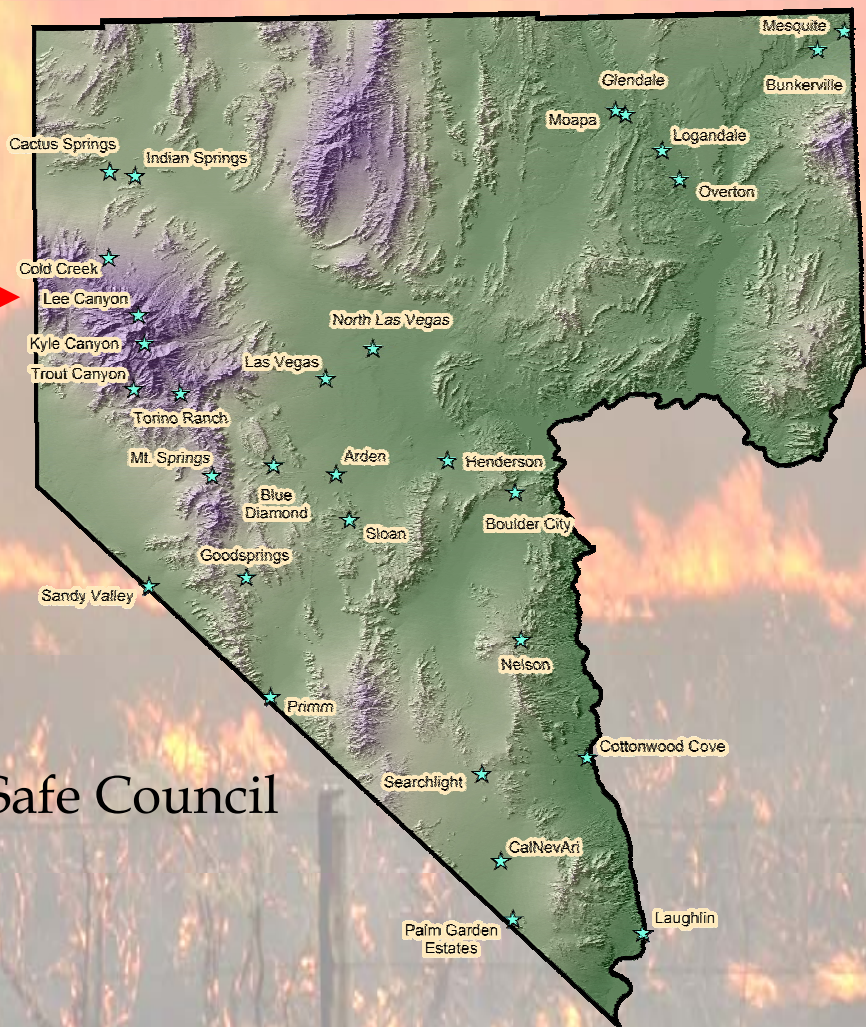
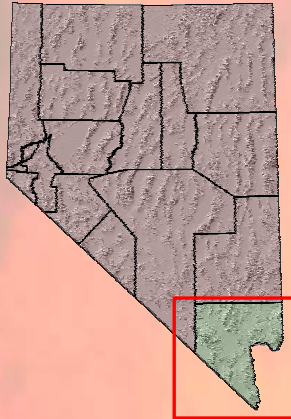


Nevada Community Wildfire
Risk/Hazard Assessment Project

CLARK COUNTY

June 2005



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This project was administered by the Nevada Fire Safe Council and funded through National Fire Plan grants from the Bureau of Land Management, the US Forest Service, and the Nevada Division of Forestry.

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Executive Summary

The Healthy Forests Initiative was announced by the White House in 2002 to implement the core components of the *National Fire Plan Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy*. The Plan calls for more active forest and rangeland management to reduce the threat of wildland fire in the wildland-urban interface, the area where homes and wildland meet.

This report was prepared specifically for the communities within Clark County, Nevada that were identified in the 2001 Federal Register list of communities at risk within the vicinity of federal lands that are most vulnerable to the threat of wildfire. The communities assessed in Clark County are listed in Table 1-1.

The Nevada Fire Safe Council contracted with Resource Concepts, Inc. (RCI) to assemble a project team of experts in the fields of fire behavior and suppression, natural resource ecology, and geographic information systems (GIS) to complete the assessment for each Clark County community listed in the Federal Register. The RCI Project Team spent almost three weeks inventorying conditions in Clark County and completing the primary data collection and verification portions of the risk assessment.

This report describes in detail the data and information collected, analyzed, and considered during the assessment of each community. The general results are summarized in Table 1-1. Five primary factors that affect potential fire hazard were assessed to arrive at the community hazard assessment score: community design, construction materials, defensible space, availability of fire suppression resources, and physical conditions such as the vegetative fuel load and topography. Information on fire suppression capabilities and responsibilities for Clark County communities was obtained from local Fire Chiefs and state and federal agency Fire Management Officers. The fire specialists on the RCI Project Team assigned an ignition risk rating for each community of low, moderate, or high. The rating was based upon historical ignition patterns, the opinions of local, state, and federal fire agency personnel, field visits to each community, and the fire specialists' professional judgments based on experience with wildland fire ignitions in Nevada.

