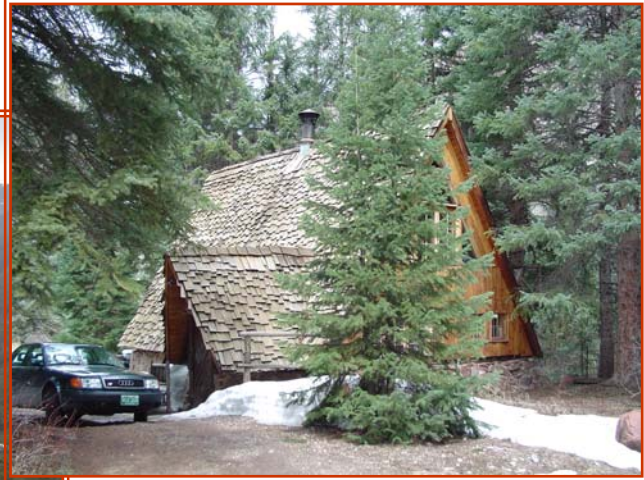




# **ROCKY MOUNTAIN ECOLOGICAL SERVICES, INC.**

NEPA••WILDLIFE••VEGETATION••WILDFIRE MITIGATION••WETLANDS••PLANNING



## **CONUNDRUM AREA COMMUNITY WILDFIRE PROTECTION PLAN PITKIN COUNTY, COLORADO**

**PITKIN COUNTY EMERGENCY MANAGEMENT  
NOVEMBER 2004**

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## 1. INTRODUCTION

The Conundrum Community Wildfire Protection Plan is the product of a broad-based planning effort that was started in early 2003, when a grant was awarded to the Northwest Colorado Council of Governments (NWCCOG) by the White River National Forest (WRNF) to produce multi-jurisdictional fuels reduction programs in or near the intermix areas of the White River National Forest. A “kick off” meeting was held on January 31, 2003, with participation from Eagle, Pitkin and Summit counties, several towns, land management agencies (USFS, BLM and CSFS), technical experts and interested publics. In response to interest in the program, NWCCOG issued cash awards (grants) as “seed money” to Eagle and Pitkin counties to assist the counties in starting up the program.

The Pitkin County multi-jurisdictional working group is comprised of members representing the Aspen Fire Protection District, Pitkin County Emergency Services, Pitkin County Community Development, Town of Aspen, Colorado State Forest Service, White River National Forest, Bureau of Land Management, Aspen Wilderness Workshop, Rocky Mountain Institute, Congressional Staff, NWCCOG, interested individuals and fire management consultants. This working group selected the Conundrum and Mountain Valley areas for starting the process in working with private land owners to reduce hazardous fuels conditions.

As part of fulfillment of this original grant, this Community Wildfire Protection Plan is being prepared for the Conundrum area in rural Pitkin County, but the format developed through this process is to be used for future planning efforts in Pitkin County. The Conundrum area was selected due to its distance from fire suppression services, poor access, hazardous fuels condition, and because the size of the subdivision fit well with the amount of money available to produce a comprehensive plan, and to facilitate implementation of the plan. This plan generally follows, and is consistent with the Healthy Forests Restoration Act, and guidance from the Colorado State Forest Service.

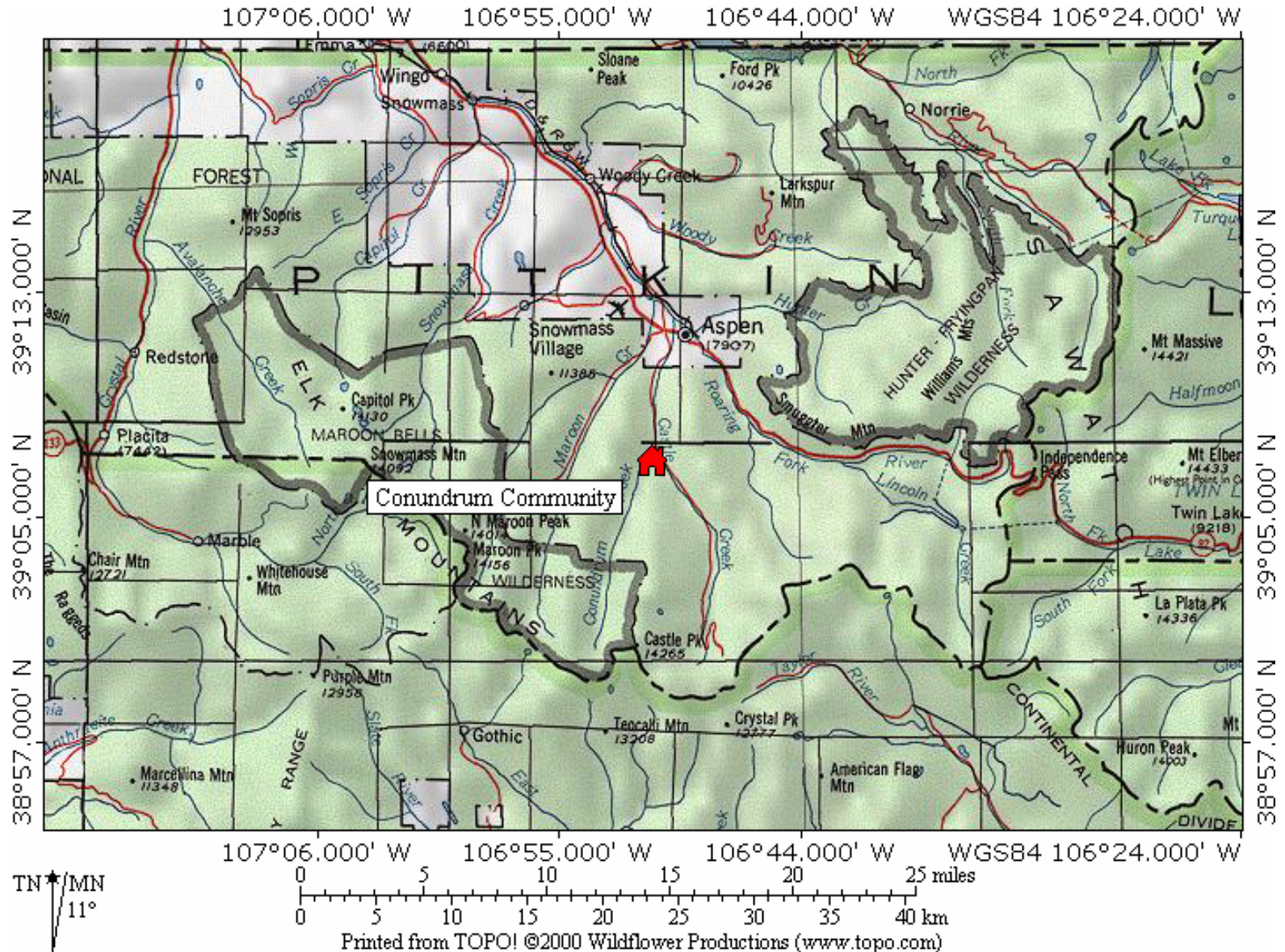


Aspen Fire





## 2. General Map of Conundrum Area



### 3. Decision Making/Planning Process

In the development of this plan, the Pitkin County multi-jurisdictional working group was comprised of members representing:

Aspen Fire Protection District  
Pitkin County Emergency Services  
Pitkin County Road and Bridge  
Pitkin County Community Development  
Town of Aspen  
Colorado State Forest Service  
White River National Forest/Bureau of Land Management  
Aspen Wilderness Workshop  
Rocky Mountain Institute  
Congressional Staff  
Northwest Colorado Council of Governments

These groups formed the members of the core team that guided the development of the issues to be addressed in minimizing fire hazards in Pitkin County. First and foremost, protection of human life would guide any planning or implementation projects in the County. This priority was followed by protection of infrastructure (roads, electricity, etc.), protection of watersheds, and protection of private property (residences).

With strong support from Aspen Fire Protection District, Pitkin County Emergency Management, and the USDA Forest Service/BLM Fire Staff, the Conundrum property owners were approached with a proposal to put together a Community Wildfire Protection Plan, and provide assistance in implementation of some of the items that were to be identified in this plan. The vast majority of the property owners in Conundrum agreed to be involved in the process, and to assist and follow through with the recommendations where they could.

Meetings with the Conundrum property owners have been ongoing in developing and addressing the specific needs of the community, and where they desire this plan to go, with input and guidance from fire experts.



Conundrum area- most of the homes are down in the bottom of the drainage



#### 4. Conundrum Community Hazard Mapping

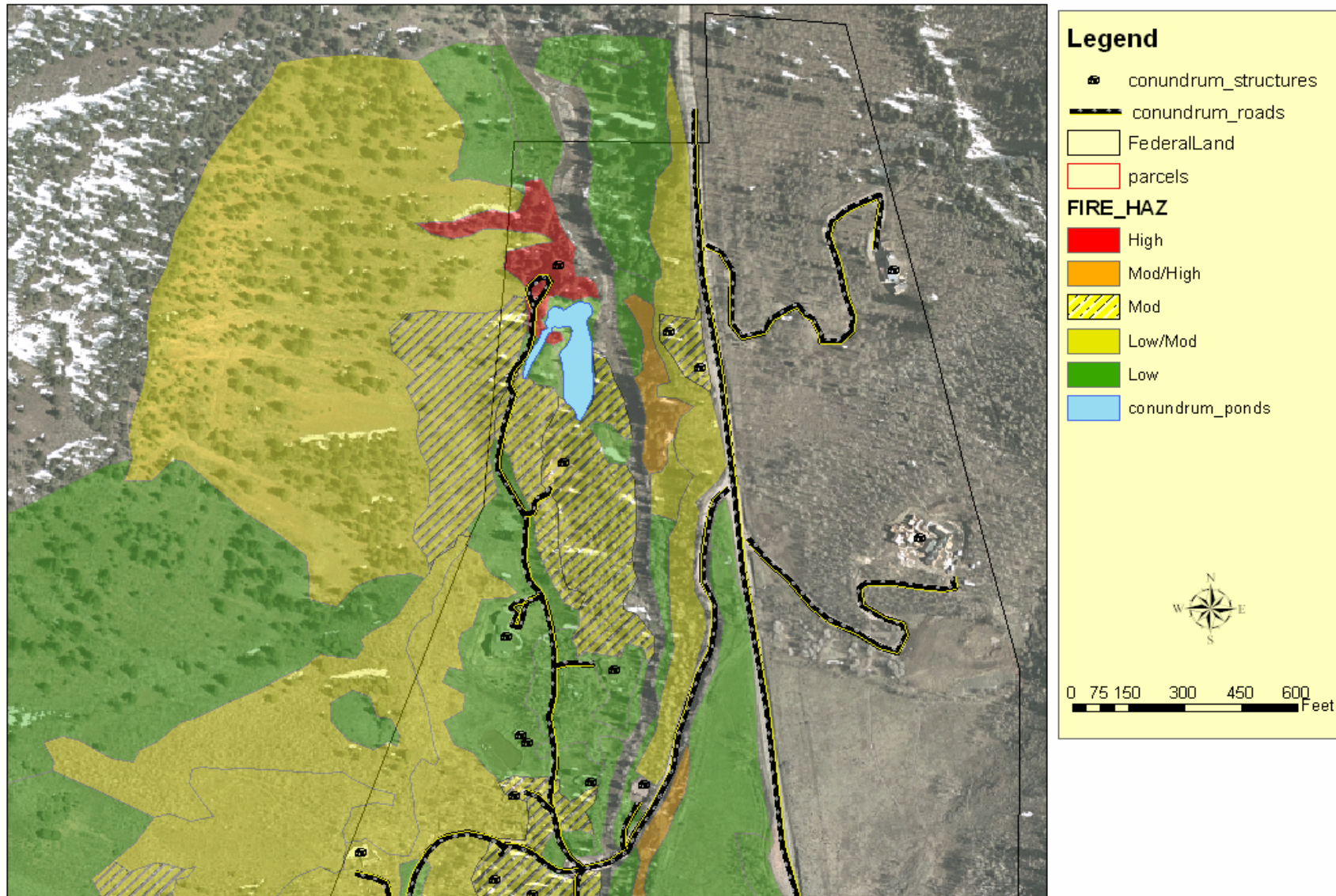
Vegetation and fuels mapping was done to provide the community a base map of the current fuels and fire hazards present in the subdivision and surrounding areas. These maps help provide the community a baseline of current conditions which is then used to develop recommendations regarding protection and risk-reduction priorities.

The Wildfire Hazard Maps were developed from using digital aerial photography to interpret current vegetation and fuels in the area. The polygons represent similar vegetation types, and similar fuels loading. Also in these polygons, a general assessment was made of the current risk of a potential wildfire in these polygons, and the hazards such a wildfire may present to life and property safety. For instance, a stand of cottonwood trees along the river, away from structures may have a “Low” wildfire hazard rating, as the odds of a wildfire carrying in the stand is low, and the potential impacts to life and property safety area low. On the other hand, a cottonwood stand in more of an upland area (further away from water), and with structures within the stand, the wildfire hazard rating may be “Mod” (or Moderate), due to the fact that the stand is drier, and there is a higher likelihood that if a wildfire did ignite the stand, fire suppression personnel would be on scene to suppress the fire as homes are nearby, and the stand is more flammable due to a less mesic (moist) site.



