

Nevada Fire Safe Council  
1187 Charles Drive  
Reno, Nevada 89509  
(775) 322-2413.

- Assure that address signs are visible from the road. Address characters should be at least four inches high, reflective, and composed of non-flammable material. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under smoky conditions during a wildland fire.
- Read and become fully knowledgeable of evacuation procedures, fire safety zones, and safety procedures for sheltering in place in the event that evacuation is not possible.

#### *Storey County Fire Department Responsibilities*

- Organize community clean-up events to remove weeds and debris in town. Facilitate community projects to dispose of accumulated biomass.

#### *Storey County Commissioner Responsibilities*

- Require all future development in the County to meet the national fire codes with regard to community design aspects, building construction and spacing, road construction and design, water supply, and emergency access. Refer to Appendix F for an example of fire safe recommendations for planning new developments.

### **8.2.3 Fuelbreaks and Fuels Reduction Treatments**

Fuel reduction treatments, including shrub thinning are recommended on approximately ten acres along the western interface (See Figure 8-1). These treatments are recommended to permanently change the fuel structure over large blocks of land. With a fuel reduction treatment, the expected result in the event of a catastrophic wildfire would be one of reduced probability for uncontrolled spread through the treated area. Fuelbreaks can stop or slow the advance of a wildfire and give firefighters a place to stand against an oncoming fire. Fuels reduction treatments are applied on a larger scale than defensible space treatments and generally reach beyond private land boundaries.

#### *Storey County Fire Department*

- Coordinate with private property owners, the Nevada Division of Forestry, and the BLM to create a fire access road along the west side of Virginia City by grading and widening the existing Summit Road and adding turn-around locations to allow passage of fire suppression equipment. In addition to improving the existing road, increase the vegetation clearance area along Summit Road by an additional thirty feet on each side of the roadway for a distance of approximately 6,000 lineal feet.
- Coordinate with private property owners, the Nevada Division of Forestry, and the Bureau of Land Management to implement a fuels reduction treatment on approximately 63 acres below Summit Road and the edge of the residential area. Thin trees to create openings of at least thirty feet between tree crowns. Remove ladder fuels and thin shrubs to a spacing equal to twice their height. Revegetate the treatment area with the seed mixture and procedures given in Appendix E to prevent establishment of cheatgrass and other noxious weeds.

#### Utility Company Responsibilities

- Maintain power line corridors by clearing flammable vegetation within fifteen feet of power poles, as fires have been known to start from arcing power lines during windy conditions or exploding transformers during periods of high electricity use.

#### Storey County and Nevada Department of Transportation Responsibilities

- Reduce and remove fuels along county roads, State Routes, and highways using brush hogs or mowers to reduce vegetation height to four inches for a distance of 25 feet on both sides of the road or to the fenced right-of-way boundary.

### **8.2.4 Public Education**

Public education about fire safety is critical. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents of the wildland-urban interface. Informed community members will be more inclined to make efforts in effectively reducing the wildfire hazards to their homes and neighborhoods. People moving into the area may be unfamiliar with standard precautions that must be taken when living in a fire-prone environment. Working with local fire officials, residents can learn to identify fire hazards in the wildland-urban interface and take effective action to remedy those hazards in Virginia City.

#### Storey County Fire Department

- Complete and distribute copies of the Virginia City emergency evacuation plan to all residents. Conduct public workshops annually prior to the tourist and fire season to ensure that all residents are fully knowledgeable of evacuation routes, evacuation procedures, designated fire safe zones, and procedures for sheltering in place in case evacuation becomes infeasible during a fast moving fire storm.
- Post the evacuation plan in parking lots and elsewhere throughout Virginia City to inform tourists of appropriate evacuation procedures.
- Distribute copies of the publication *Living with Fire* to all property owners. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.
- Enforce or develop county laws, regulations, and ordinances that support implementation and maintenance of defensible space and establish fuel reduction responsibilities for absentee homeowners and vacant lots.
- Contact the University of Nevada Cooperative Extension and the BLM Carson City Field Office for assistance with public education.

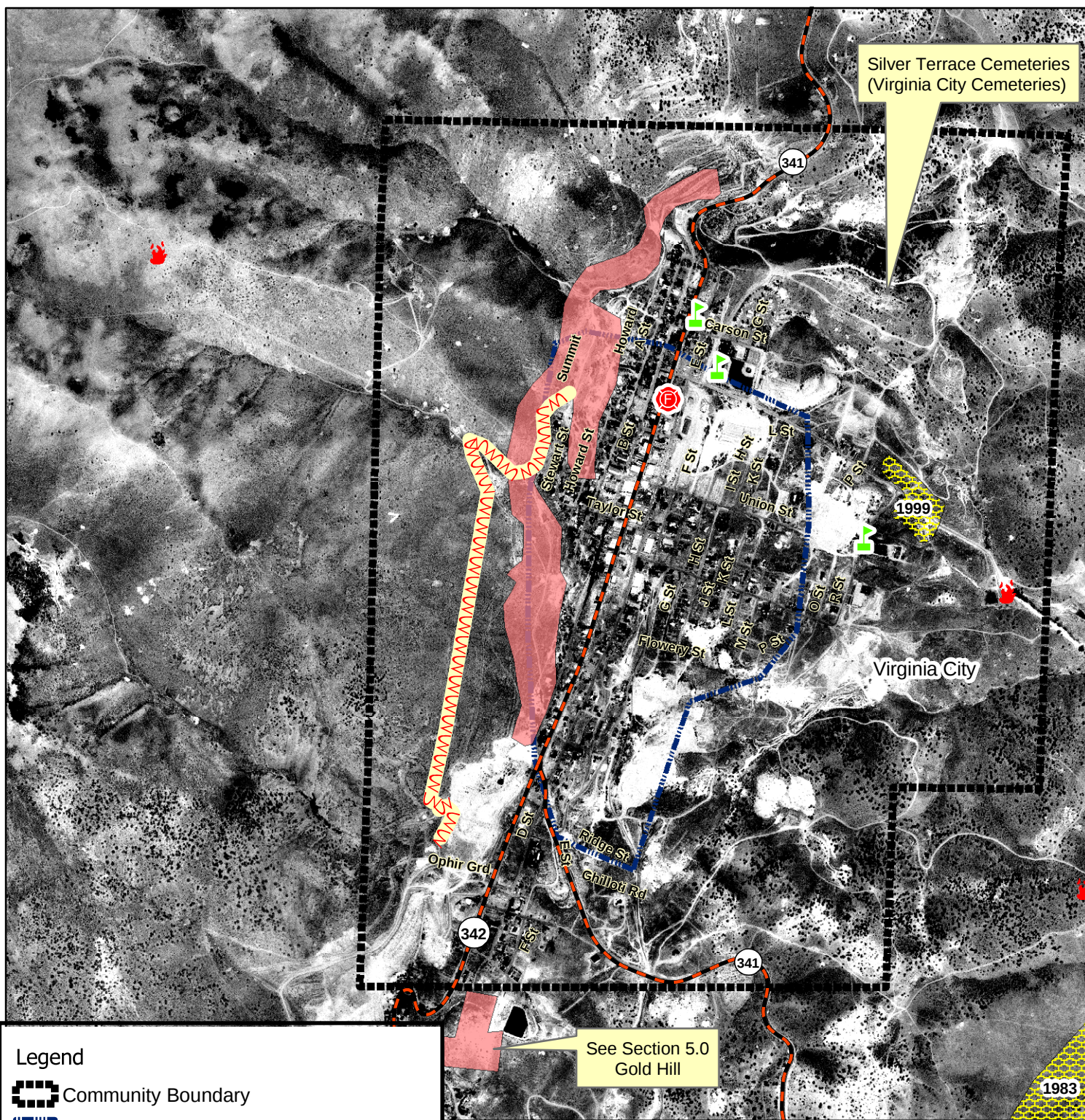
### 8.3 SUMMARY OF RECOMMENDATIONS

**Table 8-1. Virginia City Priority Recommendations to Reduce Wildfire Risks and Hazards**

| RESPONSIBLE PARTY                                                                                              | RECOMMENDED TREATMENT  | RECOMMENDATION DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Property Owners</b>                                                                                         | Defensible Space       | Remove, reduce, and replace vegetation around home according to the defensible space guidelines in Appendix E.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                | Community Coordination | Form a local chapter of the Nevada Fire Safe Council.<br>Improve address visibility.<br>Participate in public education opportunities and become knowledgeable of emergency evacuation procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Utility Company</b>                                                                                         | Fuels Reduction        | Reduce and remove vegetation in power lines corridors.<br>Maintain fifteen feet of clearance around utility poles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Storey County And NDOT</b>                                                                                  | Fuels Reduction        | Reduce and remove vegetation in county road, state route, and highway right-of ways to maintain an average four-inch vegetation height. Reseed with the recommended seed mixture given in Appendix E to minimize opportunities for cheatgrass and noxious weed invasion.<br>Facilitate removal of biomass generated from fuel reduction projects.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Storey County Fire Department</b><br><b>Nevada Division of Forestry</b><br><b>Bureau of Land Management</b> | Fuels Reduction        | Grade Summit Road for a distance of approximately 6,000 lineal feet to create a fire safe access road on the west side of the community Clear vegetation an additional thirty feet on the uphill side of the road.<br>Implement a fuels reduction treatment on approximately 63 acres.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Storey County Fire Department</b>                                                                           | Public Education       | Complete and distribute the Virginia City emergency evacuation plan. Conduct annual workshops to train residents on evacuation procedures and safety procedures for sheltering in place.<br>Post the evacuation plan throughout the community to inform tourists of evacuation procedures.<br>Organize community clean-up projects and facilitate biomass removal from treatment areas.<br>Enforce or develop county laws, regulations, and ordinances for defensible space and fuel reduction that include responsibilities for absentee homeowners, vacant lots, and new subdivisions.<br>Distribute copies of the publication <i>“Living with Fire”</i> to all property owners.<br>Contact the Nevada Cooperative Extension and the Bureau of Land Management for assistance with public education. |
| <b>Storey County Commissioners</b>                                                                             | Community Coordination | Require all future development in the County meet the national fire codes with regard to community design aspects, building construction and spacing, road construction and design, water supply, and emergency access.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 8-2 Virginia City Wildfire Hazard Rating Summary**

