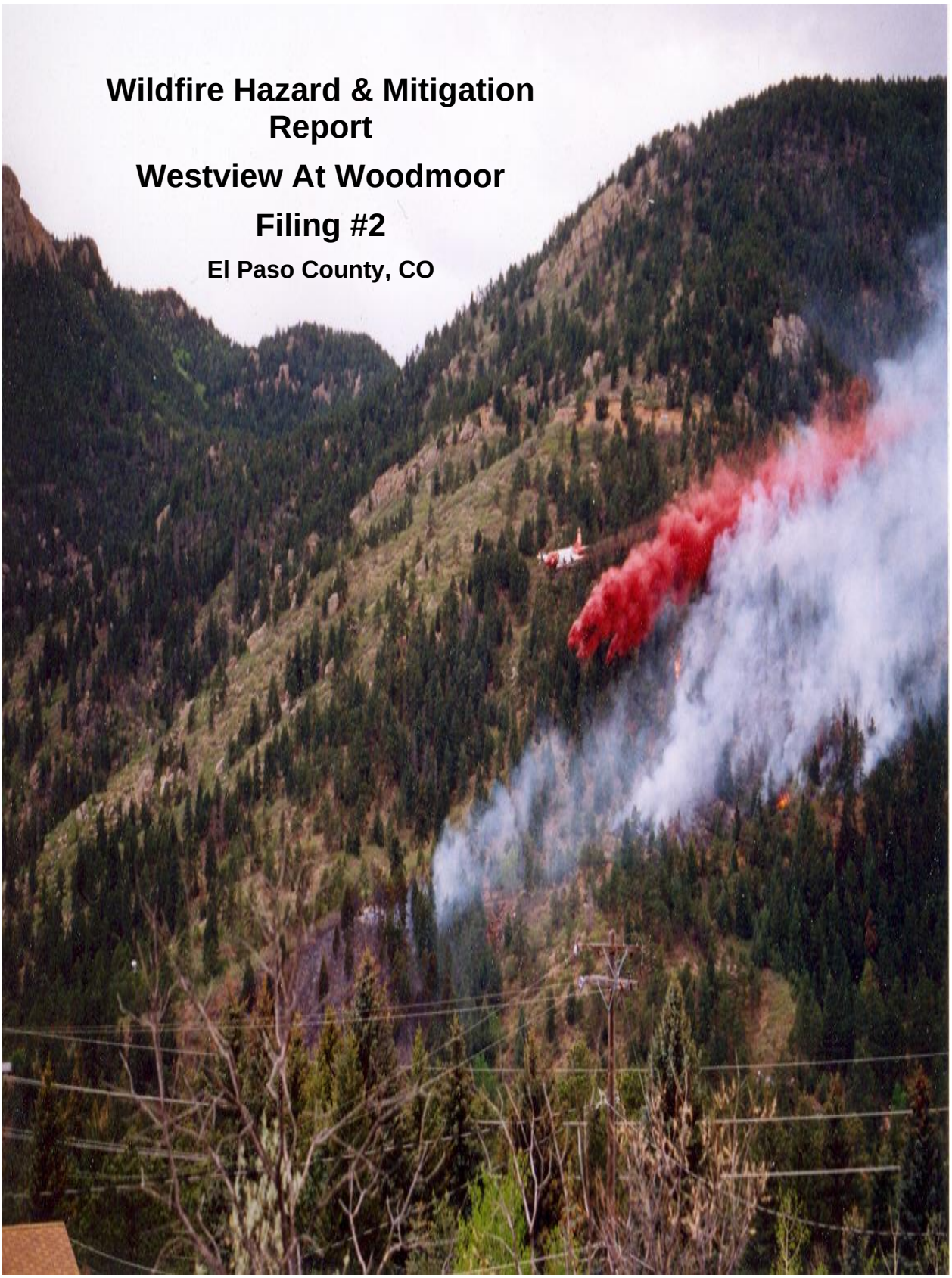
# Wildfire Hazard & Mitigation Report

## Westview At Woodmoor

## Filing #2

**El Paso County, CO**



# Wildfire Hazard Evaluation Report

**For the**

## Westview at Woodmoor
## Filing #2
## Subdivision

## El Paso County, CO

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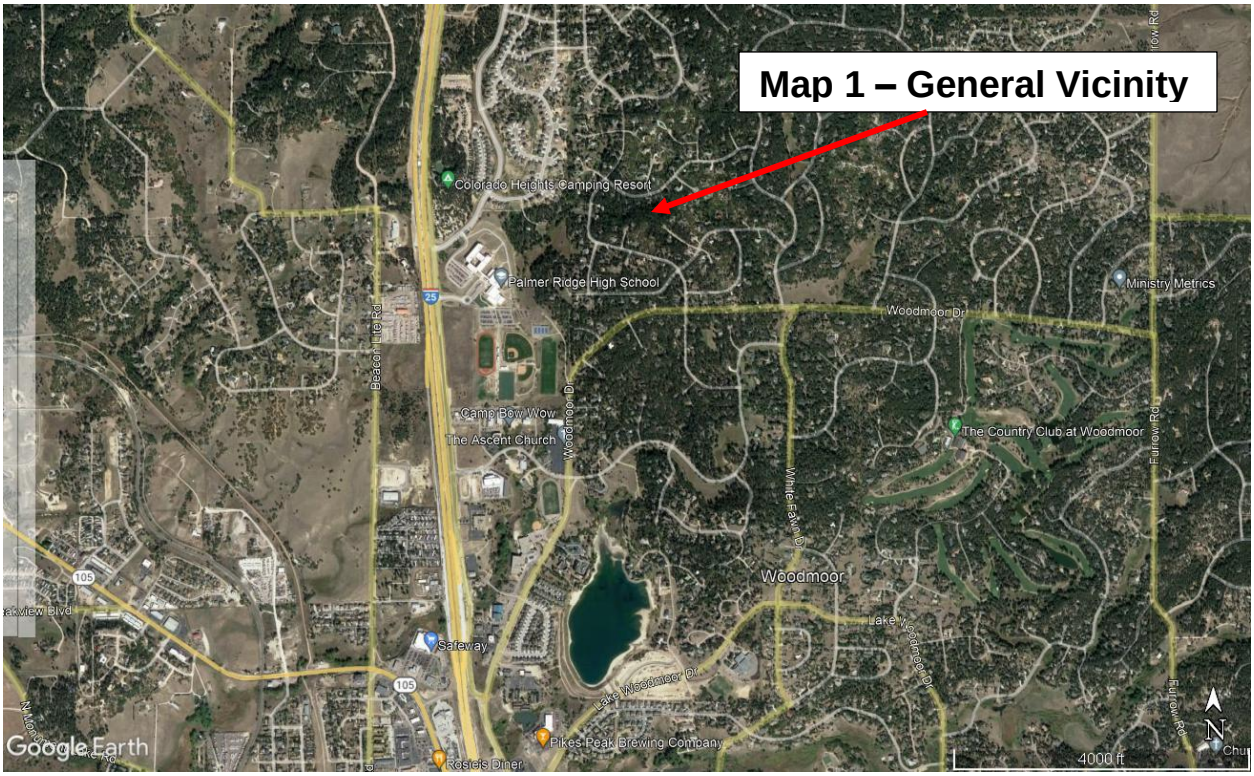
**Warning and Disclaimer**: The degree of protection from wildfire hazards intended to be provided by this plan is considered reasonable for planning purposes. It is based on accepted forestry and fire science methodology. This plan is intended to aid the Westview at Woodmoor #2 subdivision in minimizing the dangers and impacts from wildfire hazards. Fire is a natural force and an historical part of the ponderosa pine and native grassland ecosystems. Therefore, unforeseen or unknown wildfire conditions, natural or man-made changes in conditions such as climate, vegetation, fire breaks, fuel materials, fire suppression or protection devices, and ignition sources may contribute to future damages to structures and land uses even though properly permitted within designated wildfire hazard areas.