Table 1-1. Community Risk and Hazard Assessment Results

COMMUNITY	INTERFACE CONDITION	INTERFACE FUEL HAZARD CONDITION	IGNITION RISK	COMMUNITY HAZARD RATING
HIGH AND EXTREME HAZARD COMMUNITIES				
Cold Creek	Intermix	High to Extreme	Moderate	High
Kyle Canyon	Rural	Extreme	High	Extreme
Lee Canyon	Intermix	Extreme	High	Extreme
Mt. Springs	Intermix	High to Extreme	High	Extreme
Nelson	Intermix	Low to Moderate	Moderate	High
Torino Ranch	Classic	Low to Extreme	High	High
Trout Canyon	Intermix	Extreme	High	Extreme
MODERATE HAZARD COMMUNITIES				
Cactus Springs	Classic	Low	Low	Moderate
Goodsprings	Classic	Moderate	Moderate	Moderate
Moapa	Classic	Low to High	Low	Moderate
Sandy Valley	Intermix	Low	Low	Moderate
Searchlight	Intermix	Low	Low	Moderate
LOW HAZARD COMMUNITIES				
Arden	Occluded	Low	Low	Low
Blue Diamond	Intermix	Low	Low	Low
Boulder City	Classic	Low	Low	Low
Bunkerville	Classic	Low to High	Low	Low
CalNevAri	Classic	Low to Moderate	Low	Low
Cottonwood Cove	Classic	Low	Low	Low
Glendale	Classic	Low to High	Low	Low
Henderson	Classic	Low	Low	Low
Indian Springs	Classic	Low	Low	Low
Las Vegas	Classic	Low	Low	Low
Laughlin	Classic	Low	Low	Low
Logandale	Classic	Low to High	Low	Low
Mesquite	Classic	Low to High	Low	Low
North Las Vegas	Classic	Low	Low	Low
Overton	Classic	Low to High	Low	Low
Palm Gardens Estates	Classic	Low	Low	Low
Primm	Classic	Low	Low	Low
Sloan	Classic	Low	Low	Low

EXTREME HAZARD COMMUNITIES

The extreme hazard communities in Clark County are all located at higher elevations within or adjacent to the Spring Mountains. The communities with the most hazardous conditions include Kyle Canyon, Lee Canyon, Mt. Springs, and Trout Canyon. The homes in these communities that are situated amongst dense trees and shrubs are in urgent need of defensible space treatment. The forests surrounding these communities need aggressive thinning in order to reduce the risk of catastrophic fires and lower the probability for loss of life and property. The current fuel conditions, limited access, and high ignition risks characterizing these communities are the precursors for disastrous fires such as those that have plagued the western United States with increasing regularity in recent years. Fuelbreaks and fuels reduction treatments are recommended around these communities as well as around the high hazard communities of Cold Creek and Torino Ranch. Increased visitor levels to these areas underscore the need to establish and publicize evacuation routes and safe zones to enhance the safety for residents and for those unfamiliar with the area.

The communities of Cold Creek, Kyle Canyon, Lee Canyon, Mt. Springs, Trout Canyon, and Torino Ranch are also advised to develop helicopter dip sites that will enhance initial attack capabilities.

Communities located along riparian corridors such as Bunkerville, Glendale, Logandale, Mesquite, Moapa, and Overton are advised to implement or continue existing tamarisk abatement programs to remove this flammable invasive plant and replace it with more fire-resistant species.

All communities in Clark County need to implement, maintain, or improve defensible space treatments. In communities with sparse vegetative fuels, an annual treatment of weeds and general clean up is important.

Additional water storage capacity, such as 50,000-gallon portable tanks, is recommended for the communities of Goodsprings, Sandy Valley, and Sloan for wildfire initial attack and suppression.

Several Clark County Fire Departments have inadequate equipment for wildland firefighting and/or personnel who have not been trained in wildland fire behavior and suppression techniques. An important recommendation of this report is to provide annual wildland fire training to all fire department members. All Captains need to be trained to the level of Engine Boss and all Chief Officers to the level of Strike Team Leader. It is also recommended that Clark County acquire wildland firefighting equipment, including Type III Brush Engines in order to respond in a safer and more effective manner to wildland fires within the County.

A summary of recommendations for each community is given in Table 1-2. 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 interface. However, the recommendations in this report are intended to increase public awareness and encourage concerned community members to take proactive actions to effectively reduce the risk of wildfire ignitions near their communities. Implementing defensible space, fuels reduction projects, and public education programs will help to mitigate the hazards inherent in wildland interface areas.

Table 1-2. Summary of Hazard Reduction Recommendations for Communities in Clark County

Community	Description	Estimated Treatment Area ¹	Cooperating Partners						
			Private	County	BLM	USFS	NDF	NDOT	Other
HIGH AND EXTREME HAZARD COMMUNITIES									
Cold Creek	Brush thinning in drainage 400' X 0.5 mi	24 acres	X						
	Perimeter fuelbreak 300' X 2.4 mi	87 acres				X			
	Additional perimeter brush thinning: 300' X 1.0 mi	36 acres				X			
Kyle Canyon	Shaded fuelbreak, SR 157 from Mile Marker 8 to Junction with SR 158: 300' both sides of road 9.2 mi	670 acres	X	X		X	X	X	
	Shaded fuelbreak, SR 157 from Junction with SR 158 to Mt. Charleston Lodge: 300' uphill, 600' downhill 3.5 mi	383 acres		X		X	X		
	Roadside brush removal, SR 157: 20' X 36 mi	175 acres	X	X		X	X	X	
	Shaded fuelbreak at Fletcher View and Kyle Canyon Campgrounds and USFS admin site	80 acres				X			
	Shaded fuelbreak/fuels reduction within Echo and Rainbow subdivisions, extending 300' beyond residential clusters	362 acres	X			X	X		
	Shaded fuelbreak on downhill side of access road from SR 158 to Spring Mountain Youth Camp 600 ft X 1.7 mi	123 acres		X		X	X		
	Shaded fuelbreak/fuels reduction on North and South slopes below Spring Mountain Youth Camp 600 ft X 2640 ft X 2	72 acres		X		X	X		
	Shaded fuelbreak around communications facilities on Angel peak: 300' X perimeter	8.25 acres	X			X	X		X