|                                              |               |                                                                                                               |                               |
|----------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>A. Urban Interface Condition</b> <b>2</b> |               | <b>TALLIES</b>                                                                                                |                               |
| <b>B. Community Design</b>                   |               | <b>262 Total Houses</b>                                                                                       | <b>20 Residential Streets</b> |
| 1. Ingress / Egress                          | <u>1</u> /5   | <b>B5. Street Signs</b><br><u>0</u> not visible <u>20</u> visible <u>100%</u> visible                         |                               |
| 2. Width of Road                             | <u>1</u> /5   | <b>B6. Address Signs</b><br><u>17</u> not visible <u>245</u> visible <u>94%</u> visible                       |                               |
| 3. Accessibility                             | <u>1</u> /3   | <b>C1. Roofs</b><br><u>7</u> combust <u>255</u> not combust <u>97%</u> not combust                            |                               |
| 4. Secondary Road                            | <u>5</u> /5   | <b>C2. Siding</b><br><u>189</u> combust <u>73</u> not combust <u>28%</u> not combust                          |                               |
| 5. Street Signs                              | <u>1</u> /5   | <b>C3. Unenclosed Structures on Lot</b><br><u>171</u> not enclosed <u>91</u> enclosed <u>65%</u> not enclosed |                               |
| 6. Address Signs                             | <u>1</u> /5   | <b>D1. Lot Sizes</b><br><u>259</u> <1ac <u>3</u> >1ac <10ac <u>0</u> >10ac                                    |                               |
| 7. Utilities                                 | <u>5</u> /5   | <b>D2. Defensible Space</b><br><u>178</u> not adequate <u>84</u> adequate <u>32%</u> adequate                 |                               |
| <b>C. Construction Materials</b>             |               |                                                                                                               |                               |
| 1. Roofs                                     | <u>1</u> /10  |                                                                                                               |                               |
| 2. Siding                                    | <u>5</u> /5   |                                                                                                               |                               |
| 3. Unenclosed Structures                     | <u>5</u> /5   |                                                                                                               |                               |
| <b>D. Defensible Space</b>                   |               |                                                                                                               |                               |
| 1. Lot Size                                  | <u>5</u> /5   |                                                                                                               |                               |
| 2. Defensible Space                          | <u>7</u> /15  |                                                                                                               |                               |
| <b>F. Fire Behavior</b>                      |               |                                                                                                               |                               |
| 1. Fuels                                     | <u>3</u> /5   |                                                                                                               |                               |
| 2. Fire Behavior                             | <u>10</u> /10 |                                                                                                               |                               |
| 3. Slope                                     | <u>10</u> /10 |                                                                                                               |                               |
| 4. Aspect                                    | <u>10</u> /10 |                                                                                                               |                               |
| <b>E. Suppression Capabilities</b>           |               |                                                                                                               |                               |
| 1. Water Source                              | <u>1</u> /10  |                                                                                                               |                               |
| 2. Department                                | <u>3</u> /10  |                                                                                                               |                               |
| <b>Score</b> <b><u>75</u> /128</b>           |               |                                                                                                               |                               |



## Legend

- Community Boundary
- Virginia City Historic District
- Proposed Fuelbreak/Road Improvement
- Proposed Fuel Reduction Treatment
- School
- Fire Station
- Fire Ignition
- Fire Boundary and Date
- Highways and State Routes

Figure 8-1. Virginia City  
Fire History, Suppression Resources,  
Critical Features,  
and Proposed Mitigation Projects

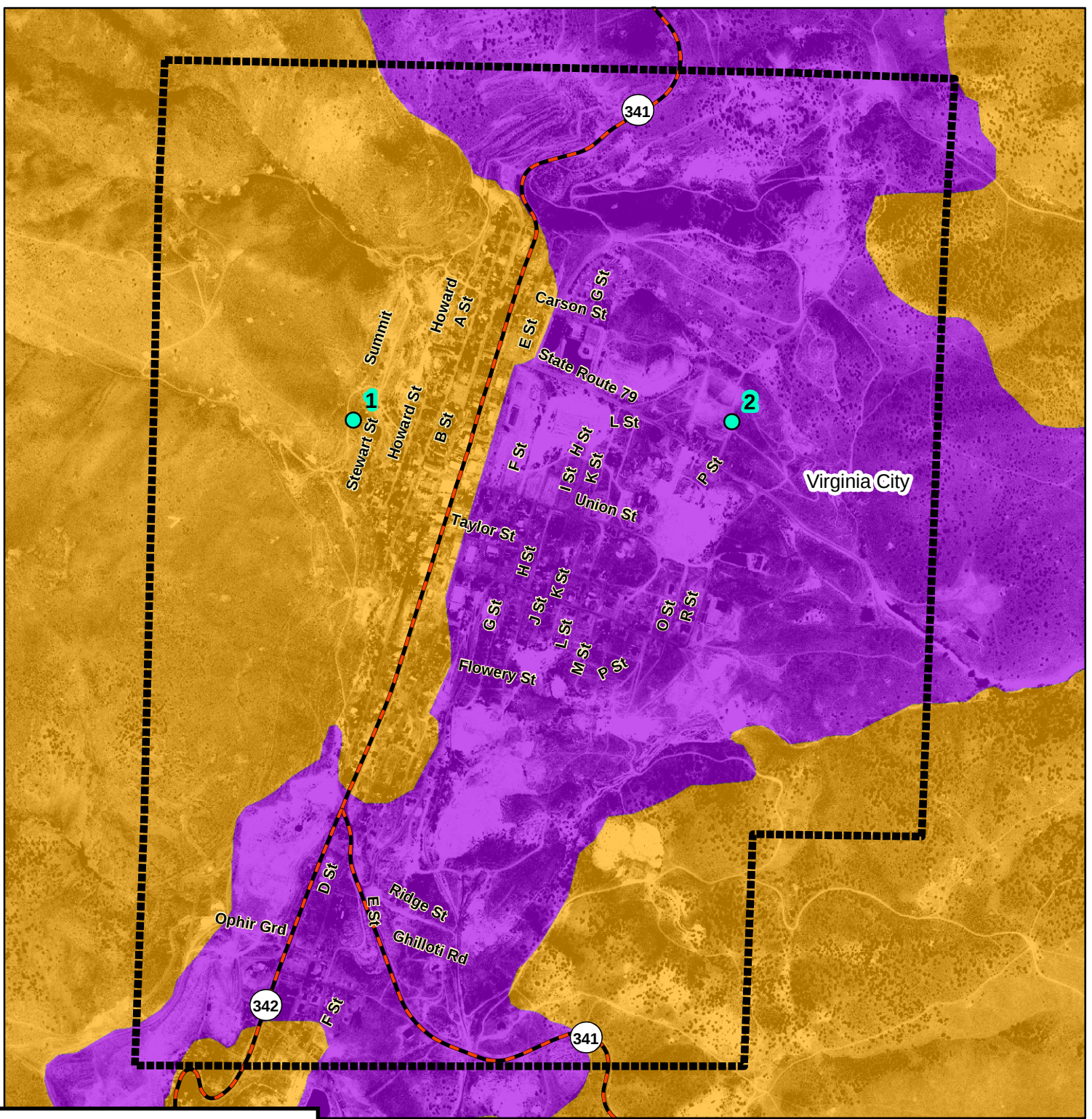
0 0.1 0.2 0.4  
Miles



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## Nevada Community Wildfire Risk / Hazard Assessment Project

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## Legend



Community Boundary



Highways and State Routes

## Fuel Hazard



Extreme



High



Low

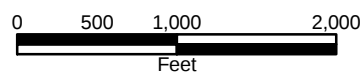


Moderate



Fuel Photo Point

Figure 8-2. Virginia City  
Fuel Hazard Classification



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**Figure 8-3. Virginia City Fuel Hazard Photo Points**



**Photo Point 1.** 0271370N. 4354566E. Direction 28°NNE. Total fuel loading on the west side of Virginia City is estimated at less than four tons per acre. Vegetation consists of sagebrush, rabbitbrush, cheatgrass, and native grasses with occasional pinyon and juniper trees. The vegetative fuel hazard is rated as high due to its position at the base of the Virginia Range on steep slopes that experience frequent downslope winds.



**Photo Point 2.** 0272365N. 4354562E. Direction 164°SSE. The fuels on the east side of the community are characterized by a light cheatgrass component, sparse sagebrush, and rabbitbrush. Historic mining activity and other disturbances create a highly fragmented fuel bed. Fuel loading is estimated at less than two tons per acre and has a hazard rating of moderate.

***Resource Concepts, Inc.***

## 9.0 VIRGINIA HIGHLANDS

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### 9.1 RISK AND HAZARD ASSESSMENT

Wildfire risks and hazards to the Virginia Highlands community were assessed in 2002, with results and recommendations documented in *Community Wildfire Risk Assessment and Fuel Reduction Plan for the Virginia Highlands Community*. Resource Concepts, Inc. prepared this report for the Fire Safe Highlands and the University of Nevada, Reno – Cooperative Extension. For a complete treatment of the community, please refer to the original report (available online at <http://www.rci-nv.com/reports/highlands>). The following section is a brief review adopted from the 2002 report and includes information on the progress made in fuels reduction and other fire safe activities since the first report was issued.

Virginia Highlands is situated between approximately 5,800 feet at the Highlands Fire Station #2 to almost 7,000 feet at Geiger Summit on Highway 341 (Geiger Grade). Except for Fivemile Flat and the large flat near the Fire Station, the area is hilly with steep forested slopes. Minor ridges run in a southwest to northeast direction. Aspects are generally northwest and southeast. Using the assessment results from the 2002 report, a rating category of **Extreme Hazard** can be inferred, principally due to the combination of steep slopes, dense, flammable vegetation, very little defensible space, narrow roads, and limited access.

#### 9.1.1 Community Design

The urban interface condition surrounding Virginia Highlands is intermixed. The Community consists of 1,169 one-acre lots clustered in the interior of the subdivision, with ten-acre parcels concentrically located around the one-acre core and forty acre parcels in the outermost extents of the subdivision. Therefore, structures and wildland fuels are not separated by clear lines of demarcation.