*September 21, 2022*

# General Description

The Westview at Woodmoor Filing #2 (‘WAW2’) is a private residential development planned for the Woodmoor area in unincorporated northern El Paso County, Colorado. The area lies to the east of Monument, Colorado. The development plan proposes the subdivision of approximately 3.1 acres into 4 lots. The proposed lots range in size from 0.64 acres up to 1.4 acres.

The property is located at the terminus of Buckwood Lane and bordered by Doewood Drive to the southwest and Fawnwood Road to the southeast (see Map 1 below). The parcels included under this report are identified with the El Paso County Assessor's Schedule Number 7111101042.



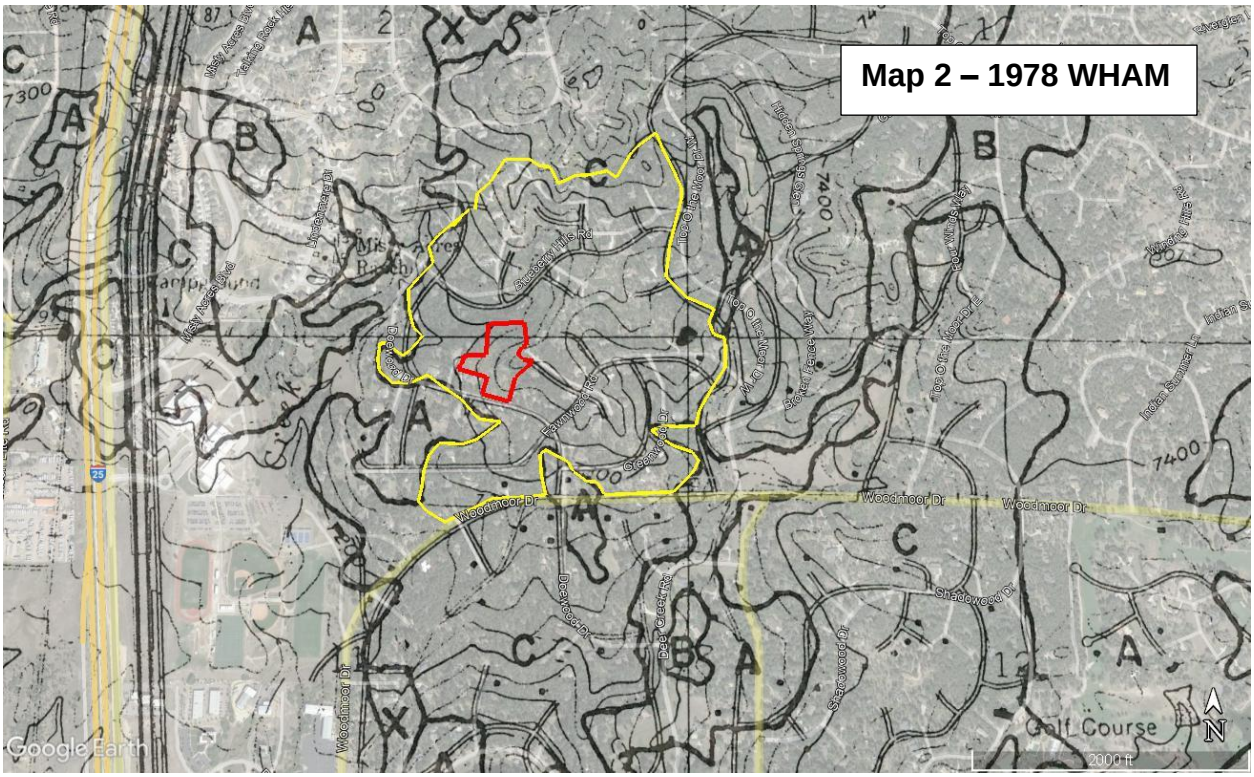

The Woodmoor Ridge subdivision borders the property on the north. The subdivision listed as Woodmoor Filing #1 is situated to the east and south. The Nicholas H Nance Subdivision, Filing #1 is located to the west.

The northern portion of El Paso County area does have a wildfire history. Most notably, the Black Forest Fire burned in June of 2013. It was the most destructive fire in Colorado history until the Marshall Fire in Boulder County in 2021. Over 14,000 acres burned, and 509 structures were destroyed.

Prior to the Black Forest Fire, in 1989, a wildfire ignited below Mount Herman which was referred to as the Berry Fire. Ignitions have repeatedly occurred in the area, with this past spring seeing several small fires along Interstate 25.