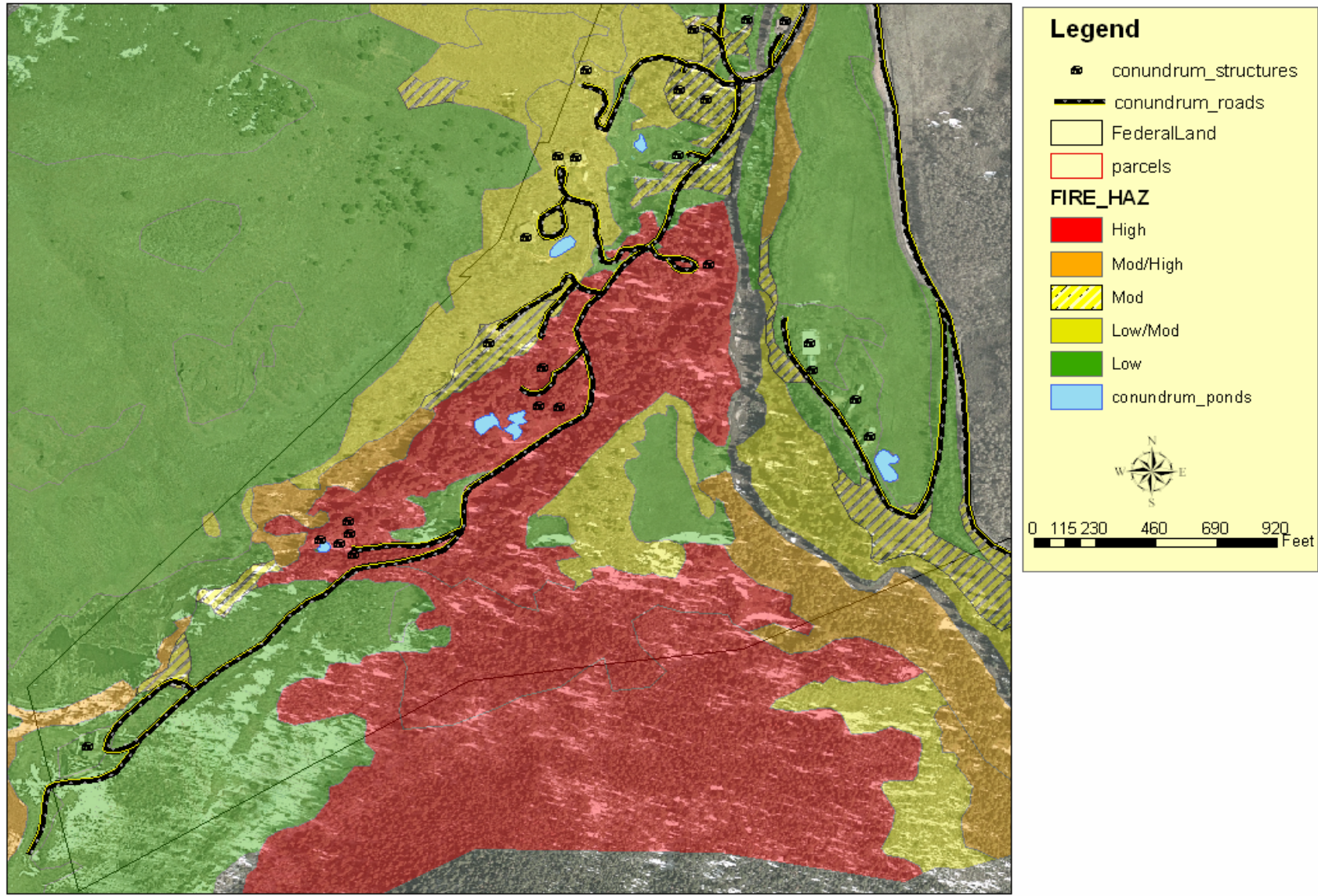


## Conundrum North- Wildfire Hazard Ratings





## Conundrum South- Wildfire Hazard Ratings



## 5. Vegetation & Fuels

The following section is a description of the major vegetation communities found in the Conundrum Subdivision, and their relative risk of supporting a wildfire.

### 5.1. Aspen Stands

The aspen stands in the area are predominately mature stands, and have low levels of coniferous encroachment. These aspen stands are considered to be mesic, and as such support a very lush understory of grasses, forbs, and shrubs. They also have a significant down and dead component in them, which during wildfires, can complicate and make suppression in these stands more difficult. Understory species in these stands include snowberry (*Symphoricarpos oreophilus*), larkspur (*Delphinium* spp.), grass species (*Carex* and others), currant or gooseberry (*Ribes inerme*), wild rose (*Rosa woodsii*), Scouler willow (*Salix scouleriana*), cow parsnip (*Heracleum sphondylium* ssp. *montanum*),



Mature aspen stand in area- stands are very mesic

chokecherry (*Prunus virginiana*) and others. Generally, aspen stands have very high understory fuel moisture levels, due to the shading effect of the overstory aspen stands, and the northern aspect of the stands. These aspen stands would likely only burn during drought periods, or during the fall, after grasses and forb species have desiccated due to cold fall temperatures.

Some of the aspen stands in the area have a more southerly aspect with dryer understory conditions. These stands would likely support an understory burn, but the aspen canopy would not become engaged in a wildfire.

Some of the aspen stands do have a coniferous encroachment component, consisting of Douglas-fir, Engelmann spruce and subalpine fir. These stands are somewhat more susceptible to a wildfire, but again, only under very dry conditions would these stands burn.

### 5.2. Spruce-Fir

The spruce-fir stands are comprised of Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and in riparian areas also blue spruce (*Picea pungens*). These stands occur primarily in the valley floor of the Conundrum creek area, where the water table is very close to the surface, or there is free surface water. The stands are generally very mature, with a heavy understory component of subalpine fir seedlings, saplings, and pole-sized timber. These stands are usually very wet and cool given the canopy closure, the high snow amounts in the area, and the location of the stands in the bottom of the canyon. Under average precipitation years, these





stands would not likely become engaged in a wildfire as they are so wet. However, during drought conditions when the forest floor of litter and small shrubs becomes dried out and the live fuel moistures drop, these stands pose a significant wildfire risk. The density of ladder fuels, the high crown connectivity, and the presence of main access roads and homes in these fuel types can pose a significant risk during drought conditions.



Spruce-fir stands in conundrum- some aspen and cottonwood are visible at the edges of the stands.

### 5.3. Cottonwood Forest

In the more open riparian areas, Narrowleaf cottonwood (*Populus angustifolia*) forests dominate the fuels. These stands are generally very wet, and grow primarily in riparian areas or areas where the water table is very close to the surface. The stands in the Conundrum area are mature, with many larger trees. The understories of these stands vary widely, depending upon the soil moisture of the site. In some areas, understories are dominated by more wetland vegetation, including willows (*Salix* spp.), redosier dogwood (*Cornus stolonifera*), twinberry (*Lonicera involucrata*), and scouring rush (*Equisetum hyemale*), along with various graminoids and forbs. These wet sites would not likely burn during a wildfire event, except under extreme drought conditions. However, during these periods of high fire danger, the large amount of down and dead material, and dense shrubby vegetation in these stands would make fire suppression time consuming and somewhat arduous.

Other cottonwood stands have more xeric understories, dominated by more grass-like plants, forbs, and with some shrubby components (including common juniper (*Juniperus communis*)). These stands are still not very susceptible to wildfire, except under drought conditions, and would not likely burn in normal precipitation years. However, as cottonwoods do produce high amounts of litter and dead branches, areas in these stands can produce higher severity fires.



Cottonwood stands are generally very wet, but brushy



#### 5.4. Mixed Shrublands

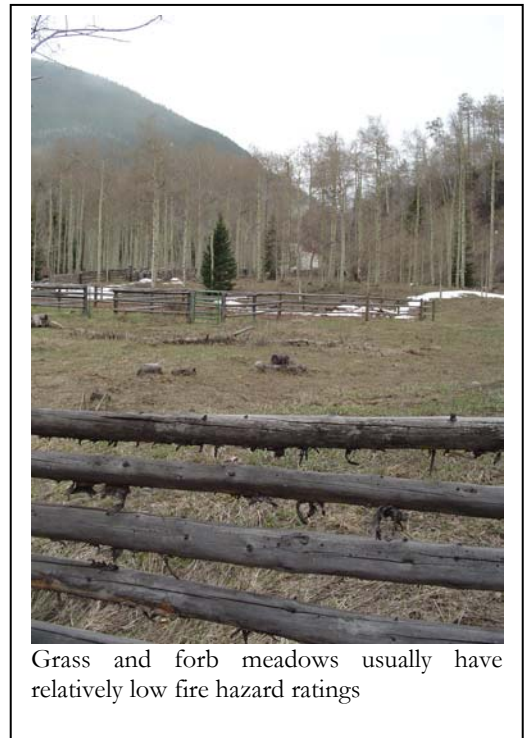
These areas vary greatly, but most areas are dominated by chokecherry with a co-dominants of snowberry and serviceberry. Many of these shrublands also have scattered aspen stands in more mesic areas. Vegetation in these areas vary widely, from more xeric sites containing common juniper, to more mesic sites containing redosier dogwood and cow parsnip. These sites vary in fire hazard, but many of these sites have large rock outcrops, scree slopes, and aspen stands that lower the potential fire hazards. In other sites, where understory grasses are very continuous and snowberry cover is high, fire hazards increase to more “moderate” hazard levels. Steep slopes (50-60%) could make suppression in these areas very difficult, however there are no houses located within these vegetation types.



This mixed shrubland has willow stringers, and scattered aspen mixed with rock outcrops

#### 5.5. Grass/Forb Meadows

Scattered around the subdivision, are large meadows that are dominated by grasses and forbs. The large meadows near the Forest Service Conundrum Trailhead are dominated by more native plant species, including native sedges (*Carex* spp.) and many forbs, including orange sneezeweed (*Helenium autumnale* var. *montanum*), lupine (*Lupinus argenteus*), Indian paintbrush (*Castilleja* spp.), larkspur (*Delphinium* spp.), and bistort (*Bistorta bistoides*). The meadows that are located in the middle of the subdivision are dominated by more agricultural grasses and introduced forbs, including timothy (*Phleum pratense*), orchardgrass (*Dactylis glomerata*), smooth brome (*Bromus inermis*), and dandelion (*Taraxacum officinale*). Common to all these meadows, is the low risk of wildfire. Fire may start in these meadows, and may be carried through them, but should be relatively easy to suppress given the light fuel loading in these meadows. During most years, these meadows will be too wet to support anything but a creeping ground fire, but during drought conditions, or during high fire danger periods, these meadows may carry fires more rapidly across their surface, and to more flammable adjacent fuel types.



Grass and forb meadows usually have relatively low fire hazard ratings



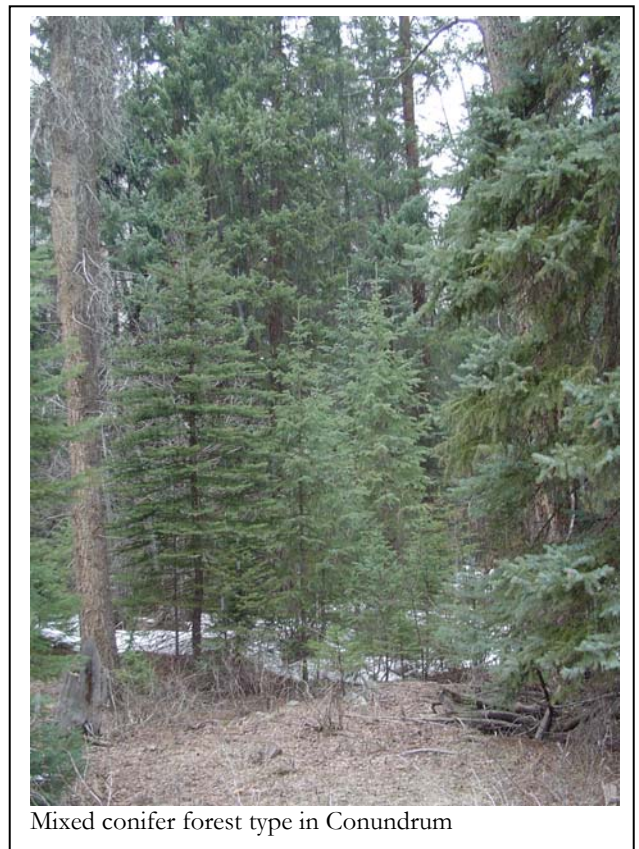


## 5.6. Lodgepole Pine

The lodgepole pine forests in the area are primarily on Forest Service lands south of the subdivision, but some lodgepole pine forests lie within the subdivision boundaries at the southern end. There are no homesites within these stands at this time. The lodgepole pine stand appears to have been initiated by a wildfire event some 120 years ago. Lodgepole pine at these elevations is usually not considered a fire hazard, except during periods of extreme drought. The canopy closure in the lodgepole stands south of the subdivision is around 60%. During extreme droughts, and during high fire danger periods, fires that start in lodgepole pine stands can be very difficult to control, and can rapidly develop into crown fires. These lodgepole stands are far enough away that their burning would not directly impact the subdivision, but may have significant indirect impacts through generation of embers that may blow or rain down on the subdivision, and by catching spruce/fir stands on fire that do have homesites in them.

## 5.7. Mixed Conifer

These stands have a strong spruce/fir component, but also have significant amounts of Douglas-fir and some lodgepole pine. Some areas of these stands also have a strong aspen component as well. These stands are normally very mesic, and would not readily become engaged in a wildfire; however during drought periods, the crown connectivity and large amounts of ladder fuels could definitely mean these stands could be involved in a wildfire. With the high amounts of ladder fuels, crown fires in these stands are not out of the question. Litter underneath the canopy is fairly contiguous, and if dried out during drought events, could carry a fire very well.