**Roads:** Access to the area is gained from Highway 341. Cartwright Road is the main entry road to the north in the area of Fivemile Flat. Lousetown Road enters the development just north of Virginia City, also from Highway 341. These two main arteries into the subdivision are paved and intersect near Storey County Fire Station #2 in the Highlands. Residential roads are typically twenty feet wide with good drainage from a minimal road base. Base materials appear to be a mix of gravel and native soil.

Access across the project area is difficult in many places. The road network is generally winding and steep; many roads dead-end at driveways. Navigation from one artery to another on residential streets involves numerous turns. Many roads are constructed straight up the slopes, making them difficult to drive. Some roads are impassable to emergency equipment, especially under wet or icy conditions.

**Signage:** Most road signs were small, made of wood, and non-reflective, making them difficult for firefighters to read in many places. During a wildland fire, these signs may be destroyed making access to specific structures impossible for firefighters, especially those brought in from cooperating agencies that are not

familiar with the neighborhoods. Small and uniform reflective street address signs have been installed where driveways meet the main road at many residences, a significant aid to rescue vehicles in locating specific homes.

**Utilities:** All of the power utilities are above ground. Large propane tanks are located throughout the area, in many cases close to structures without adequate clearance from brush and trees.

### **9.1.2 Construction Materials**

Homes within the Highlands Community have been built with a variety of roofing materials and exterior wall siding products. While the roofing materials on most residences were made of composite or other fire-resistant materials, some homes with highly flammable shake shingle roofs were observed. Most of the exterior walls observed during neighborhood reconnaissance were composed of wood products.

### **9.1.3 Defensible Space**

The fuel hazard in the Virginia Highlands interface area ranges from moderate to extreme. Fuels consist of sagebrush with inclusions of bitterbrush, rabbitbrush, desert peach, pinyon pine, and juniper trees. The terrain is steep. At the time of the evaluation, the vast majority of the homes did not have landscaping that would meet the minimum requirement for defensible space to protect the home from damage or loss during a wildfire; however, activities focused on clearing defensible space have been initiated.

### **9.1.4 Suppression Capabilities**

#### Wildfire Protection Resources

Storey County Fire Station #2 is located in the Virginia Highlands and, at the time of inquiry, this station reported housing three permanent firefighters, thirteen volunteers for the Storey County Fire Department, and the fire suppression equipment listed in Table 4-2 (G. Hames, pers. comm.). The Nevada Division of Forestry assigns a Type III engine and five seasonal firefighters to this station during the fire season. Resource availability and mutual aid agreements with Storey County Fire Protection District are described in Section 4.1.1.

#### Water Sources and Infrastructure

Virginia Highlands has the following water resources:

- Fifteen underground water storage tanks that total 247,000 gallons that are used as drafting tanks for filling water tenders.
- Fire hydrants are available in Virginia City, which is more than 45 minutes away, roundtrip. The fire main flow is 3,000 gpm per hydrant in Virginia City.

### **9.1.5 Factors Affecting Fire Behavior**

Slopes range from zero to eighty percent with an average slope of about seventeen percent. Minor ridges run in a southwest to northeast direction. Aspects are generally northwest and southeast. The terrain has many topographic features conducive to extreme fire behavior, particularly canyons with steep slopes and saddles.

Numerous single-tree lightning strike fires occur during the summer in the Highlands area. These ignitions are usually extinguished before burning beyond the tree of origin. Historically, large fires in the general area have started to the west and to the north of the Virginia Highlands. A map of the fuel hazard condition for Virginia Highlands is shown in Figure 9-3. Photographs of fuel conditions in the Virginia Highlands interface area are included in Figure 9-4.

#### **9.1.6 Fire Behavior Worst-case Scenario**

An example of a worst-case wildfire scenario in the Highlands is a fire that starts southwest of the community near Highway 341 and Cartwright Road in mid-afternoon. Winds in excess of 35 mph from the southwest could move the fire in a northeast direction toward areas with extreme fuel loads and very limited road access.

The dense woodlands and steep topography in this area almost assure that the worst-case scenario wildfire will be carried through the canopy of the pinyon trees in a stand-destroying crown fire. A crown fire is the most perilous of all fire conditions and is usually catastrophic in nature since the danger to firefighters is generally too great to deploy ground crews. In the absence of a well-executed and aggressive fuels management plan before a fire occurs, virtually all of the vegetation, homes, and people in the path of a crown fire are at risk of destruction, injury and loss of life. In addition to limited possibilities for structure protection, there is a high possibility of loss of life in the worst-case wildfire scenario of a wind-driven crown fire.

#### **9.1.7 Ignition Risk Assessment**

The Virginia Highlands have been categorized with a high ignition risk rating. There is a history of lightning strikes in the area, as shown in Figure 9-1. Human caused ignitions can come from nearby highways and county roads by burning material thrown out of vehicle windows or ignited during auto accidents, recreational use by off-road vehicles, debris burning in piles or burn barrels, and firearm use on adjacent undeveloped lands.

### **9.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS AND RESPONSIBILITIES**

Resource Concepts, Inc provided the treatments and recommendations listed below in the June 2002 report. In that report, the Virginia Highlands were separated into four Fire Risk Zones; recommendations are provided for each risk zone. All recommendations are a priority.

Specifications for the recommendations pertaining to fuelbreaks recommended by Resource Concepts, Inc. (2002) are summarized in Tables 9-1 through 9-4 and shown in Figure 9-2. Perimeter fuelbreaks are planned for Cartwright Road and proposed for Yellowjacket Road and Highway 341 for the fall of 2004 through the spring of 2005.

The Storey County Fire Department prioritized several internal fuelbreak recommendations for the Virginia Highlands community. At the time of this report, the homeowner support on parcels that would be affected by internal fuelbreaks was around fifty percent (J. Copeland, pers. comm.). This observation indicates that efforts to emphasize the importance and effectiveness of internal fuelbreaks will be a necessary prerequisite to the actual implementation of these fuelbreaks in the interior of the community.

### 9.3 SUMMARY OF RECOMMENDATIONS FOR VIRGINIA HIGHLANDS

The following recommendations are summarized from RCI 2002 *Community Wildfire Risk Assessment and Fuel Reduction Plan for the Virginia Highlands Community*.

**Table 9-1. Recommendations for Zone 1: Extreme Fuel Hazard**

| RESPONSIBLE PARTIES                                                  | RECOMMENDATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nevada Division of Forestry</b><br><br><b>Fire Safe Highlands</b> | <p>Construct shaded fuelbreaks a minimum of 200 feet wide along the following existing roads: Cartwright Road, Lousetown Road, segments of Hwy 341 that traverse the P-J woodland, Sazarac to Empire, and north to Agate and on to Lousetown. Seek to extend Saddleback to Lousetown Road to provide a continuous fuelbreak.</p> <p>Extend less intensive tree and shrub treatment for an additional 25 feet.</p>                                                                                                                                                                                                                |
| <b>Property Owners</b>                                               | <p>Thin trees and shrubs along driveways similar to the recommendations for roadside fuelbreaks. See the RCI Highlands Report (2002) for further details.</p> <p>Broadcast seed treated areas with a recommended seed mixture such as included in Appendix E of this report, or Appendix A of the RCI Highlands Report (2002).</p> <p>Refer to the RCI Highlands Report (2002) for detailed specification on creating and maintaining effective defensible space. (Refer to Appendix E of this report for guidelines on defensible space.)</p> <p>Seek advice from the Storey County Fire Department for sheltering on-site.</p> |

Source: RCI 2002

**Table 9-2. Recommendations for Zone 2: High Fuel Hazard**

| RESPONSIBLE PARTY                                                              | RECOMMENDATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nevada Division of Forestry</b><br><br><b>Fire Safe Highlands Coalition</b> | <p>Construct fuelbreaks along Cartwright Road and Lousetown Road that are a minimum distance of fifty feet from the centerline on both sides of the road.</p> <p>Areas dominated by pinyon-juniper should follow the RCI 2002 Highlands Report recommendations for Zone 1.</p>                                                                                                                                                                                                                                                |
| <b>Property Owners</b>                                                         | <p>Refer to the RCI 2002 Highlands Report for detailed specification on creating and maintaining effective defensible space. (Refer to Appendix E of this report for guidelines on defensible space.)</p> <p>Broadcast seed with seed mix recommended in Appendix E of this report or Appendix A, Zone 2 of the RCI 2002 Highlands Report to minimize cheatgrass invasion.</p> <p>Clear residential driveways of hazardous fuels and construct pullouts or adequate turning radius to accommodate firefighting equipment.</p> |

Source: RCI 2002.