## Wildfire Hazard

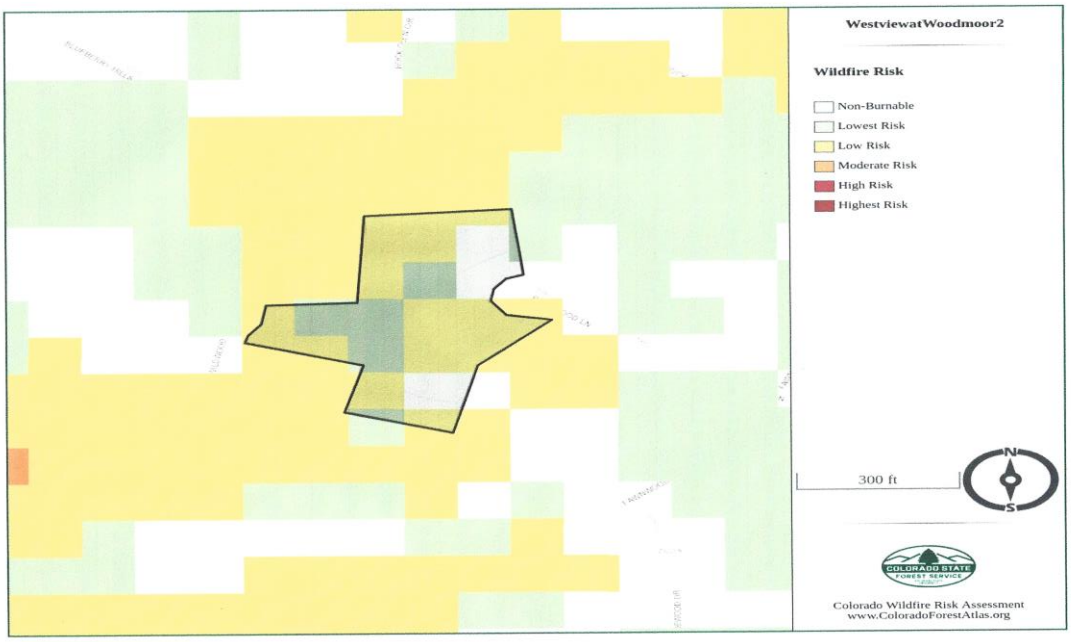
Based upon the Wildfire Hazard Area Map (WHAM) developed by the Colorado State Forest Service (CSFS) in 1978, the site of the proposed development of 'WAW2' subdivision contains a high hazard for trees (see Map 2). However, the area has since been built out significantly which should reduce the overall risk.




**Legend: A= Low Hazard (Trees/Grass)  B= Medium Hazard (Trees)  C= High Hazard (Trees)**

Since the publication of the hazard map series, the CSFS developed a wildfire risk assessment tool in 2012 referred to as the Colorado Wildfire Risk Assessment Web Portal (CO-WRAP). This assessment was recently updated to include events up to 2017. A copy is attached to this report.

Within the assessment report, the Wildfire Risk to the property is classified as the lowest upwards to low. Wildfire risk is a composite rating which identifies the probability of loss or harm from a wildfire.




The Burn Probability is the annual probability of any location becoming subjected to a wildfire event. The assessment gives the proposed development a very low-low to low ranking in this regard. This is not unexpected due to the amount of mitigation performed and education under the auspices of the Woodmoor Improvement Association.

One distinction that can be drawn from the assessment is the selection of the fuel models used in determining the wildfire hazard. The WHAM (Map 2) uses a simplistic approach and delineates between grass, shrub and tree fuel beds. The CO-WRAP assessment uses a distinct set of fuel models, in this instance focusing on timber litter. This is a more dynamic approach, as it does not delineate between fuel beds but considers them uniform across large areas. So even though there may be clusters of shrubs or grasses present, the timber litter fuel will dominate wildfire spread. A copy of the COWRAP assessment is included as a separate document.

A field inspection was performed on September 11, 2022, to determine if any change should be made to the original wildfire hazard conclusions or the CO-WRAP assessment. Based upon the field inspection, **the wildfire risk was confirmed as low**.

There has been no appreciable forest management activity conducted on the property. Due to a dwarf mistletoe infection in ponderosa pine, in the southwest portion of the subject property, a few smaller trees have perished. There are also several larger diameter ponderosa pine that border the lots on Wildwood Way that are severely stressed from a combination of extensive mistletoe infection and severe drought. The

green canopy has died back, leaving a large volume of dead limbs and needles (see Photo 1).

***Photo 1. View of dwarf mistletoe infection and tree mortality along property boundary with lots along Wildwood Way.***

# Wildfire Behavior

This rating considers the role of the three major components that affect wildfire behavior: fuels, topography and weather. These three components will be examined in relation to 'WW2' development plan.

## Fuels

The area was field checked, and the results of the WHAM were confirmed based upon the observed fuel models on the property. The USDA – Forest Service Intermountain Forest and Range Experiment Station in Ogden, Utah, developed these fuel model descriptions. They are used as aids in estimating fire behavior (see Appendix A).

The criteria for choosing a fuel model reflects that a wildfire will burn in that fuel type which best supports that fire. There may be more than one fuel model represented on any given area of land. In addition, current and expected weather conditions will influence the condition of these fuels.

The forested can best be described under Fuel Model 8 (see Appendix A). "Slow burning ground fires with low flame lengths are generally the case, although the fire may encounter …heavy fuel concentrations that can flare up.