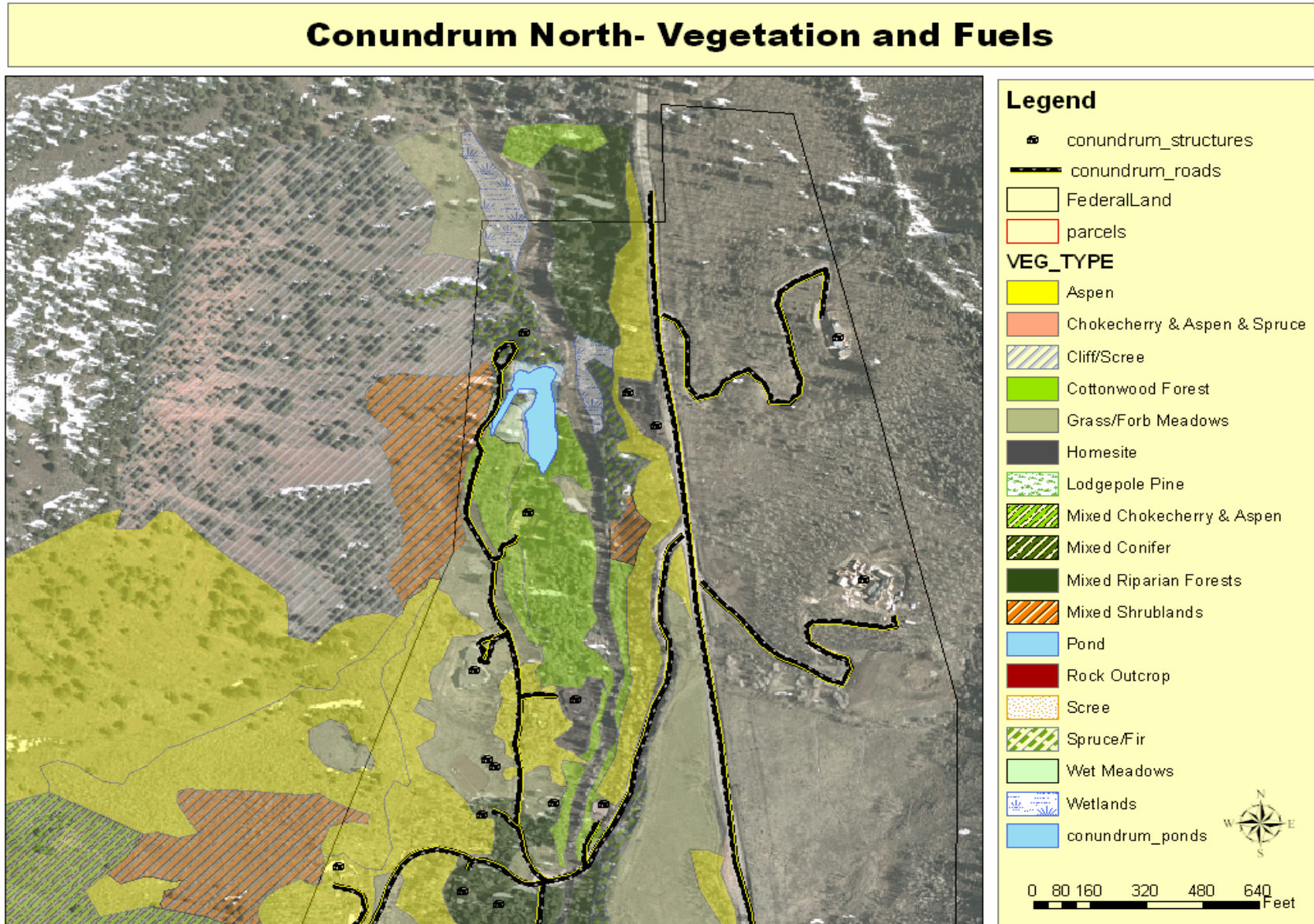
### 5.8. Mixed Riparian Forests

These stands are a combination of spruce/fir and cottonwood. They are normally riparian, occurring where free surface water is nearby, and/or the water table is very close to the surface. These stands may have been generated by more shade tolerant coniferous species invading established cottonwood stands over time, or natural openings in the cottonwood overstory initiated spruce establishment in these mesic sites. The fuel loading in these stands is very high, with a well established ladder fuels profile. However, as these stands occur in very wet areas adjacent to perennial streams, their high moisture contents usually exclude these stands from becoming engaged in a wildfire event. During extreme droughts, it is possible that these stands could become dry enough to support a crown fire, or at the least a ground fire with intermittent torching of individual trees. The understory of these stands is dominated by mostly litter, but in more open areas grasses, forbs and shrubs (willows and twinberry) can dominate the understory.



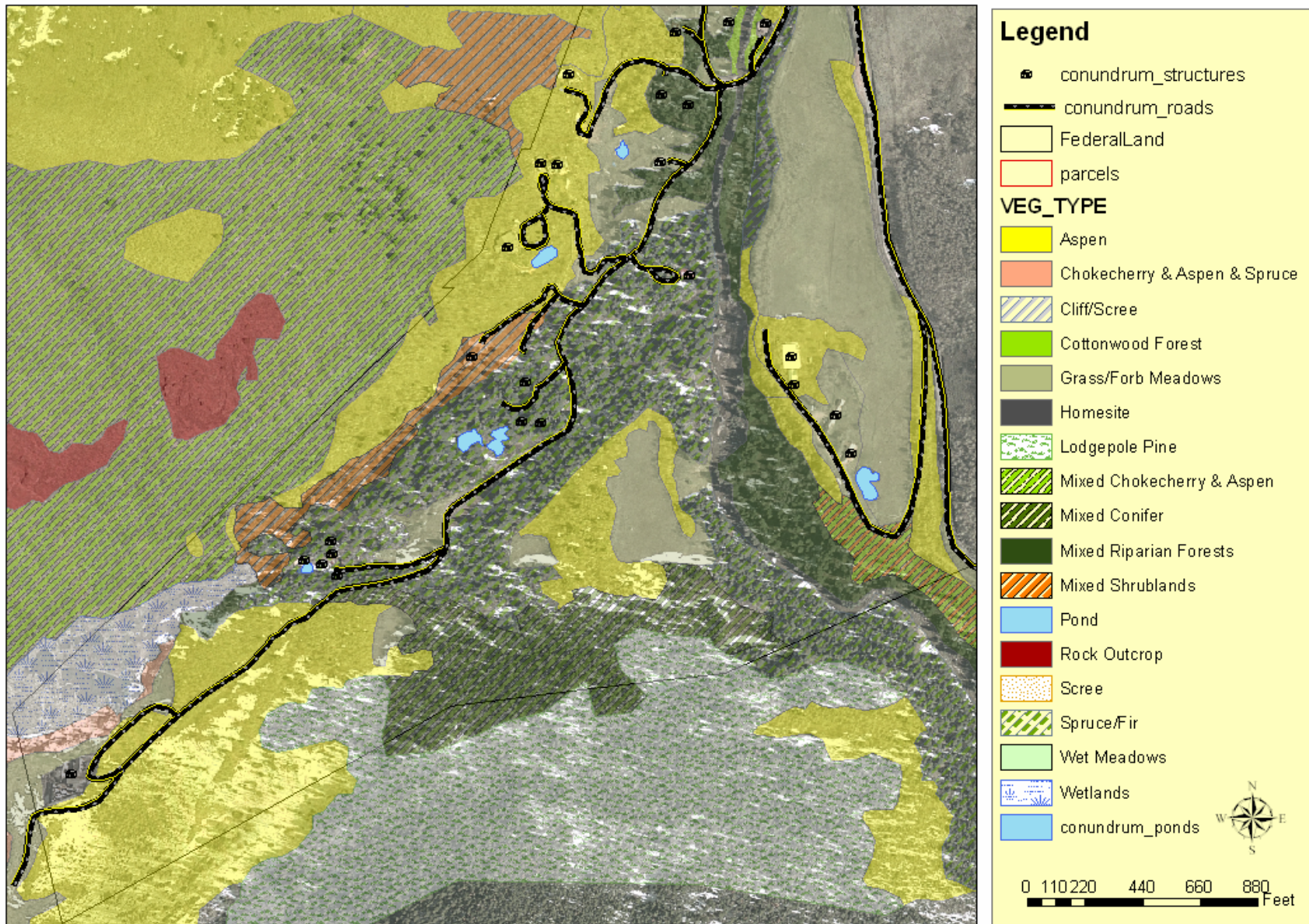


### 5.9. Conundrum Vegetation Maps





## Conundrum South- Vegetation and Fuels





## 5.10. Risk of Wildfire Occurrence- Historic Fire Regime

The Conundrum area lies within the upper montane forest types, which can include lodgepole pine, aspen, mixed conifer, and spruce/fir stands. Historically, these forest types may have had intermittent, small wildfires from lightning strikes, that usually did not get very large- usually around ¼ to 3 acres. These small fires would slowly burn in the understories, occasionally torching individual trees, and were usually put out by rain (or snow) events. During drought periods (such as the one Colorado is experiencing), these usually mesic forests would become very dry, with low live fuel moistures. In these conditions, the high crown connectivity, abundant ladder fuels, and steep slopes would allow these coniferous forests to burn under high intensity/high severity conditions, initiating a stand replacing crown-fire event. These wildfires could reach very large acreages, such as what was observed in the 20,000 acre Big Fish Fire in the Flattops in 2002.

The aspen stands in areas such as Conundrum are very mesic, and would not likely burn until the aspen stands had been replaced by spruce/fir trees through natural seral progression. Only when the amount of coniferous trees in these stands could support a more severe wildfire would these stands burn, and by then only scattered aspen trees would have been visible. After a fire in these conifer invaded aspen stands, the root system of the aspen would have sprouted new shoots rapidly, restoring the stand to aspen dominance. This fire return interval would normally be on the order of 200+ years.

The riparian spruce/fir and cottonwood stands in the Conundrum area would have likely only burned during the most severe droughts, when wildfires on the slopes in the valley could have produced enough embers to start fires in these normally wet valley bottoms, or when wind driven fires moved down the slopes and into the valley bottoms. The fire return interval in these riparian spruce/fir stands would normally be on the order of every 250 years.

In Conundrum, the risk of a wildfire starting on the slopes above the subdivision is low to moderate. The high precipitation the area normally receives would keep fuel moistures high enough to discourage large fire events. However, fuel moistures observed during the current drought are extremely low, and such fuel moistures could easily allow high severity wildfires to develop.

But a more likely scenario in Conundrum is the accidental start of a wildfire from human causes within the subdivision itself. Human caused ignitions could include a house fire, escaped trash fire or campfire, cigarette butts, a hot muffler from an automobile, lawn mower or chainsaw, sparks, illegal electrical wiring or improper use of extension cords, etc. A fire in the subdivision, in the dense spruce/fir forests could initiate a few trees crowning, which could quickly spread given the dry conditions observed during the current drought. It is likely that fires started outside of the spruce/fir forests could be suppressed quickly enough to keep the fires small in size- the smaller flames and lower amounts of fuels in the aspen stands, meadows and around newer homes would allow even homeowners to potentially put out fires. However, once the heavy fuels associated with spruce/fir forest become involved, the heat generated from these fires would be too great to allow individuals to suppress the fires. The only way people could put out these fires (when only one or a few trees were involved) would be through the local fire department utilizing high volume water supplies.



A confounding impact to the risk of fires in the subdivision is the high amount of summer season traffic to the Forest Service trailhead on the western side of the valley. The high amounts of vehicle traffic through the area increases the potential risk of a human caused ignition in the area- either through an automobile accident, parking over dry grasses, or through incendiaries such as cigarettes.



Burned spruce/fir stand in the Flat-tops- which has very similar forest conditions to that found in Conundrum



## 6. Individual Home Recommendations

This section was developed to provide recommendations to reduce risks to existing homes from wildfire damage. The statements not “mandatory” actions that must be taken, but are designed rather to provide homeowners with steps they could take if they desired to make their home more fire-safe.

### 6.1. 0210 Conundrum Creek Road (Bergen Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 3%) and the fuels were discontinuous. However, some activities can be done to reduce the fire hazard around the house:

#### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around the house.
2. All branches from trees and brush within a thirty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels from around trees and brush.
3. No branches shall be within 15' of chimneys.
4. All thinned oak brush, serviceberry, or chokecherry stumps must be painted with Garlon® (or equivalent) herbicide to prevent aggressive re-sprouting.
5. All deadfall within 100' perimeter of the structures shall be removed.



#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.



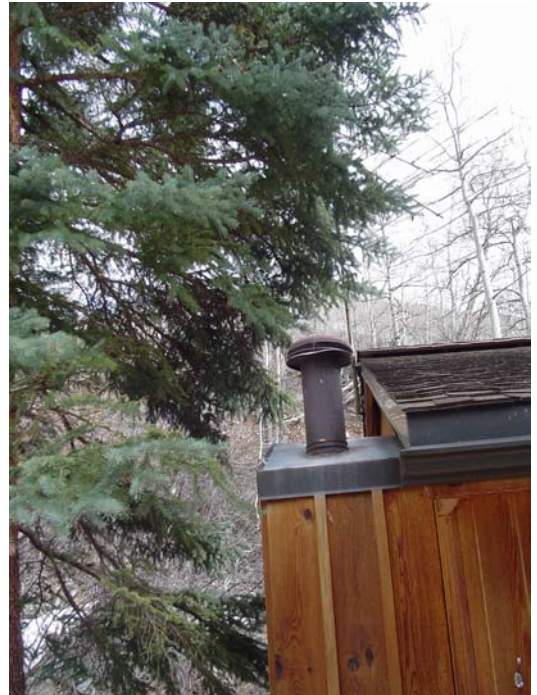
Remove shrubs and litter adjacent to house, and rake out from under and around deck.





### Miscellaneous

1. Any outbuildings or additional structures should adhere to the same standards as the main house.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Install ¼" inch mesh (or fully enclose) underneath the porch to prevent debris, flames or embers from igniting underside of porch.
5. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



Prune back limbs near chimney so no branches are within 15'.



## 6.2. 0251 Conundrum Creek Road (Bellingrath Residence)

The building site is considered “Moderate Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 4%) and the fuels were discontinuous. However, the structure has a wood shake-shingle roof, which is extremely flammable, and some trees are very close to the structure:

### Defensible Space

1. Limb trees near house so that branches do not brush up against house (see photo below).
2. Do not use flammable mulches (i.e. wood chips) adjacent to the house. Keep vegetation within 20' of house irrigated during the summer to keep live fuel moistures high.

### Building Materials

1. Replace shake shingle roof with Class A or better roofing materials.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
5. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.
6. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface
7. Install ¼" inch mesh (or fully enclose) underneath the porch to prevent debris, flames or embers from igniting underside of porch.



Consider removal of tree from adjacent to house, or ensure no litter or flammable material is below the tree. Limb tree up to 10'.



Limb coniferous tree to that limbs are above roofline.



8. Installed landscaping should not contain any coniferous or shrubby vegetation, only grasses and forbs. Trees should be aspen, and should not be planted within 10' of any window.
9. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.

### **6.3. 0253 Conundrum Creek Road (Bellingrath Caretakers Residence)**

The building site is considered "Moderate Hazard: Trees", due to the fact that the slope is less than 20% (actual slope was 4%) and the fuels were continuous. Therefore, the following Maintenance activities are recommended:

#### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around all structures. This includes raking needles and litter away from house.
2. Vegetation shall be reduced to break up the vertical and horizontal continuity of the fuels at a minimum of 40' perimeter around the house.
3. Spacing between trees should be at least 10' between the crowns, as measured from the furthest branches of a crown. A group of two or three trees may be considered to be one tree for spacing.
4. All branches from trees and brush within the forty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels from around trees and brush.
5. Prune coniferous trees to a minimum of 10' above the ground.
6. No branches shall be within 15' of chimneys.
7. From the 30' perimeter around the house, out to a 40' perimeter, brush and shrubs shall be thinned to 2 times the height of the fuels.
8. All deadfall within 100' perimeter of the structures shall be removed.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.
5. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.





### 6.4. 0212 Conundrum Creek Road (Mitchell Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 3%) and the fuels were discontinuous. However, landscaping trees are mostly bristlecone pine, which are very flammable. Therefore, the following Mitigations are recommended:



Flammable bristlecone pine underneath eaves is very hazardous, and should be removed.

#### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10’) perimeter around the house.
2. Remove bristlecone pines within 35’ of the house.
3. All branches from trees and brush within a thirty-foot perimeter shall be pruned to a height of ten feet (10’) above the ground with removal of ladder fuels from around trees and brush.
4. No branches shall be within 15’ of chimneys.
5. All thinned oak brush, serviceberry, or chokecherry stumps must be painted with Garlon® (or equivalent) herbicide to prevent aggressive re-sprouting.
6. All deadfall within 100’ perimeter of the structures shall be removed.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30’ from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.



Remove all flammable materials from under porch, and enclose with mesh or solid walls

#### Miscellaneous

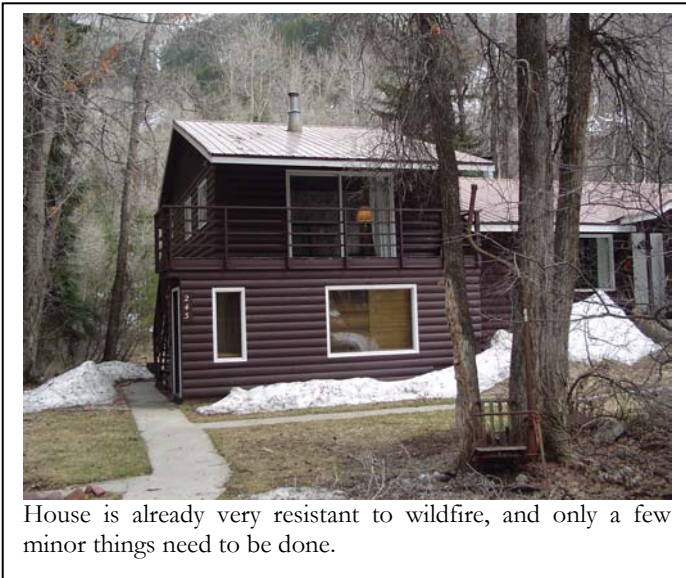


1. Any outbuildings or additional structures should adhere to the same standards as the main house.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Installed landscaping should not contain any coniferous or shrubby vegetation, only grasses and forbs. Trees should be aspen, and should not be planted within 10' of any window.
5. Do not use flammable mulches (i.e. wood chips) adjacent to the house. Keep vegetation within 20' of house irrigated during the summer to keep live fuel moistures high.
6. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
7. Any porch or deck or projection should be void of vegetation below it, and areas below such projections shall be protected from accumulation of vegetation materials by placement of a vegetation barrier covered with rocks or gravel, or by coverage with concrete or stone. Walls underneath projections should be constructed with materials approved for 1 hour fire-resistive construction on the exterior side of the wall. Pillars or columns shall be of non-flammable materials, or if wood, made out of heavy log construction and treated with a fire retardant. The underside of any porch, deck or projection should be sheathed in 1 hour fire resistive materials, or with fire-retardant treated wood.



### 6.5. 0225 Conundrum Creek Road (Whitson Property)

The building site is considered “Low Hazard: Brush”, due to the fact that the slope is less than 20% (actual slope was 3%) and the fuels were discontinuous. The house is already very defensible, and needs only a few small tasks, and some more work around the garage. Therefore, the following Mitigations are recommended:



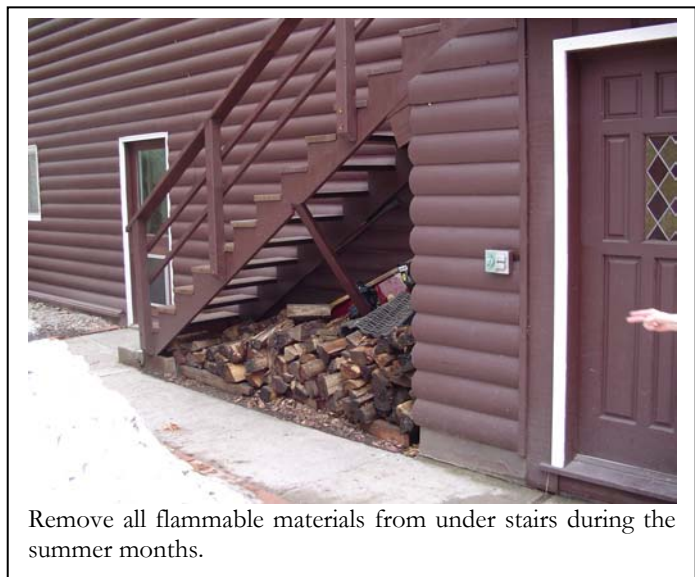
House is already very resistant to wildfire, and only a few minor things need to be done.

#### Defensible Space

1. Remove cottonwoods within 10’ of either the house or the garage.
2. Remove ladder fuels (shrubs) from around the base of trees, and remove some shrubs from the northeast corner of the house and around driveway.
3. Limb trees to 10’ within 30’ of the house, garage and driveway.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30’ from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.
5. Fix openings in eaves to keep embers from entering roof.
6. Remove flammable materials away from back of garage.



Remove all flammable materials from under stairs during the summer months.

#### Miscellaneous

1. Any outbuildings or additional structures should adhere to the same standards as the main house.



2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Installed landscaping should not contain any coniferous or shrubby vegetation, only grasses and forbs. Trees should be aspen, and should not be planted within 10' of any window.
5. Do not use flammable mulches (i.e. wood chips) adjacent to the house. Keep vegetation within 20' of house irrigated during the summer to keep live fuel moistures high.
6. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



### 6.6. 0226 Conundrum Creek Road (Katz Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 2%) and the fuels were discontinuous. The house is currently very resistant to wildfires, and only a minimum of activities need to be done:

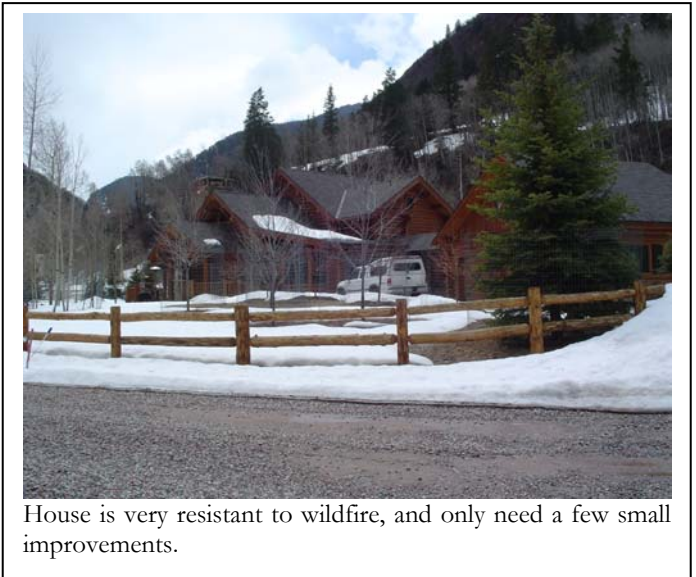
1. Enclose bottom of porch to prevent embers from getting under porch, either through installing mesh, or using a solid material (rocks, etc.)
2. Remove firewood out from under porches during summer months, and store at least 30’ from the structure.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

#### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



House is very resistant to wildfire, and only need a few small improvements.





**6.7. 0231 Conundrum Creek Road (Launer Residence “The Fort”)**

The building site is considered “Moderate Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 2%) and the fuels were continuous. Therefore, the following Mitigations are recommended:

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10’) perimeter around all structures.
2. Vegetation shall be reduced to break up the vertical and horizontal continuity of the fuels at a minimum of 35’ perimeter around the house.
3. Spacing between clumps of brush within a thirty-foot (35’) perimeter shall be 2 times the height of the fuel. Maximum diameter of the clumps shall be two (2) times the height of the fuel. All measurements shall be from the edges of the crowns of the fuel.
4. All branches from trees and brush within the thirty five-foot perimeter shall be pruned to a height of ten feet (10’) above the ground with removal of ladder fuels from around trees and brush.
5. Coniferous trees should not be within 20’ (as measured from the edge of the crown) of the structure.
6. Prune coniferous trees to a minimum of 12’ above the ground, thin out coniferous trees where possible.
7. No branches shall be within 15’ of chimneys.
8. From the 30’ perimeter around the house, out to a 40’ perimeter, brush and shrubs shall be thinned to 1 times the height of the fuels.
9. All deadfall within 100’ perimeter of the structures shall be removed.



Large amounts of down/dead fuels are around the access route and the structure. These fuels need to be removed.



Do not store flammable fuels near walls, or under walkways.

**Maintenance**

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including





firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.

4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

Miscellaneous

1. Each structure shall have a minimum of two ten-pound ABC fire extinguishers.
2. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
3. Repair rotting wood, as it currently is a receptive fuel for embers.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



Clear flammable vegetation away from wood walkways at least 2'.

Access

1. Do not store vehicles in driveway, to allow access for fire trucks. Park vehicles as far away from structure as possible, if parked for periods longer than a week, or if left unattended for lengthy periods of time.
2. Low vegetation (grasses, forbs and low shrubs) shall be kept mowed to less than 6" within 10' of either side of the driveway.
3. Remove conifers from 15' on either side of driveway.
4. Bushes shall be thinned to 3 times the height of the bush.

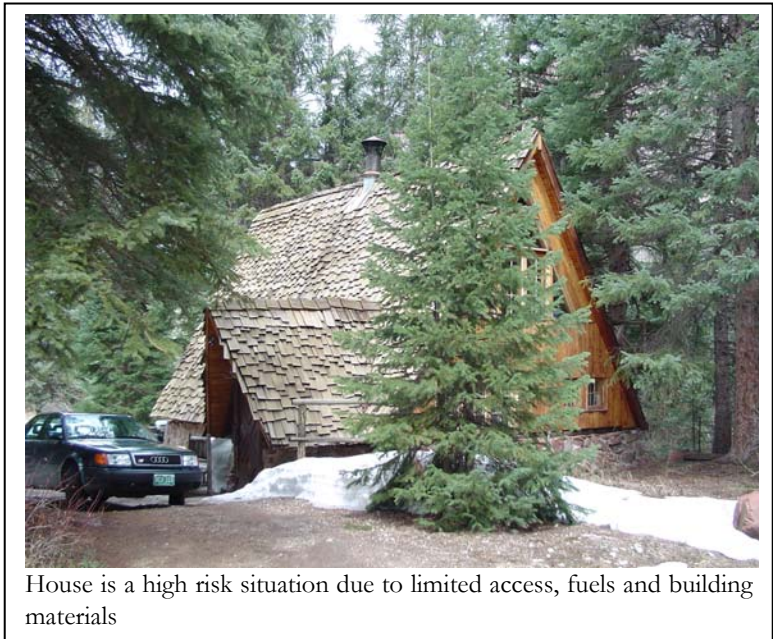


Clear coniferous vegetation away 20' from structure, and limb cotton woods to 18'. Remove ladder fuels (shrubs) from under remaining trees, and limb conifers up 12' within 30' of house.



**6.8. 0235 Conundrum Creek Road (Launer Residence- “A frame”)**

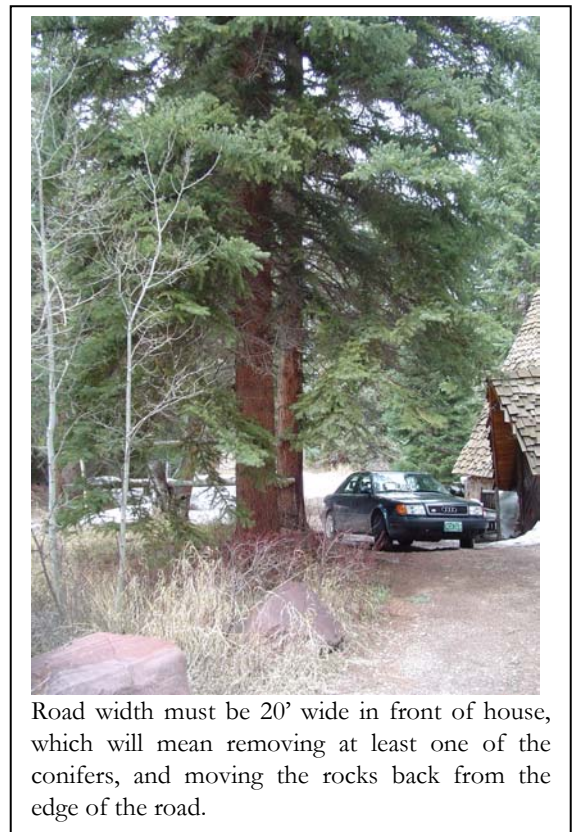
The building site is considered “High Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 4%) and the fuels were continuous. The shake shingle roof and limited access places this residence in a high hazard situation. Therefore, the following Maintenance activities are recommended:



House is a high risk situation due to limited access, fuels and building materials

**Defensible Space**

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around all structures. This includes raking needles and litter away from house.
2. Vegetation shall be reduced to break up the vertical and horizontal continuity of the fuels at a minimum of 40' perimeter around the house.
3. Spacing between trees should be at least 10' between the crowns, as measured from the furthest branches of a crown.
4. All branches from trees and brush within the forty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels from around trees and brush.
5. Coniferous trees will need to be thinned out from near the house, with trees closest to the house prioritized for removal.
6. Prune coniferous trees to a minimum of 12' above the ground.
7. No branches shall be within 15' of chimneys.
8. From the 30' perimeter around the house, out to a 40' perimeter, brush and shrubs shall be thinned to 2 times the height of the fuels.
9. All deadfall within 100' perimeter of the structures shall be removed.



Road width must be 20' wide in front of house, which will mean removing at least one of the conifers, and moving the rocks back from the edge of the road.

**Maintenance**

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.





