine air tanker (SEAT) when available, though it is not always stationed in Cortez. The counties, federal land management agencies, Colorado Division of Fire Prevention and Control and fire protection districts in southwest Colorado operate under a County Annual Operating Plan (AOP) for wildfire protection.

Fire Policies and Programs

Federal, State, and Local Fire Policies

Federal

The Forrest Groves Estates CWPP has been developed in response to the Healthy Forests Restoration Act of 2003 (HFRA). This legislation established unprecedented incentives for communities to develop comprehensive wildfire protection plans in a collaborative, inclusive process. Furthermore, this legislation directs the Departments of Interior and Agriculture to address local community priorities in fuel reduction treatments, on both federal and non-federal lands.

The HFRA emphasizes the need for federal agencies to collaborate with communities in developing hazardous fuel reduction projects and places priority on treatment areas identified by communities themselves through development of a Community Wildfire Protection Plan (CWPP). Priority areas include the wildland-urban interface (WUI), municipal watersheds, areas impacted by wind-throw or insect or disease epidemics, and critical wildlife habitat that would be negatively impacted by a catastrophic wildfire. In compliance with Title 1 of the HFRA, the CWPP requires agreement among local government, local fire departments, and the state agency responsible for forest management i.e., the Colorado State Forest Service. The CWPP must also be developed in consultation with interested parties and the applicable federal agencies with managing public lands surrounding the at-risk communities.

State

The State of Colorado is concerned about the size and intensity of wildfires occurring across the state in recent years. In 2013, the State Legislature extended a program that allows landowners to deduct a portion of the actual costs of their wildfire mitigation from their state income tax through 2024. The program allows each landowner to get credit for 50% of the cost of wildfire mitigation up to a total of \$2,500. To get the full credit the total mitigation costs must be \$5,000 or greater.

La Plata County Annual Operating Plan

La Plata County, Colorado Division of Fire Prevention and Control (DFPC), and Federal land management agencies, both approve and operate under the guidelines set forth in an Annual Fire Operating Plan (AOP) for wildfire. This plan is acknowledged by the Upper Pine River Fire Protection District(s), the FPD with jurisdiction for Forrest Groves subdivision. The AOP addresses how the participating parties will work together in regard to wildfire prevention, preparedness, response,

and payment. Included in the plan are provisions for mutual aid between agencies, significantly enhancing initial and extended attack capabilities through the rapid convening of fire protection resources for managing a wildfire.

The La Plata County AOP is tiered to the "Agreement for Cooperative Wildfire Protection in La Plata County" between La Plata County and the Colorado State Forest Service (CSFS). This in turn is tiered to the 201 "Colorado Statewide Cooperative Wildland Fire Management and Stafford Act Response Agreement" between the Federal resource management agencies and CSFS. On July 1, 2012, state responsibility for wildfire management and control was transferred from CSFS to the Division of Fire Prevention and Control in the Colorado Department of Public Safety. As a result, DFPC has replaced CSFS in the above-mentioned agreements.

La Plata County is a voluntary member of the Colorado Emergency Fire Fund (EFF), which helps the County manage and pay for wildfires that exceed its ability to control. The fund is comprised of annual fees assessed to each member county. The County must request EFF designation for an incident that meets EFF criteria, and then the Director of DFPC, or his designee, must approve it.

USFS and BLM Land Resource Management Plan/Fire Management Plan

The San Juan National Forest and BLM Tres Rios Field Office Resource Management Plans and associated Fire Management Plans describe the role of fire in the native ecosystems in southwest Colorado. These plans outline the strategies that the USFS and BLM will utilize to manage wildland fire and fuels on these federal lands in southwest Colorado. The San Juan National Forest and Tres Rios Field Office Fire Management Plan (2007) specifically describes objectives and strategies to manage fire and fuels on federal lands near communities within the wildland-urban interface.

Nearby CWPPs

One subdivision within the Forrest Groves WUI, Los Ranchitos, completed a CWPP in 2012. Another subdivision, Rancho Mira Sol, which sits to the south of the Vosburg-Pike and south of Forrest Groves, completed a CWPP in Jan. 2013. The Mira Sol residents are also very concerned about a wildfire in the Vosburg-Pike area. Sweetwater Springs, located just to the west of Forrest Groves has expressed interest in a CWPP but has not yet begun work on one.

La Plata County CWPP

The Forrest Groves Estates CWPP tiers to the La Plata County CWPP approved in July 2006. This plan is consistent with the goals and strategies described within the La Plata County CWPP and provides further strategic and tactical direction specific to wildfire protection and mitigation for the Forrest Groves community.

Planning Process

Land Stewardship Team (LST)

The HOA maintains a Land Stewardship Team. This team was formed by one resident who became a FireWise Ambassador in June 2012. At the FGEHA July 2012 annual meeting, the Ambassador presented a short report of fire danger and what it meant to be a FireWise Ambassador. Two more residents then joined the team as Ambassadors, and in August 2012 the Land Stewardship Team (LST) was created to begin the process of crafting the FGECWPP. The LST then met monthly to identify issues within the neighborhood, prioritize projects and collaborate with agencies to write the CWPP.

In October 2012, the LST asked Kent Grant and Pam Wilson to do a walk-through of the neighborhood to identify and prioritize fire reduction projects as well as to identify the vegetation types, which they did. By January 2013, the WUI was identified and mapped for Forrest Groves in collaboration with the LST, and agency partners. By May 2013, the vegetation types, topography and fire risks for the subdivision were identified in collaboration with agency partners. By July 2013, a draft CWPP was completed and sent for approval. In April 2015, the FGECWPP was completed and approved.

Wildfire Risk Assessment





There is high potential risk to FGE from a wildland fire. Below are the factors contributing to the overall rating:

Fuels and Fire Hazard

Topography: Forrest Groves Estates is located on the valley bottom and toe slopes of the Florida River drainage and on the lower third of the north-facing slope adjacent to the valley floor. The average slope of the valley floor is 5 to 10 percent. The lower portion of the hillside (toe slope) has an average slope of about 25 percent. The upper portion on the southeast edge of the subdivision has slopes of about 45 percent. Wildfire hazard is generally greater on steeper slopes.

Vegetation Type: There are four primary vegetation types within the Forrest Groves Estates: (1) mountain grassland; (2) riparian forest, cool-moist mixed conifer and warm-dry mixed conifer (refer to Table 1 and Figure 1).

Table 2: Major Vegetation Types of Forrest Groves Estates subdivision

Vegetation Type	Major Plant Species	Acres
Mountain Grassland	Brome, bluegrass, shrubby cinquefoil 	3
Riparian forest	Narrowleaf cottonwood and blue spruce 	14
Cool-moist mixed conifer	Douglas-fir, white fir and blue spruce 	9
Warm-dry mixed conifer	Ponderosa pine, Douglas-fir and white fir 	5

In addition to the vegetation types listed above, scrub oak has been added for the purpose of the Structural Vulnerability Assessment, specifically as it relates to creating fuel breaks by clumping.



The mountain grassland vegetation type is found on the toe slope on the north side of the Florida River. The primary vegetation is grass with clumps of shrubs and a few scattered trees. Grass species may include Kentucky bluegrass, nodding brome, mountain muhly and some cultivated species including timothy and smooth brome. Shrub species may include shrubby cinquefoil, Gambel oak and serviceberry. Tree species include ponderosa pine and blue spruce.

Riparian forest vegetation occurs along the Florida River on relatively flat ground. The dominant tree species are narrow-leaf cottonwood and blue spruce with minor amounts of Douglas-fir, white fir and Rocky Mountain juniper in the understory and scattered ponderosa pine. Numerous shrub species are also present in the riparian forest including willow, redbud dogwood, snowberry, current, gooseberry and Rocky Mountain maple. The riparian forest is somewhat patchy with dense clumps interspersed by small openings of grass or shrubs. There are numerous ladder fuels comprised of small trees and shrubs in the dense clumps. Included within this vegetation type are wetlands. Generally the wetlands are on lower sections dominated by sedge, willow and cottonwood and the soil will be saturated for at least part of the growing season.

FORREST GROVE ESTATES Vegetation Types and Topography

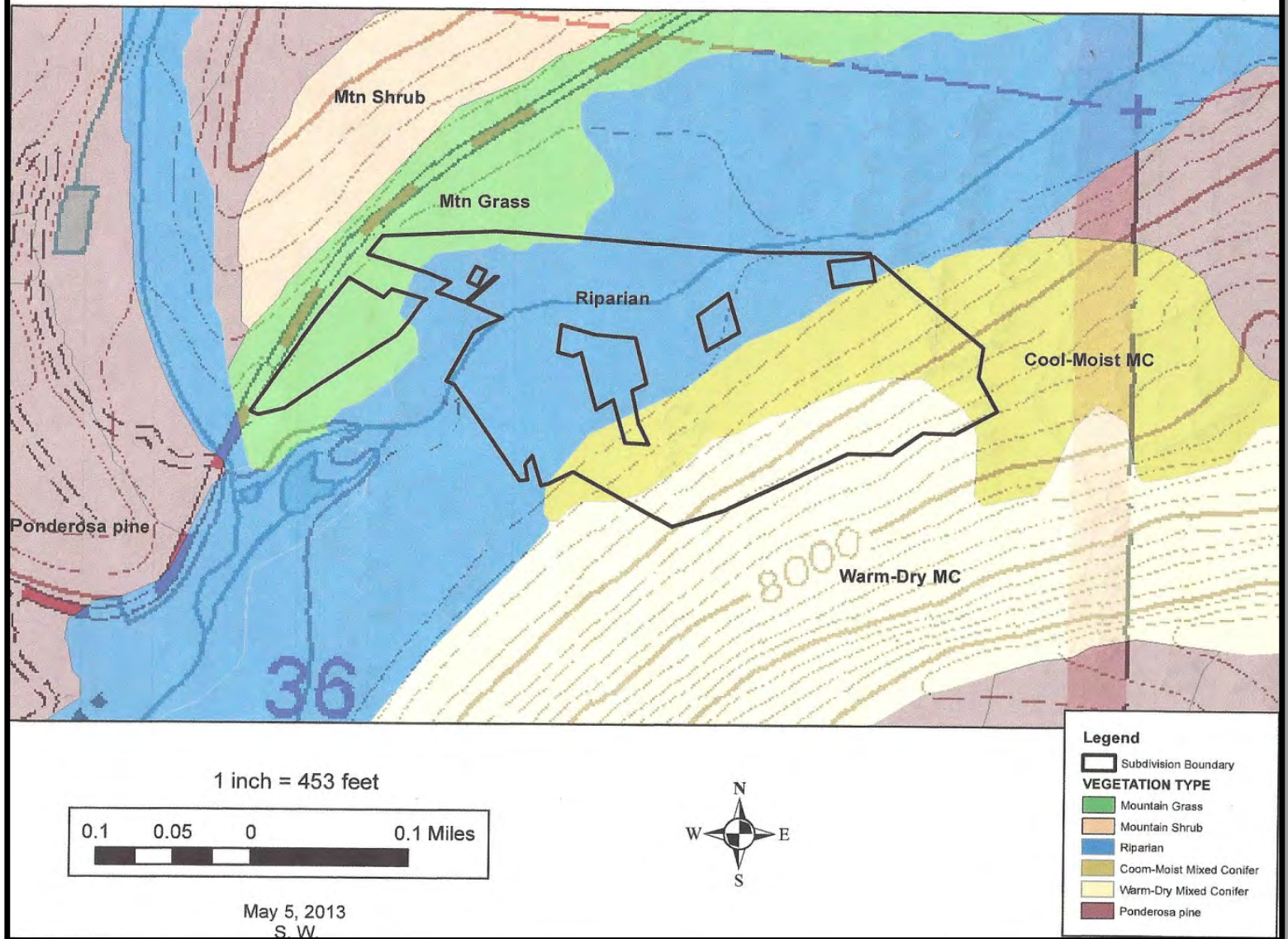


Figure 1: Primary Vegetation Types and Topography in Forrest Groves Estates

The lower portion of the slope adjacent to the riparian forest contains cool-moist mixed conifer forest dominated by Douglas-fir, blue spruce and scattered white fir trees. The forest is moderately dense with dense clumps of trees interspersed by natural and man-made openings. Understory vegetation consists of various shrubs including snowberry, Rocky Mountain maple, serviceberry and chokecherry. In the dense patches of trees, the understory is sparse as a result of shading from overstory vegetation. Fuel loading is moderate to high and ladder fuels are common.

The upper portion of the slope adjacent to the south boundary of the subdivision contains a warm-dry mixed conifer forest dominated by Douglas-fir with ponderosa pine and white fir tree species. Generally, the forest is dense with multiple layers

and ladder fuels present except for two moderate sized openings dominated by grass and shrubs. Understory shrub vegetation includes Gambel oak, snowberry, serviceberry, and chokecherry. Aspen is present in small patches throughout all three vegetation types.

The cool-moist and warm-dry mixed conifer forests are best thought of as a continuum that follow a moisture gradient based on location on slope and aspect. There is no distinct line separating the two types and ponderosa pine may be found in both but will be more common, if not dominant, in the warm-dry type and only found in isolated patches within the cool-moist type. Generally, the best indicator species of the warm-dry type is presence of Gambel oak.

The historic fire regime for the mountain grassland vegetation type is Fire Regime Group I: 0 – 35 year frequency, low and mixed severity (refer to Table 1, for a summary of the Fire Regime Groups). The fire return interval is an average timeframe that fires will occur at the same location. The majority of fires in mountain grassland burned through the grass and shrubs without burning tree crowns. Occasionally, fire will torch individual or clumps of trees. Native grasses and most shrubs sprout from roots following fire. Some species of shrubs and trees that are less well adapted to frequent fires such as juniper, blue spruce and buckbrush are more common in grasslands as a result of fire suppression. The species of grasses have been significantly altered since Euro-settlement as a result of the introduction of cultivated grasses and weeds. This vegetation type is considered moderately altered from historic conditions as a result of introduction of non-native species and several missed fire events. Presence of juniper and other ladder fuels and low crown base heights of ponderosa pine significantly increase the risk of torching and small patches of crown fire.