Community	Description	Estimated Treatment Area ¹	Cooperating Partners						
			Private	County	BLM	USFS	NDF	NDOT	Other
HIGH AND EXTREME HAZARD COMMUNITIES <i>(continued)</i>									
Lee Canyon	Shaded fuelbreak, SR 156: 300' both sides of road from Jct with 158, 2.5 mi to lower end of PJ cover type	272 acres				X	X	X	
	Shaded fuelbreak, SR 156: 600' downhill, 300' uphill from Jct 156 and 158 to ski area, 3.2 mi	346 acres				X	X	X	
	Fuels reduction within residential clusters in canyon, including 300' buffer beyond	240 acres	X			X	X		
	30' firebreak and 300' shaded fuelbreak around electric transfer station	8.25 acres				X	X		Util.
Mt. Springs	Roadside fuelbreak, SR 160 50' X 1.25 mi	15 acres		X		X		X	
	Shaded fuelbreak, Benedict Dr. and selected perimeter segments 200' X 1.0 mi	24 acres	X	X		X			
	Roadside fuelbreaks, residential. 50' width adjacent to parcels containing homes, 100' adjacent to undeveloped parcels. Approx. 3,500 lineal feet.	4-8 acres	X	X		X			
	30' firebreak and 300' shaded fuelbreak around electric transfer stations	8.25 acres							Util.
Nelson	Fuels reduction in utility corridor and 30' around electric transfer station	n/a							Util.
Torino Ranch	Shaded fuelbreak, 300' X 1.0 mi	36 ac	X	X		X	X		
	Roadside brush thinning 30' both sides of roads	n/a	X	X		X	X		
	Reduce fuels in power line corridors	n/a							Util.
Trout Canyon	Shaded fuelbreak, perimeter 300' X 2.1 mi	76 ac							Util.
	Roadside brush thinning 30' both sides of roads	n/a		X					
	Reduce fuels in power line corridors	n/a	X						Util.

Community	Description	Estimated Treatment Area ¹	Cooperating Partners						
			Private	County	BLM	USFS	NDF	NDOT	Other
MODERATE HAZARD COMMUNITIES									
Cactus Springs	Fuels reduction on vacant lots	n/a	X						
	Annual grass treatment on roadsides	n/a		X				X	
Goodsprings	30' fuel clearance around transformers	n/a	X						Util.
Moapa	Roadside fuelbreaks, residential: 20' either side of roads	n/a		X					RR
	Continue tamarisk reduction program	100 acres per year			X				
	Maintain fuels along railway corridor 15' from tracks	n/a							RR
Sandy Valley	Roadside fuelbreaks, residential 15' each side of road	n/a		X					
Searchlight	Remove abandoned structures	n/a	X						
	Defensible space	n/a	X						
LOW HAZARD COMMUNITIES									
Arden	Defensible space	n/a	X						
Blue Diamond	Defensible space	n/a	X						
Boulder City	Annual grass control and defensible space	n/a	X						
Bunkerville	Defensible space	n/a	X						
	Continue tamarisk reduction program	n/a			X				
CalNevAri	Perimeter fuelbreak 100' X 621'	1.42 acres			X				
	Roadside fuelbreaks ¹ , residential 20' each side of road	n/a		X					
Cottonwood Cove	Roadside fuelbreaks, SR 164 10' X 0.7 mi	1.75 acres		X				X	
Glendale	Fuels removal from along fence lines and irrigation ditches	n/a	X	X					
	Continue tamarisk reduction program	100 acres per year			X				

Community	Description	Estimated Treatment Area ¹	Cooperating Partners						
			Private	County	BLM	USFS	NDF	NDOT	Other
LOW HAZARD COMMUNITIES <i>(continued)</i>									
Henderson	Defensible space	n/a	X						
	Initiate tamarisk reduction program along the Las Vegas Wash	n/a							City
Indian Springs	Fuels reduction in vacant lots	n/a	X						
Las Vegas	Annual grass control and defensible space	n/a	X						
Laughlin	Defensible space	n/a	X						
Logandale	Fuels removal from along fence lines and irrigation ditches	n/a	X	X					
	Begin tamarisk reduction program	100 acres per year			X				
	Maintain fuels along railway corridor 15' from tracks	n/a							RR
Mesquite	Continue tamarisk reduction program	100 acres per year			X				
North Las Vegas	Defensible space	n/a	X						
Overton	Begin tamarisk reduction program	100 acres per year			X				
	Remove fuels from along fence lines and irrigation ditches	n/a	X	X					
Palm Garden Estates	Perimeter fuelbreak 50' X 4,000'	4.5 ac	X		X				
Primm	Maintain fuels along railway corridor 15' from tracks	n/a							RR
Sloan	Defensible space	n/a	X						

¹ Roadside fuelbreak areas are measured from the edge of pavement. Treatment area estimates include both sides of the road.

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APPENDICES

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

A key element of the Healthy Forests Initiative announced by the White House in 2002 is the implementation of core components of the *National Fire Plan Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-year Comprehensive Strategy*. Federal agencies and Western State Governors adopted the Plan in the spring of 2002 in collaboration with County Commissioners, State Foresters, and tribal officials. The Plan calls for more active forest and rangeland management to reduce the threat of wildfire in the wildland-urban interface.

The Healthy Forest Restoration Act (H.R. 1904) was signed into law in December of 2003. The act creates provisions for expanding the activities outlined in the National Fire Plan. In the same year the Nevada Fire Safe Council received National Fire Plan funding through the Department of Interior Bureau of Land Management to conduct a Community Risk/Hazard Assessment in communities at risk across Nevada. The communities to be assessed are among those named in the 2001 Federal Register list of communities within the vicinity of Federal lands most vulnerable to wildfire threat in Nevada (66 FR 160).

Resource Concepts, Inc. (RCI), a Carson City consulting firm, was selected to conduct the Community Risk/Hazard Assessments. During 2004, The RCI Project Team, consisting of fire behavior specialists, forest and rangeland fuels specialists, and field technicians visited over 250 communities in seventeen Nevada counties to assess both the risk of ignition and the potential fire behavior hazard within the wildland-urban interface, places where homes and wildland meet. Procedures accepted by Nevada wildland fire agencies were used to reach consistent and objective evaluations in each community.

The specific goals of the Nevada Community Risk/Hazard Assessment Project are to:

- Assess the wildfire hazards present to each community on the Federal Register list of communities at risk in Nevada,
- Identify firefighting resource needs (e.g. equipment and infrastructure),
- Conduct fuel hazard mapping for high fuel hazard communities.
- Describe proposed risk and hazard mitigation projects in enough detail to aid communities in applying for future implementation funds, and
- Distribute assessment results and proposed mitigation project descriptions to each County in a format that will be easily updated and useful for public meetings and other public education activities.

The Community Risk/Hazard Assessments were conducted systematically. The RCI Project Team observed and recorded the factors that influence the risk of wildfire ignition along the wildland-urban interface, and they inventoried features that could have an influence on hazardous conditions in the event of a wildfire. Interviews with local fire agency and emergency response personnel were completed to assess the availability and capability of suppression resources and identify opportunities for increased community preparedness. A description of the existing fuel hazard and fire behavior potential is presented for each community. For communities with a Community Hazard Rating of “High” or “Extreme,” photo

points and field-verified fuel hazard maps are presented. The communities of Cold Creek, Kyle Canyon, Lee Canyon, Mountain Springs, Nelson, Torino Ranch, and Trout Canyon meet these criteria.