3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

**Building Materials**

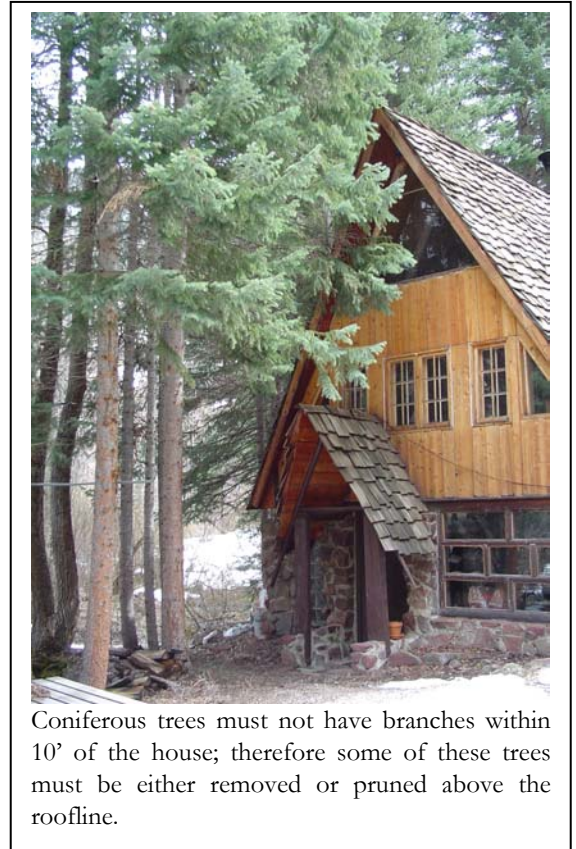
1. Replace shake shingle roof. It is old and currently a fire hazard.

**Access**

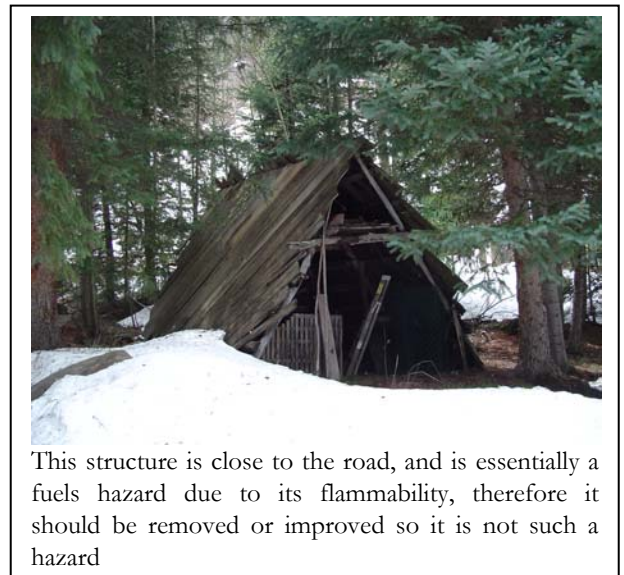
1. Road width must be 20' wide to accommodate fire trucks, therefore rocks must be moved back from edges of road, and vegetation must be cleared back as well.
2. Thin shrubs (chokecherry, serviceberry, etc.) to 3 times height along the driveway. No shrubs or conifers are allowed within 10' of the driveway/road. Aspen are permitted within 10' of the driveway, but must be pruned to 10' above the ground. Low shrubs (<3.5' in height) must be thinned to 4 times height, and may not be within 10' of other larger shrubs or coniferous trees.
3. Low vegetation (grasses, forbs and low shrubs) should be kept mowed to less than 6" within 10' of either side of the driveway.

**Miscellaneous**

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Fuel tanks should be installed underground with an approved container.
5. Propane tanks should be installed according to NFPA 48 standards and on a contour away from the structure with standard defensible space vegetation mitigation around any



Coniferous trees must not have branches within 10' of the house; therefore some of these trees must be either removed or pruned above the roofline.



This structure is close to the road, and is essentially a fuels hazard due to its flammability, therefore it should be removed or improved so it is not such a hazard





aboveground tank. Any wood enclosure around the tank shall be constructed with materials approved for two (2) hour fire-resistive construction on the exterior side of the walls.



### 6.9. 0285 & 0287 Conundrum Creek Road (Duplex- Finnell & Mitchell Residences)

The building site is considered “Moderate Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 10%) and the fuels were discontinuous. The house has a large opening at the back of the house, but the front of the house has some trees fairly close to it. A large amount of firewood is stored adjacent to the structure. Therefore, the following mitigation activities are recommended:



This duplex has mostly adequate defensible space, but needs some clean up of receptive materials immediately around the house.

#### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around all structures. This includes raking needles and litter away from house.
2. Thin conifers within 30' of the house so that trees have a 10' spacing between the crowns.
3. Limb up trees to at least 10' high, so that drooping branches are at least 6' above the ground.

#### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
3. Move fire wood at least 30' away from the house during the summer months.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



Move firewood 30' away from house during the summer.



## 6.10. 0300 Conundrum Creek Road (Goudvis Residence)

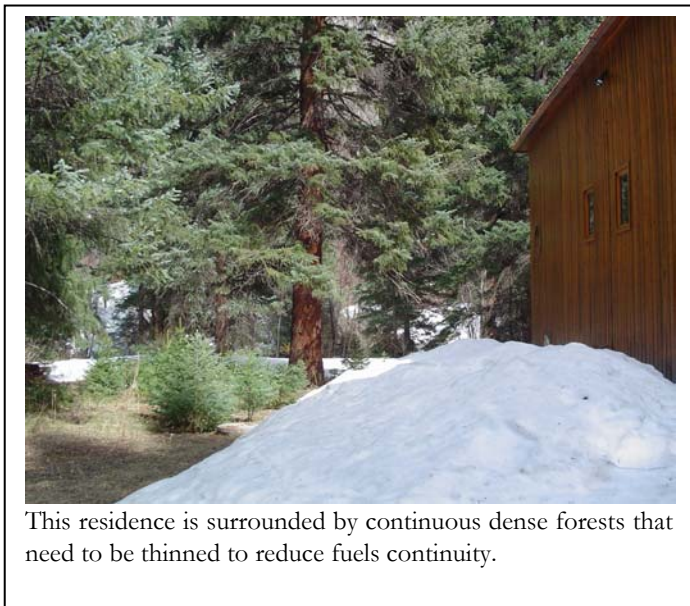
The building site is considered “High Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 3%) and the fuels were continuous. The forests surrounding this house are very dense and have high levels of crown connectivity and dense ladder fuels. The driveway is also lined by hazardous fuel amounts. Therefore, the following mitigation activities are recommended:

### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around the house.
2. All branches from trees and brush within a sixty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels from around trees and brush.
3. Existing tree crown separation within a 50' perimeter shall have a minimum of 10' between the edges of the crowns. **However, due to the possibility of blowdown, a forester should mark the trees to be removed and the amount of thinning necessary.**
4. No branches shall be within 15' of chimneys.
5. All trees with a diameter of less than 8" at 4.5' up the trunk should be removed within 60' of the house.
6. All deadfall within 100' perimeter of the structures shall be removed.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.



This residence is surrounded by continuous dense forests that need to be thinned to reduce fuels continuity.



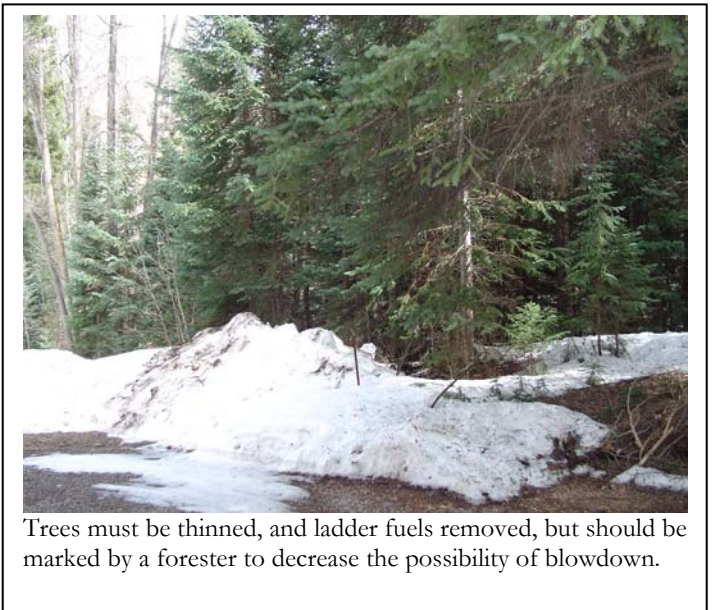
Propane tank should be buried.





Miscellaneous

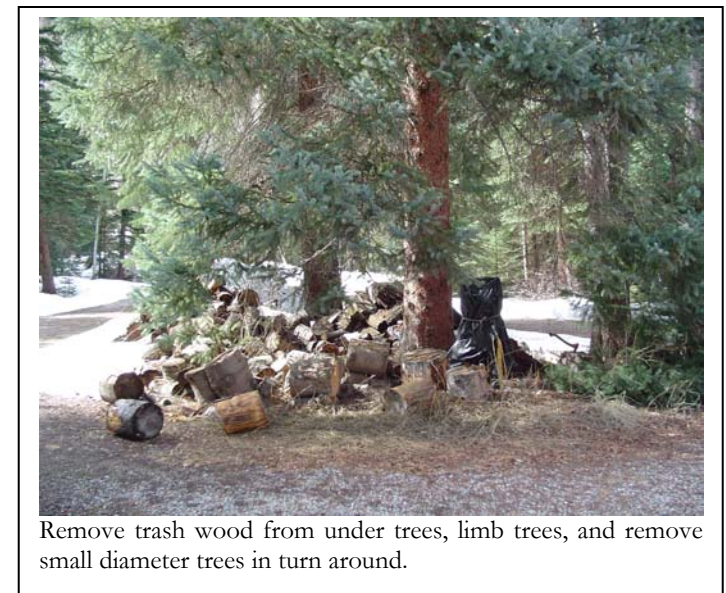
1. Any outbuildings or additional structures should adhere to the same standards as the main house if possible.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



Trees must be thinned, and ladder fuels removed, but should be marked by a forester to decrease the possibility of blowdown.

Access

1. Thin trees along driveway, **However, due to the possibility of blowdown, a forester should mark the trees to be removed and the amount of thinning necessary.**
2. Limb remaining trees to 10' within 25' of the driveway.
3. Remove all trees less than 8" diameter at 4.5' up the trunk within 25' of the driveway.
4. Remove the firewood in the center of the turn around, limb trees to 15', and remove all trees less than 8" diameter at 4.5' up the trunk in this center area.



Remove trash wood from under trees, limb trees, and remove small diameter trees in turn around.



## 6.11. 0465 Conundrum Creek Road (Killam Residence)

The building site is considered “Moderate Hazard: Brush”, due to the fact that the slope is less than 20% (actual slope was 12%) and the fuels were not continuous. However, the house is placed at the top of a small ridge, which increases fire hazard. Therefore, the following activities are recommended:

### Defensible Space

1. Remove spruce in front of house. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around the house.
2. Ornamental shrubs should also be removed or dramatically thinned within 10' of house.
3. Mow grasses out to at least 25' from house, and maintain to a depth of less than 6".
4. Grass should not touch wood sides of house- unless kept mowed and irrigated and green during summer and fall months.

### Access

1. The driveway currently will not accommodate a standard fire truck, and fire suppression from Aspen Fire Protection District would have to pull hoses up the hill by hand. Therefore the Killam's should seriously consider mitigating this situation by improving the driveway access.
2. Low vegetation (grasses, forbs and low shrubs) shall be kept mowed to less than 6" within 10' of either side of the driveway.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Rake dead leaves and grass out from around house.
4. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
5. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
3. Enclose porch around base to prevent embers and dead leaves from accumulating underneath porch. Use either a maximum ¼" mesh, or a solid wall from either wood or stone, etc.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
5. Limb trees growing through porch up to at least 10' above the porch. Also irrigate the trees during the summer and fall months to keep live fuel moistures high.



## 6.12. 0461 Conundrum Creek Road (Killam Caretakers Residence)

The building site is considered “High Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 4%) and the fuels were continuous. The forest around the caretaker’s house has fairly high crown connectivity, and a moderate amount of understory ladder fuels. Therefore, the following activities are recommended:

### Defensible Space

1. Limb up trees around house to 12’ up the trunk. Limb trees out to 40’ from the house.
2. Thin out trees so crown spacing is approximately 10’. However, this should be done carefully to ensure that blowdown of remaining trees does not occur.
3. At least 2 of the spruce in front of the house should be removed. Remove many of the small trees around the back of the house, the larger fir could be left if limbed up to 15’.
4. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10’) perimeter around the house.
5. All deadfall within 100’ perimeter of the structures shall be removed.

### Miscellaneous

1. Replace shake shingle roof with a Class A or non-combustible material (i.e. steel or tin roof).
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2” non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.

### Maintenance

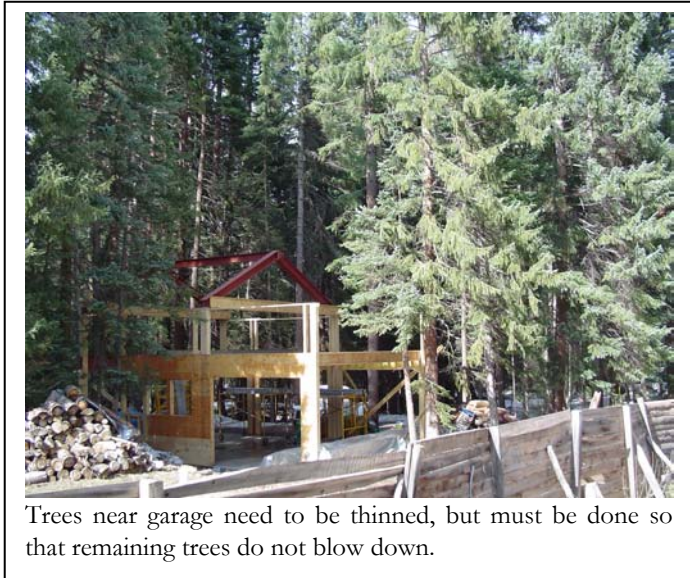
1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30’ from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.





### 6.13. 0573 Conundrum Creek Road (Tanguay Residence)

The building site is considered “High Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 3%) and the fuels were continuous. The forests surrounding this house are very dense and have high levels of crown connectivity and dense ladder fuels. However, the current owner has done some work in thinning out understory fuels. Therefore, the following mitigation activities are recommended:



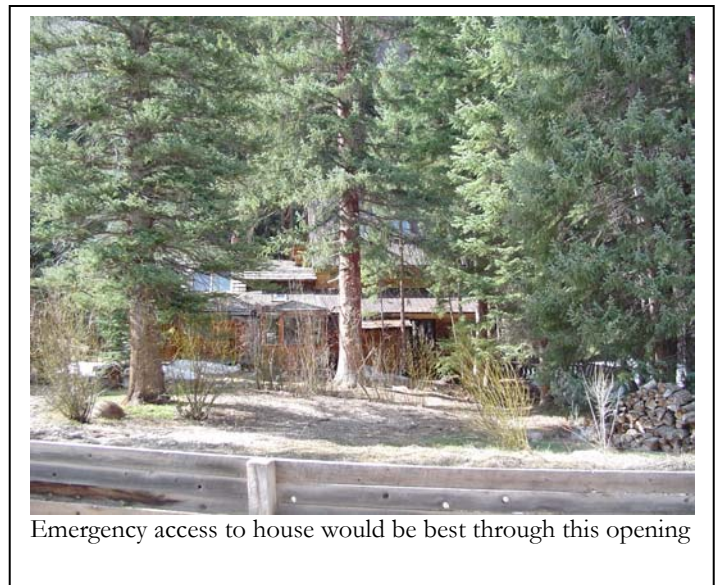
Trees near garage need to be thinned, but must be done so that remaining trees do not blow down.

#### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around the house.
2. All branches from trees and brush within a sixty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels from around trees and brush.
3. Existing tree crown separation within a 75' perimeter shall have a minimum of 10' between the edges of the crowns. **However, due to the possibility of blowdown, a forester should mark the trees to be removed and the amount of thinning necessary.**
4. No branches shall be within 15' of chimneys.
5. All trees with a diameter of less than 8" at 4.5' up the trunk should be removed within 60' of the house.
6. All deadfall within 100' perimeter of the structures shall be removed.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.



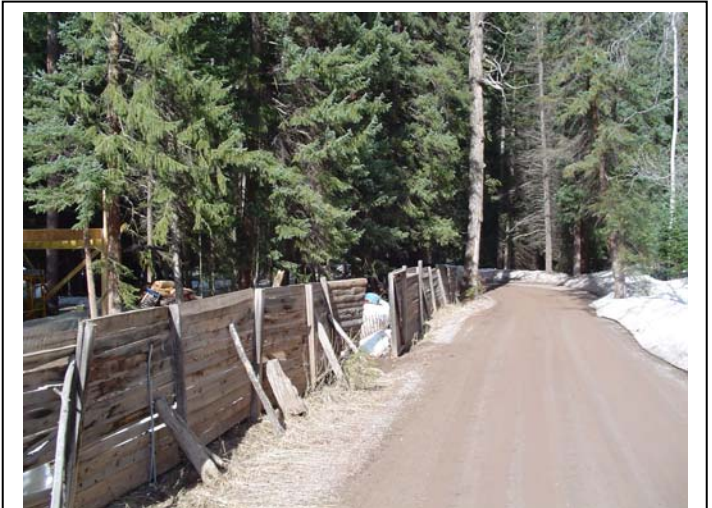
Emergency access to house would be best through this opening



4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

#### Miscellaneous

1. Any outbuildings or additional structures should adhere to the same standards as the main house if possible.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.



This fence is somewhat of a fire hazard due to the old condition of the wood, and density of the planks.

4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.

#### Access

1. Thin trees along driveway, **However, due to the possibility of blowdown, a forester should mark the trees to be removed and the amount of thinning necessary.**
2. Limb remaining trees to 10' within 25' of the driveway.
3. Remove all trees less than 8" diameter at 4.5' up the trunk within 25' of the driveway.
4. Develop an emergency access route through meadow south of the house, but improving the gate for fire truck access, signing the gate, and keeping the meadow mowed during dry periods in the summer



## 6.14. 0761 Conundrum Creek Road (Steinmetz Residence)

**Note: At the request of the property owner, no photographs were taken of the structures.**

The building site is considered “High Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 2%) and the fuels were continuous. The forests surrounding this house are very dense and have high levels of crown connectivity and dense ladder fuels. The driveway is also lined by hazardous fuel amounts. The area has very high loading of flammable wood piles and trash wood. The property has one main house, and a few other structures that need very aggressive fuels reduction, building materials upgrading, and removal of hazardous wood storage. Therefore, the following mitigation activities are recommended:

### Defensible Space

1. Brush, debris, and non-ornamental vegetation shall be removed within a minimum ten-foot (10') perimeter around the houses.
2. All branches from trees and brush within a sixty-foot perimeter shall be pruned to a height of ten feet (10') above the ground with removal of ladder fuels (including stored wood) from around trees and brush.
3. Existing tree crown separation within a 75' perimeter shall have a minimum of 10' between the edges of the crowns. **However, due to the possibility of blowdown, a forester should mark the trees to be removed and the amount of thinning necessary.**
4. No branches shall be within 15' of chimneys.
5. All trees with a diameter of less than 8" at 4.5' up the trunk should be removed within 60' of the house.
6. All deadfall within 100' perimeter of the structures shall be removed.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30' from any structure, or within a separate structure.
4. Open storage structures are currently storing very dry wood, and it would be easy for embers to catch these structures on fire, therefore these structures should have doors and walls (at least during the summer and fall months) that seal tight enough to prevent embers from blowing in.
5. Roofs of storage facilities should be surfaced with a non combustible material (such as tin), and should have flammable automobile tires removed from the roofs.
6. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

### Miscellaneous





1. Any outbuildings or additional structures should adhere to the same standards as the main house if possible.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Have Fire Marshall or Pitkin County building inspector inform owner of improvements that need to be done to have apparent electrical wiring brought up to safer standards.
5. ***Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.***

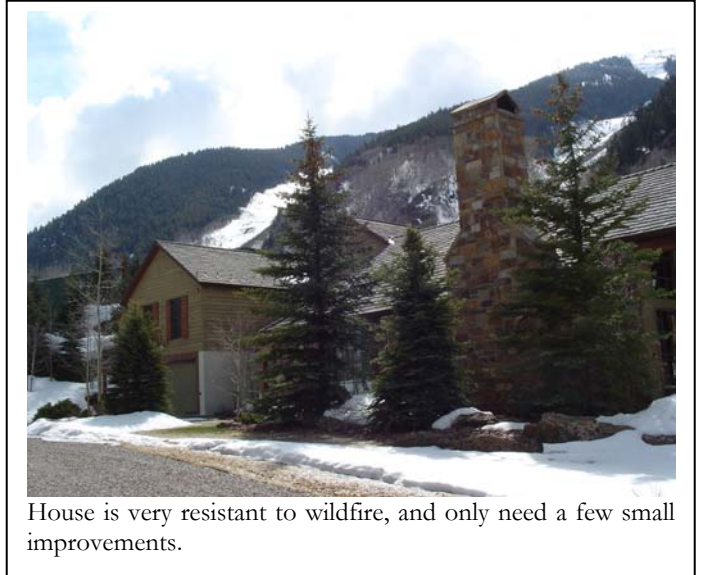
#### Access

1. Limb remaining trees to 10' within 25' of the driveway.
2. Remove all trees less than 8" diameter at 4.5' up the trunk within 25' of the driveway.
3. If possible, increase the turn around space at the end of the driveway to a 45' to 50' turnaround area. Cars should not be stored in this area for long periods of time, as parked vehicles will impede fire truck access.



### 6.15. 1053 Conundrum Creek Road (Wampold Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 8%) and the fuels were discontinuous. The house is currently very resistant to wildfires, and only a minimum of activities need to be done.



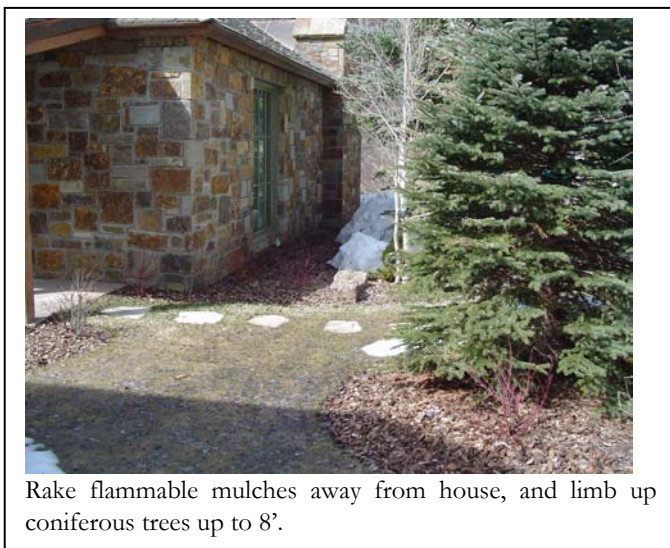
House is very resistant to wildfire, and only need a few small improvements.

#### Defensible Space

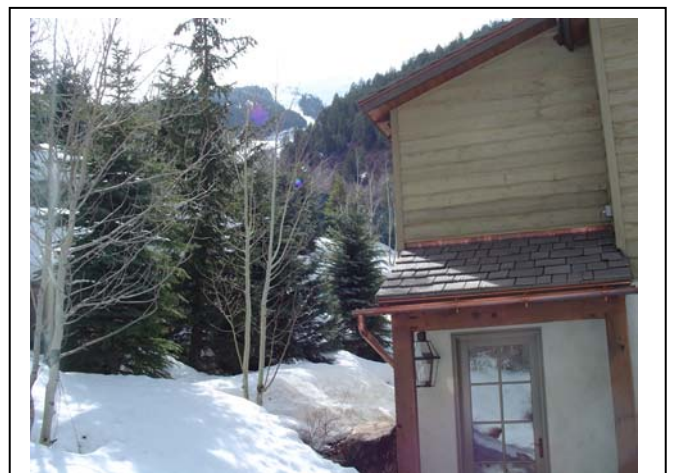
1. Removal of a couple of the conifers in front of the house (within 10’ of the house) should be done to allow a safe place for firefighters to work close to the house.
2. Limb up conifer trees that are within 30’ of the house to 8’ above the ground.
3. Remove shrubs that are below coniferous trees within 30’ of house.
4. Rake flammable mulches out 2’ from the house, so that flammable materials are not directly touching the structure.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six



Rake flammable mulches away from house, and limb up coniferous trees up to 8’.



Thin out some of the conifers on the hillside above the house. Tree crown separation should be no less than 10’.

inches, or if ornamental, shall be irrigated



and kept free of dead materials.

Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
3. Do not plant any more conifers within 40' of the house or the driveway.





### 6.16. 0301 Conundrum Creek Road (Houston Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 5%) and the fuels were discontinuous. The area is currently dominated by grasses and aspen, and therefore could not support a high severity wildfire. Only a minimum of activities need to be done.



#### Defensible Space

1. Thin chokecherry and shrubs on slope below house. Shrubs must be thinned to 3 times height of shrub.
2. Remove down and dead woody debris within 100' of house.
3. Remove flammable material (leaves, mulches, old wood, etc.) out 2' from the house, so that flammable materials are not directly touching the structure. Lager piles of flammable materials should be moved at least 30' away from the houses.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

#### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
3. Do not plant any conifers within 40' of the house or the driveway.

#### Access

1. The access road up to the houses needs to be improved to facilitate fire truck access, primarily on the corners. The road width should be 20', and the turn radius should be 40 feet.



## 6.17. 0255 Conundrum Creek Road (Mathys Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 9%) and the fuels were discontinuous. The area currently is dominated by grasses and aspen, and therefore could not support a high severity wildfire. Only a minimum of activities need to be done.



### Defensible Space

1. Thin chokecherry and shrubs within 70' of the house. Shrubs must be thinned to 2 times height of shrub.
2. Remove down and dead woody debris within 100' of house.
3. Remove flammable material (leaves, mulches, old wood, etc.) out 2' from the house, so that flammable materials are not directly touching the structure. Lager piles of flammable materials should be moved at least 30' away from the houses.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
3. Do not plant any conifers within 40' of the house or the driveway.



## 6.18. 0303 Conundrum Creek Road (Valerio Residence)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 5%) and the fuels were discontinuous. The area around the house currently is dominated by grasses and aspen, and therefore could not support a high severity wildfire. Only a minimum of activities need to be done.

### Defensible Space

1. Limb up conifer trees that are within 30’ of the house to 8’ above the ground.
2. Remove non ornamental shrubs that are within 30’ of house.
3. Rake flammable mulches, litter, etc. out 2’ from the house, so that flammable materials are not directly touching the structure.



### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.

### Miscellaneous

1. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
2. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.
3. Do not plant any more conifers within 40’ of the house or the driveway.



Driveway is very narrow here- limb up or (preferably) remove conifer, and widen drivable surface, or make sure soils are compacted so fire trucks don't get stuck in soft soils.





## Access

1. Remove rocks on either side of entry way, as these rocks make it difficult for fire truck access.
2. Widen driveway to accommodate fire truck access, or make sure that sod on either side of driveway is placed on top of packed soil, so that heavy fire trucks do not get stuck in soft sod.



Remove rocks to allow better emergency vehicle access.



### 6.19. 5387 Castle Creek Road (Highland Ranch – Coffey Estate)

The building site is considered “Low Hazard: Trees”, due to the fact that the slope is less than 20% (actual slope was 5%) and the fuels were discontinuous. The ranch currently is dominated by grasses and aspen, and therefore could not support a high severity wildfire, but may be susceptible to grassfires. Only a minimum of activities need to be done.



Remove vegetation from below porches, and keep grass mowed to less than 6” within 20’ of porches. Enclose deck that meets the ground at right side of cabin

#### Defensible Space

1. Make sure that grass is mowed to less than 6” within 30’ of all structures during the summer and fall months.
2. For structures that have wood siding that touches the ground, either keep mowed grasses irrigated, and rake away dead grass from being adjacent to structures, or ring structures with non-combustible ground cover (i.e. gravel or stones).
3. Remove vegetation from below porches that overhang slope. Keep grass mowed to less than 6” within 20’ downslope of these porches.
4. Remove conifers within 15’ of any structure, unless they are limbed and irrigated during the summer months to keep live fuel moistures high.

#### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30’ from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.



Move woodpiles and other flammable materials 30’ away from structures during the summer and fall months.



### Miscellaneous

1. Any outbuildings or additional structures should adhere to the same standards as the main house if possible.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2" non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.