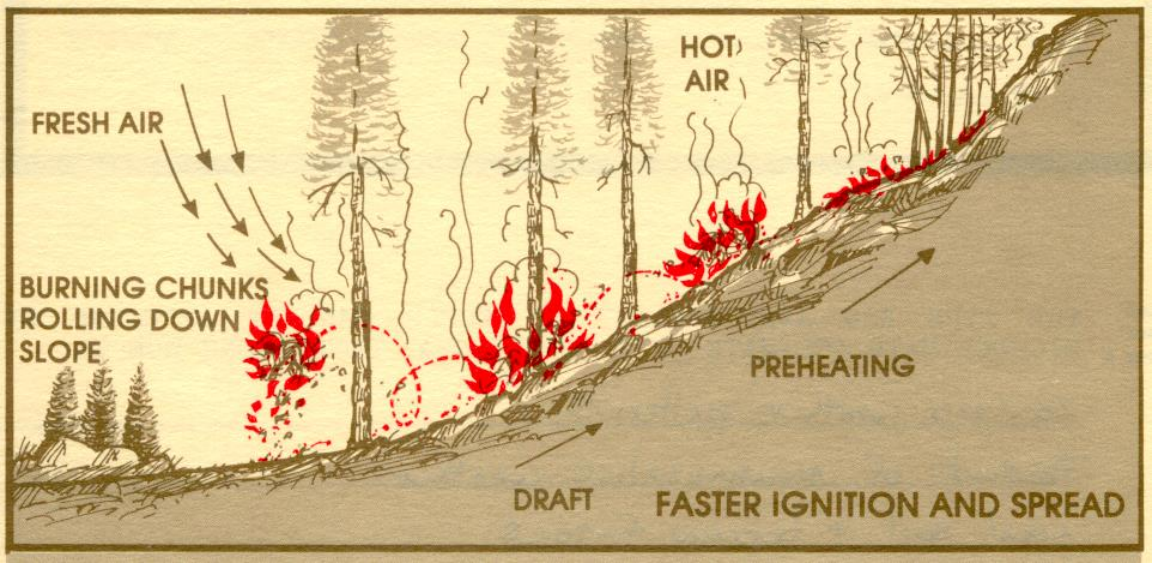
Fuel Model 8 can be further refined to TL8, Long-needle Litter (see Appendix A). This fuel model was developed by Scott & Brogan in 2005. The primary carrier of a fire is dead and down woody fuel. Live fuel, if present, has little effect on fire behavior. This fuel type encompasses 75% of the total area. One acre is identified as being non-burnable.

## Topography

The topography of the site is one of the main factors that will influence a fire spread. The aspect or compass direction that any slope faces influence the fuel type that exists and the amount of preheating these fuels receive by the sun. Aspect can also influence the effects of diurnal winds, as they move upslope during the daylight hours and down slope during the evening and early morning hours.

In this instance, one of the most important attributes of topography is the percent of slope on which the development is proposed. As the percent of slope increases, the rate of fire spread by convection increases. In other words, wildfires burn faster moving uphill (see Figure 1).

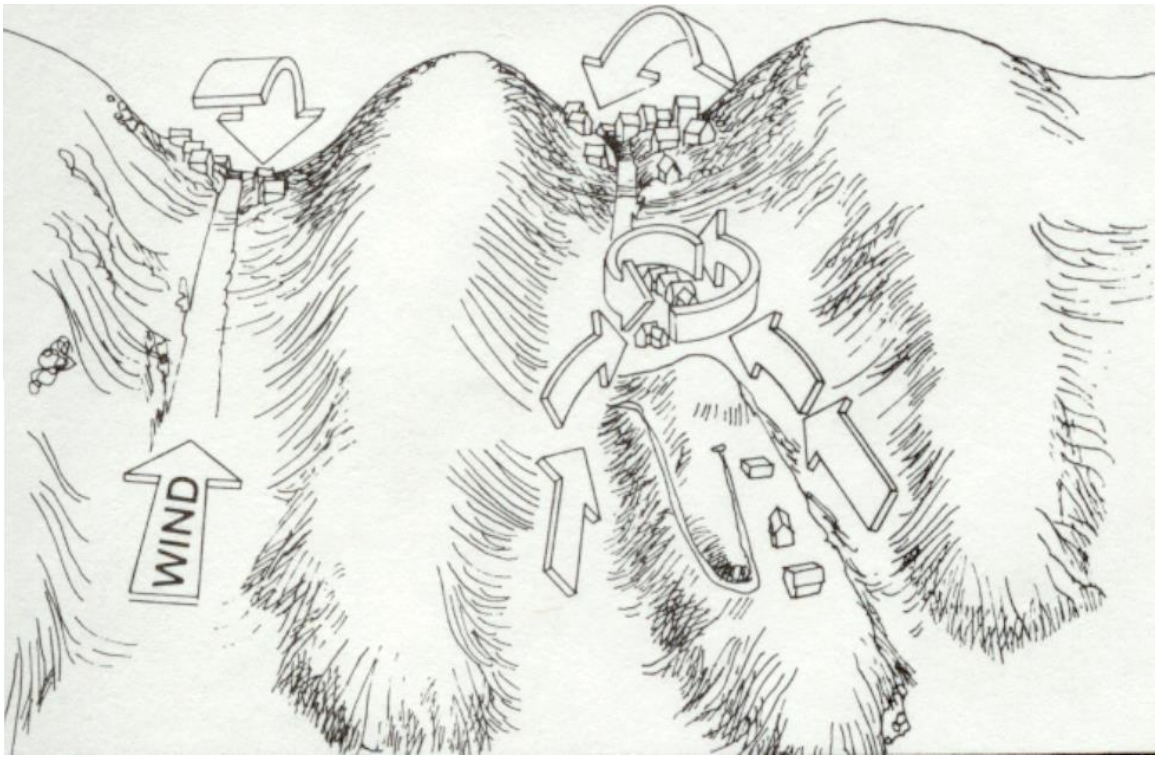
**Figure 1. Slope Affects Fire Spread**




Slopes that are more than 25% are considered extreme slopes in their effect on wildfire behavior. The specific topography of the property is relatively flat. The slope is only 8% from the end of the Buckwood Lane cul-de-sac across the property to the southwest corner of the property at Doewood Drive.

Figure 2 depicts the effect the drainages or box canyons have on a fire. These topography features tend to funnel a wildfire uphill within a narrow profile and the preheating effect tends to ignite the side slopes of the drainage. Structures placed at the mouth of the drainage are most at risk from a wildfire.

**Figure 2. Drainages Tend to Draw in Fire**




*Graphic Courtesy of Colorado Springs Fire Department*

## Weather

Weather is the most variable of all the factors. The accumulative effects of weather over time can influence vegetation curing and fuel moisture content.

Grasses, for example, are described as being one-hour time lag fuels. Time lag is a measure of the rate at which a given dead fuel gains or loses moisture. Hence grasses tend to be influenced by the weather conditions on an hourly basis. Wood fuels that are three inches in diameter or larger are considered 1,000-hour time lag fuels. This type of fuel requires a long period of time of dry or wet weather to affect its combustibility.

Winds can influence the direction and rate of spread of a wildfire. Of greater concern is the short spotting of the fire by embers transported by winds ahead of the main fire.