The results of the assessments are formatted to facilitate ease of reference and reproduction for individual communities. A glossary of wildland fire terms is included in Appendix A. Each community is mapped and ignition risks, fire hazards, and recommended mitigation projects are described. The recommendations are presented on the community map, if the proposed mitigation project can be graphically represented. These tools will aid local, state, and federal agencies in strategic planning, raising public awareness, and securing funding to implement risk and hazard reduction projects. Mitigating the risks and hazards identified by these assessments is not only crucial to the long term goals of the National Fire Plan, but also to the short and long term viability of Nevada communities, natural resources, infrastructures, and watersheds.

Numerous agencies and individuals were involved in the planning and implementation of this effort. Special thanks and acknowledgement is given to the following:

- Nevada Fire Safe Council (NFSC)
- Bureau of Land Management (BLM)
- U.S. Forest Service (USFS)
- Nevada Division of Forestry (NDF)
- University of Nevada Cooperative Extension (UNCE)
- Nevada Association of Counties (NACO)
- Nevada's Counties
- Fire Chiefs and firefighters statewide

1.2 COMMUNITIES ASSESSED

This assessment included 28 communities at risk in proximity to Federal Lands that were identified on the Federal Register list (66 FR 160). Two additional communities were included: Palm Garden Estates and Torino Ranch. Palm Garden Estates is a rapidly growing new community. Torino Ranch, a particular concern for the Clark County Fire Department, is used as a summer camp for underprivileged and terminally ill children. Torino Ranch was threatened by the Lost Cabin Fire in 2001. The locations of the thirty Clark County communities included in the assessment are shown in Figure 3-1, and they are listed below.

- | | | |
|-------------------|--------------------|-----------------------|
| • Arden | • Blue Diamond | • Boulder City |
| • Bunkerville | • Cactus Springs | • CalNevAri |
| • Cold Creek | • Cottonwood Cove | • Glendale |
| • Goodsprings | • Henderson | • Indian Springs |
| • Kyle Canyon | • Las Vegas | • Laughlin |
| • Lee Canyon | • Logandale | • Mesquite |
| • Moapa | • Mountain Springs | • Nelson |
| • North Las Vegas | • Overton | • Palm Garden Estates |
| • Primm | • Sandy Valley | • Searchlight |
| • Sloan | • Torino Ranch | • Trout Canyon |

1.3 COMMUNITIES NOT ASSESSED

1.3.1 Jean

Jean is located at the junction of State Route 604 and the road to Sandy Valley. There are two casinos and no permanent residences in Jean. Because the vegetation is very sparse, there is low ignition risk, and there are no homes. An assessment was not completed for Jean.

There may be additional rural areas or new subdivisions in Clark County that were not included on the Federal Register list or specifically requested for assessment by the County. Conditions in and around some of these areas may warrant future wildfire hazard/risk assessments. However, many of the recommendations developed for similar communities assessed in this report may apply to additional areas.

2.0 METHODOLOGY

2.1 PROJECT TEAM

The RCI Project Team, composed of experts in the fields of fire behavior and suppression, forest and rangeland ecology, and geographic information systems (GIS), collaborated to complete a Community Risk/Hazard Assessment for each of the identified communities in Clark County. The RCI Project Team included Fire Specialists with extensive wildland fire experience in Nevada and Southern California and Resource Specialists experienced in the Mojave Desert environment.

The RCI Project Team used standardized procedures developed from the *Draft Community Wildland Fire Assessment For Existing and Planned Wildland Residential Interface Developments in Nevada* during the assessment process (Nevada's Wildland Fire Agencies, Board of Fire Directors, April 2001; revised 2002). This approach incorporates values for hazardous fuels and landscape features, community design, and fire protection capabilities into an overall community rating. A glossary of wildland fire terms frequently used in describing assessment results and recommendations is included in Appendix A.

2.2 BASE MAP DATA COLLECTION

Geographic Information System (GIS) Specialists on the RCI Project Team compiled and reviewed existing statewide geospatial data to create field maps for recording baseline data and data verification. Data sources for the maps were the Nevada Fire Safe Council, the Nevada Department of Transportation, the Natural Resource Conservation Service, the US Forest Service, and the Bureau of Land Management. Datasets and sources utilized are summarized in Table 2-1.

Table 2-1. Primary Datasets and Sources Utilized in the Clark County Community Wildfire Risk/Hazard Assessment

SPATIAL DATASET	DATA SOURCE
Land Ownership	BLM Nevada State Office Mapping Services
Vegetation Communities	Nevada Gap Analysis Program Data, Utah Cooperative Fish and Wildlife Research Unit, Utah State University
Topography	US Geological Survey Digital Elevation Models and Topographic Maps
Fire Suppression Resources	Field Interviews
Roads	'TIGER' Census data (2000)
Current Aerial Photographs	US Geological Survey Digital Orthophoto Quadrangles (1994, 1996, or 1998)
Fuel Hazard Classification	BLM Nevada and Utah State Office Fire Hazard Potential Data
Fire History	BLM Nevada State Office Mapping Services US Forest Service Humboldt-Toiyabe Supervisor's Office National Interagency Fire Center - Boise, Utah

2.2.1 Wildfire History

Wildfire history was mapped using Bureau of Land Management and US Forest Service datasets and GIS databases that identify wildfire perimeters on federally managed lands covering the past 21 years. This database was compiled by agency personnel using global positioning system (GPS) and screen digitizing from source maps with a minimum detail of 1:250,000. The dataset is updated by the Bureau of Land Management Nevada State Office at the end of each fire season from information provided by each Nevada Bureau of Land Management Field Office. The dataset is the central source of historical GIS fire data used for fire management and land use planning on federal lands.