Table 3: Summary of Fire Regime Groups

Group	Fire frequency	Fire severity
I	0 – 35 years	Low to mixed understory burn.
II	0 – 35 years	Replacement of above ground features of most of the vegetation.
III	35 – 200 years	Low severity and mixed severity which includes understory burning intermixed with patches of replacement of above ground vegetation.
IV	35 – 200 Year	Replacement of above ground features of most of the vegetation.
V	200 + Years	Replacement of above ground features of most of the vegetation.

The historic fire regime of the riparian and cool-moist mixed conifer forests is characterized by Fire Regime Group III: 35 to 200 year fire return interval with mixed severity. There is a wide range (35 to 200 years) for this Fire Regime because there is a lot of variation in topography, elevation, aspect, slope and adjacent vegetation types that all affect how frequently a site burns. Fire risk is driven by climate while topography and fuel characteristics determine fire severity. Fires are mixed severity with low-intensity, surface fires and isolated torching at one end of the spectrum and high-intensity, stand replacement fire at the other end. Factors that affect the severity of fires include density of the overstory, ladder fuels, aspect, slope and adjacent vegetation. A dense overstory of short-needled conifer trees will shade the understory and surface fuels. Only shade-tolerant plants will be present and in some areas the surface is predominately needle litter. Short-needle litter is less flammable and more compact than long-needle litter which significantly reduces fire spread and intensity. The fuels will have higher fuel moistures during typical fire seasons and the dense shade will create a cooler environment also having the effect of reducing fire behavior. On the other hand, Douglas-fir, blue spruce and white fir tree species tend to have very low crown base heights and understory trees and shrubs create a ladder fuel connection to the overstory thus it does not take very much energy for surface fires to transition to crown fires.

The natural Fire Regime of the warm-dry mixed conifer forest type is Fire Regime Group I (0 to 35 year), low to mixed severity. This Fire Regime Group is typical of ponderosa pine forests in southwest Colorado. The fire return frequency of warm-dry mixed conifer forests cover a range from about 10 years on the lower elevation, drier sites to 35 years on the higher elevations, northerly aspects and wetter sites where the warm-dry MC transitions into the cool-moist MC. Historically, fires burned on the ground surface with occasional individual and group tree torching. During extreme conditions, crown fires may occur in small areas up to about 20 acres in size.

The riparian forests and cool-moist mixed conifer forests are only slightly departed from their historic condition as a result of fire suppression and other activities. However, large areas of high-intensity crown fire could occur during extremely dry summers. The warm-dry mixed conifer forests in Fire Regime Group I are significantly departed from historic conditions. It is likely that three or more fire events have been missed as a result of fire suppression. The result being that surface fuels are unusually high and ladder fuels are very common. The risk of fire outside of the historic fire regime is high, especially during extremely dry years.

Dr. Hal Anderson developed a set of 13 fuel models for wildland fire behavior. These were updated and more fuel models were added by Joe H. Scott and Robert E. Burgen in 2005. Fuel models are a simplified version of wildland fuels represented with mathematical equations. These fuel models aid firefighters in predicting the type of fire behavior that can be expected under various fuel moisture and weather conditions. The following Table 4 lists the Anderson and equivalent Scott & Burgen Fuel Models for Forrest Groves Estates subdivision.

Table 4: Scott & Burgen Fuel Models by Vegetation Type

Vegetation Type	Anderson Fuel Model	Scott and Burgen Fuel Model
Mountain Grassland	1	GS -2 Low Load, Dry Climate Grass-Shrub
Riparian and Cool-moist Mixed Conifer Forest	8	TL4 – Short-Needle Litter with Small Downed Logs
Warm-dry mixed conifer forest	10	TU5 - Very High Load, Dry Climate Timber-Shrub

GS-2-Low Load, Dry Climate Grass: The primary carrier of fire is grass and shrubs combined. Shrubs are 1 to 3 feet high. Spread rate is high with moderate flame lengths.

TL4-Short-Needle Conifer with Small Downed Logs: The primary carrier of fire is a moderate load of fine litter and small diameter downed logs. Surface fire spread rate is low and flame lengths are low. Transition to crown fire can occur at relatively low flame lengths due to low crown base heights. Crown fire spread can be rapid and intense.

TU5-Very High Load, Dry Climate Timber-Shrub: The primary carrier of fire is heavy forest litter with a shrub or small tree understory. Spread rate is moderate with moderate flame length.

Table 5: Comparable Rates of Spread and Flame Lengths for Each Fuel Model (Surface fire Spread) under dry fuel conditions with a 10 mph mid-flame level wind.

Fuel Model	Rate of Spread (ft./min.)	Flame Length (ft.)
GS2	11	3.5
TL4	2	1.3
TU5	7	6.5

The grass fuel models display the highest rates of spread but generally are easy to contain because the small fuels can easily be extinguished with water. The timber fuel models have slower rates of spread but can be much more difficult to contain because of the higher fuel loads with larger diameter fuels. Fires in the TU5 fuel type can be very difficult to contain and control.

Structural Vulnerability and Defensible Space

According to the CFSF Defensible Space Quick Guide (**Appendix A-7**) the two main sources for structural vulnerability are defensible space and the home ignition zone (HIZ).

Defensible Space

- There are no guarantees, but creating defensible space can significantly improve the chances of your home (and possibly yourself) surviving a wildfire, but even the best examples of defensible space are going to be strongly tested during a “perfect storm” event.
- Defensible space can allow firefighters to effectively and safely make a stand to protect your home. Not having defensible space could mean that firefighters will pass by your driveway to look for another spot where their efforts will have a higher likelihood of success.
- Defensible space could allow your home to survive a wildfire if firefighters are not on scene to protect it.
- In an extreme situation where a fire has blocked access routes and evacuation is not an option, defensible space will make it safer to shelter in place should this be necessary.

Home Ignition Zone

Includes the home itself and everything around it up to 100 – 200 feet.

In areas across the country where the risk of wildfire is high, the home ignition zone extends up to 200 feet beyond the actual home structure. Within this 200 foot area, there are three zones:

- **Zone 1** encircles the structure and all its attachments (wooden decks, fences, and boardwalks) for at least 30 feet on all sides. Note: the 30-foot number comes from the very minimum distance, on flat ground, that a wood wall can be separated from the radiant heat of large flames without igniting.
- **Zone 2** is 30 to 100 feet from the home, and plants in this zone should be low-growing, well irrigated and less flammable.
- **Zone 3** is 100 to 200 feet from the home and this area should be thinned, although less space is required than in Zone 2. **NOTE:** Because of other factors such as topography, the recommended distances to mitigate for radiant heat exposure actually extend between 100 to 200 feet from the home – on a site-specific basis.

In addition to these factors, choosing fire resistant building materials and landscaping can further increase success should a devastating fire occur. These materials can be found in the Fire Wise Construction: Site Design and Building Materials pamphlet **(Appendix A-7, 8)**

FGE Structural Vulnerability and Defensible Space Assessment

In April 2013, the LST conducted a neighborhood fire vulnerability assessment using a variety of self-created and published resources: a fire vulnerability spreadsheet using established assessment criteria **(Appendix A-1)**, a structural vulnerability rubric **(Appendix A-2)**, the FGE Lot Address Map **(Appendix A-3)** and the FGE Lot, Water and Sewer Tap Map **(Appendix A-4)**. This assessment looked at a number of factors including structural ignitability, access to structures, and fire mitigation treatments to determine the risk factors for each home in the subdivision. The results showed both strengths and weaknesses in the subdivision in regards to wildfire safety.

Out of 56 total lots in FGE, 53 of them contain structures. There are 56 structures total on those 53 lots.

Strengths:

Of those 56 structures:

- 87% were assessed as being a LOW risk for structural fire vulnerability.
- 7% were assessed as being a LOW/MODERATE risk for structural fire vulnerability.
- 3% were assessed as being MODERATE risk for structural fire vulnerability.
- 2% were assessed as being MODERATE/HIGH risk for structural fire vulnerability.
- 1% was assessed as being HIGH risk for structural fire vulnerability.
- 98% were assessed as being defensible structures.
- One large, centrally located lot was determined to be the perfect "command center" in case of wildfire.

Weaknesses:

- Of the 56 lots, only 19% had turn-arounds for fire trucks.
- There is only one entrance/exit to FGE with all roads ending in dead-ends.
- None of the dead-end roads have sufficient space for a large fire truck to turn around easily.
- There are no fire hydrants in the subdivision and only 3% of the homes are close enough to the Florida River to take advantage of that water source.

- The original 10,000-gallon water tank has fallen into a state of disrepair and would require extensive modification for water storage or use.
- The three vacant lots (located on the hillside) contain vast amounts of dead, fallen trees, overstocked trees, slash and other highly ignitable materials. There has been little to no fire mitigation of these lots by property owners.
- There is a large parcel of undeveloped land at the top of FGE that is not a part of the subdivision, which again, contains vast amounts of dead, fallen trees, overstocked trees, etc. This land potentially could have a huge impact on FGE if a fire started at the top (Vosberg-Pike) and moved downward as a crown fire.

The complete structural vulnerability data base was given to Upper Pine Fire Protection District and FGEHA. An informational letter and comment key was sent to each homeowner informing them of the results of the assessment (**Appendix A-5 and A-6**). Weaknesses have been analyzed and assessed as priority actions (see Management and Evaluation).

Protection Capabilities

Protection capabilities for FGE are currently limited as the subdivision access is mostly one-lane road with very few turnarounds. Additionally, there are no hydrants installed and water storage for consumption is not available for firefighting purposes. The subdivision has limited resources in heavy equipment and volunteers should a devastating fire occur. Fuel breaks in the upper elevations of the subdivision along steeply wooded slopes need to be established and/or maintained.

Values at Risk

FGE is a moderate-cost subdivision close to Durango so the location is prized by its residents. The Florida River runs through the subdivision with an island forming in the middle. This island is known as Treasure Island, and is the common shared space for FGE. Many of the residents living in FGE have foot bridge access to this densely wooded island, but all FGE residents have access to it for picnicking, exploring, fishing, and other activities. It is one of the subdivision's most distinctive and attractive features.

The wooded ambiance of FGE is valued by its residents, so loss of the trees from wildfire would have a significant impact to the community even if no structures were lost. House pets are common. There are also numerous bear and mountain lion habitats within and bordering the subdivision, so impacts to wildlife would be substantial if a large fire occurred. No threatened or endangered species are known to inhabit the subdivision itself, but rare plants may occur within the WUI area.

Southwest Colorado is noted for its good air quality. Wildfire would negatively affect the air quality of the area during a fire. Wildfire can adversely affect soil quality, reducing water permeability, increasing bulk density and removing organic matter. The soils in the subdivision are sedimentary with moderate erodibility and moderate fertility. Loss of tree cover due to a severe wildfire would increase susceptibility to erosion.

The subdivision is located in the Florida River watershed. Water originating from the watershed flows into Navajo Lake and the San Juan River and then into the Colorado River. Introduction of soot and sediment due to a wildfire within the watershed could compromise water quality in Navajo Lake and the Colorado River.

Ecosystem health for the WUI is fair. Density of the ponderosa pine component and suppression of small fires over the past 100 years has increased the downed woody fuels across the WUI area as well as needle and leaf litter depths. Fuels management has occurred on approximately one acre in the subdivision located primarily on common shared space. Homeowners have begun to do some mitigation on private land.

Emergency Management

Protection Capabilities & Infrastructure Protection

The subdivision is served by the Upper Pine River Fire Protection District (UPRFPD). The District is staffed by both full-time staff and volunteer firefighters. UPRFPD operates a seasonal wildfire crew from March – October which has National Wildfire Coordinating Group (NWCG) wildland firefighting qualifications. UPRFPD maintains staffing at the main fire station located on the east side of the town of Bayfield at Clover and Bayfield Parkway and Fire Station 2 at the Vallecito Dam. Fire Station 3 is located by the southeast corner of FGE subdivision and has a reliable volunteer group and a resident firefighter. Fire Station 3 has a wildland Type 6 fire engine, a Type 2 fire engine and a Type 1 water tender. U.S. Forest Service and Bureau of Land Management fire crews are available under the mutual aid agreement as well as aerial wildfire support by the Mesa Verde National Park initial attack helicopter at Hesperus and the Ute Mountain Ute initial attack helicopter at Towaoc.

Wildland fires occurring on private lands are generally managed for full suppression. Wildfires on National Forest System lands, BLM-managed public lands, and Tribal

lands in La Plata County are managed with policies that may involve full suppression, point suppression, confinement or containment strategies.

Currently there are no fire protection resources available in the FGE subdivision outside of the Florida River. Evacuation of the subdivision in an emergency is confined to one access point on High Trails Drive at CR 240/Florida Road.

Evacuation actions are the responsibility of the La Plata County Sheriff's Office and the La Plata County Emergency Manager, but it is critical that FGE residents understand the key components/procedures necessary for responsible fire evacuation in order to minimize loss of life and property. With this in mind, the LST has created an evacuation kit for homeowners of information that includes a checklist of items to take, as well as proactive steps to secure a home before leaving. In addition, notification of emergency or evacuation is facilitated within FGEHA by email through the subdivision website or by contacting owners via phone. An online database of resident contact information is located on the FGE website:

<http://forrestgrovesstates.hoa-express.com/>

Implementation Plan

Three key components for successful implementation of the FGECWPP are **education, mitigation/implementation, and monitoring/evaluation.**

Each of these components is included in the action table below, which prioritizes projects based on need, cost, and homeowner participation.

The audience for mitigation efforts includes the residents of Forrest Groves, landowners immediately surrounding the subdivision that can benefit from mitigation activities on their properties and in the subdivision, government agencies planning complementary mitigation treatments and/or supplying grants/matching funds to perform mitigation, and emergency responders.

Preferred Method of Treatment for Fuels Reduction

FGHEA is currently responsible for determining land use within the subdivision. Private land use falls under the by-laws and covenants set up for FGHEA. Policies and Covenants forbid burning yard waste within the subdivision. Preferred method for removal of slash is through chipping and/or hauling off site.

Historically, Upper Pine Fire District has assisted FGE in burning slash piles removed from shared common spaces and private land within the subdivision, and FGEHA

would consider burning by UPFD as an alternate approved method for fuels reduction.