## 6.20. 5835 Castle Creek Road (King Residence- Hope Tunnel Site)

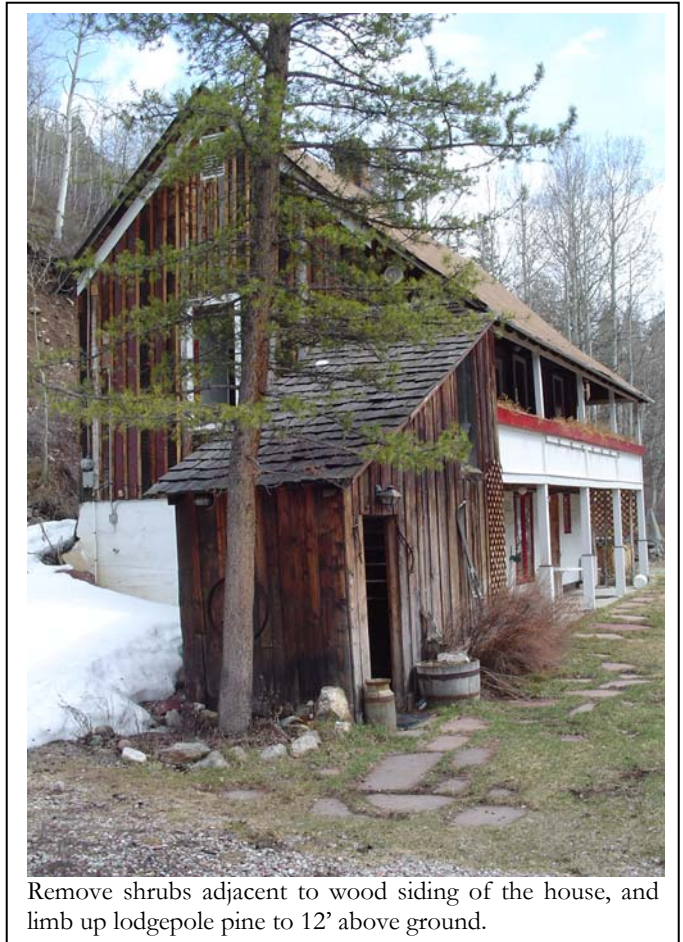
The building site is considered “Moderate Hazard: Trees”, due to the fact that the slope is greater than 20% (actual slope was 32%) and the fuels were discontinuous. The site is relatively safe, but due to the old wood on the structure, and its location on the hillside, a few things need be done.

### Defensible Space

1. Remove shrubs within 10’ of wood siding on the house.
2. Limb up lodgepole pine to 12’ above the ground.

### Maintenance

1. Roofs and gutters shall be kept clear of debris.
2. Yards shall be kept clear of all litter, slash and flammable debris.
3. All flammable materials (including firewood) shall be stored on a parallel contour a minimum of 30’ from any structure, or within a separate structure.
4. Vegetation within the ten-foot perimeter shall be maintained to a height not more than six inches, or if ornamental, shall be irrigated and kept free of dead materials.



Remove shrubs adjacent to wood siding of the house, and limb up lodgepole pine to 12’ above ground.

### Miscellaneous

1. Any outbuildings or additional structures should adhere to the same standards as the main house if possible.
2. Each structure shall have a minimum of one ten-pound ABC fire extinguisher.
3. Addresses shall be clearly marked with 2” non-combustible letters and shall be visible at the primary point of access from the public or common access road and installed on a non-combustible surface.
4. Ensure that cracks, crevices, and other places on the house that could catch an ember and ignite the structure are sealed off, or do not provide an ignition point.



### Access

1. Limb remaining trees to 10' within 25' of the driveway.
2. If possible, increase the turn around space at the end of the driveway to a 45' to 50' turnaround area. Cars should not be stored in this area for long periods of time, as parked vehicles will impede fire truck access.



## 7. Local Preparedness & Firefighting Capability

Fire suppression for the Conundrum area is handled by the Aspen Fire Protection District, out of their station in downtown Aspen, and with support from their Woody Creek station. Aspen Fire can respond with the following equipment to structure or wildland fires:

### Aspen Station (5.2 miles away)

1. 500 ga/500 gpm Type 2 4x4 Wildland Engine
2. 880 ga/1250 gpm Type 1 4x4 Engine
3. 500 ga/1000 gpm Type 1 4x4 Engine

Also an Aerial Truck, and a Tanker from Sardy Field but would not likely be dispatched. AFD also has life support vehicles (rescue and ambulances).

### Woody Creek Station (11 miles away)

1. 400 ga./90 gpm Type 6 4x4 Brush Truck (CSFS vehicle)
2. 750 ga./1000 gpm Type 1 4x4 Engine

Additionally, Aspen FPD has agreements under the Pitkin County Annual Operating Plan to be able to call upon Snowmass/Wildcat FPD, Basalt & Rural FPD, and Carbondale & Rural FPD for additional resources. Agreements through the Colorado State Forest Service also allow Aspen FPD to request US Forest Service, BLM fire suppression resources, and aerial support (helicopters, single-engine air tankers, and heavy air tankers) during wildland fire events.

The USDA Forest Service will also respond automatically to any wildland fire in the area if AFD has not put out the fire by the time they arrive, with initially a Type 6 fire truck (with a crew of 3 firefighters), and if conditions warrant the Forest Service and/or Aspen Fire will call for additional resources. At this time there is no fire suppression equipment in the subdivision, aside from personal fire extinguishers, and in-house sprinkler systems (on newer homes).

The Conundrum area does not have a fire hydrant system. One home owner has developed a dry hydrant system.

### 7.1. Communications

Emergencies in the Conundrum area are communicated via the 911 emergency system. Pitkin County Emergency Management has also recently brought on-line a reverse 911 system for the Conundrum area as well (this system also covers all land lines in Pitkin County). Local emergency management communication needs are covered by two-way radios using County, Fire Department, and Forest Service frequencies.

### 7.2. Additional Water Resources for Fire Suppression

At this time, development of water for fire suppression is desirable for the community as there are no hydrants or cisterns in the subdivision (except for one dry hydrant that could serve one or two homes). Therefore, water for fire fighting must either be drafted out of ponds and creeks, or must be brought to the scene by Aspen Fire's 3000 ga. water tender (at Sardy Field), or one of their 880 ga. engines. At this time Aspen Fire will always respond with the tender to fires in





Conundrum as a matter of policy. Once water supplies in tenders are used up, the tenders must refill by either drafting from ponds or creeks, or by going back down Castle Creek road to a dry hydrant set up on the side of the road. In the event of a structure fire in Conundrum, a likely scenario would be to set up Aspen Fire's tender near one of the creeks or ponds, draft into the tender, then pump from the tender to another pumper engine, which would pump the water to other fire trucks on scene. Another possibility is for water from the tender to be dumped into a port-a-tank, and then used by nearby engines. This would take valuable time to set up and get working, especially compared to the time it takes to use pressurized water from a hydrant system.

Therefore, development of water resources should be explored by the Conundrum home owners, with an end goal of producing as much water as possible to be used towards the needs of structure protection and fire suppression.

## 8. Community Hazard Reduction Priorities

This section targets the needs for fuels reduction activities within the subdivision in areas outside of the immediate defensible space areas around the individual homes.

### 8.1. Roadside Fuel Reduction Areas

Thinning and tree removal needs to occur along the roadsides to mitigate the effect of heavy fuel loading along the access roads. Heavy fuels along the roads makes it dangerous in a wildfire event for people and vehicles to evacuate the area, and for fire suppression personnel to access homesites within the subdivision. Many of the injuries and deaths during wildfire events occur when people are try to evacuate, and get burned over along roads lined with heavy fuels. Additionally, because of the heavy roadside vegetation, visibility of oncoming traffic (and potentially emergency vehicles) is compromised.

Therefore removal of smaller diameter trees and brush is recommended along many of the access roads in the subdivision. In the southern end of the subdivision, heavy spruce and fir trees are the main species that need to be thinned.

In these conifer stands the following prescriptions are recommended:

1. Remove all trees smaller than 6" dbh within 20' of either side of the road
2. Thin larger trees so that the distance between the canopies is 5 to 10', leaving the larger, healthier trees. The distance between the remaining stems should be approximately 15'.
3. Limb up remaining trees so that the lowest branches are at least 10' off of the ground, out 30' from either side of the road.
4. Remove shrubs and other ladder fuels within 30' of the road.



Photo of thinned spruce/fir and aspen forest on the Grand Mesa. Area was thinned so trees won't be as susceptible to blowdown- this is the type of thinning prescription desired for the Conundrum area. Photo courtesy of the Colorado State Forest Service- Grand Junction District.



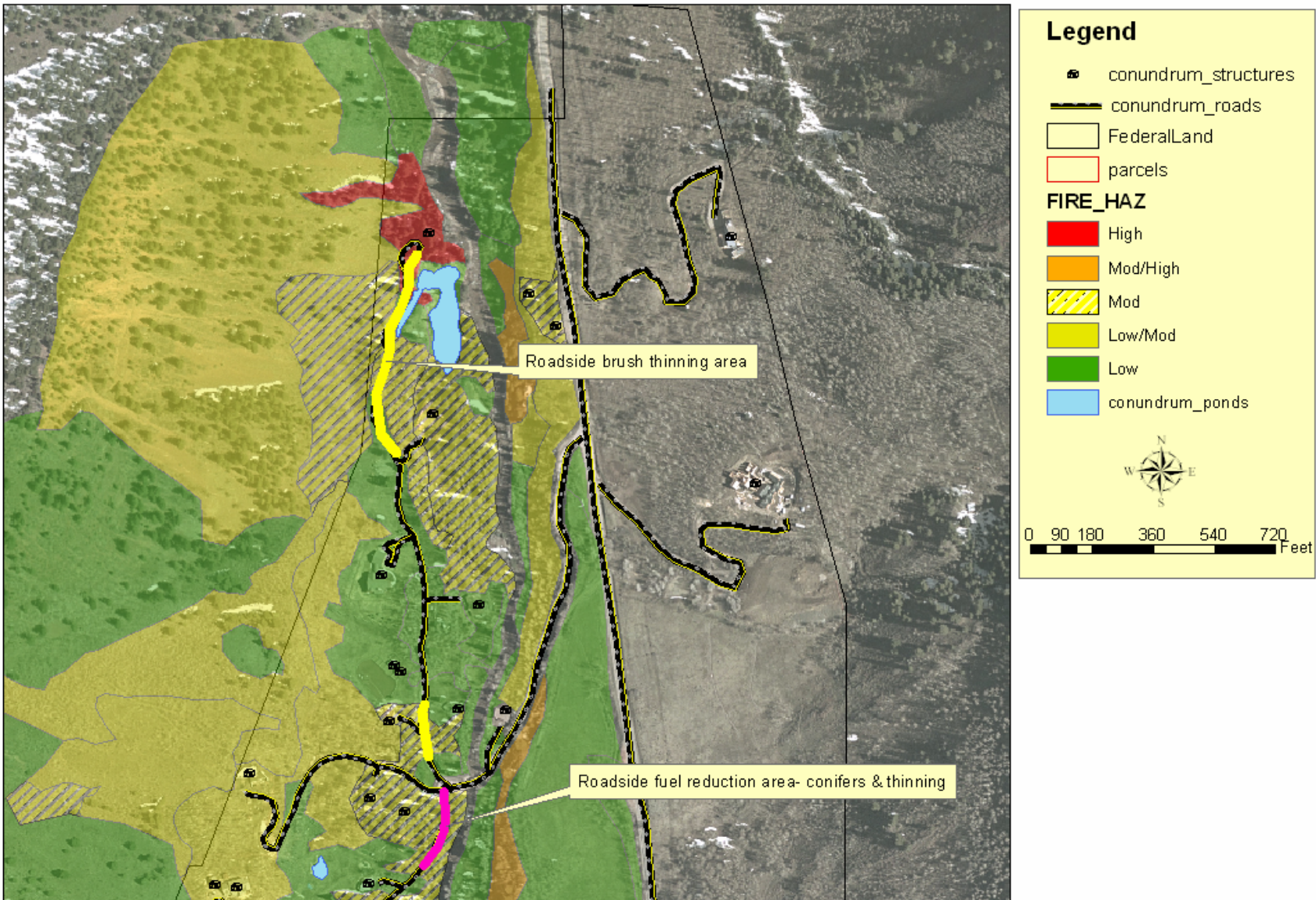
5. Have a forester (private, USFS or CSFS) mark trees to be removed due to potential for blowdown of remaining trees, and have CSFS review this marking plan.

In the northern part of the subdivision, willows, cottonwoods, aspen and other deciduous shrub and tree species crowd the sides of the road, therefore the following prescriptions are recommended:

1. Remove all trees smaller than 4" dbh within 15' of either side of the road
2. Thin larger trees in order to break up the fuels continuity within 25' of either side of the road. This may mean removal of clumps of trees, or a few individual trees depending on stand structure in the area.
3. Limb up remaining trees so that the lowest branches are at least 10' off of the ground, out 30' from either side of the road.
4. Remove shrubs and other ladder fuels within 30' of the road.
5. During dry summer months, or during droughts, mow grasses and lower vegetation within 25' of the road.