Winds can influence the direction and rate of spread of a wildfire. Of greater concern is the short spotting of the fire by embers transported by winds ahead of the main fire. The effect of wind on a fire were on display most dramatically this past winter (December - 2021) during the Marshall Fire in Boulder County. This fire grew to over 6,200 acres and destroyed 1,084 homes. The fuel bed consisted of grassland. High winds carried embers across a railway bed and several county roads. The wind gusts up to 115 miles per hour where reported. The wildfire reached the town of Superior, three miles away, in just one hour.

It should be noted that this level of high wind activity is not uncommon along the foothills where the proposed subdivision is located.

While the weather may contribute greatly to a wildfire event, it is immune to outside influences.

# Predicted Fire Behavior

Based upon history, one can expect that if an ignition occurs, a wildfire will spread slowly through the proposed development. Using the USDA – Forest Service Fire Behavior Fuel Model TL8, the following predictions can be made based upon an 80-degree temperature day with a relative humidity of 18% with little cloud cover at 2:00 p.m. in the month of June.

The fire will spread quickly, at a rate more than 8,646 feet per hour, or 144 feet per minute. Flame lengths will range from 4 ½ to 7 ½ feet. The probability of fuels igniting in advance of the fire front is 100%. In the fifteen minutes that it may take for the fire to be noticed, reported to the fire department's dispatch office and for the arrival of the initial attack force, the fire could have traveled over 2,160 feet. At that distance, the wildfire would exit the property or potentially enter the property.

This prediction is in line with the results in the COWRAP Assessment.

It is predicted that local suppression forces will not be able to contain the initial fire outbreak with mobile engines and hand constructed control lines.

It should be noted that these predictions are based upon normal weather conditions prevailing over the course of a year. Weather conditions that were exhibited from the winter of 2022 through the present date are outside of normal conditions resulting in the catastrophic losses experienced throughout the western United States this past fire season. Again, the Marshall Fire provides an insight in what fire behavior might occur even in the winter season.

If such conditions are present on or in the vicinity of the proposed development site, any wildfire event can be predicted to be more severe and resistant to initial control efforts.

The normal diurnal winds will accelerate the wildfire incident. If the normal diurnal wind patterns are present, a wildfire will move quickly uphill from the east. The drainages will draw fire upslope by increasing wind velocity. This convective heat current will accelerate the pre-heating of available fuel upslope of the fire. It is expected that the fire will move upslope rapidly with high heat intensity.

Finally, it should not be assumed that the main periods of fire danger would be in the summer months. As history has shown, out of season fire events are much more common than might be expected by the public.

# Wildfire Mitigation

It should be noted here that the occurrence of a wildland fire on this property and any subsequent spread of a wildfire to adjacent land could never be eliminated. In the Spaatz Fire, suppression forces were able to arrive on scene in approximately four minutes after the fire was reported. Even with this rapid response, the wildfire reached a size of 67 acres before it was controlled.

The potential for loss can be reduced and the odds can be improved that initial response forces can be successful in keeping a wildfire to the smallest size possible and structure loss to a minimum. But even with the best efforts of suppression forces, there will always exist a level of risk of loss to a wildfire.

The only way to reduce the risk of loss from a wildfire is to modify the factors that influence fire behavior. Of the three factors discussed previously, the only factor that could be modified prior to a wildland fire is the fuels. The efforts in modifying fuels can be targeted to their arrangement, continuity and availability.

- **Arrangement**

The arrangement of fuel considers the size, shape and compactness of the fuel itself. Smaller fuel sizes have a greater surface area exposure for preheating. If these smaller sized fuels are only lightly compacted in spacing this results in easier ignition and increased combustion.

Fuels that are tightly compacted and larger in size have lower surface areas. This reduces the ease of ignition and combustion.

One technique in reducing the readily ignitable fuel level would be to remove fuels, such as dead leaves, fallen limbs and other small organic debris, from the proposed development. However, it is not practical to remove these types of fuels from the entire property.

During the construction phase of any residential structure, the most likely source of ignition will come from personnel and activities. These sources of ignition may come from flammable chemicals, improperly discarded cigarettes, shorts in electrical equipment, and other means.

It is suggested here that the reduction of the most ignitable fuel be done in areas that are within fifty feet of the pad of any proposed residential structures. This will reduce the amount of small, flashy fuel in proximity to the structure. It will also retard the spread of a fire towards adjacent property and provide suppression forces additional time to contain a fire quickly.

Once a residential structure is built, a wildfire safety zone should be established. Wildfire safety zones are intended to slow a fire down so that it may be controlled and extinguished. There are three zones that comprise a wildfire safety zone.

The first zone is the one that contains the most opportunity for modification. The minimum width recommended is thirty feet and is divided into three segments.

As these zones may be unique for each lot that is developed, it is difficult to make specific recommendations here. However, it is recommended that each lot be treated prior to completion of the structure and the issuance of the occupancy certificate.

Specific information on the development of wildfire safety zones are available through the Colorado State Forest Service in the Quick Guide Series Fire 2012-1, *Creating Wildfire-Defensible Zones* at the following link: https://static.colostate.edu/client-files/csfs/pdfs/FIRE2012_1_DspaceQuickGuide.pdf

- **Continuity**

The second factor affecting fuels that can be modified is their continuity. Is the fuel continuous or patchy in nature? Is the fuel layered in such a manner that it can leave the ground and spread into a vegetative canopy?

In this instance, the fuels in the fuel model are patchy. There are clusters of younger ponderosa pine trees and Gambel oak. Within these clusters are open areas of grass, sprouting oak and bare mineral soil (see Photo 2).

***Photo 2. This photo is taken looking to the east from Doewood Drive across Lot 1 towards Lot 2. Note the change between fuel types.***

- **Availability**

The final consideration is the availability of the fuel to physically burn. This factor is influenced by the weather on a daily or yearly basis and cannot be readily influenced.

As was mentioned earlier, the availability of this fuel type should be considered a year-round hazard and not limited to the summer months. Drought conditions and early fall frosts may inhibit the normal leaf drop from Gambel oak. This would leave a very flashy aerial fuel in place and available for rapid combustion and subsequent wildfire spread.

The current weather patterns have contributed to a long-term drought situation that has influenced the availability of the fuels to burn. The trend of above average day time temperatures and below normal precipitation levels have allowed fuels to reach a higher state of availability than might normally be the case, particularly during winter months. This may result in wildfire acting in a manner that might be more characteristic of mid to late summer burning conditions.