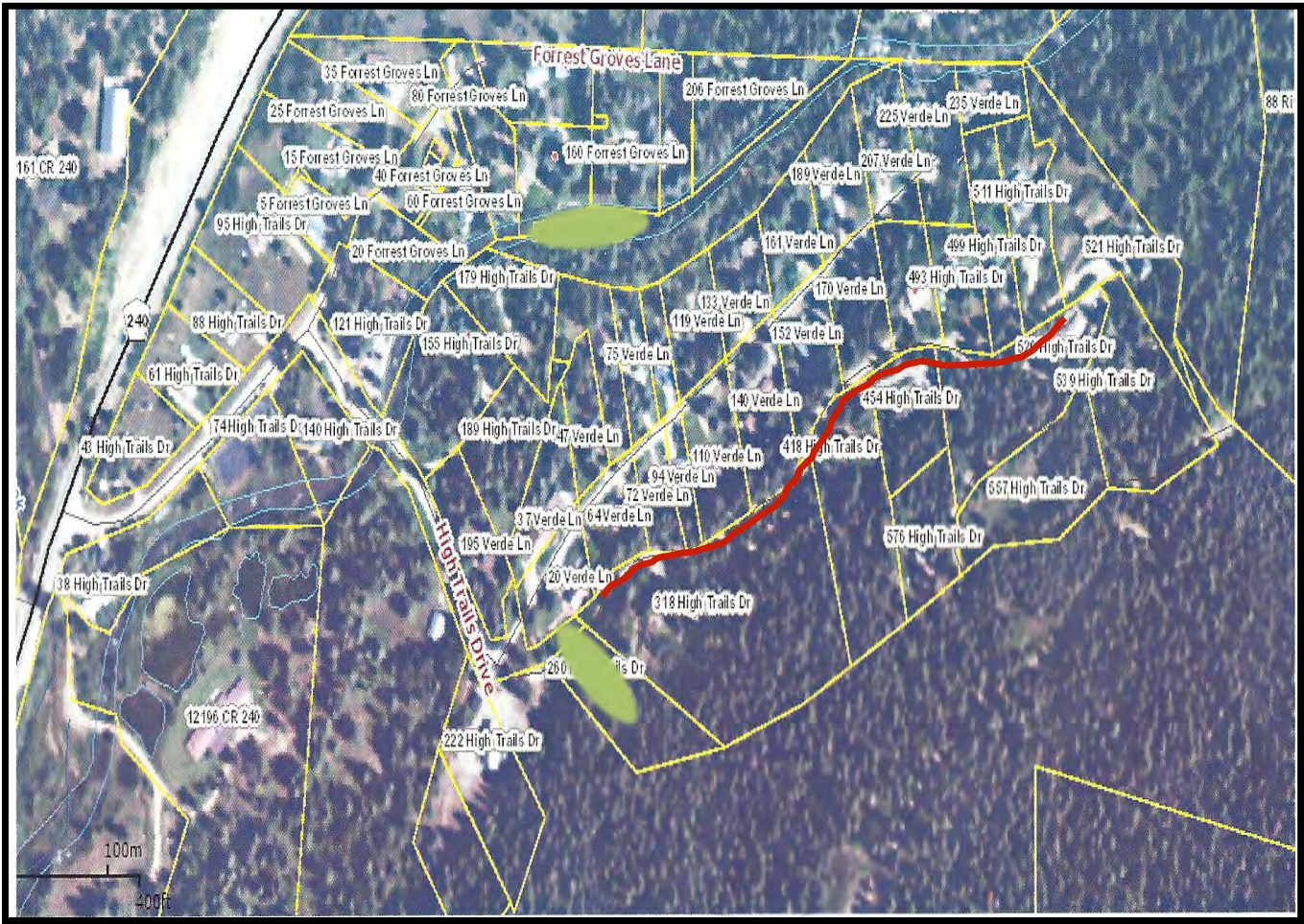
EDUCATION			
Action	Group	Estimated Cost/Resources Needed	Anticipated Completion Date(s)
1. Form a Land Stewardship Team (LST)	Volunteer homeowners and at least one resident Fire Wise Ambassador	• none	Completed October 2012
2. Create FGECWPP	LST and FGEHA	• none	Begun April 2013; June 2015
3. Develop Fire Wise page on FGE website	Jen Williams	• none	Completed November 2012
4. Contact homeowners with high fire risk lots to initiate mitigation processes	LST and FGEHA	• mailing	Completed May 2013; ongoing
5. Create and install a Fire Danger sign at FGE mail kiosk	LST	• \$100	Completed June 2013 (Appx. B-1)
6. Publish LST updates and Fire Wise information in quarterly FGHEA newsletters	LST and FGEHA Secretary	• \$50/quarter	Completed June 2013; ongoing
7. Create fire awareness packets to be given residents	LST and FGEHA	• \$8 per packet	Completed June 2013; (Appx. A-7 through A-12) ongoing
8. Educate homeowners about available tax credits for mitigation	LST and FGEHA at annual meetings	• none	Completed June 2013; ongoing
9. Invite local agencies to attend and speak at annual Homeowner meetings	e.g.: FGHEA, UPFD, DFRA, USFS, Fire Wise, BLM	• none	Completed June 2014; ongoing
10. Inform residents to register phone numbers with LaPlata County's emergency notification	LST	• none	Ongoing

MITIGATION/IMPLEMENTATION			
11. Conduct a structural vulnerability assessment of FGE	LST	<ul style="list-style-type: none"> • none 	Completed April 2013
12. Organize bi-annual subdivision mitigation workday	LST and FGEHA	<ul style="list-style-type: none"> • \$2000 annually (for chipper) 	Completed May 2013 (Appx. B-2)
13. Mitigate subdivision's public space (Treasure Island)	FGE residents and/or professional mitigation company (possible grant funding)	<ul style="list-style-type: none"> • Volunteers' time to mitigate and to assist with burning or chipping slash pile • Upper Pine Fire Department's time to supervise burn (if necessary) • Professional fire mitigation if grants are acquired- \$3000 	Completed May 2013 (Appx. B-2); ongoing
14. Construct shaded fuel break from 521 High Trails to top of High Trails Drive	FGE Residents or professional mitigation company	<ul style="list-style-type: none"> • Volunteers' time or professional fire mitigation - \$1500/acre Kickstarter Grant 	June 2015
15. Retrofit 15,000 gallon water tank to be used if needed for firefighting purposes	FGEHA with assistance from Upper Pine Fire District	<ul style="list-style-type: none"> • Approximately \$2000 	September 2015
16. Mitigate all private lots	Individual homeowners	<ul style="list-style-type: none"> • Lot owner's time or professional fire mitigation - \$1500/acre 	ongoing
17. Create fuel break and/or thin BLM land south and east of FGE.	BLM, LST, FGEHA	<ul style="list-style-type: none"> • BLM responsible for cost 	2015-2020
18. Create turnarounds for emergency vehicles	LST, FGEHA, affected homeowner	<ul style="list-style-type: none"> • Cost - tbd 	2015-2020 (Appx. A13-14)
MONITORING/EVALUATION			
19. Schedule periodic professional consultations from local fire/forest agencies	LST	<ul style="list-style-type: none"> • None 	Completed October 2012; ongoing
20. Maintain and update FGECWPP	LST	<ul style="list-style-type: none"> • none 	ongoing

Perhaps the most important overarching action to be accomplished by the FGEHA and the LST in regards to fire-safety awareness is to establish a heightened wildfire prevention attitude among FGE's residents. Unfortunately, many FGE full and part-time residents do not grasp the critical importance of fire mitigation and/or fire safety precautions to help lessen the impact of a potentially devastating wildfire on the subdivision. Efforts to encourage community cohesiveness and wildfire safety awareness/prevention are on-going and prominent.

Project Map

The following map highlights the mitigation locations within FGE. Specifically noted are: a shaded fuel break (in red) running along the upper portion of High Trails Drive, and continued mitigation in FGE's communal lots (in green).



Evaluation

Considering the values at risk, it will be important to take a reading of FGE's wildfire safety accomplishments and continued needs on an annual basis. This will be done by the FGHEA reviewing the CWPP before the annual summer homeowners' meeting and then communicating important conclusions and lessons learned from fuels mitigation projects and activities over the preceding year with residents. Adjustment in the form of revisions will then be made.

In addition, after months of work on the CWPP, much has been learned and some important conclusions reached:

- Education has to be the key to a successful implementation of the FGE CWPP. It seems that the average FGE resident is, for the most part, fairly uninformed concerning the potential impact of a wildfire occurring in or close to the subdivision, and pro-active mitigation efforts needed to help maintain the safety of all community life and property. People are busy and often don't have the time to learn about and/or care to participate in preparing their home and their community for a potentially devastating wildfire. Educating the residents on wildfire preparedness and creating a community attitude of "together we stand," can spell the difference between life and death.
- Of course, education and preparation does not guarantee that structures will be saved; despite doing everything right, it is still possible that homes will be destroyed in a catastrophic fire. But, education and preparation can remove the fear and anxiety surrounding devastating fires and can help create a peace of mind versus the "ignorance is bliss" model that many residents employ.

Glossary

Acre: an area of land containing 43,560 square feet. A square acre would be about 209 feet by 209 feet. A circular acre would have a radius of 117.75 feet.

Canopy: the foliage formed by the crowns of trees in a stand.

Defensible space: an area around a structure where fuels and vegetation are cleared or reduced to slow the spread of wildfire towards the structure.

Downed fuels: the accumulated woody and vegetative material on the forest floor.

Ecosystem: A spatially explicit, relatively homogenous unit of the earth that includes all interacting organisms (plants, animals, microbes) and components of the abiotic environment within its boundaries. An ecosystem can be of any size: a log, pond, field, forest, or the earth's biosphere.

Fire break: a natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fuel break: an easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, thus improving fire control opportunities. The stand is thinned and remaining trees are pruned to remove ladder fuels. Brush, heavy ground fuels, snags and dead trees are disposed of, and an open, park like appearance is established.

Fuel loading: the oven-dry weight of fuel per unit area.

Home Ignition Zone: includes the home itself and everything around it up to 100 – 200 feet. In areas across the country where the risk of wildfire is high, the home ignition zone extends up to 200 feet beyond the actual home structure. Within this 200 foot area, there are three zones:

- **Zone 1** encircles the structure and all its attachments (wooden decks, fences, and boardwalks) for at least 30 feet on all sides. Note: the 30-foot number comes from the very minimum distance, on flat ground, that a wood wall can be separated from the radiant heat of large flames without igniting.
- **Zone 2** is 30 to 100 feet from the home, and plants in this zone should be low-growing, well irrigated and less flammable.
- **Zone 3** is 100 to 200 feet from the home and this area should be thinned, although less space is required than in Zone 2. **NOTE:** Because of other factors such as topography, the recommended distances to mitigate for radiant heat exposure actually extend between 100 to 200 feet from the home – on a site-specific basis.

Ladder fuels: combustible material that provides vertical continuity between vegetation strata and allows fire to climb into the crowns of trees or shrubs with relative ease.

Litter: the surface layer of a forest floor that is not in an advanced stage of decomposition, usually consisting of freshly fallen leaves, needles, twigs, stems, bark, and fruits.

Lop and scatter: a hand method of removing the up-ward branches from tips of felled trees to keep slash low to the ground, to increase rate of decomposition, lower fire hazard, or as a pre-treatment prior to burning.

Sapling: a usually young tree larger than a seedling but smaller than a pole.

Shaded fuelbreak: A strategically located strip or block of land (of varying width) depending on fuel and terrain, in which fuel density is reduced, thus improving fire control opportunities. The stand is thinned and remaining trees are pruned to remove ladder fuels. Most brush, heavy ground fuels, snags and dead trees are removed and an open park-like appearance established.

Slash: the residue of treetops and branches left on the ground after logging or accumulating as a result of storms, fire, girdling or delimbing.

Snag: a standing, generally un-merchantable dead tree from which the leaves and most of the branches have fallen.

Thinning: a cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Wildland-Urban Interface (WUI): The geographical meeting point of two diverse systems: wildland and structures. In the WUI, structures and vegetation are sufficiently close so that a wildland fire could spread to structures or a structure fire could ignite vegetation.

The Dictionary of Forestry, John A. Helms, editor.

A majority of "Glossary" terms compiled by Los Ranchitos CWPP authors





Bibliography

Scott, Joe H., Burgan, Robert E. "Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model". USDA Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-153, June 2005.