Fire Specialists on the RCI Project Team identified additional fire perimeters that were not present in the Bureau of Land Management and US Forest Service datasets during interviews with local fire experts. Fires that occur on private lands are generally recorded on paper maps and have not been consistently included in the federal agency GIS datasets. Additional fire locations identified during the interviews with local fire personnel were recorded on the field maps where possible and added to the project wildfire perimeter dataset.

In addition to the fire perimeter (polygon) information obtained at the state level, point data for all fire ignitions within Nevada from 1980 to 2003 was obtained from the National Interagency Fire Center (NIFC) database in Boise, Idaho. This dataset includes an ignition point coordinate and an acreage component, as reported to NIFC through a variety of agencies. This data, summarized in Table 3-2, provides the ignition point locations for the maps in this report. In cases where the ignition point data is only accurate to within the section, the point coordinate is located on maps in the section center.

The wildfire history and ignition history data were used to formulate risk ratings and to develop recommendations specific to areas that have been repeatedly impacted by wildland fires. Observations made by the RCI Project Team and comments from local fire agencies were also used to develop recommendations in areas without recent wildfire activity where a significant buildup of fuels or expansion of urban development into the interface area represents a growing risk.

2.3 COMMUNITY RISK/HAZARD ASSESSMENT

The wildland-urban interface is the place where homes and wildland meet. This project focused on identifying risks and hazards in the wildland-urban interface areas countywide by assessing each community individually. Site specific information for each community in Clark County was collected during field visits conducted between March 17 and April 2, 2004. The predominant conditions recorded during these site visits were used as the basis for the community risk and hazard assessment ratings.

2.3.1 Ignition Risk Assessment Criteria

Fire Specialists on the RCI Project Team assigned an ignition risk rating of low, moderate, or high to each community assessed. This rating is based on four sources of information: interpretation of the historic record of ignition patterns and fire polygons provided by the National Interagency Fire Center, Bureau of Land Management, and US Forest Service databases; interviews with local fire department personnel and local Fire Management

Officers; field visits to each community; and the professional judgment of Fire Specialists on the RCI Project Team, based on their experience with wildland fire ignitions in Nevada.

2.3.2 Hazard Assessment Criteria

The Community Risk/Hazard Assessments were completed using methodology outlined in the *Draft Community Wildland Fire Assessment For Existing and Planned Wildland Residential Interface Developments in Nevada* (Nevada's Wildland Fire Agencies 2001, revised 2002). This system assigns hazard ratings of low through extreme based on the scoring system shown in Table 2-2.

Table 2-2. Hazard Rating Point System Used in the Nevada Community Wildfire Risk/Hazard Assessment Project

HAZARD CATEGORY	SCORE (POINTS)
Low Hazard	Less than 41
Moderate Hazard	41-60
High Hazard	61-75
Extreme Hazard	76 or higher

To arrive at a score for the community, five primary factors that affect potential fire hazard were assessed: community design, construction material, defensible space, availability and capability of fire suppression resources, and physical conditions such as fuel loading and topography. A description of each of these factors and their importance in developing the overall score for the community is provided below. Individual community score sheets presenting the point values assigned to each element in the hazard assessment are provided at the end of each community assessment. Photographs of representative fuel types for each community are provided in Appendix C.

Community Design

Aspects of community design account for 26 percent of the total hazard score. Many aspects of community design can be modified to make a community more fire safe. Factors considered include:

- **Interface Condition.** Community safety is affected by the density and distribution of structures with respect to the surrounding wildland environment. Four interface condition classes are used to categorize the wildland-urban interface: Classic Interface, Intermix, Occluded, and Rural. Definitions for each interface condition are included in the glossary in Appendix A.
- **Access.** Design aspects of roadways influence the hazard rating assigned to a community. Roads less than twenty feet in width often impede two-way movement of vehicles and fire suppression equipment. A road gradient of greater than five percent can increase response times for vehicles carrying water. Hairpin turns and cul-de-sacs with radii of less than 45 feet can cause problems for equipment mobility. Adequately designed secondary access routes and loop roads in a community can lower a hazard rating. Visible fire-resistant street and address signs and adequate driveway widths also reduce the overall community score.

- **Utilities.** Poorly maintained overhead power lines can be a potential ignition source for wildfires. It is important to keep power line corridors clear of flammable vegetation, especially around power poles and beneath transformers. Fires have been known to start from arcing power lines or exploding transformers during windstorms or during periods of high electricity demand. Keeping flammable vegetation cleared from beneath power lines and around power poles reduces potential hazards from damaged power lines. Energized power lines may fall and create additional hazards for citizens and firefighters, including blocked road access. Power failures are especially dangerous to a community without a back-up energy source. Many communities rely on electric pumps to provide water to residents and firefighters for structure protection and fire suppression.

Construction Materials

The type of building materials used throughout the interface areas accounts for sixteen percent of the total assessment score. While it is not feasible to expect all structures in the wildland-urban interface area to be rebuilt with non-combustible materials, there are steps that can be taken to address specific elements that strongly affect structure ignitability in the interface area. Factors considered in the assessment include:

- **Building Materials.** The composition of building materials determines the length of time a structure can withstand high temperatures before ignition occurs. Houses composed of wood siding and wood shake roofing are usually the most susceptible to ignitions. Houses built with stucco exteriors and tile, metal, or composition roofing are able to withstand much higher temperatures and heat durations; thereby, presenting a much lower ignition risk from firebrands or the proximity of advancing flames when defensible space conditions are adequate.
- **Architectural Features.** Unenclosed or unscreened balconies, decks, porches, eaves, or attic vents on homes can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house. A high number of houses within a wildland-urban interface with these features implies a greater hazard to the community.

Defensible Space

Defensible space accounts for sixteen percent of the assessment score. The density and type of fuel around a home determines the potential fire exposure levels and the potential for damage to the home. A greater volume of trees and shrubs, dry weeds, dry grass, woodpiles, and other combustible materials near the home will ignite more readily, produce more intense heat during a fire, and increase the threat of losing the home. Defensible space is one of the factors that homeowners can easily manipulate in order to improve the chances that a home or other property avoids damage or complete loss from a wildfire.