**Table 9-3. Recommendations for Zone 3: High Fuel Hazard, Brush Fuel Type**

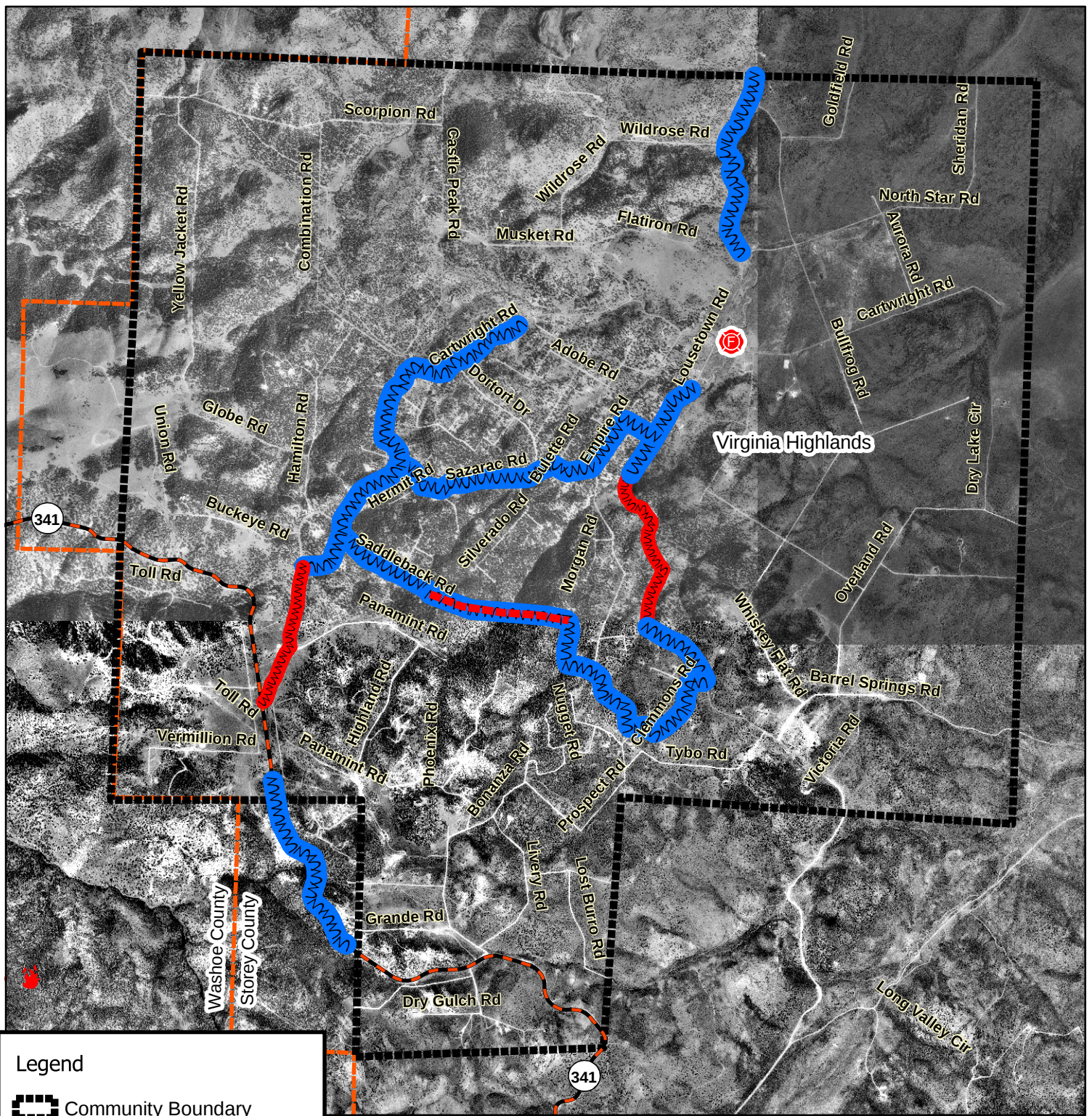
| RESPONSIBLE PARTY                                          | RECOMMENDATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nevada Division of Forestry<br/>Fire Safe Highlands</b> | Continue the fuelbreak along Lousetown Road by implementing the recommendations for Zone 1 in the RCI Highlands Report (2002).                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Private Property Owners</b>                             | <p>Treat private driveways for a minimum distance of fifty feet from centerline on both sides of the road.</p> <p>Remove all dead shrubs and other accumulated biomass to a designated safe area.</p> <p>Refer to the RCI 2002 Highlands Report for detailed specification on creating and maintaining effective defensible space. (Refer to Appendix E of this report for guidelines on defensible space.).</p> <p>Provide adequate space for fire equipment to turn around.</p> <p>Identify addresses with four-inch fluorescent numbers that are readily visible to emergency responders</p> |

Source: RCI 2002

**Table 9-4. Recommendations for Zone 4: Moderate Fuel Hazard**

| RESPONSIBLE PARTY             | RECOMMENDATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Private Property Owner</b> | <p>Control shrubs and herbaceous vegetation within thirty feet along both sides of driveways.</p> <p>Revegetate all disturbances created from hazard reduction treatment according to the recommendations for Zone 4, given in Appendix 2 of the RCI Highlands Report (2002).</p> <p>Refer to the RCI 2002 Highlands Report for detailed specification on creating and maintaining effective defensible space. (Refer to Appendix E of this report for guidelines on defensible space.).</p> <p>Replace hazardous fuels with fire retardant species or desert landscaping (xeriscape) treatments that incorporate rock or gravel and minimize use of flammable plants.</p> |

Source: RCI 2002



### Legend

Community Boundary

Fire Station

Fire Ignition

County Boundary

Highways and State Routes

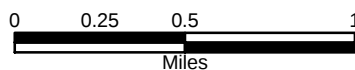
Proposed Road Extension

### Proposed Fuelbreak

100 ft. Fuelbreak

200 ft. Fuelbreak

Figure 9-1. Virginia Highlands  
Fire History, Suppression Resources, and  
Proposed Mitigation Projects



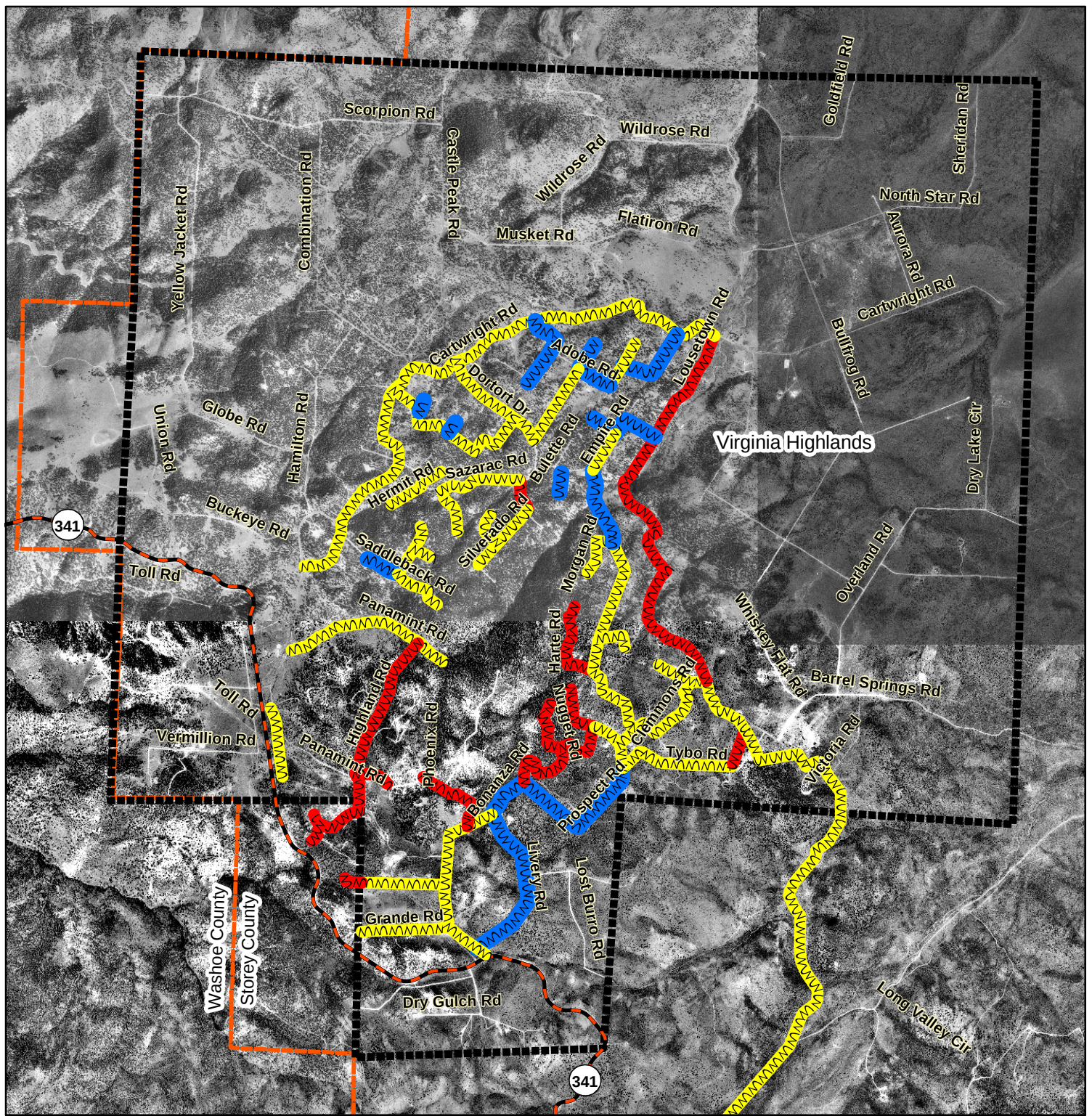
\* Proposed Mitigation Projects were recommended by Resource Concepts, Inc. in the Community Wildfire Risk Assessment and Fuel Reduction Plan for the Virginia Highlands Community (RCI, June 2000).



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### *Nevada Community Wildfire Risk / Hazard Assessment Project*

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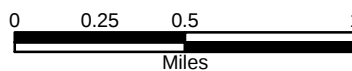
#### Legend