## Other Considerations

### *Firebrands & Secondary Ignitions*

It is becoming more apparent that structure loss is not occurring during the passage of a burning wildfire front but from ignition of the structure by firebrands and secondary ignitions. Firebrands are burning materials or embers that are lifted into the air by convective wind currents. Firebrands can be cast hundreds of feet in advance of the fire front.

Research and case studies in Australia have found that there is a 50% probability of loss of structures that are 100 – 200 feet from the fire front. This would seem to indicate that firebrands are a major contributing factor of structure loss.

In the U.S., studies indicate there is 90% probability that a structure with a non-flammable roof and that is at least 100 feet from the fuel bed will not be lost during a wildfire. However, this statistic may be misleading as the Cedar Fire (CA) in 2003 indicated that 60% -70% of the structures lost were ignited by firebrands. This would also infer that solely relying on 'defensible space' for structure protection may not be adequate.

In a professional paper by Scott (2005), the exposure of a structure to embers and firebrands is discussed. In an inference to fuel mitigation in the 'defensible space' zones, Scott states that "In no case is complete removal of the forest canopy required to mitigate crown fire potential near a structure." This infers that 'defensible space', while a good starting point, may not be the whole solution in preventing structure loss.

***Currently, fire-safe construction is the recommended protocol for fire brand risk reduction by the professional wildfire community.***

### *Roads and Driveways*

Roads and driveways to individual lots should be constructed in accordance with NFPA 1141, *Fire Protection for Planned Building Groups*. Specifically, road widths should not be less than twenty-four feet to allow for simultaneous access of emergency equipment and evacuation of residents.

Driveways should provide a minimum width of twelve feet and a minimum vertical clearance of fifteen feet. The grade of any driveway should not exceed 12%. The entrance to any driveway from public roads should not exceed a ninety-degree angle. A turnaround should be provided at all structure sites on driveways over three hundred feet in length. These turnarounds should be within fifty feet of any structure.

From a detailed wildfire hazard assessment performed in a local subdivision, a common discrepancy found was inadequate or poor visibility of individual residential address

numbers. Letters and numbers indicating specific street addresses should be a minimum of 4 inches in height with a ½" stroke. The numbers or letters should be strongly contrasting with the background color to readily visible from the main access road.

## *Landscaping*

The vegetation that is used in the landscaping of the structure should be fire resistant. For example, ornamental junipers can be very flammable and easily ignited by aerial firebrands. Planting these shrubs or other conifers near the exterior walls of any residential structures provide a readily available fuel source that could threaten the structure and divert suppression forces to protect the building instead of controlling the wildfire.

From the historical fire record of the region, the ignition of ornamental junipers around structures is a major contributor of damage and subsequent loss. **It is strongly recommended that the use of junipers and any other lowing growing ornamental conifer in the landscape be prohibited within thirty feet of a structure's foundation.**

It is assumed that the majority of lots built on will have some type of irrigated greenbelt. Irrigated lawns around a structure are very effective fuel breaks and serve as defensible space in the event of a wildfire.

If a native landscape is preferred, the use of periodic irrigation helps keep landscapes lush and green, thereby lowering their ability to ignite. There are many irrigation techniques available that can keep plants less susceptible to burning while still adhering to water conservation principles.

Another alternative to irrigated green space would be to line the footprint of the foundation of the structure with rock. If rock is used, it should be placed at a minimum width of five feet from the foundation. This will prevent flame lengths from reaching the building.

It should be noted that the use of rock will require regular maintenance to remove flammable debris such as leaves and conifer needles. This material can accumulate quickly and may reduce a rock border's effectiveness.

## *Construction Considerations*

As the fuel in this subdivision are needles and other small woody debris, predictable sources of fuel that will burn and allow entry of a wildfire into the structure will be debris that is trapped under or next to the building or accumulation in the roof gutters. Porch, foundation, roof and attic openings should be screened off or enclosed to keep debris from accumulating and burning underneath. This is particularly important where wooden decks are planned at ground level. This was a factor in the loss of structures in the Waldo Canyon Fire. These location concerns were also expressed in a joint publication by Green Builder Media and the NFPA. This recently released e-book, 'Design with Fire in Mind', can be downloaded using the link. Go to the Resources tab and click on e-books.

**It is strongly recommended that all decks that are planned at ground level be required to be sealed off and enclosed to prevent the accumulation of flammable debris underneath them.**

The National Institute of Standards and Technology published results from experiments that examined how fire spread toward a structure is affected by combustible fences and mulch under conditions that may be encountered in a wildland-urban interface fire.

The study found that firebrands capable of igniting spot fires downwind were generated by nearly all combinations of fence and mulch tested. Mulch was placed under the fences to mimic debris that commonly accumulates under or around them. A target mulch bed at the base of a constructed structure tested the ability of firebrands produced by the burning fence and mulch (simulated debris) to ignite spot fires that threatened the structure.

The result was that all wood fences with mulch (simulated debris) at the base caused spot fires in the target mulch bed. In summary, fire spread is more likely with wood and wood-plastic composite fences than with fences made of vinyl or noncombustible materials such as stone, brick, or steel.

More details on this study can be found at Wind-Driven Fire Spread to a Structure from Fences and Mulch (nist.gov)

While the Woodmoor Improvement Association covenants may not allow for wooden fences, the proximity of combustible fences, if installed, to the main residence, including neighboring residences, should be avoided to prevent direct ignition.

In a wildfire risk assessment in a local development, a significant entry point for fire into a house was through the eaves, overhangs or sofits. These locations can trap embers and combustible gas or heat, that can ignite the structure.

**Based upon recommendations from FEMA, overhangs, if used, should be enclosed with a flat, horizontal sofit with a one-hour fire resistance rating. The fascia should be constructed of non-combustible material.**

Due to the increased loss of structures to wildfire events nationwide, there is growing emphasis on 'hardening the structure'. A recent report published by Headwaters Economics discusses the costs of added protection during construction of a residential structure. A copy of the full report can be downloaded at: Construction Costs for a Wildfire Resistant Home, California Edition (headwaterseconomics.org)

The report lists several construction improvements that are relatively inexpensive to install.

# *Forest Management*

It becomes quickly apparent that the dwarf mistletoe infection and its potential control is the highest priority for the forest stand on the property. Dwarf mistletoe is a parasitic plant which feeds off its host plant. In this instance, the ponderosa pine is infected with this parasite.