Suppression Capabilities

The availability and capability of fire suppression capabilities account for sixteen percent of the total assessment score. Knowledge of the capabilities or limitations of the fire suppression resources in a community can help the residents take action to maximize the resources available. Factors considered in the assessment include:

- **Availability, Number, and Training Level of Firefighting Personnel.** When a fire begins in or near a community, having the appropriate firefighters available to respond quickly is critical to saving structures. Whether there is a local paid fire department, volunteer department, or no local fire department impacts how long it takes for firefighters to respond to a reported wildland fire or a threatened community.
- **Quantity and Type of Fire Suppression Equipment.** The quantity and type of available fire suppression equipment has an important role in minimizing the effect of a wildfire on a community. Wildland firefighting requires specialized equipment.
- **Water Resources.** The availability of water resources is critical to fighting a wildland fire. Whether there is a community water system with adequate flow capabilities, or whether firefighters must rely on local ponds or other drafting sites affects how difficult it will be for firefighters to protect the community.

Physical Conditions

The physical conditions that influence fire behavior account for 26 percent of the hazard rating. Physical conditions include slope, aspect, topographic location, fuel type, and fuels density. With the exception of changes to the fuels composition, physical conditions in and around a community cannot be altered to make the community more fire safe. Therefore, an understanding of how these physical conditions influence the behavior of a fire is essential to planning effective preparedness activities, such as fuels reduction treatments. Physical conditions considered in the assessment include:

- **Slope, Aspect, and Topography.** In addition to local weather conditions, slope, aspect, and topographic features are also used to predict fire behavior. Steep slopes greatly influence fire behavior. Fire usually burns upslope with greater speed and with longer flame lengths than on flat areas. Fire can burn downslope; however it usually burns downhill at a slower rate and with shorter flame lengths than in upslope burns. West and south facing aspects are subject to more intense solar exposure, which preheats vegetation and lowers the moisture content of fuels, increasing the potential for hazardous fire behavior. Canyons, ravines, and saddles are topographical features that are prone to higher wind speeds than adjacent areas. Fires pushed by winds grow at an accelerated rate compared to fires burning in non-windy conditions. Homes built mid-slope, at the crest of slopes, or in saddles are most at risk due to wind-prone topography.
- **Fuel Type and Density.** Vegetation type, fuel moisture values, and fuel density around a community affect the potential fire behavior. Areas with thick, continuous, vegetative fuels carry a higher hazard rating than communities situated in areas of irrigated, sparse, or non-continuous fuels.

2.3.3 Fuel Hazard Mapping

Fuel hazard maps were initially generated by the Bureau of Land Management Nevada and Utah State Offices using wildfire hazard delineations derived from vegetation satellite data at thirty-meter resolution (Nevada GAP Analysis Program). A total of 65 vegetation types were mapped statewide and reclassified into four wildfire hazard categories (low, moderate, high, and extreme) based on the anticipated fire behavior for each vegetation cover type.

For example, pinyon-juniper cover types were generally rated as an extreme fuel hazard, while sparse Mohave shrublands were rated as low fuel hazards.

The RCI Project Team visited high and extreme fuel hazard communities and verified the Bureau of Land Management fuel hazard information by comparing the hazard ratings on the existing fuel hazard maps to observed vegetation, slope, and aspect conditions. Where necessary, changes to the ratings were recorded on maps and used to update the wildfire hazard potential layer of the project database. Hazard mapping was updated for seven communities in Clark County. Photo points were established in high and extreme fuel hazard areas to monitor future changes in fuel hazard conditions. Hazard mapping was reviewed for the listed Clark County communities. In this report, hazard maps are provided only for those communities where high and extreme fuel types were noted.

2.3.4 Worst-Case Wildfire Scenario

The RCI Project Team Wildfire Specialists described the worst-case scenarios included in this evaluation based on their analyses of the severe fire behavior that could occur given a set of weather conditions, observed fuel load conditions, slope, aspect and minimal fire suppression resources. The drought conditions and dry vegetation in combination with steep slopes or high winds can create situations in which the worst-case scenario can occur. The worst-case scenario does not describe the most likely outcome of a wildfire event in the interface, but it does illustrate the potential for damage if a given set of conditions were to occur simultaneously. The worst-case scenarios are described in this document for public education purposes and are part of the basis for the fuels reduction recommendations.

2.4 INTERVIEWS WITH FIRE PERSONNEL

The RCI Project Team interviewed local fire department personnel and local Fire Management Officers to obtain information on wildfire training, emergency response time, personnel and equipment capability and availability, evacuation plans, pre-attack plans, and estimates of possible worst-case scenarios. Local fire personnel reviewed maps showing the history of wildfires to ensure that local information on wildland fires was included. A list of fire agency personnel contacted for information used in the Clark County assessment is included in Appendix D.

2.5 RECOMMENDATION DEVELOPMENT

A wide variety of treatments and alternative measures can be used to reduce ignition risks, mitigate fire hazards, and promote fire-safe communities. Proposed recommendations typically include physical removal or reduction of flammable vegetation, increased community awareness of the risk of fires and how to reduce those risks, and coordination among fire suppression agencies to optimize efforts and use of resources. The RCI Project Team met repeatedly to analyze community risks, treatment alternatives, and treatment benefits. Treatment recommendations to reduce existing risks and hazards were formulated based upon professional experience, the community hazard score, and information from published references such as “*Living With Fire*” and FIREWISE resources (National Fire Plan website; FIREWISE website; and Nevada Cooperative Extension).

3.0 DESCRIPTION OF THE COUNTY

3.1 DEMOGRAPHICS, LOCATION, TOPOGRAPHY, AND CLIMATIC DATA

Clark County is located in southern Nevada and is approximately 7,910 square miles (over five million acres) in size. A summary of land administration and/or management is provided in Table 3-1.

Table 3-1. Land Management Acreage Within Clark County

LAND ADMINISTRATOR	ACRES	PERCENT OF COUNTY
Federal		
Bureau of Land Management	2,811,500	56
US Fish and Wildlife Service	496,700	10
National Park Service	454,300	9
USFWS/Nellis Range	355,600	7
US Forest Service	276,800	5
US Air Force	28,300	<1
State of Nevada		
NDOW, NDOT, State Parks	46,400	1
Private / Local Government		
Boulder City Easement, Private	507,200	10
Native American		
Moapa River Indian Reservation	71,500	1
Las Vegas Paiute Indian Reservation	3,900	<1
Fort Mojave Indian Reservation	3,700	<1
Total	5,055,900	

Source: Clark County Multi-Species Habitat Conservation Plan (MSHCP) (Recon 2000).