- Community Boundary
- County Boundary
- Highways and State Routes

#### Priority Fuelbreaks

- 1st Priority
- 2nd Priority
- 3rd Priority

Figure 9-2. Virginia Highlands  
Priority Fuelbreak Locations



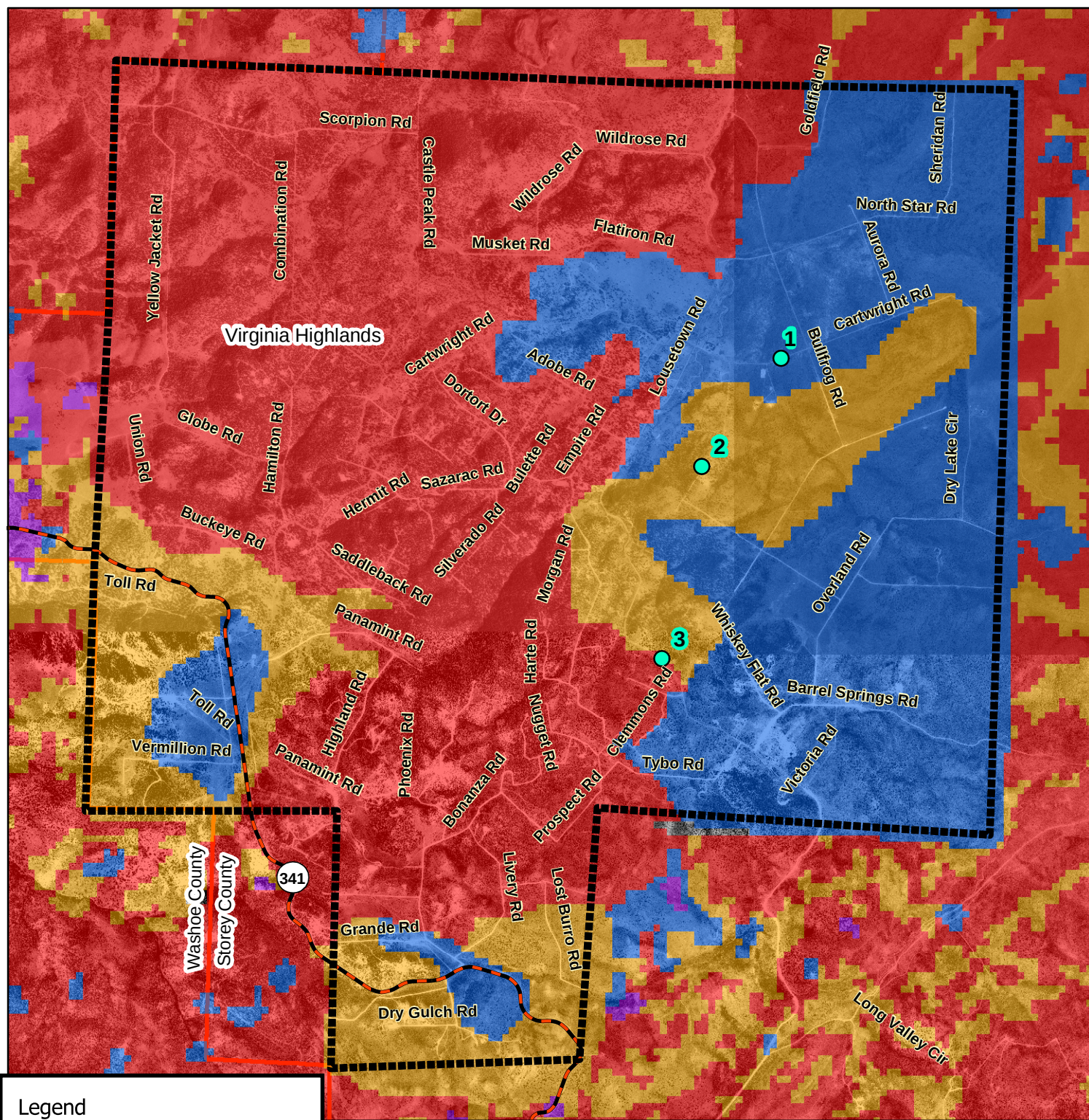
\* Priority fuels reduction areas were provided by the Storey County Fire Department and presented in the Community Wildfire Risk Assessment and Fuel Reduction Plan for the Virginia Highlands Community (RCI, June 2000).



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#### Legend

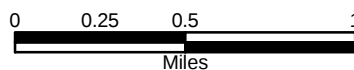
- Community Boundary
- County Boundary
- Highways and State Routes

#### Fuel Hazard

- Extreme
- High
- Moderate
- Low

- Fuel Photo Point

Figure 9-3. Virginia Highlands Fuel Hazard Classification



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**Figure 9-4. Virginia Highlands Fuel Hazard Photo Points**

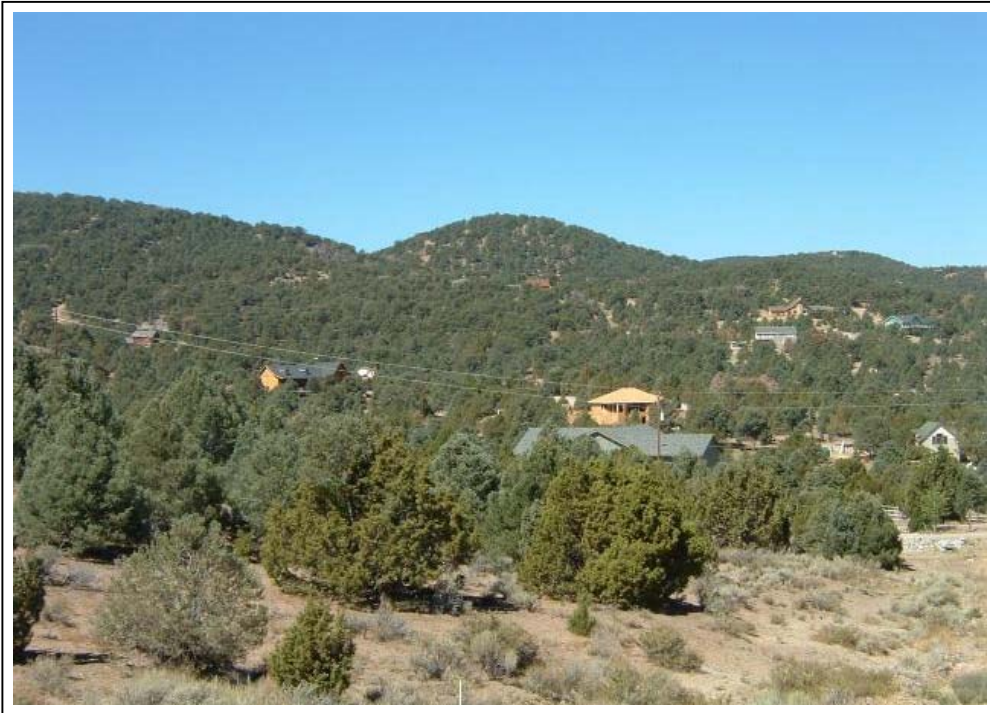


**Photo Point 1.** 0273891N. 4362936E. Direction 22°NNE. The moderate fuel hazard in this area consists of sagebrush, with some bitterbrush and rabbitbrush. The total fuel load was estimated at less than five tons per acre.



**Photo Point 2.** 0273376N. 4362234E. Direction 104°ESE. High fuel hazard areas consist of scattered pinyon-juniper woodland cover with some sagebrush and bitterbrush understory. Fuel loading for high fuel hazard areas ranges between four and eight tons per acre.

**Figure 9-4. Virginia Highlands Fuel Hazard Photo Points (*continued*)**



**Photo Point 3.** 0273117N. 4360986E. Direction 264°WSW. Extreme fuel hazard in the Virginia Highlands characterized by steep slopes and closed-canopy pinyon-juniper woodlands with understory of sagebrush, bitterbrush, and rabbitbrush. The total fuel load for these areas was estimated at more than eight tons per acre.

## 10.0 STOREY COUNTY CONCLUSIONS

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The RCI Project Team developed the recommendations in this report based on site-specific conditions observed during the risk and hazard assessments and information provided by local fire departments and agencies. General and specific recommendations provide a starting point for each community to take a proactive approach in implementing projects to reduce the risks for loss of life, property, and natural resources during a wildland fire. For it is not a matter of "if" a wildfire will start, but rather "when" and "where" the next wildfire ignition will occur.

There is potential for catastrophic wildfire in the wildland-urban interface area around Virginia City, the Virginia Highlands, and Gold Hill. In many cases the fuel hazards identified in these communities are the results of a build up of fuels and combustible debris adjacent to old wooden structures and fences. Removal of debris and excess vegetation as described in the defensible space guidelines will remedy many of the hazards and provide a greater level of fire safety to these communities. Local ordinances that support enforcement of defensible space requirements will greatly facilitate implementation of needed fuel reduction on a community-wide basis.

High tourist occupancy and recreational off-road traffic during the summertime increases the risk of a human caused fire ignition. It also heightens the need for well-developed community evacuation plans that are readily communicated to tourists as well as local residents.

Wildfire suppression resources are available throughout Storey County. The Storey County Fire Department, the Nevada Division of Forestry 473 Fire Protection District, and the additional resources that respond under cooperative mutual aid agreements have been successful in minimizing wildfires through rapid response to both human and lightning caused ignitions.

The Highlands Fire Safe Coalition has demonstrated that grassroots community coordination is an effective tool for securing funding, planning, and implementing large-scale projects to protect resources, property, and life in the wildland interface. The experiences of the Coalition are a valuable resource for other areas in Storey County and statewide as they prepare to address wildfire threats to their communities.

To be most effective, fire safe practices need to be implemented on a community-wide basis. There is no way to completely eliminate the threat that wildfires present to communities at the wildland-urban interface. However, the recommendations in this report are intended to increase public awareness and encourage all community members to take proactive steps to effectively reduce the risk of wildfire ignitions and catastrophic wildfires within and near their communities. Implementing defensible space, fuel reduction projects, and a strong public education program will help to mitigate the current hazards inherent in wildland interface areas, and maintenance of these treatments will assure a fire safe community into the future.

## 11.0 REFERENCES

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# APPENDICES

# *Appendix A*

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*Glossary of Terms used in Wildfire Management And  
Scientific And Common Plant Names*

## Appendix A Glossary of Terms used in Wildfire Management

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**Agency:** Any federal, state, or county government organization with jurisdictional responsibilities.

**Air Attack:** The deployment of fixed-wing or rotary aircraft on a wildland fire to drop retardant or suppressant, shuttle and deploy crews and supplies, or perform aerial reconnaissance of the overall fire situation. Can also refer to the person functioning as air attack officer and directing aerial operations.

**All-Risk County Plan:** Similar to a pre-attack (pre-fire) plan but encompasses action plans for responding to all types of natural and human caused emergencies such as earthquakes, floods, structure fires, hazardous materials situations, terrorism, train and vehicle accidents.

**Annual Grass Treatment:** The purpose of this treatment is to reduce the volume of flashy fuels associated with annual grass growth (e.g. cheatgrass and red brome). Fuel reduction can be accomplished by chemical treatment or mechanical removal of plant biomass. Pre-emergent herbicides can be applied near residential areas at the proper rates and following all label instructions to inhibit seed germination. After plants have started growth, mowing annual grasses before seed maturity reduces the amount of fine fuels during the summer fire season, limits seed production, and reduces the potential for annual grass in the following year. Repeated mowing over several years should reduce the density of the annual grass in the long term.

**Aspect:** Direction toward which a slope faces.

**Biomass Utilization and Disposal:** Biomass utilization is an alternative to open pile burning or landfill disposal. It results in the use of the natural resource for beneficial purposes such as firewood, wood chips, compost, and other products. If residents cannot find an alternative to burning, then proper burning procedures should be followed.

**Brush Fire:** A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

**Buffer Zones:** An area of reduced vegetation that separates wildland areas from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is often used for another purpose such as agriculture or recreation, or parks or golf courses.