Fire Effects Information System, USDA Forest Service,
<http://www.fs.fed.us/database/feis/index.html>

Appendix A – Maps, Documents, and Resources

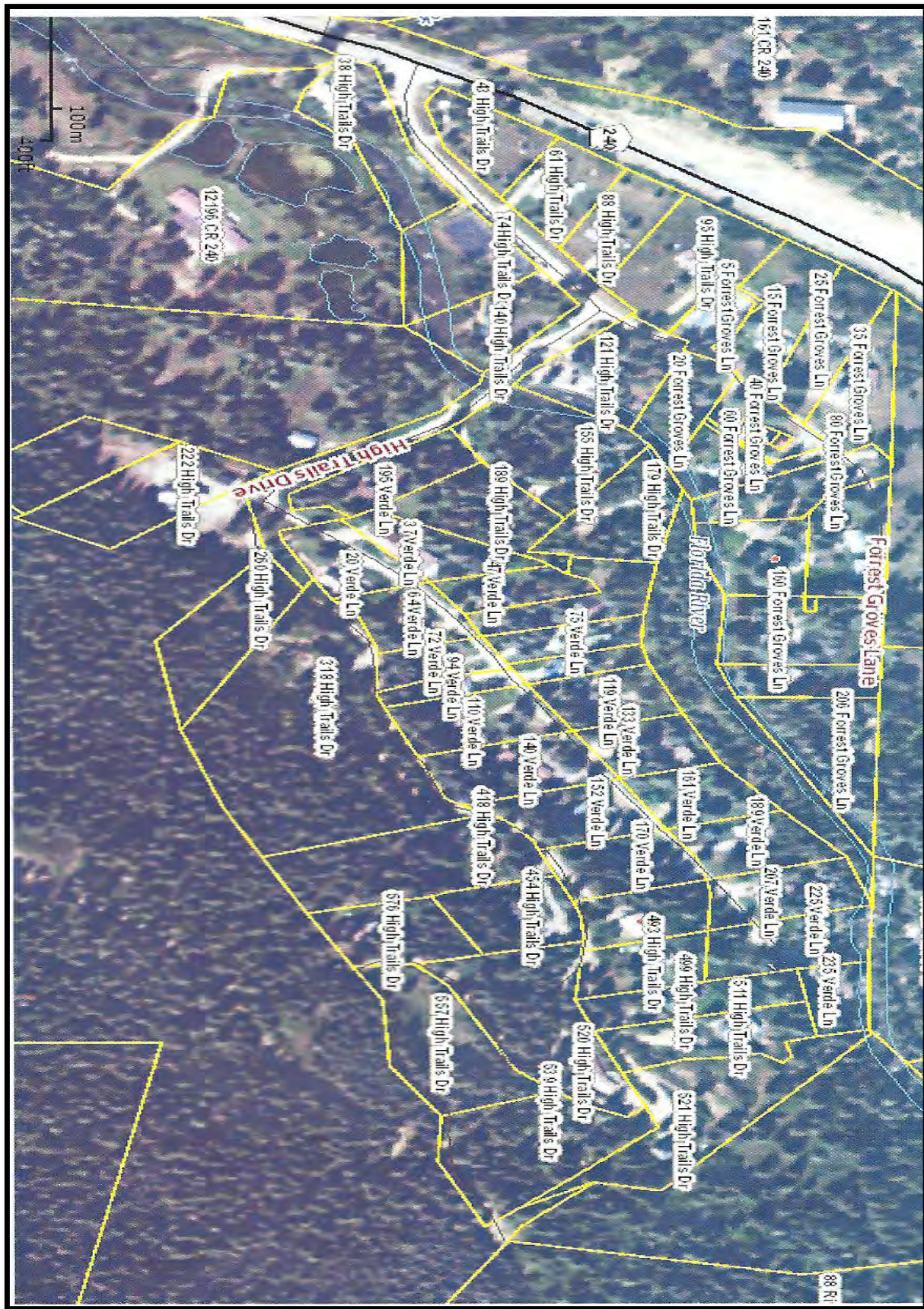
A-1: Structural Risk Assessment Criteria/Data Base Sample

Forrest Groves Structure Triage (pg. 1)														
Map Number	Owner	Address	Status	Length (feet)	Width (feet)	Pitch in degrees	Turn-around	Structure Rating	Defensible Space	Fuel Model	Defendable Structure	Photo	Comments	Recommendations to Owner
1			Rental	60'	14'	0	No	M	Yes	2, 4	Yes		10, 13, 15, 17	keep grass trimmed low to reduce hazard
2			Full Time	90'	13.5'	0	No	L	Yes	3, 4	Yes			
3			Rental	81'	17'	0	No	L	Yes	3, 4	Yes			
4			Rental	102'	12'	0	No	M/H	Yes	1	Yes		3, 13, 17	keep grass trimmed low to reduce hazard

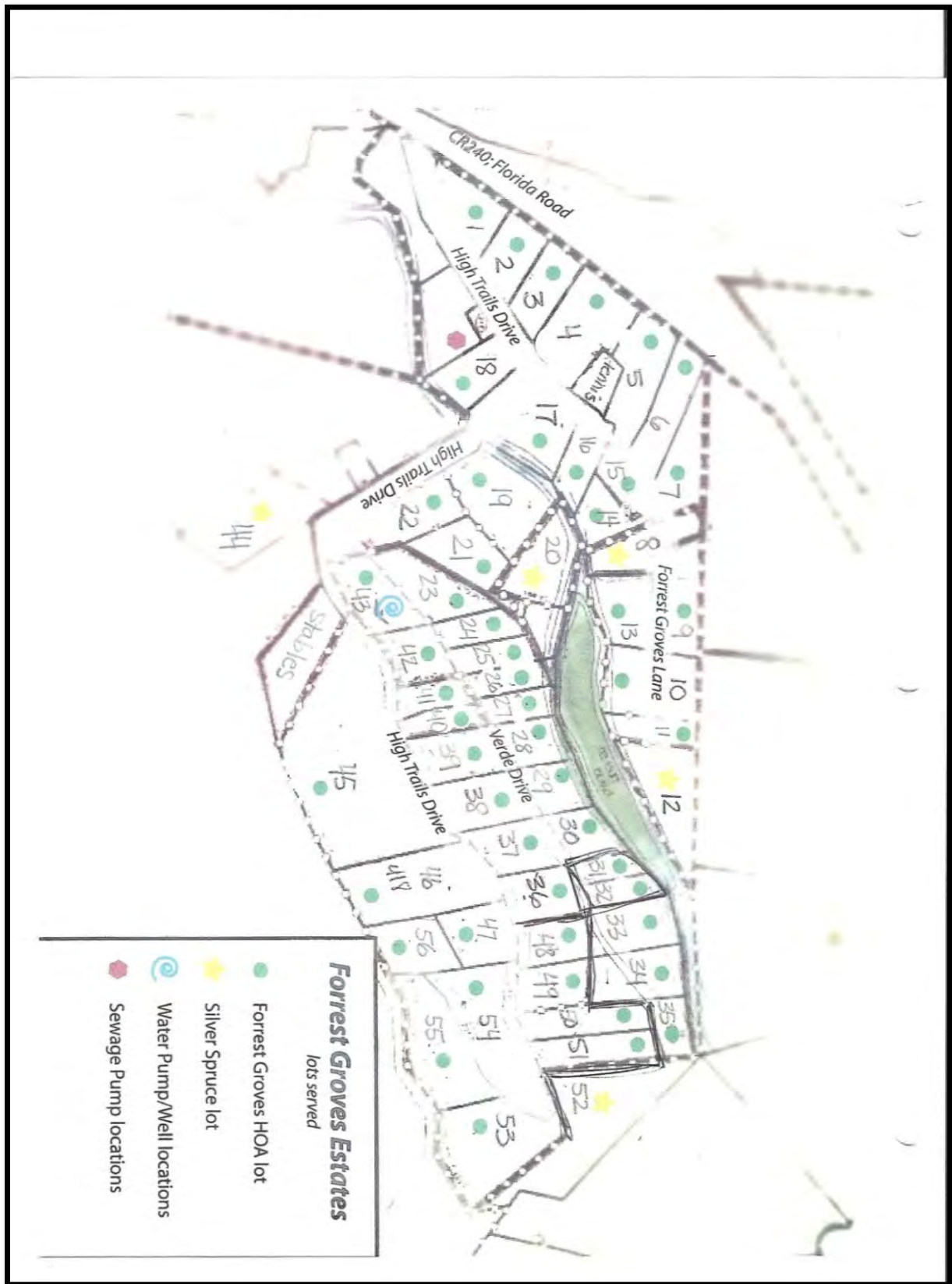
A-2: Structural Risk Assessment Rubric

IRubric™			
	High Risk 1 pts	Moderate Risk 2 pts	Low Risk 3 pts
Roofing Roofing material Soffit and fascia Vents	High Risk Roofing material is combustible and has visible damage. Soffit and/or fascia is open/exposed. Vents missing or clogged with debris.	Moderate Risk Roofing material is non combustible but has visible damage. Soffit and/or fascia is mostly enclosed. Vents in place but clogged with debris.	Low Risk Roofing material is non combustible and has no visible damage. Soffit and/or fascia is enclosed. Vents in place and free from debris.
Siding and finishes Siding material Gutters/downspouts/eaves	High Risk Siding needs significant repair or replacement. Gutters/downspouts/eaves clogged with debris.	Moderate Risk Siding needs minor repair. Gutters/downspouts/eaves mostly free of debris.	Low Risk Siding in good repair. Gutters/downspouts/eaves free from debris.
Decks and patios Deck material Substrate/storage beneath decks Landscaping attached to home	High Risk Deck/patio material is combustible. Substrate beneath decks/patios is combustible. Storage of combustible materials beneath decks/patios. No screening over gaps.	Moderate Risk Deck/patio material is partially combustible. Substrate beneath decks/patio is non combustible. Storage of non combustible materials beneath decks/patios, or covered with flame resistant materials. Some screening over gaps.	Low Risk Deck/patio material in non combustible. Substrate beneath decks/patio is non combustible. No storage beneath decks/patios. Screens in place over gaps.

A-3: Forrest Groves Addressed Lots



A-4: Forrest Groves Estates Lot Map Including Water and Sewer Taps



Forrest Groves Estates Homeowners Association



5/16/2013

Dear Neighbor,

As members of your Forrest Groves Land Stewardship Team and co-authors of the Forrest Groves Community Wildfire Protection Plan (CWPP), we have assessed your home for wildfire vulnerability and would like to share the results with you.

There are many benefits to these assessments: 1.) you will become more aware of the key part you play in protecting your home (as well as the homes of your neighbors) from the devastating effects of wildfire, 2.) local fire and rescue agencies will have a more comprehensive understanding of the layout of Forrest Groves and each home's accessibility and structural vulnerability points, and 3.) it is a necessary component of our CWPP which is, among other things, a pre-requisite for acquiring a variety of grant funds for wide-scale wildfire mitigation projects that would normally cost the subdivision thousands of dollars.

Of course, the comments and recommendations concerning your home's fire vulnerability are not action-requirements dictated from the HOA; rather they are suggestions of how you can make your home safer and more defensible in the advent of fire. Please remember that in the case of wildfire, we are all on the same team. The actions, or often the non-actions, of one can indeed affect the whole.

The structure, located at **155 High Trails**, has been rated as **Low Risk** for wildfire vulnerability according to our Structural Risk Assessment Rubric (roofing material, soffit and fascia, vents; siding material, gutters/downspouts/eaves; deck material, substrate/storage beneath decks, landscaping attached to home). It **does have** defensible space around it and **is** considered a defensible structure. We have included a comment key with this letter. Please reference the following numbers on that key to decode the comments we made about your property: **9, 17, 19.**

In addition, we have made specific recommendations or comment explanations to some homeowners. Your recommendations/comment explanations are the following: **N/A**

Wildfire education and neighborhood mitigation efforts are the keys to minimizing damage during a wildfire. This summer could be a bad fire season due to the continuing drought-like conditions so let's band together and make Forrest Groves one of the "fire-wisest" subdivisions in the state.

Thank you,

Your F.G. Land Stewardship Team (Jon Aardal, JoAnne Hibbard and Jen Williams)

A-6: Letter to Homeowners: Comment Key

Forrest Groves' Structure Triage Comments and Fuel Models	
Comment Number	Comments
1	Roofing made of combustible material
2	Roofing has visible damage
3	Soffit and/or fascia is open/exposed
4	Vents missing or clogged with debris
5	Roof full of visible debris
6	Broken doors or windows
7	Siding in disrepair
8	Gutters/downspouts/eaves clogged with debris
9	Deck/patio made of combustible materials
10	Substrate beneath decks/patios or around house is combustible
11	Storage of combustible materials beneath decks/patios
12	No screening over gaps
13	Significant amounts of combustible materials in Zone 1
14	Fire pit not rocked or subsurface
15	Trees in Zone 1 not pruned to 10 feet (to reduce ladder fuels)
16	Limited access to structure
17	Plants not clumped together with 6 - 10 feet in between
18	Fire wood against structure with no barrier
19	Trees not pruned 10 feet up from roofline
20	Zone 2 needs mitigation work
21	Metal address sign either posted on home or not visible from road

Resources for Homeowners

Resources 1 - 11 may be found by clicking on the link or going to the Colorado State Forest Service Web site at: www.colostate.edu, and looking under "Resources for Homeowners". Resource 12 comes from the University of Nevada Cooperative Extension Office.

1. CSFS QUICK GUIDE SERIES, FIRE 2012-1 – [Protecting Your Home From Wildfire: Creating Wildfire-Defensible Space Zones](#)
2. CSFS QUICK GUIDE SERIES, FM 2011-1 - [Piñon –Juniper Management](#)
3. CSFS #6.303 – [Fire-Resistant Landscaping](#)
4. CSFS #6.304 – [Forest Home Fire Safety](#)
5. CSFS #6.305 – [Fire Wise Plant Materials](#)
6. CSFS #6.306 – [Grass Seed Mixes to Reduce Wildfire Hazard](#)
7. CSFS #6.310 – [Cheatgrass and Wildfire](#)
8. CSFS #6.311 – [Gambel Oak Management](#)
9. CSFS – [Mastication Operational Guidelines](#)
10. CSFS – [Firewise Construction Design and Materials](#)
11. CSFS - [Fuelbreak Guidelines for Forested Subdivisions and Communities](#)
12. University of Nevada Cooperative Extension – [Be Ember Aware!](#)



QUICK GUIDE SERIES

FIRE 2012-1

Protecting Your Home from Wildfire: Creating Wildfire-Defensible Zones

Formerly CSU Extension Factsheet 6.302

If your home is located in the natural vegetation of Colorado's grasslands, shrublands, foothills or mountains, you live in the **wildland-urban interface (WUI)** and are inherently at risk from a wildfire. The WUI is any area where structures and other human developments meet or intermingle with wildland vegetative fuels. In many vegetation types, it is not a matter of *if* a wildfire will impact your home, but *when*.

Wildfires are a natural part of Colorado's varied forest ecosystems. Many rural communities are located in areas historically prone to frequent natural wildfires. Living in the wildland requires more self-reliance than living in urban areas. It may take longer for a fire engine to reach your area, and a small fire department can easily become overwhelmed during an escalating wildfire. Planning ahead and taking actions to reduce fire hazards can increase your safety and help protect your property. As more people choose to live in areas prone to wildfire, additional homes and lives are potentially threatened every year. Firefighters always do their best to protect rural residents, but ultimately, it is **YOUR** responsibility to protect your life, family, animals and property from wildfire.

The information contained in this document is for use by individual landowners to help reduce wildfire risk on their property. In order to effectively protect subdivisions and communities, all landowners must work together to reduce fire hazards within and adjacent to communities. This includes treating individual home sites and common areas within communities, and creating fuelbreaks within and adjoining the community where feasible. This document will focus on actions individual landowners can take to reduce wildfire hazards on their property. For additional information on broader community protection, go to www.csfs.colostate.edu.