Dwarf mistletoe does not directly kill the affected trees. It reduces their health as the mistletoe competes for water and nutrients. With the recent severe drought, this added stress does start to kill trees. In addition, this makes the tree susceptible to insects such as bark beetles. These insects attack and complete the process the mistletoe started.

In 1977, Frank Hawksworth developed a 6-class rating system for dwarf mistletoe. By dividing the crown of a tree into thirds, a numerical number was assigned to the level of infection in each third. Zero if no infection was observed, one if it was lightly infected and two if the tree had a heavy infection in that third. The three numbers are added together to achieve the overall infection rating.

In the ‘WAW2’, the infected ponderosa pines have a rating of three or higher. The best course of action would be to remove infected trees whose health is so poor that they appear to be dying. These are primarily the trees along the borders of Lots 3 & 4 with the property at 19395 Wildwood Way.

As the forest on the property is approximately two acres in size, an extensive management plan is not necessary.

The inventory result is only from one random plot due to the size of the area. This leaves it difficult to obtain a quantifiable accuracy. None the less, it is estimated that there is an average of 178 ponderosa pine per acre. Approximately one-half of the trees can be found in the 10-16-inch diameter classes. This would infer that the larger diameter trees represent an even-aged forest. This is typical of the Black Forest area due to the historical logging and settlement period.

The other half of the trees are found solely in the 6-inch diameter class. This may be the result of a substantial seed crop that occurred. This is referred to as the understory of the forest. It is in this diameter class several trees could be removed. From the inventory, at least twenty (20) per cent of the trees were snow bent or suppressed and should be removed.

This would be considered as a sanitation cut. The focus would be on removing the least desirable pine to the benefit of the remaining forest stand. This has three main benefits. It would allow the removal of potential ladder fuels that would allow a wildfire to reach the main canopy. It would also reduce the risk of individual or cluster of trees torching from the heat produced from the burning forest floor.

***Photo 3. A view of the ponderosa pine found on Lot 4. Small diameter trees would be removed for health. A select number of larger trees may need to be removed to reduce the risk of bark beetle attack.***

Finally, it would increase the overall health and vigor of the remaining pines. Based on an average diameter of 12.5 inches, the residual forest should consist of approximately 115 trees. This stocking level would lower the risk of future attack by mountain pine beetle, an insect pest. So, it may require the removal of a limited number of larger trees to reach the 115-tree target.

With a minimum of 18 trees being removed under a sanitation cut, this would require the removal of an additional 45 trees. Obviously, there may be more trees removed in the sanitation cut of the six-inch diameter class. However, it is difficult to accept that almost two-thirds would be removed. To make up the difference, large trees may need to be cut down.

This is important to note as the Woodmoor Improvement Association requires a permit for removing trees greater than four inches in diameter. Trees requiring permitting must be outside the first thirty feet of a structure's footprint. Trees within the footprint can be removed without a permit as that is the first zone of the defensible space within the Firewise program.

The young ponderosa pine that grown into the ditch along Doewood Drive and Wildwood Way should be thinned. There may be a concern about removing trees to retain the privacy they provide to residential structures that are eventually built.

***Photo 4. View of ponderosa pine along Doewood Drive that should be thinned.***

However, by giving the pine sufficient room, they will increase their green crowns or canopy. This will provide an even greater amount of privacy and will increase a higher level of noise reduction from passing traffic.

The young pine along Wildwood Way may require selective pruning to remove individual limbs that are infected with dwarf mistletoe.

## *Wildlife Considerations*

This section is intended to fulfill the requirement of Section 6.3.9 of the development code.

The proposed development is just over three acres in size. This is not large enough on its own to impact any wildlife values positively or negatively. In addition, the proposed subdivision is surrounded by residential development. So, any steps taken to favor any wildlife specie would be lost in the surrounding noise and outdoor activities.

A search of the Natural Diversity Information Service (NDIS) found no locations of critical habitat for any major game wildlife species. The property is listed as overall range for mule deer, turkeys and black bear.

El Paso County recognizes many federally Threatened or Endangered species. Again, the size of the subdivision and the surrounding development precludes any concern over their potential presence.

A review of the Colorado Natural Heritage Program (CNHP) reveals no concern for any specie in or around the proposed development. A Survey of Critical Biological Resources in El Paso County, Colorado, conducted by CNHP, was published in 2000. Of all the Potential Conservation Areas identified in the report, none are in proximity of the proposed subdivision.

More information on the survey can be found at: Microsoft Word - El Paso report unlinked.doc (colostate.edu)