**Classic Interface:** Structures abut native vegetation with a clear line of separation between structures and the wildland vegetation along roads and fences. The fuels do not extend into the developed areas.

**Contain a Fire:** A fuelbreak around the fire has been completed. This break may include natural barriers such as a river or road, and/or fireline built by hand, and/or fireline constructed mechanically.

**Control a Fire:** The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through the line.

**Crown Fire:** The movement of fire through the crowns or tops of trees or shrubs more or less independently of the surface fire. A fire is said to be crowning when the flames get up into the tops of trees and spreads.

**Defensible Space:** Defensible space is defined as a *minimum of a 30-foot area* around houses and other structures where vegetation has been significantly modified or removed. The purpose of creating defensible space is to reduce the risk of losing homes and other property improvements to a wildfire (Smith and Adams, 1991).

Defensible space is especially important in communities with structures directly adjacent to wildland vegetation, as in the intermix or rural interface conditions, where wildfires can spread quickly through the wildland fuels, threatening homes and lives.

**Dispatch Center:** A facility from which resources are directly assigned to an incident.

**Dry Lightning Storm:** Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

**Duff:** The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

**Extreme Fire Behavior:** “Extreme” implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following are usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, a strong convection column. Predictability is difficult because such fires often exercise influence on their environment and behave erratically, sometimes dangerously.

**Fine Fuels:** Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than ¼-inch in diameter and have a timelag of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

**Fire Behavior:** The manner in which a fire reacts to the influences of fuels, weather, and topography.

**Firebrands:** Pieces of burning material carried on the wind ahead of an advancing wildfire that, in extreme cases, can ignite spot fires up to a mile removed from the flame front.

**Firebreak:** A strip of land cleared of brush and trees down to the mineral soil.

**Fire Front:** The part of a wildland fire in which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

**Fire Hazard:** As used in this report, vegetative factors that affect the intensity and the rate a fire spreads as well as urban factors that can facilitate or inhibit public safety and the containment of a fire in an interface area.

**Fire Perimeter:** The entire outer edge or boundary of a fire, which may contain within it substantial areas of unburned fuels.

**Fire Regime:** A term used by fire ecologists to describe the recurrence and intensity of fire relative to a specific plant community.

**Fire Risk:** Potential ignition sources and factors that facilitate ignition of wildfires.

**Flash Fuels:** Fuels such as grass, leaves, pine needles, ferns, tree moss, and some types of slash, flash fuels or flashy fuels ignite readily and are consumed rapidly when dry. Also called fine fuels.

**Fuel Bed:** In a research setting, an array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also commonly used to describe the fuels composition in natural settings.

**Fuelbreaks:** Fuelbreaks are constructed in strategic locations where a cover of dense, heavy, or flammable vegetation has been permanently changed to one of lower fuel volume or reduced flammability. Fuelbreak construction may include removing, controlling and possibly replacing highly flammable vegetation with more fire resistant species. Ridge top fuelbreaks should have continuous length and width, which requires long-range planning.

A fuelbreak network system could be used to protect critical watersheds while more remote areas might have narrower fuelbreaks that might serve as anchor points for prescribed fires. A fuelbreak strategy can be effective even if fuelbreaks are not connected.

**Fuel Loading:** The amount of fuels present expressed quantitatively in terms of weight per unit area.

**Fuel Reduction Treatment:** This treatment involves strategically locating blocks of land near communities where flammable vegetation has been permanently changed to one of lower fuel volume or reduced flammability.

**Fuel Type:** An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

**Greenstrips:** Greenstrips are usually non-irrigated linear bands of open space on private or public land (usually a minimum of 300 feet wide) that serve as a buffer zone between wildland and adjacent urban development to promote safer environments. These areas are usually seeded to establish vegetation that is relatively fire resistant or slow burning and with shortened flame lengths. Seedings also decrease soil erosion and prevent invasion of noxious weeds and other aggressive plants such as cheatgrass and Russian knapweed.

**Ground Fuels:** All combustible materials below the surface litter, including duff, tree or shrub roots, punky wood, peat, sawdust, and other materials that can support a glowing combustion without flame.

**High Hazard Day:** Also known as a “red flag day”, a combination of conditions such as low humidity (<15 percent), high winds (>25 mph), and low fuel moisture create a high probability of ignition and subsequent increased fire intensity. Various agencies have different trigger points to establish a “high hazard day”.

**Initial Attack:** The actions taken by the first resources upon arrival at a wildfire to protect lives and property and prevent further expansion of the fire.

**Interface Condition:** The density and distribution of structures with respect to the surrounding wildland environment. The four Interface Conditions are Rural, Intermixed, Occluded, and Classic.

**Intermix Interface:** Structures are scattered throughout the wildland, with no clear boundary between the wildland vegetation and the community.

**Ladder Fuels:** Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help start and continue crowning on a fire.

**Mutual Aid Agreement:** Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request by furnishing personnel and equipment.

**Occluded Interface:** This condition is usually within towns and cities where there are small islands of wildland fuels such as parks or open space. There is a clear boundary between the community and the wildland vegetation.

**Pre-Attack Plan:** Also known as a pre-fire plan. A plan written in anticipation of a fire in a given community or specific area. This plan is made readily available to all local agencies and typically lists expected need and availability of initial and extended attack resources, includes radio frequencies, name and number of contact person for each agency, and identifies the staging base, incident command post, evacuation center, location of water resources, and additional details unique to the locality being described.

**Red Card Certification:** A fire qualifications management system used by many state and all federal wildland fire management agencies to ensure that individuals are qualified to fight wildland fires.

**Rural Interface:** Clusters of structures such as ranches or summer homes are widely spaced, sometimes more than a mile apart. The rural homes are surrounded by the wildland vegetation, with no clear line of separation between the fuels and homes.

**Shaded Fuelbreaks:** A shaded fuelbreak is created by altering surface fuels, and increasing the height of the base of the live crown, and opening the canopy by removing a portion of the woody plants in the treatment area. This type of fuelbreak spans a wide range of understory and overstory prescriptions. Construction methods include mechanical thinning, manual biomass removal, and the use of prescribed fires.

**Structure Fire:** Fire burning any part or all of any building or structure.

**Volunteer Fire Department (VFD):** A fire department of which some or all members are unpaid.

**Water Tender:** A ground vehicle capable of transporting water in the field, generally used to supply engines.

**Wildland Fire:** Any non-structure fire, other than prescribed fire, that occurs in a wildland area.

**Wildland-Urban Interface:** The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

#### **SOURCES:**

FIREWISE. Glossary of Terms.

National Fire Plan. Glossary of Terms.

Utah Department of Natural Resources Division of Forestry, Fire and State Lands. 2001. Fuel load reduction treatments along the wildland-urban interface: Community level protection support document for National Fire Plan projects in Utah and Nevada.

## Dominant Vegetation of the Wildland-Urban Interface, Storey County

| COMMON<br>NAME     | SCIENTIFIC<br>NAME*                           |
|--------------------|-----------------------------------------------|
| <b>Trees</b>       |                                               |
| Black locust       | <i>Robinia pseudoacacia</i>                   |
| Pinyon pine        | <i>Pinus monophylls</i>                       |
| Utah juniper       | <i>Juniperus osteosperma</i>                  |
| <b>Shrubs</b>      |                                               |
| Bitterbrush        | <i>Purshia tridentata</i>                     |
| Desert peach       | <i>Prunus andersonii</i>                      |
| Mountain sagebrush | <i>Artemisia tridentata ssp. vaseyana</i>     |
| Rabbitbrush        | <i>Chrysothamnus sp.</i>                      |
| Wyoming sagebrush  | <i>Artemisia tridentata ssp. wyomingensis</i> |
| <b>Grasses</b>     |                                               |
| Cheatgrass         | <i>Bromus tectorum</i>                        |

\*All scientific names taken from: Hickman, J.C. editor. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkely, CA.

# *Appendix B*

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*Community Wildfire Assessment Rating System*

## Appendix B – Community Wildfire Assessment Rating System

| Community Design                                                  | Score |
|-------------------------------------------------------------------|-------|
| <b>1. Ingress/Egress</b>                                          |       |
| Two or more primary roads                                         | 1     |
| One Road                                                          | 3     |
| One-way road in, one way out                                      | 5     |
| <b>2. Width of Primary Road</b>                                   |       |
| >24 feet                                                          | 1     |
| >20 feet and <24 feet                                             | 3     |
| <20 feet                                                          | 5     |
| <b>3. Accessibility</b>                                           |       |
| Road grade 5% or less                                             | 1     |
| Road grade more than 5%                                           | 3     |
| <b>4. Secondary Road Terminus</b>                                 |       |
| Loop roads, cul-de-sac w/outside turning radius of 45' or greater | 1     |
| Dead-end roads 200' or less in length                             | 3     |
| Dead-end roads greater than 200'                                  | 5     |
| <b>5. Street Signs</b>                                            |       |
| Present 90-100%                                                   | 1     |
| Present 75-89%                                                    | 3     |
| Present <75%                                                      | 5     |
| <b>6. Address Signage</b>                                         |       |
| Present 90-100%                                                   | 1     |
| Present 75-89%                                                    | 3     |
| Present <75%                                                      | 5     |

| Existing Building Materials      | Score |
|----------------------------------|-------|
| <b>1. Roofing Materials</b>      |       |
| Non-combustible covering 90-100% | 1     |
| Non-combustible covering 80-90%  | 5     |
| Non-combustible covering 70-80%  | 8     |
| Non-combustible <70%             | 10    |
| <b>2. Siding Materials</b>       |       |
| Non-combustible siding >75%      | 1     |
| Non-combustible siding <75%      | 5     |
| <b>3. Unenclosed Features</b>    |       |
| Less than 25%                    | 1     |
| 25 - 50%                         | 3     |
| >50%                             | 5     |

| Utilities                 | Score |
|---------------------------|-------|
| Low risk of ignition      | 1     |
| Moderate risk of ignition | 3     |
| High risk of ignition     | 5     |

| Defensible Space           | Score |
|----------------------------|-------|
| <b>1. Average Lot Size</b> |       |
| 10 acres or larger         | 1     |
| 1 to 10 acres              | 3     |
| <1 acre                    | 5     |
| <b>2. Defensible Space</b> |       |
| 70% or more adequate       | 1     |
| 30-70% adequate            | 7     |
| <30% adequate              | 15    |