In this guide, you'll read about steps you can take to protect your property from wildfire. These steps focus on beginning work closest to your house and moving outward. Also, remember that keeping your home safe is not a one-time effort – it requires ongoing maintenance. It may be necessary to perform some actions, such as removing pine needles from gutters and mowing grasses and weeds several times a year, while other actions may only need to be addressed once a year. While



Figure 1: Firefighters will do their best to protect homes, but ultimately it is the homeowner's responsibility to plan ahead and take actions to reduce fire hazards around structures. Photo: National Interagency Fire Center



Figure 2: Colorado's grasslands, shrublands, foothills and mountains all have areas in the wildland-urban interface where human development meets wildland vegetative fuels. Photo: CSFS

This quick guide was produced by the Colorado State Forest Service to promote knowledge transfer.

October 2012
www.csfs.colostate.edu



Figure 3: Burning embers can be carried long distances by wind. Embers ignite structures when they land in gaps, crevices and other combustible places around the home. Photo: CSFS

Remember...

- **Reducing fuels around a home will increase the chances for survival in a wildfire, but there is no guarantee.**
- **This quick guide provides minimum guidelines. The more fuels you remove, the greater the chance your home will survive.**
- **Working with your neighbors and community will increase the effectiveness of your home's defensible space.**

you may not be able to accomplish ALL of the actions described in this document to prepare your home for wildfire, each completed activity will increase the safety of your home, and possibly your family, during a wildfire.

(Note: These guidelines are adapted for ponderosa pine, Douglas-fir and mixed-conifer ecosystems below 9,500 feet. See page 9 for guidelines adapted to other forest ecosystems.)

This guide primarily will help design your defensible space. **Defensible space** is the natural and landscaped area around a home or other structure that has been modified to reduce fire hazard. Defensible space gives your home a fighting chance against an approaching wildfire. Creating defensible space also reduces the chance of a structure fire spreading to the surrounding forest and other homes.

Three factors determine wildfire behavior: **fuels, weather and topography**. We cannot alter weather or topography, so we must concentrate on altering fuels. Fuels include vegetation, such as trees, brush and grass; near homes, fuels also include

such things as propane tanks, wood piles, sheds and even homes themselves. Some plant species are more flammable than others, and the flammability of vegetative fuels changes depending on the season, recent weather events, and other factors such as drought. Fuel continuity and density also play an important role in wildfire.

Wildfire often creates its own weather conditions. Hot rising air and associated winds can carry embers and other burning materials into the atmosphere for long distances, where they can ignite vegetation and structures up to several miles away. Embers have caused the loss of many homes during wildfires.

As you think about protecting your home and property from wildfire, consider how you can manage fuels on your property to prevent fire from spreading to your home and other structures.

For more information on wildfire behavior, please see [FireWise Construction: Site Design and Building Materials](http://www.csfs.colostate.edu) at www.csfs.colostate.edu.

Fuel Arrangement and Types

When fuels are abundant, a fire can be uncontrollable and destructive. But when fuels are scarce, a fire cannot build momentum and intensity, which makes it much easier to control and is more likely to be beneficial to the land.

The more dense and continuous the fuels, the bigger the threat they pose to your home. The measure of fuel hazard refers to its continuity, both horizontal and vertical. Horizontal continuity refers to fuels across the ground, while vertical continuity refers to fuels extending from the ground up into the crowns of trees and shrubs. Fuels with a high degree of both vertical and horizontal continuity are the most hazardous, particularly when they occur on slopes. Mitigation of wildfire hazards focuses on breaking up the continuity of horizontal and vertical fuels.

Heavier fuels, such as brush and trees, produce a more intense fire than light fuels, such as grass. However, grass-fueled fires travel much faster than heavy-fueled fires. Some heavier surface fuels, such as logs and wood chips, are potentially hazardous heavy fuels and also should be addressed.

Vertical/Ladder Fuels

Ladder fuels are defined as smaller trees and brush that provide vertical continuity, which allows a fire to burn from the ground level up into the branches and crowns of larger trees. Lower branches on large trees also can act as ladder fuels. These fuels are potentially very hazardous, but are easy to mitigate. The hazards from ladder fuels near homes are especially important to address. Prune all tree branches from ground level up to a height of 10 feet above ground or up to $\frac{1}{3}$ the height of the tree, whichever is less. Do not prune further up because it could jeopardize the health of the tree. Shrubs should be pruned based on specifications recommended for the species. Dead branches should be removed whenever possible.

Surface Fuels

Logs/Branches/Slash/Wood Chips

Naturally occurring woody material on the ground and debris from cutting down trees (also known as slash) may increase the intensity of fires. Increased fire intensity makes a fire harder to control and increases the likelihood of surface fires transitioning to crown fires. Dispose of any heavy accumulation of logs, branches and slash by chipping, hauling to a disposal site or piling for burning later. Always contact your county sheriff's office or local fire department first for information about burning slash piles. Another alternative is to lop and scatter slash by cutting it into very small pieces and distributing it widely over the ground. If chipping logs and/or slash, it's essential to avoid creating continuous areas of wood chips on the ground. Break up the layer of wood chips by adding nonflammable material, or allow for wide gaps (at least 3 feet) between chip accumulations. Also, avoid heavy accumulation of slash by spreading it closer to the ground to speed decomposition. If desired, two or three small, widely spaced brush piles may be left for wildlife habitat. Locate these well away from your home (NOT in Zones 1 or 2; see page 5-8 for zone descriptions).

Pine Needles/Duff Layers

Due to decades of fire suppression, decomposing layers of pine needles, twigs and other organic debris—called duff—is deeper under many large trees today than it would have been a century ago. This is especially true in ponderosa pine forests where frequent and naturally occurring fires have been absent. These large trees often are lost when fires occur, because flames burning in the duff layer can pre-heat live vegetation and ignite the trees, or the tree's roots can be damaged from the intense heat of the smoldering duff, killing the tree. It is important to rake needle or duff layers deeper than 2 inches at least 3 feet away from the base of large trees. This should be done annually, and the additional duff also should be removed from the area.

Grasses

Grasses are perhaps the most pervasive and abundant surface fuel in Colorado. Mow grasses and weeds as often as needed throughout the growing season to keep them shorter than 6 inches. This applies to irrigated lawns and wild or native grasses. This is critical in the fall, when grasses dry out, and in the spring, after the snow is gone but before plants green-up.

Be especially careful when mowing in areas with rocks. Mower blades can hit rocks and create sparks, causing fires in dry grass. Consider mowing only on days with high humidity or after recent moisture to reduce the risk of starting an unwanted fire.

When mowing around trees, be sure to avoid damaging the root system and tree trunk by using a higher blade setting on the mower and trimming grass that grows against the trunk only by hand.

Crown Fuels

An intense fire burning in surface fuels can transition into the upper portion of the tree canopies and become a crown fire. Crown fires are dangerous because they are very intense and can burn large areas. Crown fire hazard can be reduced by thinning trees to decrease crown fuels, reducing surface fuels under the remaining trees, and eliminating vertical fuel continuity from the surface into the crowns. Specific recommendations are provided in the Defensible Space Management Zones, pages 5-8.



Figure 4: Ladder fuels are shrubs and low branches that allow a wildfire to climb from the ground into the tree canopy. Photo: CSFS



Figure 5: Surface fuels include logs, branches, wood chips, pine needles, duff and grasses. Photo: CSFS



Figure 6: Tree canopies offer fuel for intense crown fires. Photo: Paul Mitrer

The Home Ignition Zone



Figure 7: Addressing both components of the Home Ignition Zone will provide the best protection for your home. Credit: CSFS

Two factors have emerged as the primary determinants of a home's ability to survive a wildfire – the quality of the defensible space and a structure's ignitability. Together, these two factors create a concept called the **Home Ignition Zone (HIZ)**, which includes the structure and the space immediately surrounding the structure. To protect a home from wildfire, the primary goal is to reduce or eliminate fuels and ignition sources within the HIZ.

Structural Ignitability

The ideal time to address home ignition risk is when the structure is in the design phase. However, you can still take steps to reduce ignitability to an existing home.

The roof has a significant impact on a structure's ignitability because of its extensive surface area. When your roof needs significant repairs or replacement, use only fire-resistant roofing materials. Also, check with your county building department – some counties now have restrictions against using wood shingles for roof replacement or require specific classifications of roofing material. Wood and shake-shingle roofs are discouraged because they are highly flammable, and are prohibited in some areas of the state. Asphalt shingles, metal sheets and shingles, tile, clay tile, concrete and slate shingles are all recommended roofing materials.

The extension of the roof beyond the exterior structure wall is the eave. This architectural feature is particularly prone to ignition. As fire approaches the building, the exterior wall deflects hot air and gasses up into the eave. If the exterior wall isn't ignition-resistant, this effect is amplified.

Most decks are highly combustible. Their shape traps hot gasses, making them the ultimate heat traps. Conventional wooden decks are so combustible that when a wildfire approaches, the deck often ignites before the fire reaches the house.

The exterior walls of a home or other structure are affected most by radiant heat from the fire and, if defensible space is not adequate, by direct contact with flames from the fire.

Windows are one of the weakest parts of a building with regard to wildfire. They usually fail before the building ignites, providing a direct path for flames and airborne embers to reach the building's interior.

Burning embers are produced when trees and structures are consumed by wildfire. These embers sometimes can travel more than a mile. Flammable horizontal or nearly horizontal surfaces, such as wooden decks or shake-shingle roofs, are especially at risk for ignition from burning embers. Since airborne embers have caused the loss of many homes in the WUI, addressing structural ignitability is critical, even if the area surrounding a home is not conducive to fire spread.

This guide provides only basic information about structural ignitability. For more information on fire-resistant building designs and materials, refer to the CSFS *FireWise Construction: Site Design and Building Materials* publication at www.csfs.colostate.edu.



Figure 8: (above) Wood shingle roofs are highly flammable and not recommended. Photo: CSFS



Figure 9: (above right) Class A roofing materials including tile, clay, concrete, slate and asphalt shingles are fire-resistant options. Photo: CSFS



Figure 10: Decks, exterior walls and windows are important areas to examine when addressing structure ignitability. Photo: CSFS

Defensible Space

Defensible space is the area around a home or other structure that has been modified to reduce fire hazard. In this area, natural and manmade fuels are treated, cleared or reduced to slow the spread of wildfire. Creating defensible space also works in the reverse, and reduces the chance of a structure fire spreading to neighboring homes or the surrounding forest. Defensible space gives your home a fighting chance against an approaching wildfire.

Creating an effective defensible space involves a series of management zones in which different treatment techniques are used. Develop these zones around each building on your property, including detached garages, storage buildings, barns and other structures.

The actual design and development of your defensible space depends on several factors: size and shape of building(s), construction materials, slope of the ground, surrounding topography, and sizes and types of vegetation on your property. You may want to request additional guidance from your local Colorado State Forest Service forester, fire department or a consulting forester as you plan a defensible space for your property.

Defensible space provides another important advantage during a fire: increased firefighter safety. Firefighters are trained to protect structures only when the situation is relatively safe for them to do so. They use a process called "structural triage" to determine if it is safe to defend a home from an approaching wildfire. The presence or absence of defensible space around a structure is a significant determining factor used in the structural triage process, as defensible space gives firefighters an opportunity to do their job more safely. In turn, this increases their ability to protect your home.

If firefighters are unable to directly protect your home during a wildfire, having an effective defensible space will still increase your home's chance of survival. It is important to remember that with wildfire, there are no guarantees. Creating a proper defensible space does not mean that your home is guaranteed to survive a wildfire, but it does significantly improve the odds.

Defensible Space Management Zones

Three zones need to be addressed when creating defensible space:

Zone 1 is the area nearest the home and other structures. This zone requires maximum hazard reduction.

Zone 2 is a transitional area of fuels reduction between Zones 1 and 3.

Zone 3 is the area farthest from the home. It extends from the edge of Zone 2 to your property boundaries.



Figure 11: Homesite before defensible space. Photo: CSFS



Figure 12: Homesite after creating a defensible space. Photo: CSFS



Figure 13: Defensible space management zones. Credit: CSFS



Figure 14: This homeowner worked hard to create a defensible space around the home. Notice that all fuel has been removed within the first 5 feet of the home, which survived the Waldo Canyon Fire in the summer of 2012. Photo: Christina Randall, Colorado Springs Fire Department



Figure 15: Clearing pine needles and other debris from the roof and gutters is an easy task that should be done at least once a year. Photo: CSFS



Figure 16: Enclosing decks with metal screens can prevent embers from igniting a house. Photo: Marilyn Brown, La Plata County

Zone 1

The width of Zone 1 extends a minimum distance of 15–30 feet outward from a structure, depending on property size. Most flammable vegetation is removed in this zone, with the possible exception of a few low-growing shrubs or fire-resistant plants. Avoid landscaping with common ground junipers, which are highly flammable.

Increasing the width of Zone 1 will increase the structure's survivability. This distance should be increased 5 feet or more in areas downhill from a structure. The distance should be measured from the outside edge of the home's eaves and any attached structures, such as decks. Several specific treatments are recommended within this zone:

- Install nonflammable ground cover and plant nothing within the first 5 feet of the house and deck. This critical step will help prevent flames from coming into direct contact with the structure. This is particularly important if a building is sided with wood, logs or other flammable materials. Decorative rock creates an attractive, easily maintained, nonflammable ground cover.
- If a structure has noncombustible siding (i.e., stucco, synthetic stucco, concrete, stone or brick), widely spaced foundation plantings of low-growing shrubs or other fire-resistant plant materials are acceptable. However, do not plant directly under windows or next to foundation vents, and be sure areas of continuous grass are not adjacent to plantings. Information on fire-resistant plants is available on the CSFS website at www.csfs.colostate.edu.
- Prune and maintain any plants in Zone 1 to prevent excessive growth. Also, remove all dead branches, stems and leaves within and below the plant.
- Irrigate grass and other vegetation during the growing season. Also, keep wild grasses mowed to a height of 6 inches or less.
- Do not store firewood or other combustible materials anywhere in this zone. Keep firewood at least 30 feet away from structures, and uphill if possible.
- Enclose or screen decks with 1/8-inch or smaller metal mesh screening (1/16-inch mesh is preferable). Do not use areas under decks for storage.
- Ideally, remove all trees from Zone 1 to reduce fire hazards. The more trees you remove, the safer your home will be.
- If you do keep any trees in this zone, consider them part of the structure and extend the distance of the entire defensible space accordingly.
- Remove any branches that overhang or touch the roof, and remove all fuels within 10 feet of the chimney.
- Remove all pine needles and other debris from the roof, deck and gutters.
- Rake pine needles and other organic debris at least 10 feet away from all decks and structures.
- Remove slash, wood chips and other woody debris from Zone 1.