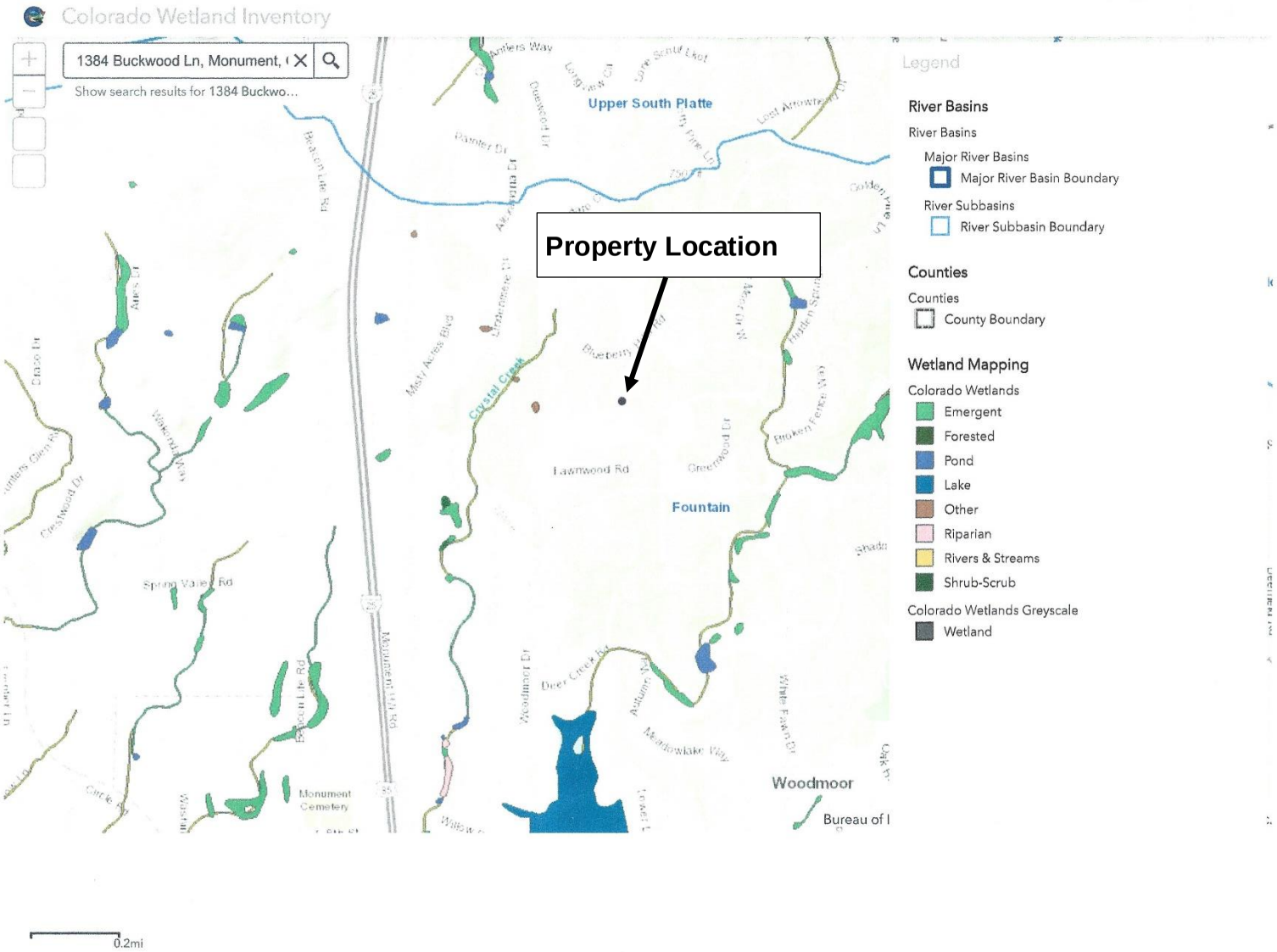
## *Wetlands*

This section is intended to fulfill the requirement of Section 6.3.8 of the development code.

The Environmental Protection Agency defines wetlands as " Wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season.

A review of the property using the Colorado Wetlands Inventory Mapping Tool was performed. This mapping tool was developed by multiple agencies under the auspices of the Colorado Natural Heritage Program. No wetlands or riparian areas were identified by the mapping tool to exist within the proposed development.

A copy of the Wetland Map of the property is on the following page.


Colorado Wetland Inventory
1384 Buckwood Ln, Monument, (
Show search results for 1384 Buckwo...
Property Location
Upper South Platte
Coastal Creek
Lawnwood Rd
Fountain
Woodmoor
Monument Cemetery
Spring Valley Rd
Deer Creek Rd
Meadowlake Way
Monument Hill Rd
Bureau of I
0.2mi
Legend
River Basins
River Basins
Major River Basins
Major River Basin Boundary
River Subbasins
River Subbasin Boundary
Counties
Counties
County Boundary
Wetland Mapping
Colorado Wetlands
Emergent
Forested
Pond
Lake
Other
Riparian
Rivers & Streams
Shrub-Scrub
Colorado Wetlands Greyscale
Wetland

## *Noxious Weeds*

This section is intended to fulfill the requirement of Section 6.3.7 of the development code.

There were no noxious weeds found within the property.

There were a couple of Knapweed plants observed in the ditch along Wildwood Way. These plants lie outside of the property and are situated in the road right-of-way. It would appear that the responsibility of controlling these weeds lies with El Paso County.

# Appendix A

## Fuel Model Descriptions

### Fuel Model 8 Summary Page

Source: Anderson, Hal E. Aids to Determining Fuel Models for Estimating Fire Behavior, National Wildfire Coordinating Group, General Technical Report INT-122, April 1982.

"This report presents photographic examples, tabulations, and a similarity chart to assist fire behavior officers, fuel management specialists, and other field personnel in selecting a fuel model appropriate for a specific field situation. Proper selection of a fuel model is a critical step in mathematical modeling of fire behavior and fire danger rating."

### Long-Needle Litter (TL8) Summary Page

Source: Scott, Joe H. & Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's (1972) surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153, Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

"This report describes a new set of standard fire behavior fuel models for use with Rothermel's surface fire spread model and the relationship of the new set to the original 13 fire behavior fuel models."

## Timber Group

### Fire Behavior Fuel Model 8

Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Representative conifer types are white pine, and lodgepole pine, spruce, fir, and larch.

This model can be used for 1978 NFDRS fuel models H and R. Photographs 22, 23, and 24 illustrate the situations representative of this fuel.

**Fuel model values for estimating fire behavior**

| | |
|---|---|
| Total fuel load, < 3-inch, dead and live, tons/acre | 5.0 |
| Dead fuel load, ¼-inch, tons/acre | 1.5 |
| Live fuel load, foliage, tons/acre | 0 |
| Fuel bed depth, feet | 0.2 |

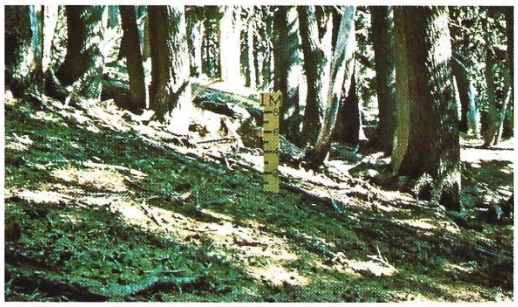


*Photo 22. Surface litter fuels in western hemlock stands of Oregon and Washington.*

*Photo 23. Understory of inland Douglas-fir has little fuel here to add to dead-down litter load.*

*Photo 24. Closed stand of birch-aspen with leaf litter compacted.*

## *TL8 (188)*

### *Long-Needle Litter*

**Description:** The primary carrier of fire in TL8 is moderate load long-needle pine litter, may include small amount of herbaceous load. Spread rate is moderate; flame length low.

| | |
|---|---|
| Fine fuel load (t/ac) | 5.8 |
| Characteristic SAV (ft-1) | 1770 |
| Packing ratio (dimensionless) | 0.03969 |
| Extinction moisture content (percent) | 35 |