The population in Clark County was estimated to be 1,620,748 persons in 2003 (Nevada State Demographer's Office). The Clark County economy is based primarily on tourism. Approximately 24 percent of the jobs are in hotels and gaming, nineteen percent are in retail trade, eleven percent are in government, nine percent are in construction, and 21 percent are in "other services" (<http://www.co.clark.nv.us>).

Elevations within the county range from 450 feet above mean sea level at the Colorado River to 11,918 feet at Charleston Peak in the Spring Mountains. The largest mountain ranges in Clark County include the Spring Mountains, the Sheep Range, the McCullough Range, and the Virgin Mountains. The largest valleys are Las Vegas Valley, Sandy Valley, Moapa Valley and the Virgin Valley. The climate is generally characterized by low precipitation and low humidity.

3.2 WILDFIRE HISTORY

Wildfire history for Clark County was compiled from the Nevada Bureau of Land Management State Office database and the US Forest Service Las Vegas Field Office. Vegetation over the majority of the county is Mojave Desert scrub, which is typically too sparse to sustain large wildfires. When wildfires do occur in these areas, they tend to occur in dense stands of fuels such as palm forests, or along ephemeral and perennial drainages and irrigation ditches. Large wildfires are typically limited to the Spring Mountain Range in northwest Clark County, in the pinyon-juniper fuel type, where large fires have been known to occur every few years. Wildfire history in Clark County is detailed in Table 3-2 and illustrated in Figure 3-2.

Table 3-2. Summary of Fire Occurrence and Estimated Acreage, pre-1980-2003

YEAR	NUMBER OF FIRE IGNITIONS	TOTAL FIRE ACREAGE	YEAR	NUMBER OF FIRE IGNITIONS	TOTAL FIRE ACREAGE
Pre-1980	46	15,215	1992	53	16
1980	115	9,288	1993	85	4,946
1981	105	13,698	1994	57	8,261
1982	149	7,444	1995	45	2,476
1983	96	272	1996	49	3,072
1984	91	301	1997	48	27
1985	112	443	1998	67	571
1986	112	166	1999	59	68
1987	114	6,368	2000	67	8,737
1988	91	770	2001	63	216
1989	72	246	2002	49	4,307
1990	75	15	2003	37	47
1991	73	6			
TOTAL				1,884	33,788

Fire ignition and base acreage data provided by the National Interagency Fire Center, Boise, Idaho, Bureau of Land Management Nevada State Office, US Forest Service Humboldt-Toiyabe Supervisor's Office, and the US Fish and Wildlife Service Nevada Fish and Wildlife Office.

During the summer of 2004, a small fire was ignited in grass and brush along the roadside of State Route 158, when a vehicle went off the road. This ignition came to be known as the Robber's Fire, which spread to a 290-acre wildfire that came within a mile and a half of residences in the Deer Creek neighborhood. This incident highlights the need to maintain highway roadsides free of flammable material in the Mt. Charleston area.

3.2.1 Ignition Risk Factors

Wildfire ignition risks fall into two categories: lightning and human caused. Human caused ignitions can come from a variety of sources such as burning material thrown out of vehicle windows, auto accidents, off-road vehicles, railroads, arcing power lines, agricultural fires, campfires, debris burning in piles or burn barrels, lit matches, and fireworks. The ignition source records for Clark County indicate that between 1981 and 2002, 579 wildfire ignitions were attributed to lightning and 976 were human caused.

3.2.2 Fire Ecology

The science of fire ecology is the study of how fire contributes to plant community structure and species composition. A 'fire regime' is defined in terms of the average number of years between fires under natural conditions (fire frequency) and the amount of dominant vegetation replacement (fire severity). Natural fire regimes have been affected throughout most of Nevada by twentieth century fire suppression policies. Areas that formerly burned with high frequency but low intensity (fires more amenable to control and suppression) are now characterized by large accumulations of unburned fuels, which once ignited, will burn at higher intensities.

Frequent, low intensity wildfires characterize the natural fire regime in ponderosa pine forests. Under a native fire regime, frequent low-intensity surface fires reduce fuel loading from grasses and shrubs, suppress regeneration of shade-tolerant white fir seedlings, and leave the adult pine trees unaffected, protected by thick, fire-resistant bark. With a natural occurrence of wildfire, ponderosa pine forests often have an open, "park-like" appearance with an understory of grass or low shrubs. Under these conditions, heavy fuel loading can occur in discrete areas, but their discontinuous nature reduces the likelihood that a fire will burn with enough intensity to affect the mature trees.

In the absence of frequent surface fires in ponderosa pine communities, vegetation growth is uncontrolled resulting in extremely hazardous fuel conditions. Accumulated dead-and-down woody fuels and the emergence of understory shrubs such as Gambel's oak, mountain mahogany, rabbitbrush, manzanita, sagebrush, and young white fir trees create ladder fuels that can carry flames into the tree canopy and potentially provoke a catastrophic, stand-destroying crown fire.

The natural fire regime for pinyon pine woodlands is typified by stand-replacing, high intensity, "stand destroying" wildfires that completely remove the existing woodland community. The low frequency of fires in these plant communities is attributed to the long periods of time required for the vegetation to reestablish vertical and horizontal continuity in the fuels and accumulate fuel loadings conducive to the combustion of the entire fuel load during a wildfire occurrence.

Mojave desert plant communities common to Clark County such as creosote bush, white bursage, and blackbrush evolved with very low fire frequencies ranging between 35 and 100 years (Brown et al., 2000). Wide spaces between shrubs, low biomass production, and low ground cover contribute to the naturally low fire occurrence in these communities. Creosote bush and blackbrush are not fire-adapted species and are often subject to high mortality rates even in low intensity burns. Plant re-sprouting of creosote bush after a fire is limited and restricts shrub reestablishment after a burn. Blackbrush is also very limited in its ability to reestablish following a wildfire in a time frame relevant to land management.