Zone 2

Zone 2 is an area of fuels reduction designed to diminish the intensity of a fire approaching your home. The width of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space in Zone 2 should extend at least 100 feet from all structures. If this distance stretches beyond your property lines, try to work with the adjoining property owners to complete an appropriate defensible space.

The following actions help reduce continuous fuels surrounding a structure, while enhancing home safety and the aesthetics of the property. They also will provide a safer environment for firefighters to protect your home.

Tree Thinning and Pruning

- Remove stressed, diseased, dead or dying trees and shrubs. This reduces the amount of vegetation available to burn, and makes the forest healthier.
- Remove enough trees and large shrubs to create at least 10 feet between crowns. Crown separation is measured from the outermost branch of one tree to the nearest branch on the next tree. On steep slopes, increase the distance between tree crowns even more.
- Remove all ladder fuels from under remaining trees. Prune tree branches off the trunk to a height of 10 feet from the ground or $\frac{1}{2}$ the height of the tree, whichever is less.
- If your driveway extends more than 100 feet from your home, thin out trees within a 30 foot buffer along both sides of your driveway, all the way to the main access road. Again, thin all trees to create 10-foot spacing between tree crowns.
- Small groups of two or three trees may be left in some areas of Zone 2, but leave a minimum of 30 feet between the crowns of these clumps and surrounding trees.
- Because Zone 2 forms an aesthetic buffer and provides a transition between zones, it is necessary to blend the requirements for Zones 1 and 3. For example, if you have a tree in Zone 2 with branches extending into Zone 1, the tree can be retained if there is proper crown spacing.
- Limit the number of dead trees (snags) to one or two per acre. Be sure snags cannot fall onto the house, power lines, roads or driveways.
- As in Zone 1, the more trees and shrubs removed, the more likely your house will survive a wildfire.



Figure 17: In Zone 2, make sure there is at least a 10-foot spacing between tree crowns. Credit: CSFS

Shrub Thinning/Pruning and Surface Fuels

- Isolated shrubs may be retained in Zone 2, provided they are not growing under trees.
- Keep shrubs at least 10 feet away from the edge of tree branches. This will prevent the shrubs from becoming ladder fuels.
- Minimum spacing recommendations between clumps of shrubs is $2\frac{1}{2}$ times the mature height of the vegetation. The maximum diameter of the clumps themselves should be twice the mature height of the vegetation. As with tree-crown spacing, all measurements are made from the edge of vegetation crowns.
- Example – For shrubs 6 feet high, spacing between shrub clumps should be 15 feet or more (measured from the edge of the crowns of vegetation clumps). The diameter of these shrub clumps should not exceed 12 feet.
- Periodically prune and maintain shrubs to prevent excessive growth, and remove dead stems from shrubs annually. Common ground junipers should be removed whenever possible because they are highly flammable and tend to hold a layer of duff beneath them.
- Mow or trim wild grasses to a maximum height of 6 inches. This is especially critical in the fall, when grasses dry out.
- Avoid accumulations of surface fuels, such as logs, branches, slash and wood chips greater than 4 inches deep.

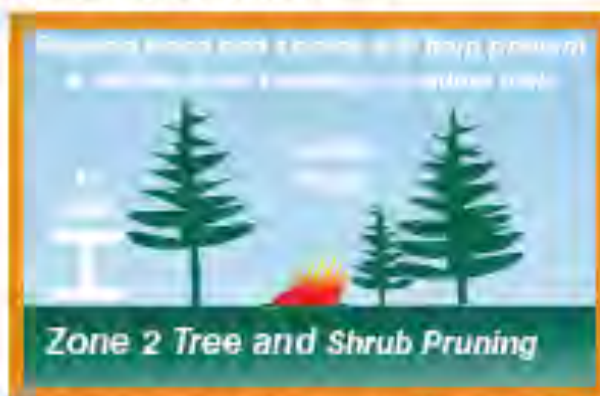


Figure 18: Pruning trees will help prevent a wildfire from climbing from the ground to the tree crowns. Credit: CSFS

Firewood

- Stack firewood uphill from or on the same elevation as any structures, and at least 30 feet away.
- Clear all flammable vegetation within 10 feet of woodpiles.
- Do not stack wood against your home or on/under your deck, even in the winter. Many homes have burned as a result of a woodpile that ignited first.

Propane Tanks and Natural Gas Meters

- Locate propane tanks and natural gas meters at least 30 feet from any structures, preferably on the same elevation as the house.
- The tank should not be located below your house because if it ignites, the fire would tend to burn uphill. Conversely, if the tank or meter is located above your house and it develops a leak, gas will flow downhill into your home.
- Clear all flammable vegetation within 10 feet of all tanks and meters.
- Do not visibly screen propane tanks or natural gas meters with shrubs, vegetation or flammable fencing. Instead, install 5 feet of nonflammable ground cover around the tank or meter.



Figure 19: Keep firewood, propane tanks and natural gas meters at least 30 feet away from structures. Photo: CSFS



Figure 20: This ponderosa pine forest has been thinned, which will not only help reduce the wildfire hazard, but also increase tree health and vigor. Photo: CSFS

Zone 3

Zone 3 has no specified width. It should provide a gradual transition from Zone 2 to areas farther from the home that have other forest management objectives. Your local Colorado State Forest Service forester can help you with this zone.

This zone provides an opportunity for you to improve the health of the forest through proper management. With an assortment of stewardship options, you can proactively manage your forest to reduce wildfire intensity, protect water quality, improve wildlife habitat, boost the health and growth rate of your trees, and increase tree survivability during a wildfire.

In addition, properly managed forests can provide income, help protect trees against insects and diseases, and even increase the value of your property. Typical forest management objectives for areas surrounding home sites or subdivisions provide optimum recreational opportunities; enhance aesthetics; improve tree health and vigor; provide barriers against wind, noise, dust and visual intrusions; support production of firewood, fence posts and other forest commodities; or cultivate Christmas trees or trees for transplanting.

Consider the following when deciding forest management objectives in Zone 3:

- The healthiest forest is one that includes trees of multiple ages, sizes and species, and where adequate growing room is maintained over time.
- Remember to consider the hazards associated with ladder fuels. A forest with a higher canopy reduces the chance of a surface fire climbing into the tops of the trees, and might be a priority if this zone has steep slopes.
- A greater number of snags – two or three per acre, standing or fallen – can be retained in Zone 3 to provide wildlife habitat. These trees should have a minimum diameter of 8 inches. Make sure that snags pose no threat to power lines or firefighter access roads.
- While tree pruning generally is not necessary in Zone 3, it may be a good idea from the standpoint of personal safety to prune trees along trails and firefighter access roads. Or, if you prefer the aesthetics of a well-manicured forest, you might prune the entire area. In any case, pruning helps reduce ladder fuels within tree stands, thus reducing the risk of crown fire.
- Mowing grasses is not necessary in Zone 3.
- Any approved method of slash treatment is acceptable, including piling and burning, chipping or lop-and-scatter.

Other Recommendations

Windthrow

In Colorado, some tree species, including lodgepole pine, Engelmann spruce and Douglas-fir, are especially susceptible to damage and uprooting by high winds or windthrow. If you see evidence of this problem in or near your home, consider making adjustments to the defensible space guidelines. It is highly recommended that you contact a professional forester to help design your defensible space, especially if you have windthrow concerns.

Water Supply

If possible, make sure that an on-site water source is readily available for firefighters to use, or that other water sources are close by. Lakes, ponds, swimming pools and hot tubs are all possible options. If there are no nearby water sources, consider installing a well-marked dry hydrant or cistern. If your primary water source operates on electricity, be sure to plan for a secondary water source. During wildfires, structures often are cut off from electricity. For more information on how to improve the accessibility of your water source, contact your local fire department.

Recommendations for Specific Forest Types

The above recommendations refer primarily to ponderosa pine, Douglas-fir and mixed-conifer ecosystems. For other forest types, please refer to the additional recommendations below:

Aspen

Tree spacing and ladder fuel guidelines do not apply to mature stands of aspen trees. Generally, no thinning is recommended in aspen forests, regardless of tree size, because the thin bark is easily damaged, making the tree easily susceptible to fungal infections. However, in older stands, numerous dead trees may be on the ground and require removal. Conifer trees often start growing in older aspen stands. A buildup of these trees eventually will increase the fire hazard of the stand, so you should remove the young conifers. Brush also can increase the fire hazard and should be thinned to reduce flammability.

Lodgepole Pine

Lodgepole pine management in the WUI is much different than that for lodgepole pine forests located away from homes, communities and other developments. Normally, it is best to develop fuels management and wildfire mitigation strategies that are informed and guided by the ecology of the tree species. This is not the case with lodgepole pine.

Older lodgepole pine stands generally do not respond well to selective thinning, but instead respond better to the removal of all trees over a defined area to allow healthy forest regeneration. Selectively thinning lodgepole can open the stand to severe windthrow and stem breakage. However, if your home is located within a lodgepole pine forest, you may prefer selective thinning to the removal of all standing trees.

To ensure a positive response to thinning throughout the life of a lodgepole pine stand, trees must be thinned early in their lives – no later than 20 to 30 years after germination. Thinning lodgepole pine forests to achieve low densities can best be



Figure 21: During high winds, these lodgepole pine trees fell onto the house. Lodgepole pine is highly susceptible to windthrow. Photo: CSFS



Figure 22: Mature aspen stands can contain many young conifers, dead trees and other organic debris. This can become a fire hazard. Photo: CSFS



Figure 23: A young lodgepole pine stand. Thinning lodgepole pines early on in their lives will help reduce the wildfire hazard in the future. Photo: CSFS

The defensible space guidelines in this quick guide are predominantly for ponderosa pine and mixed-conifer forests. These guidelines will vary with other forest types.



Figure 24: Piñon-juniper forests are often composed of continuous fuels. Creating clumps of trees with large spaces in between clumps will break up the continuity. Photo: CSFS



Figure 25: Gambel oak needs to be treated in a defensible space at least every 5-7 years because of its vigorous growing habits. Photo: CSFS

accomplished by beginning when trees are small saplings, and maintaining those densities through time as the trees mature.

Thinning older stands of lodgepole pine to the extent recommended for defensible space may take several thinning operations spaced over a decade or more. When thinning mature stands of lodgepole pine, do not remove more than 30 percent of the trees in each thinning operation. Extensive thinning of dense, pole-sized and larger lodgepole pine often results in windthrow of the remaining trees. Focus on removing trees that are obviously lower in height or suppressed in the forest canopy. Leaving the tallest trees will make the remaining trees less susceptible to windthrow.

Another option is leaving clumps of 30-50 trees. Clumps are less susceptible to windthrow than solitary trees. Allow a minimum of 30-50 feet between tree crowns on the clump perimeter and any adjacent trees or clumps of trees. Wildfire tends to travel in the crowns of lodgepole pine. By separating clumps of trees with large spaces between crowns, the fire is less likely to sustain a crown fire.

Piñon-Juniper

Many piñon-juniper (PJ) forests are composed of continuous fuel that is highly flammable. Fire in PJ forests tend to burn intensely in the crowns of trees. Try to create a mosaic pattern when you thin these trees, with a mixture of individual trees and clumps of three to five trees. The size of each clump will depend on the size, health and location of the trees. The minimum spacing between individual trees should be 10 feet between tree crowns, with increasing space for larger trees, clumps, and stands on steeper slopes.

Tree pruning for defensible space is not as critical in PJ forests as in pine or fir forests. Instead, it is more important to space the trees so that it is difficult for the fire to move from one tree clump to the next. Trees should only be pruned to remove dead branches or branches that are touching the ground. However, if desired, live branches can be pruned to a height of 3 feet above the ground. Removing shrubs that are growing beneath PJ canopies is recommended to reduce the overall fuel load that is available to a fire.

It is NOT recommended to prune live branches or remove PJ trees between April and October, when the piñon ips beetle is active in western Colorado. Any thinning activity that creates the flow of sap in the summer months can attract these beetles to healthy trees on your property. However, it is acceptable to remove dead trees and dead branches during the summer months.

For more information, please refer to the CSFS [Piñon-Juniper Management Quick Guide](http://www.csfs.colostate.edu) at www.csfs.colostate.edu.

Gambel Oak

Maintaining Gambel oak forests that remain resistant to the spread of wildfire can be a challenge because of their vigorous growing habits. Gambel oak trees grow in clumps or groves, and the stems in each clump originate from the same root system. Most reproduction occurs through vegetative sprouts from this deep, extensive root system. You may need to treat Gambel oak near your home every five to seven years. Sprouts also should be mowed at least once every year in Zones 1 and 2. Herbicides can be used to supplement mowing efforts for controlling regrowth.

For more information, please refer to the CSFS [Gambel Oak Management](http://www.csfs.colostate.edu) publication at www.csfs.colostate.edu.

Note: This publication does not address high-elevation spruce-fir forests. For information on this forest type, please contact your local CSFS district office.

Maintaining Your Defensible Space

Your home is located in a dynamic environment that is always changing. Trees, grasses and shrubs continue to grow, die or are damaged, and drop their leaves and needles each season. Just like your home, the defensible space around it requires regular, ongoing maintenance to be effective. Use the following checklists to build and maintain your defensible space.