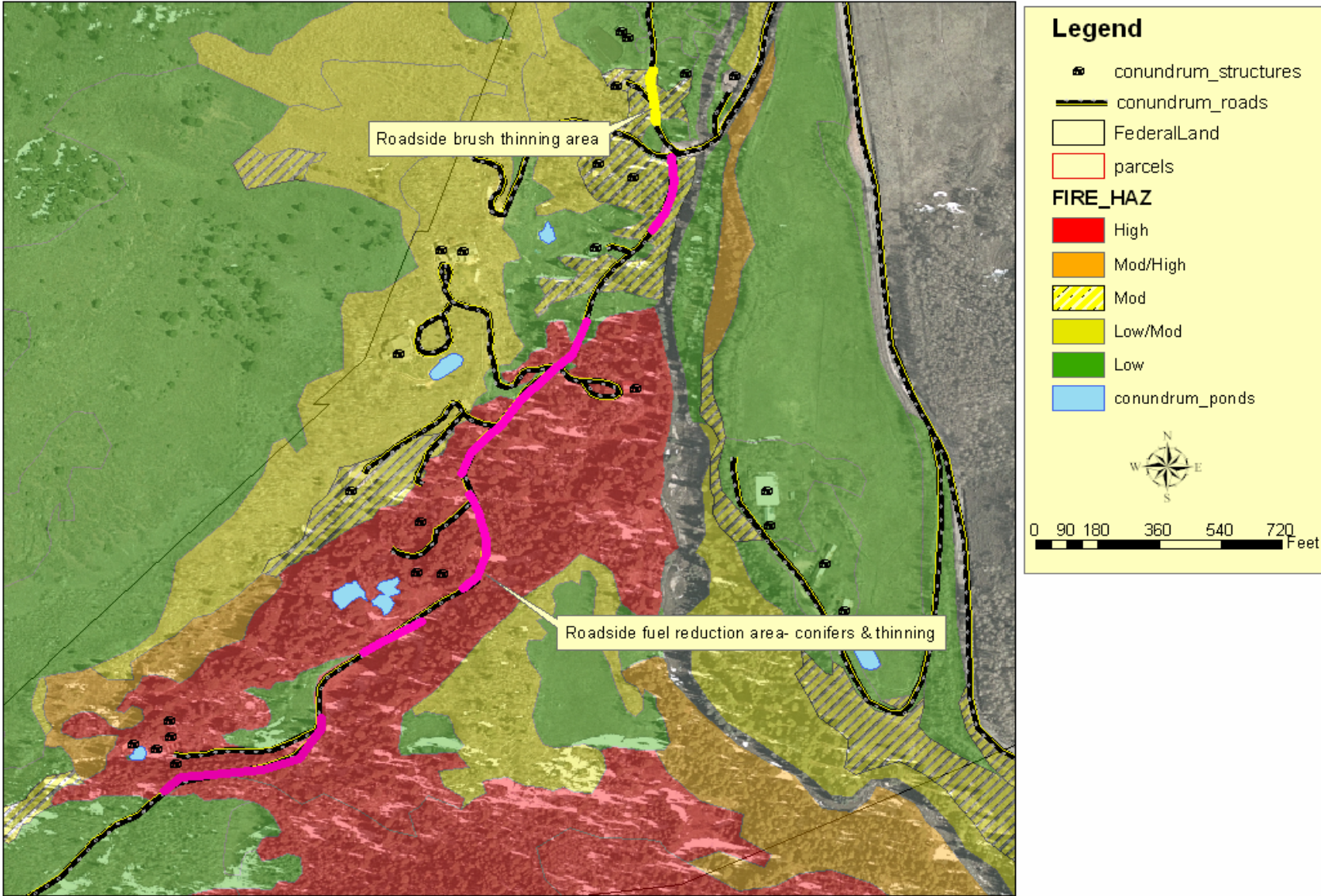


### Conundrum North- Roadside Thinning





# Conundrum South- Roadside Thinning



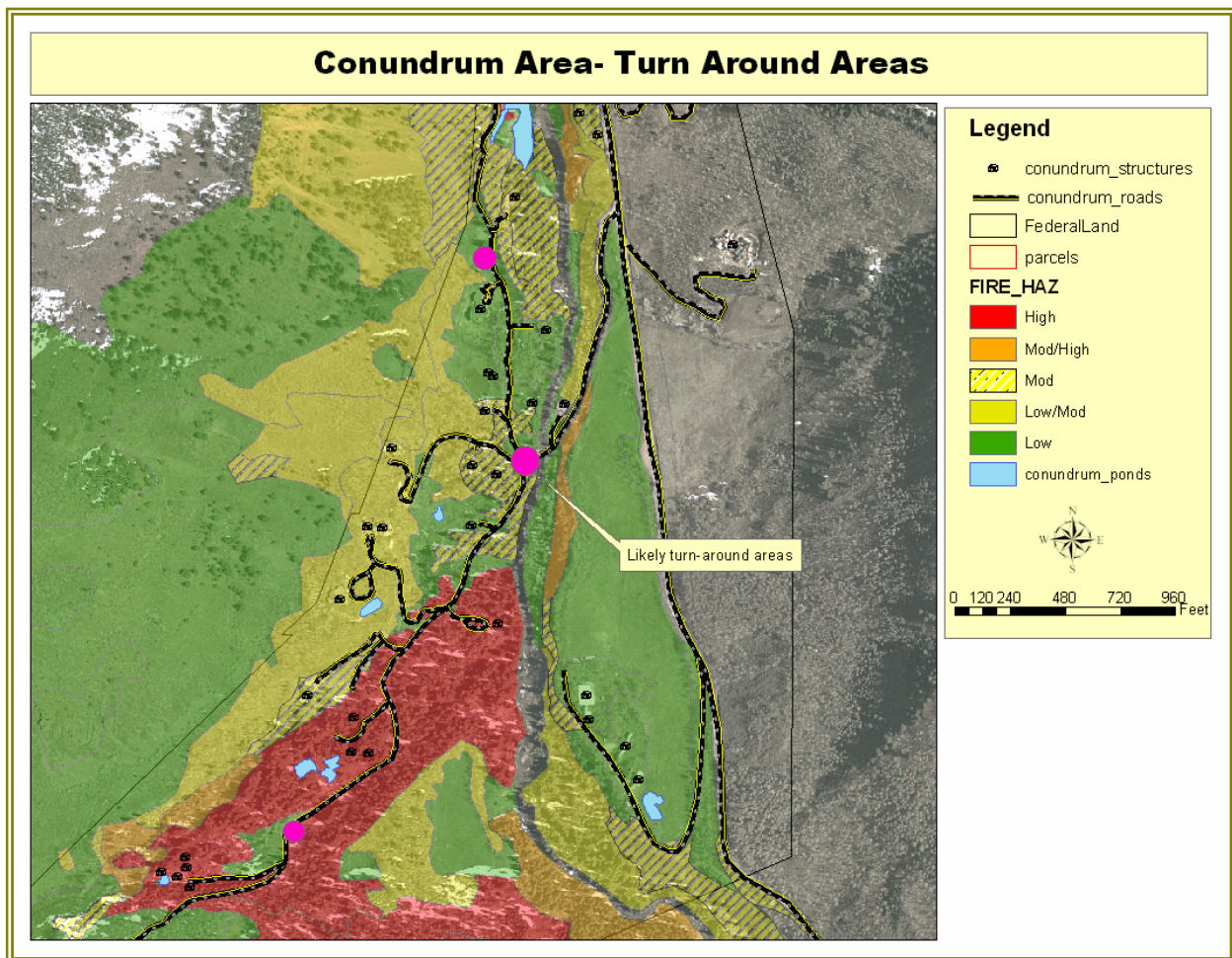


### 8.2. Road Widening

The Aspen Fire Protection District desires that the roads in Conundrum be 20' wide to accommodate fire truck access and the ability for fire trucks to pass and get by other vehicles on the road. In many areas of the subdivision, the roads are not 20' wide, but area closer to 12' to 15'. Therefore, with the assistance of Aspen Fire personnel, trees and vegetation should be removed or thinned in critical areas in order to move roads towards this desired 20' wide condition (in as many areas as possible). In areas where fire trucks and other heavy fire fighting equipment may get stuck on the sides of roads, then additional road fill material may have to be brought in to firm up the shoulders of the roads. The Conundrum home owners should work with Aspen Fire and Pitkin County Road and Bridge to identify these areas, and procure needed road materials.

### 8.3. Turn Around Areas

With assistance from Aspen Fire Protection District personnel, key areas in the subdivision should be targeted for development of a turn around area suitable for fire truck access. In general, these areas should have a 60' diameter drivable turn around area. There are already areas within the subdivision that may be suitable for these turn around areas.



## 9. Evacuation and Contingency Planning

In the event of a wildland fire in the Conundrum subdivision, evacuation of residents will be likely. One of the major factors that need to be addressed for evacuation is the management of the large amount of cars and people at the USFS Conundrum trailhead at the southwestern end of the area. During summer months, the parking lot is usually full during the weekend, and many times cars line the already narrow road from Forest Service lands down into the subdivision.

### 9.1. Residential Evacuation

Evacuation of most of the residents within the subdivision will likely be through the main roads, and up and out of the subdivision to Castle Creek Road. Residents by the Tanguay and Steinmetz residences will have less ground to travel if they evacuated to the southwest, up into the aspen stands and eventually to the USFS parking lot and meadows beyond. Conundrum residents should discuss this with Pitkin County Emergency Management and the Sheriff's department.

### 9.2. USFS Evacuation

The USFS Conundrum trailhead can have many cars and people there during the summer months. Cars are often parked on either side of the narrow access road, constricting the access to vehicles, and would often preclude smaller Type 6 fire trucks (brush trucks) and larger fire trucks. The cars are often parked for a half-day, full day, or multiple days, with the car's owners far up the trail, and unavailable to move them.

Therefore, the following recommendations are suggested in the event of a fire emergency in Conundrum during the summer months:

1. Pitkin Sheriff, USFS, or Aspen Fire personnel should not allow people or their vehicles to leave the relative safety of the trailhead area, and move down into the subdivision where access should be kept open for emergency service personnel. Vehicles at the trailhead can be allowed to leave the area once the fire emergency is over, or contained.
2. Pitkin County needs to work with the USFS to keep vehicles from spilling over from the USFS trailhead parking lot down the road into the subdivision. The road is very narrow, and with vehicles parked on both sides, it is often too narrow for a full sized pickup to pass through. This is a hazardous situation that should be addressed soon. One option is to have parking spaces designated in the parking lot, and if the lots becomes full, have a secondary area determined, and not allow cars to park on the road shoulders.





## 10. Implementation Plan and Schedule

The following is a prioritized list of activities that should be undertaken to reduce wildfire risk in the Conundrum area.

1. **Implement defensible space recommendations-** The recommendations in this report are the minimum that should be done at the home sites, it is the responsibility of the homeowner to implement the recommendations, but RMES, Inc. the Colorado State Forest Service, Aspen Fire Department personnel or other wildfire consultants would be available to help mark the vegetation that needs to be removed.
2. **Mark trees and vegetation to be removed along roads-** The trees that are to be removed should be marked and tallied in order to get bids from prospective contractors. Some of the larger trees may be 'salvaged' and used for wood products, which should reduce the cost of the project.
  - a. **Send out Request for Quotation for thinning work-** The thinning work along the roadsides will be a large job, and it may be in the best interest of Conundrum to get bids from companies qualified to do the work.
  - b. **Start thinning this winter-** Thinning work along the roadsides should be started this winter when the ground is frozen, and administered to ensure quality work.
3. **Widen roads through vegetation removal & installing road base-** Trees that are impinging upon access for emergency vehicles should be marked and tallied for removal, and coordination with Pitkin County Road & Bridge should occur for placement of road base where the roadsides are too soft for emergency vehicles.
4. **Installation of emergency vehicle turn around-** In coordination with Aspen Fire and Pitkin County Road and Bridge, turn-around areas should be installed in key areas to allow emergency vehicles an easy to use turn around area. These areas should be signed to disallow parking so the turn arounds are always open for emergency vehicles.
5. **Begin planning process for installation of emergency water supplies-** Residents working with Aspen Fire should begin process for development of a dry hydrant or cistern system for emergency fire fighting water supplies within the subdivision. It may be possible to find grants to help pay for the cost of installing such as system.
6. **Begin coordination with USFS for parking management of Conundrum Trailhead-** The parking of vehicles beyond the boundaries of the USFS parking lot, and down the sides of the access road into the subdivision is creating a hazardous access issue. Pitkin County Road & Bridge, Emergency Management, Aspen Fire & the USFS should be involved in this process in developing a solution.
7. **Begin planning of USFS vegetation management project south of Conundrum-** The hillside south of the subdivision has an aspen stand that is being taken over by conifers, and would be a good area to do fuels mitigation work.

## 11. Appendices

### 11.1. Aerial Photo of Conundrum Area





## 11.2. List and Contacts of Sponsor Organizations

### Northwest Colorado Council of Governments

Gary Severson, Director  
P.O. Box 2308  
Silverthorne, CO 80498  
(970) 468-0295  
[gjs@nwc.coq.co.us](mailto:gjs@nwc.coq.co.us)

### Pitkin County- Board of County Commissioners

Patti Clapper, Commissioner  
530 E. Main St. Ste. 301  
Aspen, CO 81611  
(970) 920-5154  
[pattic@co.pitkin.co.us](mailto:pattic@co.pitkin.co.us)

### Pitkin County Emergency Services

Ellen Anderson, E.M. Coordinator  
530 E. Main St. Ste. 301  
Aspen, CO 81611  
(970) 920-5234  
[ellena@co.pitkin.co.us](mailto:ellena@co.pitkin.co.us)

### Aspen Fire Protection District

Darryl Grob, Chief  
(970) 925-5532  
[darrylg@ci.aspen.co.us](mailto:darrylg@ci.aspen.co.us)

### Pitkin County Community Development

Suzanne Wolf, Senior Planner  
130 S. Galena St.  
Aspen, CO 81611  
(970) 920-5093  
[suzannew@co.pitkin.co.us](mailto:suzannew@co.pitkin.co.us)

### Pitkin County Public Works

Bert Pearce, Road and Bridge  
76 Service Center Rd  
Aspen, CO 81611  
970-920-5397  
[bertp@co.pitkin.co.us](mailto:bertp@co.pitkin.co.us)

### Aspen/Sopris Ranger Districts, White River National Forest

Fire Management Officer  
806 W. Hallam  
Aspen, CO 81611  
970-925-3445

### Colorado State Forest Service, Grand Junction District

Kelly Rogers, District Forester  
222 S. 6<sup>th</sup> Street, Rm. 416  
Grand Junction, CO 81501-2771  
970-248-7325  
[kjrogers@lamar.colostate.edu](mailto:kjrogers@lamar.colostate.edu)

### The Wilderness Workshop

Sloan Shoemaker, Director  
P.O. Box 9025  
Aspen, CO 81612  
(970) 544-0733  
[www@sopris.net](http://www@sopris.net)

### Rocky Mountain Ecological Services, Inc.

Eric Petterson  
0222 Bobcat Lane  
Redstone, CO 81623  
(970) 963-2190  
[ericpetterson@msn.com](mailto:ericpetterson@msn.com)





## 12. Report Authors

The primary author for this report is Eric Petterson of Rocky Mountain Ecological Services, Inc. Mr. Petterson holds a Masters of Science Degree in Rangeland Ecosystem Science (emphasis on fire ecology) and a Bachelors of Science Degree in Wildlife Biology from Colorado State University. Mr. Petterson has 13 years of natural resource planning and management experience. He has authored numerous Wildfire Hazard Reviews for Pitkin County, and has authored three Community Wildfire Protection Plans in the Roaring Fork Valley. Mr. Petterson has also conducted fuels inventories and management recommendation reports for 5 Colorado State Parks. As a contractor, Mr. Petterson has performed various assessments and planning tasks on the Cerro Grande, Missionary Ridge, Burn Canyon, Big Fish, Eldorado Canyon, and Hayman fires. Prior to being a consultant/contractor, Mr. Petterson was a Fuels Planner on the Canyon Lakes Ranger District on the Arapaho/Roosevelt National Forest. As a fuels planner, Mr. Petterson was the Project Manager for five prescribed fires, ranging in size from 300 acres to 7,000 acres, as well as combination mechanical treatment/prescribed fire projects. Mr. Petterson was with the USDA Forest Service for 10 years.

Eric Petterson has managed Rocky Mountain Ecological Services since 2000.