| Fire Protection                                                 | Score |
|-----------------------------------------------------------------|-------|
| <b>1. Water Source</b>                                          |       |
| 500 gpm hydrants within 500' of structures                      | 1     |
| 500 gpm hydrants or draft source within 1000 feet of structures | 2     |
| Water source 20 minutes away roundtrip                          | 5     |
| Water source > 45 minutes away roundtrip                        | 10    |
| <b>2. Fire Department Protection Within 5 Miles</b>             |       |
| Career Department                                               | 1     |
| Combination Career / Volunteer                                  | 3     |
| Volunteer with Seasonal Staffing                                | 5     |
| All Volunteer Department                                        | 7     |
| No Organized Department                                         | 10    |

| Fire Behavior      | Score |
|--------------------|-------|
| <b>1. Slope</b>    |       |
| 8% or less         | 1     |
| 8% - 20%           | 4     |
| 20% - 30%          | 7     |
| >30%               | 10    |
| <b>2. Aspect</b>   |       |
| North or <8% slope | 1     |
| East               | 3     |
| West               | 7     |
| South              | 10    |
| <b>3. Fuels</b>    |       |
| Light density      | 1     |
| Medium density     | 3     |
| High density       | 5     |

| Fire Behavior ( <i>continued</i> )                                                                                                                                                                                                                                                                                                                                                              | Score |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <p><b>Situation #3 –</b><br/> Fine and/or sparse fuels surround structures; infrequent wind exposure; flat terrain with little slope and/or north aspect. No large wildland fire history and/or moderate fire occurrence.</p>                                                                                                                                                                   | 3     |
| <p><b>Situation #2 –</b><br/> Moderate slopes; broken moderate fuels; some ladder fuels; composition of fuels is conducive to torching and spotting; conditions may lead to moderate suppression success; some fire history and/or moderate fire occurrence.</p>                                                                                                                                | 7     |
| <p><b>Situation #1 –</b><br/> Continuous fuels in close proximity to structures; composition of fuels is conducive to crown fires or high intensity surface fires; steep slopes; predominately south aspects; dense fuels; heavy duff; prevailing wind exposure and/or ladder fuels that may reduce suppression effectiveness; history of some large fires and/or moderate fire occurrence.</p> | 10    |

# *Appendix C*

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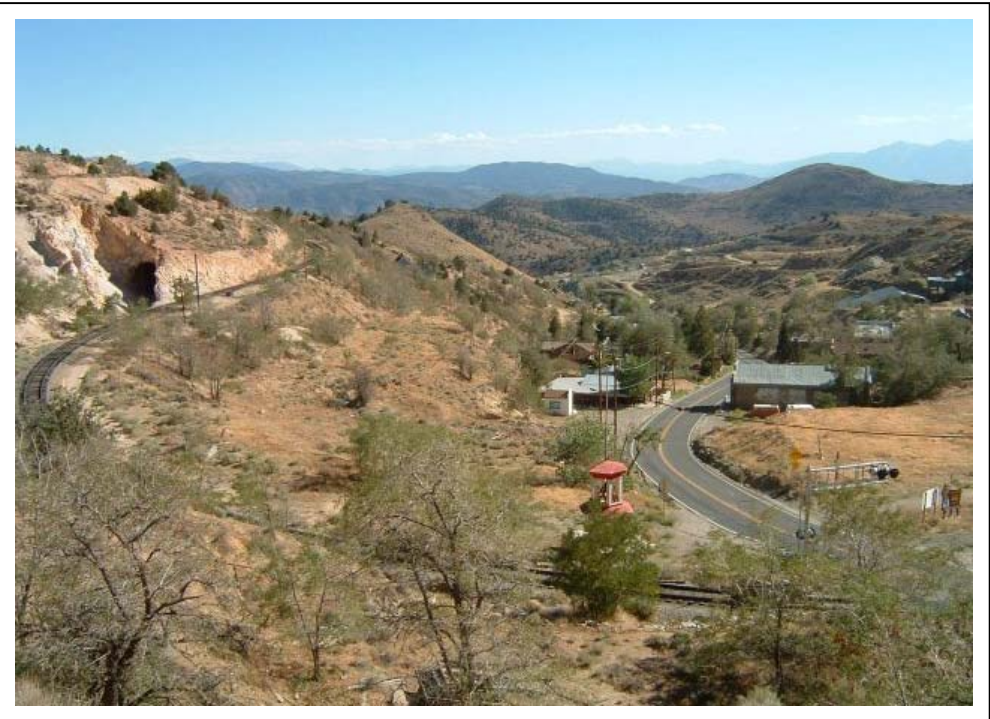
*Photographs of Representative Fuel Types in Storey County  
Communities*

## Appendix C – Photographs of Representative Fuel Types in Storey County Communities

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**Photo 1. Gold Hill.** Roadside fuels can consist of native grasses and cheatgrass that create a fuel bed highly receptive to ignition sources from the adjacent highway. Many trees are in contact with overhead power lines. Fuel loading is estimated at less than three tons per acre.



**Photo 2. Gold Hill.** Overview of community from the north, where residential and commercial structures are concentrated between State Route 342 and the west-facing canyon walls. The most common wildland fuels are sagebrush and rabbitbrush, with lightly stocked pinyon-juniper stands at some distance from the community.



**Photo 3. Lockwood.** Interface vegetation on west aspect, view looking north. Fuels consist primarily of sagebrush, two feet tall. Fuel loading is estimated at less than one ton per acre and has a low fuel hazard classification.



**Photo 4. Six Mile.** Typical fuels on the north side of Six Mile are low-growing sagebrush. Light pinyon-juniper fuels in the distance present little threat to buildings and other property in the community. Fuel loading is estimated at less than one ton per acre.



**Photo 5. Six Mile.** Medium density fuels, in the form of sagebrush and rabbitbrush, are present in open parcels to the south of the community. Due to their larger size and their position relative to the community and the prevailing winds out of the south and southwest, this area presents a moderate threat to the community.



**Photo 6. Virginia City.** Fuel loads along the west side interface include sagebrush and rabbitbrush at the foot of steep slopes. Implementing a fuelbreak alongside the existing jeep trail is a key recommendation for protecting the homes along the western flank of the community, where the fuel hazard is rated high.



**Photo 7. Virginia City.** Fuel loading on the east side of the community is moderate; continuity is fragmented by historic mining activity and other disturbance. Some cheatgrass is present but the threat to homes and other structures is mild.



**Photo 8. Virginia Highlands.** Medium hazard fuel loads are typically found in sagebrush flats surrounded by pinyon-juniper stands of with high and extreme fuel loads.



**Photo 9. Virginia Highlands.** Understory brush removal and limbing of pinyon and juniper trees in parcel on the right significantly reduces the fire hazard presented by these woodland fuels. Typical understory vegetation includes sagebrush, bitterbrush, and rabbitbrush. Overall fuel loading is in excess of eight tons per acre in the uncleared parcel on the left, an extreme fuel hazard.

# *Appendix D*

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*List of Persons Contacted*

## Appendix D – List of Persons Contacted

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| CONTACT NAME                                   | POSITION                                                                                      | DATE CONTACTED                                             | TELEPHONE    |
|------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------|
| Greg Hess,<br>John Flanagan,<br>Robert Kershaw | County Commissioners                                                                          | December 2, 2003                                           | 775.847.0968 |
| Dean Haymore                                   | Storey County<br>Building Official                                                            | January 7, 2004                                            | 775.847.0966 |
| Gary Hames                                     | Fire Chief,<br>Storey County FD                                                               | January 7, 2004<br>September 2, 2004<br>September 29, 2004 | 775.847.0954 |
| Ronan Thornhill                                | FMO,<br>NDF Western Region                                                                    | January 7, 2004<br>September 2, 2004                       | 775.849.2500 |
| Leonard Wehking                                | FMO, BLM<br>Carson City Field Office                                                          | January 7, 2004                                            | 775.885.6000 |
| John Copeland                                  | Fire Protection Officer<br>NDF Western Region                                                 | September 10, 2004                                         | 775.849.2500 |
| Janice Meyer                                   | NDF Dispatch, Sierra<br>Front Wildfire<br>Cooperators                                         | September 28, 2004                                         | 775.883.5995 |
| Duane Whitelaw                                 | Operational Area and<br>Mutual Aid Coordinator,<br>Tahoe Regional Fire<br>Chief's Association | September 29, 2004                                         | 530.583.6911 |
| Rich Riolo                                     | Nevada Division of<br>Forestry                                                                | September 29, 2004                                         | 775.849.2500 |

# *Appendix E*

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*Homeowner Guidelines*

# DEFENSIBLE SPACE

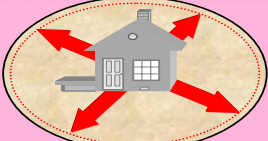
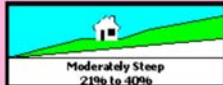
## A FACT SHEET FOR STOREY COUNTY HOMEOWNERS

**Defensible space** refers to a **minimum** 30-foot area around houses and other buildings where vegetation has been significantly reduced or removed. The purpose of creating defensible space is to reduce the risk of losing homes and other property improvements to a wildfire.

### HOW TO CREATE DEFENSIBLE SPACE

**STEP 1 DETERMINE DEFENSIBLE SPACE DISTANCE.** Use the table below to determine the minimum distance for defensible space, dependent upon slope and native vegetation type surrounding homes.

#### Standard Defensible Space Guidelines

| Defensible Space Recommended Distances<br>Dependent upon Slope                                                              |                                                                                                                                                                                                                          |                                                                                                                       |                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <br>Recommended Defensible Space Distance | <br>Flat to Gently Sloping<br>0 to 20%                                                                                                 | <br>Moderately Steep<br>21% to 40% | <br>Very Steep<br>+40% |
|                                                                                                                             | <br>Grass<br>Wildland grasses (such as cheatgrass), weeds, and widely scattered shrubs with grass understory.                         | 30 feet                                                                                                               | 100 feet                                                                                                   |
|                                                                                                                             | <br>Shrubs<br>Includes shrub dominant areas (such as sagebrush, bitterbrush, manzanita) and pinyon-juniper.                           | 100 feet                                                                                                              | 200 feet                                                                                                   |
|                                                                                                                             | <br>Trees<br>Includes forest areas of the Sierras. If substantial grass or shrub understory is present, use those values shown above. | 30 feet                                                                                                               | 200 feet                                                                                                   |

1) Find the percent slope which best describes your property.  
2) Find the type of vegetation which best describe the wildland plants growing on or near your property.  
3) Locate the number in feet corresponding to your slope and vegetation. This is your recommended defensible space distance.