Defensible Space: Initial Projects

- ☐ Properly thin and prune trees and shrubs within Zones 1 and 2.
- ☐ Dispose of slash from tree/shrub thinning.
- ☐ Screen attic, roof, eaves and foundation vents, and periodically check them to ensure that they are in good condition.
- ☐ Screen or wall-in stilt foundations and decks; screens should be $\frac{1}{8}$ -inch or smaller metal mesh ($\frac{1}{16}$ -inch mesh is best).
- ☐ Post signs at the end of the driveway with your last name and house number that are noncombustible, reflective and easily visible to emergency responders.
- ☐ Make sure that the driveway is wide enough for fire trucks to enter and exit, and that trees and branches are adequately cleared for access by fire and emergency equipment. Contact your local fire department or check the CSFS website for information specific to access.
- ☐ Take pictures of your completed defensible space for comparison of forest growth over time.



Figure 26: Keeping the forest properly thinned and pruned in a defensible space will reduce the chances of a home burning during a wildfire. Photo: CSFS

Defensible Space Tasks: Annual Requirements

- ☐ Clear roof, deck and gutters of pine needles and other debris. *
- ☐ Mow grass and weeds to a height of 6 inches or less. *
- ☐ Rake all pine needles and other flammable debris away from the foundation of your home and deck. *
- ☐ Remove trash and debris accumulations from the defensible space. *
- ☐ Check fire extinguishers to ensure that they have not expired and are in good working condition.
- ☐ Check chimney screens to make sure they are in place and in good condition.
- ☐ Remove branches that overhang the roof and chimney.
- ☐ Check regrowth of trees and shrubs by reviewing photos of your original defensible space; properly thin and prune trees and shrubs within Zones 1 and 2.
- ☐ Dispose of slash from tree/shrub thinning. *

*Address more than once per year, as needed.



Figure 27: Sharing information and working with your neighbors and community will give your home and surrounding areas a better chance of surviving a wildfire. Photo: CSFS

Be Prepared

- ☐ Complete a checklist of fire safety needs inside your home (these should be available at your local fire department). Examples include having an evacuation plan and maintaining smoke detectors and fire extinguishers.
- ☐ Develop your fire evacuation plan and practice family fire drills. Ensure that all family members are aware of and understand escape routes, meeting points and other emergency details.
- ☐ Contact your county sheriff's office and ensure that your home telephone number and any other important phone numbers appear in the county's Reverse 911 or other emergency notification database.
- ☐ Prepare a "grab and go" disaster supply kit that will last at least three days, containing your family's and pets' necessary items, such as cash, water, clothing, food, first aid and prescription medicines.
- ☐ Ensure that an outdoor water supply is available. If it is safe to do so, make a hose and nozzle available for responding firefighters. The hose should be long enough to reach all parts of the house.

Preparing your home and property from wildfire is a necessity if you live in the wildland-urban interface. It is important to adequately modify the fuels in your home ignition zone. Remember, every task you complete around your home and property will make your home more defensible during a wildfire.

Always remember that creating and maintaining an effective defensible space in the home ignition zone is not a one-time endeavor – it requires an ongoing, long-term commitment.

If you have questions, please contact your local CSFS district office. Contact information can be found at www.csfs.colostate.edu.

List of Additional Resources

- The Colorado State Forest Service, <http://www.csfs.colostate.edu>
- CSFS wildfire-related publications, <http://csfs.colostate.edu/pages/wf-publications.html>
- Community Wildfire Protection Planning, <http://csfs.colostate.edu/pages/community-wf-protection-planning.html>
- Colorado's "Are You FireWise?" information, <http://csfs.colostate.edu/pages/wf-protection.html>
- National Fire Protection Association's Firewise Communities USA, <http://www.firewise.org>
- Fire Adapted Communities, <http://fireadapted.org/>
- Ready, Set, Go!, <http://wildlandfirerog.org/>



Figure 28: This house has a high risk of burning during an approaching wildfire. Modifying the fuels around a home is critical to reduce the risk of losing structures during a wildfire. Photo: CSFS



Figure 29: This house survived the Fourmile Canyon Fire in 2010. Photo: CSFS



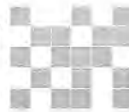
Figure 30: Firefighters were able to save this house during the 2012 Weber Fire because the homeowners had a good defensible space. Photo: Dan Bender, La Plata County

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FIREWISE TOOLKIT

» FIREWISE / TIPS FOR HOMEOWNERS



Firewise tips checklist for homeowners

WILDFIRE DOESN'T HAVE TO BURN everything in its path. In fact, cleaning your property of debris and maintaining your landscaping are important first steps to helping minimize damage and loss.

The work you do today can make a difference. Follow these simple action steps now and throughout the year to prepare and help reduce the risk of your home and property becoming fuel for a wildfire:

- ☐ Clear leaves and other debris from gutters, eaves, porches and decks. This prevents embers from igniting your home.
- ☐ Keep your lawn hydrated and maintained. If it is brown, cut it down to reduce fire intensity. Dry grass and shrubs are fuel for wildfire.
- ☐ Remove dead vegetation from under your deck and within 10 feet of the house.
- ☐ Don't let debris and lawn cuttings linger. Dispose of these items quickly to reduce fuel for fire.
- ☐ Remove anything stored underneath decks or porches.
- ☐ Inspect shingles or roof tiles. Replace or repair those that are loose or missing to prevent ember penetration.
- ☐ Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustible materials from accumulating.
- ☐ Cover exterior attic vents with metal wire mesh no larger than 1/8 inch to prevent sparks from entering the home.
- ☐ Remove flammable materials (firewood stacks, propane tanks, dry vegetation) within 30 feet of your home's foundation and outbuildings, including garages and sheds. If it can catch fire, don't let it touch your house, deck or porch.
- ☐ Enclose under-eave and soffit vents or screen with metal mesh to prevent ember entry.
- ☐ Wildfire can spread to tree tops. If you have trees on your property, prune so the lowest branches are 6 to 10 feet from the ground.

Learn more about how to keep your family safe and reduce your home's risk for wildfire damage at www.firewise.org.



A guide to Firewise principles

THE FIREWISE COMMUNITIES PROGRAM provides homeowners with simple and easy steps to help reduce a home's wildfire risk by preparing ahead of a wildfire. These steps are rooted in principles based on solid fire science research into how homes ignite. The research comes from the world's leading fire experts whose experiments, models and data collection are based on some of the country's worst wildland fire disasters.

Below are Firewise principles and tips that serve as a guide for residents:

When it comes to wildfire risk, it is not a geographical location, but a set of conditions that determine the home's ignition potential in any community.

Wildfire behavior is influenced by three main factors: topography (lie of the land), weather (wind speed, relative humidity and ambient temperature) and fuel (vegetation and man-made structures). In the event of extreme wildfire behavior, extreme weather conditions are normally

present, like extended drought, high winds, low humidity and high temperatures, coupled with excess fuel build up including the accumulation of live and dead vegetation material. Additionally, the inherent lie of the land influences the intensity and spread a fire takes. Fires tend to move upslope, and the steeper the slope the faster it moves.

Of these three factors, **fuel** is the one we can influence.

Debris like dead leaves and pine needles left on decks, in gutters and strewn across lawns can ignite from flying embers. Fire moving along the ground's surface can "ladder" into shrubs and low hanging tree limbs to create longer flames and more heat. If your home has flammable features or vulnerable openings, it can also serve as fuel for the fire, and become part of a disastrous chain of ignitions to other surrounding homes and structures.

A home's ignition risk is determined by its immediate surroundings or its "home ignition zone" and the home's construction materials.

According to fire science research and case studies, it's not where a home is located that necessarily determines ignition risk, but the landscape around it, often referred to as the "home ignition zone." The home ignition zone is defined as the home and its immediate surroundings up to 200 feet (60 m).

The Firewise Communities Program provides tips for reducing wildfire risk based on the home ignition zone concept:

Home Zone: Harden your home against wildfire. This includes fences, decks, porches and other attachments. From the point of view of a fire, if it's attached to the house it is a part of the house. Non-flammable or low flammability construction materials—especially for roofs, siding and windows—are recommended for new homes or retrofits. Keep any flammables, including plantings and mulch out of the area within 5 feet of your home's perimeter.

Zone 1: This well-irrigated area encircles the structure for at least 30 feet on all sides including decks and fences, and provides space for fire suppression equipment in the event of an emergency. Lawns should be well maintained and mowed. Plantings should be limited to carefully-spaced low flammability species. In particularly fire prone areas, non-flammable mulch should be considered.

Zone 2: This area encircles 30 - 100 feet from the home. Low flammability plant materials should be used here. Plants should be low-growing and the irrigation system should extend into this section. Shrubs and trees should be limbed up and spaced to prevent crowns of trees from touching.

Zone 3: This area encompasses 100 - 200 feet from the home. Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.





Zone 4: This furthest zone from the structure is a natural area. Selectively prune and thin all plants and remove highly flammable vegetation.

Homeowners can and must take primary responsibility for wildfire safety action around the home.

There are not enough fire fighting resources to protect every house during severe wildfires, and with shrinking budgets it means we need to do more with less. Fire fighters are trained to safely and efficiently suppress wildland fires, but their effectiveness is reduced when they must sweep decks, move wood piles and patio furniture while trying to fight a fire. According to fire science research, individual efforts do make a difference even in the face of a catastrophic wildfire.

The following steps are outlined by the Firewise program to reduce home ignition risk, based on this principle:

- Prune low hanging limbs to reduce ladder fuels
- Clean roofs and gutters of pine needles and dead leaves
- Keep flammable plants and mulches at least 5 feet away from your home's perimeter
- Use low-growing, well pruned and fire-resistant plants around home
- Screen or box-in areas below patios and decks with wire screening no larger than 1/8-inch mesh
- Sweep decks and porches clear of fallen leaves
- Move woodpiles away from the home during non-winter months
- Bring doormats and furniture cushions inside when an area is threatened by a wildfire

- Close garage doors when leaving your home in the event of an evacuation

We all have a role to play in protecting ourselves and others.

Your home ignition zone extends up to 200 feet—and it's quite common to have neighbors whose home ignition zone overlaps yours. Buildings closer than 100 feet apart can ignite one another if they are in flames. In addition, many communities have commonly owned property, including natural or wooded areas that can pose fire risks to all. This means that to be most effective, neighbors need to work together and with their local fire service to achieve greater wildfire safety.

Together, community residents can work with agencies and elected officials to accomplish the following:

- Ensure that homes and neighborhoods have legible/clearly marked street names and numbers
- Create "two ways out" of the neighborhood for safe evacuation during a wildfire emergency
- Create phone trees to alert residents about an impending fire
- Review any existing community rules or regulations on vegetation management and construction materials to see if they are "Firewise-friendly"
- Use the "Ready, Set, Go!" program with the fire department to educate neighbors
- Use the Firewise Communities/USA® Recognition Program to create and implement an ongoing action plan that will also earn the neighborhood national recognition for their efforts

LEARN MORE about how to keep families safe and reduce homeowners' risk for wildfire damage at www.firewise.org.

ADDITIONALLY, complimentary brochures, booklets, pamphlets, videos and much more can be found on the Information and resources page of the website and ordered online through the Firewise catalog.



Home Safety Checklist

Simple fixes from roof to foundation to make your home safer from embers and radiant heat.

HOME SAFETY CHECKLIST

- ❑ Clean roofs and gutters of dead leaves, debris and pine needles that could catch embers.
- ❑ Replace or repair any loose or missing shingles or roof tiles to prevent ember penetration.
- ❑ Enclose under-eave and soffit vents of screen with metal mesh to prevent ember entry.
- ❑ Cover exterior attic vents with metal wire mesh no larger than 1/8 inch to prevent sparks from entering the home.
- ❑ Repair or replace damaged or loose window screens and any broken windows.
- ❑ Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustible materials from accumulating.
- ❑ Move any flammable material away from wall exteriors – mulch, flammable plants, leaves and needles, firewood piles – anything that can burn.
- ❑ Remove anything stored underneath decks or porches.



For More Information

For more information about how to protect your home and property, as well as Firewise plant lists and other resources, visit the Firewise website at www.firewise.org, and see the "homeowners" section.

For more tips on what to do when wildfire is approaching and how to safely evacuate, visit the Ready, Set, Go! website sponsored by the International Association of Fire Chiefs at www.wildlandfire.org. Talk to your local fire department to learn more about specific wildfire risks in your area.

Saving Lives and Property from Wildfire!



Firewise® is a program of the National Fire Protection Association. This publication was produced in cooperation with the USDA Forest Service. USDA supports the fire program of the National Association of State Foresters. NFPA is a nonprofit organization of Firewise® and Firewise Communities USA® members. For more information on the National Fire Protection Association, call 1-800-345-1669 or visit www.nfpa.org.

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FWC22612



A Firewise Home

FIREWISE LANDSCAPING

1. Home Ignition Zone

Keep leaves and needles off your roof and deck. Create a fuel-free area within 3-5 feet of your home's perimeter. From 5 feet to a minimum of 30 feet out, thin and space vegetation, remove dead leaves and needles, prune shrubs and tree limbs. Keep areas around decks, sheds, fences and swing sets clear of debris and vegetation.

2. Landscaping and Firewise Plants

To prevent fire spread, trim back branches that overhang structures and prune branches of large trees up to 6 to 10 feet from the ground. Remove plants containing resins, oils, and waxes; make sure organic mulch is at least 5 feet from structures. Choose Firewise plants – find lists at www.firewise.org or from your local Cooperative Extension service.

BE PREPARED

3. Disaster Plan

Develop, discuss, and practice an emergency action plan with everyone in your home. Include details for pets, large animals and livestock. Program cell phones with emergency numbers. Know two ways out of your neighborhood and have a pre-designated meeting place. Have tools such as a shovel, rake, axe, handsaw, or chainsaw available, and maintain an emergency water source. Always leave if you feel unsafe – don't wait to be notified.

4. Emergency Responder Access

Identify your home and neighborhood with legible, clearly marked street names and numbers. Make your driveway at least 12 feet wide with a vertical clearance of 15 feet and a slope of less than 5 percent to provide access to emergency vehicles.