\*Please note the recommendations presented in this diagram are suggestions made by local firefighters experienced in protecting homes from wildfire. They are not requirements nor do they take precedence over local ordinances.

Source for the above graphics: University of Nevada, Reno Agricultural Experiment Station/Cooperative Extension. August 1998. Living With Fire-A Guide for the Homeowner.

- STEP 2 REMOVE.** Cut and remove all dead, diseased or dying trees and shrubs from within the defensible space area. Remove selected trees and shrubs to eliminate continuous fuels extending up to the house. Also remove any flammable debris and firewood piles from within the minimum defensible space distance. Weeds or other dry vegetation should be removed from underneath porches and decks. Eliminate any flammable vegetation or debris within 10 feet of propane tanks. Remove leaves and debris from rain gutters.
- STEP 3 REDUCE.** Reduce vegetation height of shrubs under mature trees to decrease “ladder” fuels. Prune low tree branches to a minimum height of 4 feet and prune branches within 15 feet of structures and chimneys. Reduce accumulations of annual grasses (cheatgrass) through mowing or pre-emergent selective herbicide treatments in the fall. Reduce the accumulation of vegetation around wood fences through mowing or plant removal.
- STEP 4 REPLACE.** Substitute flammable vegetation such as juniper, sagebrush, and rabbitbrush with fire resistant plants. Replacement plantings may include low stature shrubs, decorative rock, lawn, flowerbeds, and succulent vegetation. Irrigation of vegetation throughout the fire season will decrease plant flammability.
- STEP 5 DISPOSE.** It is essential that all tree branches, shrubs, and other plant biomass be removed from the site immediately to a safe disposal area. This material dries rapidly and can contribute to the fire hazard problem if allowed to remain on the premises.
- STEP 6 MAINTAIN.** Maintenance of the defensible space area requires an annual review of fuel reduction guidelines around the home. Action should be taken to maintain an effective defensible space area.

***Remember, good defensible space is –***

***Lean – There are only small amounts of flammable vegetation***

***Clean – There is no accumulation of dead vegetation or flammable debris***

***Green – Existing plants are healthy, green, and irrigated during fire season***

(Source: Living With Fire...In the Big Sagebrush/Bitterbrush Environment. Nevada State Bureau of Land Management. Produced by Ed Smith and JoAnne Skelly.)

# ***HOMEOWNERS' ANNUAL CHECKLIST***

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## ***A FACT SHEET FOR STOREY COUNTY HOMEOWNERS***

This checklist includes actions homeowners can perform annually to help create a fire safe home and community.

- ☐ Check all address signs for ease of visibility. Metal signs with four-inch high reflective numbers are recommended for visibility by emergency responders.
- ☐ Continue clearing of all trees underneath and adjacent to overhead power lines and poles. This includes the poles and lines to individual parcels. Trees that can touch or blow into the power lines can easily be trimmed or removed, and maintained to reduce fire hazard.
- ☐ Remove shrubs and trees for a distance of 10 feet from propane tanks.
- ☐ Remove all tree limbs within at least 15 feet of chimneys, decks, and open overhangs.
- ☐ Remove woodpiles, obvious accumulations of trash, pine needles or other debris from defensible space areas.
- ☐ Remove all dead and diseased branches. After initial emergency treatments, it is recommended that tree limbing occur during late fall and winter to prevent disease and attacks by pests.
- ☐ Harvested vegetation and trimmings must be immediately removed from the premises to assure that fuel reduction treatments are effective. All harvested biomass should be moved to a predetermined disposal area or safe zone approved by the Fire Department.
- ☐ All soil disturbances including those during biomass removal should be broadcast seeded according to the recommended species and rates provided in the "pre-suppression seeding" section.
- ☐ Where possible, improve driveway access to assure an adequate turning radius for firefighting apparatus.
- ☐ Clear rain gutters of leaves, needles and other debris. Screen vents to prevent any embers from entering attics in the event of a wildfire.
- ☐ Check hoses, valves, and other water equipment to assure operability should a fire occur.
- ☐ During high precipitation years, when growing conditions produce exceptional amounts of weeds, care should be taken to reduce the height of fire-prone vegetation, particularly weeds and grasses that carry fire to the adjacent shrubs. Implements such as weed-eaters work well for this job.

# ***FUELBREAKS***

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## ***A FACT SHEET FOR STOREY COUNTY HOMEOWNERS***

**Fuelbreaks** are natural or constructed barriers used to stop or slow fires that may occur. They also provide a control line from which firefighters can work.

An effective firebreak is created when the majority or the entire fuel load (trees and shrubs) is removed from a swath of land large enough to serve the following purposes:



- ◆ Stop or slow the advance of a raging wildfire and increase the effectiveness of firefighting opportunities;
- ◆ Provide safe evacuation routes for residents and safe access for firefighters when aligned on existing roads;
- ◆ Help confine fires to limited areas; and,
- ◆ Protect private property.

### ***DESCRIPTION***

Existing roads in fire-prone areas provide excellent opportunities to create effective fuelbreaks. However, the area within the road easement is many times too narrow for complete treatment. In these cases, the firebreak treatments may necessarily extend onto adjacent properties.

Fuelbreaks should always be revegetated with seedlings of low stature fire-resistant grasses and wildflowers to provide ground cover and soil stability while leaving as little fuel as possible.

**When constructing fuelbreaks, it is essential that all tree branches, shrubs, pine needle litter from beneath remaining trees, and other plant biomass be removed from the site immediately to a safe disposal area. This material dries rapidly and can contribute to the fire hazard problem if allowed to remain on the premises. Tree stumps should be cut as close to ground level as possible to allow fire suppression vehicles to pass over them.**

## Seed Mix and Application Specifications For Disturbed Areas in Storey County

| COMMON NAME                      | SCIENTIFIC NAME                             | SEEDING RATE<br>(PLS<br>LBS./ACRE) |
|----------------------------------|---------------------------------------------|------------------------------------|
| Ephraim crested wheatgrass       | <i>Agropyron cristatum</i>                  | 2.50                               |
| Critana thickspike wheatgrass    | <i>Elymus lanceolatus ssp. lanceolatus</i>  | 1.00                               |
| Sodar streambank wheatgrass      | <i>Elymus lanceolatus ssp. psammophilus</i> | 2.50                               |
| Bottlebrush squirreltail         | <i>Elymus elymoides</i>                     | 1.00                               |
| Sandberg bluegrass               | <i>Poa sandbergii</i>                       | 0.25                               |
| Indian ricegrass                 | <i>Achnatherum hymenoides</i>               | 1.00                               |
| Lupine                           | <i>Lupinus argenetus</i>                    | 0.25                               |
| Penstemon                        | <i>Penstemon palmeri</i>                    | 0.25                               |
| Western blue flax                | <i>Linum lewisii</i>                        | 0.25                               |
| Forage kocio                     | <i>Kochia prostrata</i>                     | 1.00                               |
| <b>TOTAL PLS POUNDS PER ACRE</b> |                                             | <b>10.00</b>                       |

This seed mixture is for treating all disturbed areas and areas cleared for fuel reduction purposes. All seeds should be thoroughly mixed and seeded together at the same time. Drill seeding is recommended where feasible. Drill rows should be spaced as twelve inches apart and seed should be planted at a depth of 1/2 inch. Broadcast seeding at twice the application rate is recommended for rocky, steep, or small treatment areas. The seed can be broadcast using hand held seeders such as a "Whirlybird" or a broadcast seeder mounted on a quad-runner. Continually mix the seed while seeding to equally distribute the small seeds throughout the mix. Following the broadcast seed application, seeded areas should be lightly raked to assure seed placement at an average depth of 1/2 inch. This can be done with hand held rakes, or by pulling a drag or piece of chain link fence behind a truck or quad-runner in areas that are less rocky.

These guidelines are provided as overall recommendations. However, site-specific evaluation of the treatment areas by a specialist from a land management agency, the Natural Resources Conservation Service, or the University of Nevada Cooperative Extension will provide even greater assurance for success.

# *Appendix F*

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## *Community Guidelines*

## Appendix F – Community Guidelines

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### **FIRE SAFE COMMUNITY PLANNING RECOMMENDATIONS FOR NEW DEVELOPMENTS**

#### Sample Building Department Requirements

1. A complete fire flow water system capable of meeting the residential calculated fire flow requirements as prescribed by the Uniform Fire Code Appendix III-A shall be installed.
2. All fire hydrant locations shall be reviewed and approved by the county building department and shall be in proximity to streets so that snow accumulation at the hydrants may be removed during routing snow plowing operations.
3. All roadways within the project shall meet requirements of paved all-weather surface, Uniform Fire Code Article 9, Section 901 and 902 conditions, and shall be designated no parking zones where roads are less than 24 feet wide. If steep roads prevent constructing 24-foot wide roads, then turnouts must be installed every  $\frac{1}{4}$  mile. Homes with long private drives must have a turn around (50-foot radius), or a horseshoe drive or a hammerhead drive that allows large engines to turn around. Cul-de-sacs shall have a minimum 50-foot radius.
4. There shall be a minimum of two-ways in and two-ways out of the development. These shall be completed prior to the delivery of any combustible materials to the project site.
5. A fuels management/reduction program around all structures shall be maintained a minimum 30 feet in accordance with Uniform Fire Code Appendix 11-A-16.
6. Clearance of vegetative growth from roadways must be performed in accordance with Uniform Fire Code Appendix II-A-17.
7. Developers should submit a fuels modification plan for the entire acreage. A property line 20-foot minimum fuelbreak shall be completed prior to approval of any final map.
8. All new structures shall be constructed with fire retardant roofing materials in compliance with Nevada Revised Statute 472.100.

These recommendations are provided as a guideline to fire safe community development and are not intended to supersede existing fire codes.