FIREWISE CONSTRUCTION

5. Fire-Resistant Roof Construction

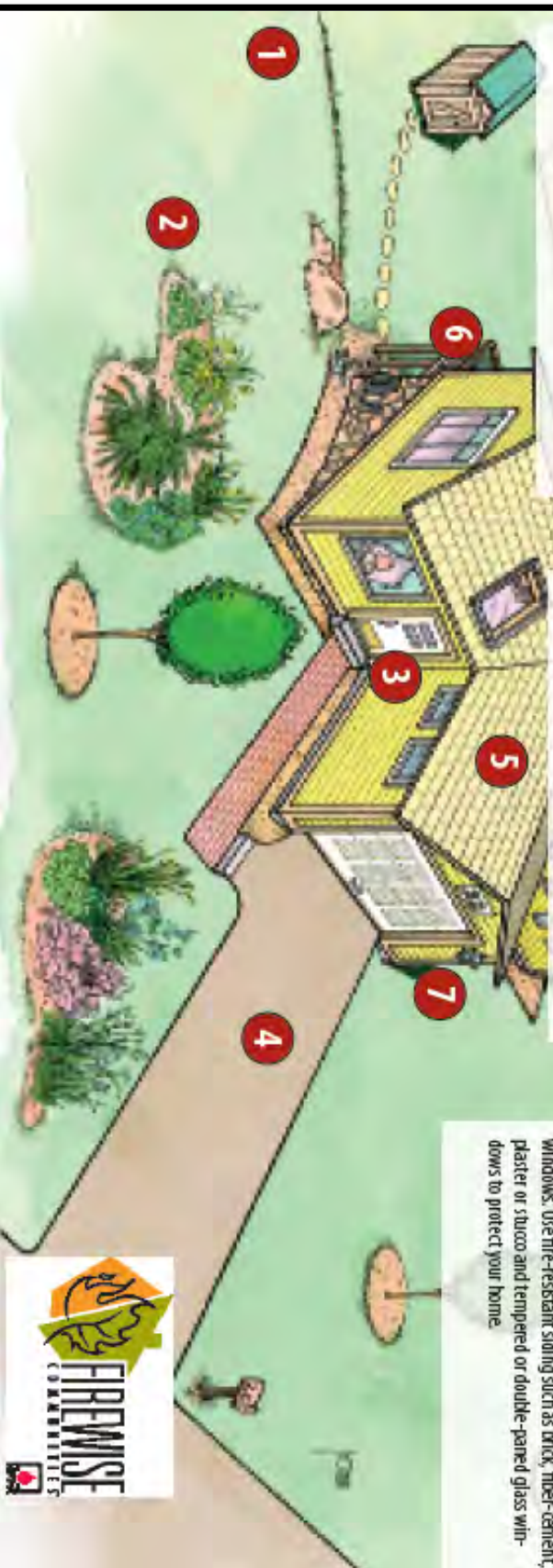
Use fire-rated shingles such as asphalt, metal, slate, clay tile or concrete products. A fire-resistant sub-roof adds protection. Box in eaves, but provide adequate ventilation to prevent condensation and mildew. Roof and attic vents should be screened to prevent ember entry.

6. Fire-Resistant Attachments

Any attachments to your home such as decks, porches, and fences must be fire-resistant. If not, your entire home is vulnerable to ignition.

7. Fire-Resistant Walls and Windows

Embers can collect in small nooks and crannies and ignite combustible materials; radiant heat from flames can crack windows. Use fire-resistant siding such as brick, fiber-cement, plaster or stucco and tempered or double-paned glass windows to protect your home.



A-12: FGE Evacuation Checklist (provided to all residents)



Forrest Groves Estates Homeowner's Association Wildfire Emergency Evacuation Checklist

brought to you by the FGE Land Stewardship Team

If a wildfire approaches your home, or if you have been notified by officials to evacuate your area, the following checklists may be used as a guide for items you may want to take with you. Each person must decide what items to gather, according to time available to safely evacuate. Remember, there is nothing you own worth your life! Please evacuate when asked and follow evacuation instructions.

Checklists like these are meant to keep you safe, but also serve to keep the fire fighters safe—which in turn will help increase the chances of your structures surviving a catastrophic fire.

Firefighters may choose not defend a structure that is high risk...is your home Fire Wise?

Things to Take:

- ☐ Water
- ☐ Food
- ☐ Flashlight, extra batteries
- ☐ Battery powered or hand-crank radio
- ☐ First Aid kit
- ☐ Medications and medical items
- ☐ Sanitation/personal hygiene items
- ☐ Blanket
- ☐ Extra cash
- ☐ Credit cards
- ☐ Cell phone, charger
- ☐ Multipurpose tool
- ☐ Copies of personal documents:
 - ☐ birth certificates
 - ☐ social security cards
 - ☐ homeowner policies
 - ☐ deeds, titles
 - ☐ health insurance cards
 - ☐ Driver's license
 - ☐ Family contact information
- ☐ Maps of the area, or evacuation routes
- ☐ Back-up computer documents or computer
- ☐ Pet items
- ☐ Leash
- ☐ Carrier
- ☐ Food, pet treats
- ☐ Vaccination records
- ☐ Pet meds
- ☐ Clothing (including jackets, gloves, boots)
- ☐ Photographs, videos
- ☐ Items that could not be replaced if destroyed

Things to Do:

Before leaving your home (as time permits)

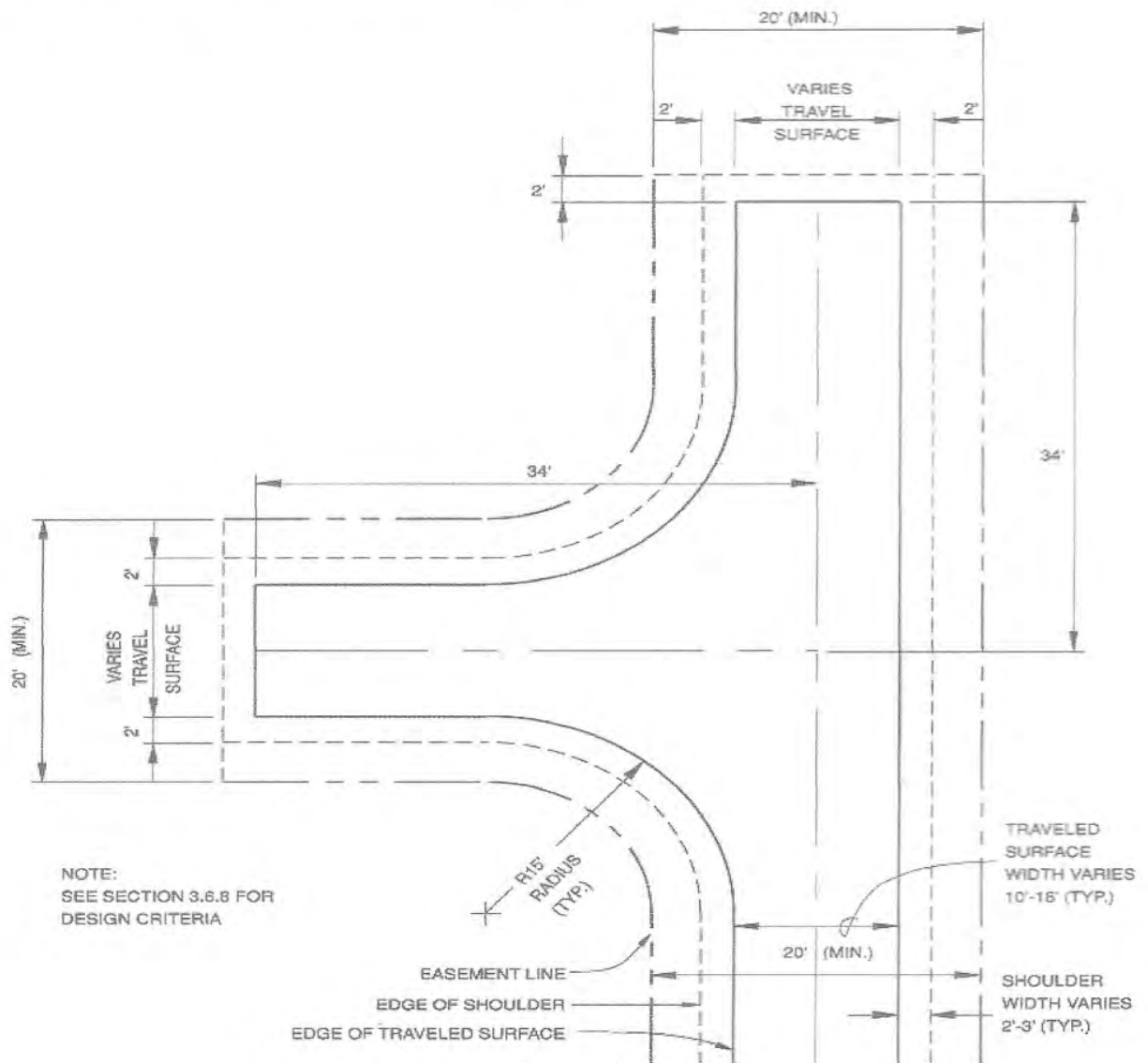
- ☐ Park evacuation vehicles facing street, keys inside
- ☐ Have at least 1/2 tank of fuel in your vehicle at all times
- ☐ Make a prior arrangement to contact a neighbor or friend who might be available to help you in an evacuation with loading or driving a second or third vehicle, or to help with large animals
- ☐ Determine meeting place
- ☐ Confine pets to one room for easy evacuation
- ☐ Close all doors and windows
- ☐ Remove lightweight, non-fireproof curtains and other combustible materials from around windows.
- ☐ Close fire-resistant drapes, shutters, or blinds
- ☐ Turn off pilot lights
- ☐ Disconnect propane tank, or shut off gas at meter
- ☐ Fill bathtubs, sinks, other large containers with water
- ☐ Place a ladder against the roof
- ☐ Remove combustible items from around exterior of home
- ☐ Remove Propane tank from BBQ
- ☐ Turn on exterior lights
- ☐ Close all exterior vents if possible
- ☐ Close garage door
- ☐ Mark home as evacuated on door

You may opt to take a video or photo inventory of objects in your home. When doing so, remember to include the date of original purchase as well as model and serial numbers. This will expedite insurance claims and help you calculate real time replacement values.

More information on making your home Fire Wise can be found by visiting: www.firewise.org.
Your Forrest Groves Estates Land Stewardship Team is also happy to answer any questions you may have.

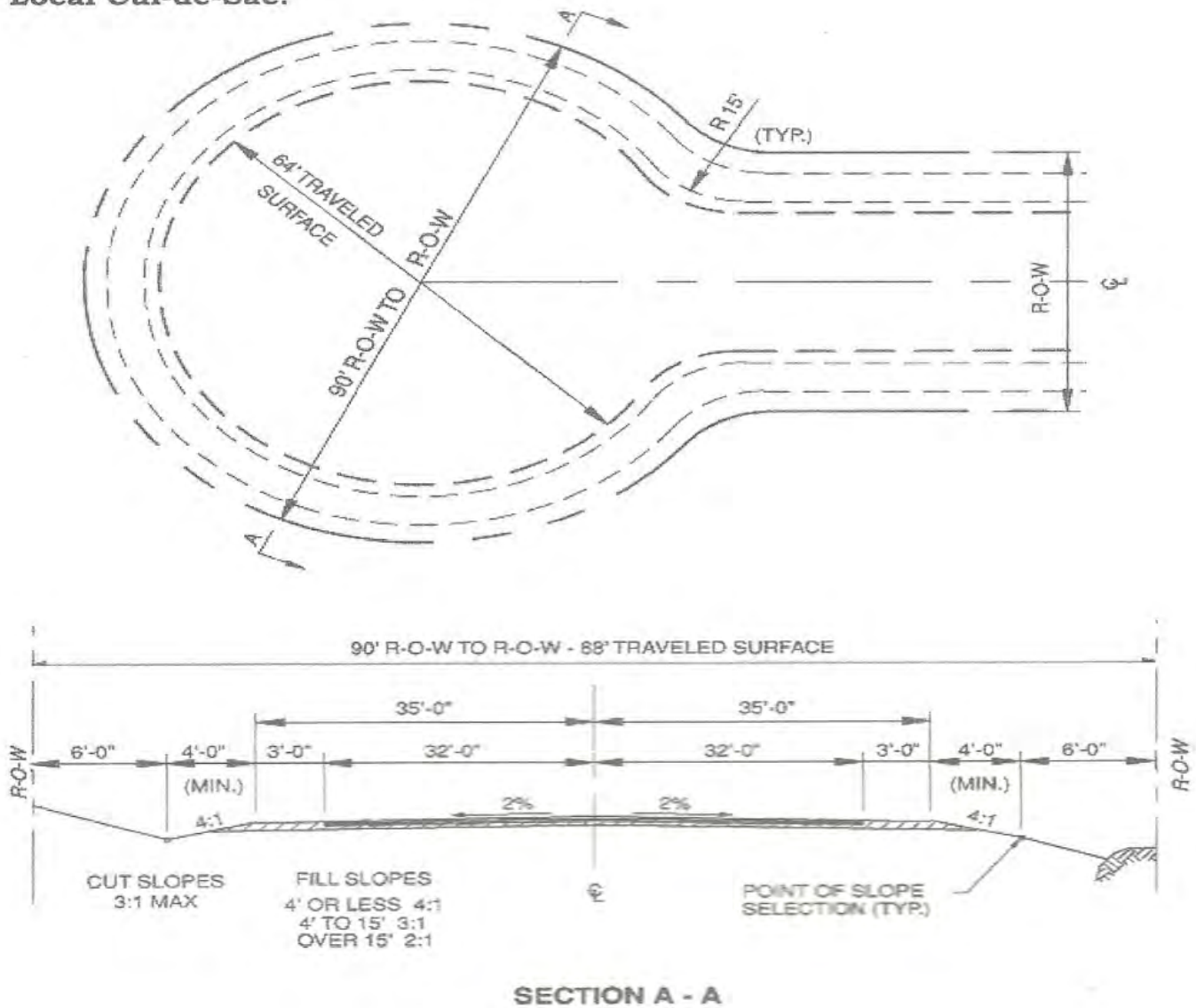
A-13: Sample Specifications for Turnarounds

Hammer Head Turnaround:



A-14: Local Cul-de-Sac Specifications

Local Cul-de-Sac:



Appendix B – Photos

B-1: Fire Danger Signed Post at FGE Entrance



B-2: Before/After Fire Mitigation of Treasure Island on Clean-Up Day