The long interval for desert shrub and pinyon pine reestablishment following fire is conducive for invasion of aggressive, pioneering plants such as cheatgrass and red brome. Since the 1970's the fire frequency in the Mojave Desert has increased dramatically and includes the occurrence of some large fires. This increase in fire frequency is often attributed to the expansion of red brome and cheatgrass. Both species can create continuous ground fuel conditions that can facilitate ignitions and the spread of fire from shrub to shrub, especially in wet years when annual plants respond with increased vegetation growth.

3.3 NATURAL RESOURCES AND CRITICAL FEATURES POTENTIALLY AT RISK

Critical features at risk of loss during a wildfire event can be economic assets such as agricultural and industrial resources or cultural features, such as historic structures, archaeological sites, and recreation-based resources. Clark County contains several natural and cultural resource features that could be at risk during a wildland fire.

3.3.1 Historical Registers

There are 54 sites listed on the National Register of Historical Places (NRHP) for Clark County. Fourteen sites are listed on the Nevada State Register of Historical Places (NSRHP). The effects of fire on cultural and historical resources depend upon factors that vary from site to site. Some factors that determine the vulnerability of a historic site to damage by a wildland fire are its physical location with respect to the wildland-urban interface, adjacent fuel loading, terrain, site type, and type of cultural or historical materials present. Archeological sites and historic trails are not necessarily vulnerable to wildfire impacts, although rock art, ceramics, and rock artifacts can be completely or partially destroyed by extremely hot fires. Historic districts, historic buildings, and resources that lie in the wildland-urban interface that could be negatively impacted by wildfire are summarized by community in Table 3-3 and illustrated in Figure 3-2.

Table 3-3. Historical Places Potentially At Risk in Clark County

SITE NAME	LOCATION	SOURCE REGISTER
Parley Hunt House	Bunkerville	National Register of Historic Places
Goodsprings Schoolhouse	Goodsprings	National Register of Historic Places
Logandale Elementary School	Logandale	Nevada State Register of Historic Places

3.3.2 Recreation

Clark County hosts diverse recreational resources. Table 3-4 lists the primary recreational areas and the managing agency. The effects of wildfire on these areas could include loss of life during a wildfire and loss of use after a wildfire.

Table 3-4. Recreational Resources Potentially At Risk in Clark County

RECREATIONAL AREA	MANAGING AGENCY
Lake Mead National Recreation Area	National Park Service
Spring Mountains National Recreation Area	US Forest Service
Floyd Lamb State Park	Nevada State Parks
Old Las Vegas Mormon Fort	Nevada State Parks
Spring Mountain Ranch State Park	Nevada State Parks
Valley of Fire State Park	Nevada State Parks
Red Rock Canyon NCA and Backcountry Byway	Bureau of Land Management
Bitter Springs Backcountry Byway	Bureau of Land Management
Gold Butte Backcountry Byway	Bureau of Land Management
Nellis Dunes/Sunrise Mountain	Bureau of Land Management
Logandale Trails	Bureau of Land Management
Desert National Wildlife Refuge Complex	US Fish and Wildlife Service

Source: Nevada Public Lands Recreation Opportunities, 2002

3.3.3 Flora and Fauna

There are eight species listed as 'threatened or endangered' under the Endangered Species Act with potential habitat in Clark County. An additional 21 species from the Nevada Natural Heritage Program 'Sensitive Taxa' list are protected by state legislation (Nevada Natural Heritage Program database; last updated for Clark County 18 March 2004). These species are identified in Table 3-4. The Nevada Natural Heritage Program, the Nevada Division of Forestry, and the Nevada Department of Wildlife should be consulted regarding specific concerns and potential mitigation to minimize impacts to these species prior to implementing fuel reduction projects or the occurrence of a wildfire.

Details on these species and measures to protect them in Clark County are provided in the Clark County Multiple Species Habitat Conservation Plan (Recon, 2000). Any of these species can be negatively impacted either directly or indirectly by wildfire. Impacts could include loss of habitat, conversion of habitat type, or erosion and sedimentation. Noteworthy habitats include those associated with the Spring Mountains, riparian corridors along washes, creeks, and rivers, and the Mojave Desert scrub vegetation types.

Table 3-5. Federal and State-Listed Species Potentially At Risk in Clark County

SCIENTIFIC NAME	COMMON NAME	LEGISLATION
Plants		
<i>Arctomecon californica</i>	Las Vegas bearpoppy	NRS 527.260.300
<i>Astragalus geyeri</i> var. <i>triquetrus</i>	Threecorner milkvetch	NRS 527.260.300
<i>Astragalus mohavensis</i> var. <i>hemigyus</i>	Mokiak milkvetch	NRS 527.260.300
<i>Cryptantha insolita</i>	Las Vegas catseye	NRS 527.260.300
<i>Eriogonum viscidulum</i>	Sticky buckwheat	NRS 527.260.300
<i>Opuntia whipplei</i> var. <i>multigeniculata</i>	Blue Diamond cholla	NRS 527.260.300 NRS 527.060.120
Fish		
<i>Crenichthys baileyi moapae</i>	Moapa White River springfish	NRS 501
<i>Cyprinodon diabolis</i>	Devil's hole pupfish	ESA-Listed Endangered NRS 501
<i>Empetrichthys latos latos</i>	Pahrump poolfish	NRS 501
<i>Gila elegans</i>	Bonytail chub	ESA-Listed Endangered NRS 501
<i>Gilia seminuda</i>	Virgin River chub	ESA-Listed Endangered NRS 501
<i>Lepidomeda millispinis mollispinis</i>	Virgin River spinedace	NRS 501
<i>Moapa coriacea</i>	Moapa dace	ESA-Listed Endangered NRS 501
<i>Plagopterus argentissimus</i>	Woundfin	NRS 501
<i>Rhinichthys osculus moapae</i>	Moapa speckled dace	ESA-Listed Endangered NRS 501
<i>Xyrauchen texanus</i>	Razorback sucker	NRS 501
Amphibians		
<i>Rana onca</i>	Relict leopard frog	NRS 501
Reptiles		
<i>Gopherus agassizii</i>	Desert tortoise (Mojave population)	ESA-Listed Threatened NRS 501
<i>Heloderma suspectum cinctum</i>	Banded Gila monster	NRS 501
Mammals		
<i>Euderma maculatum</i>	Spotted bat	NRS 501
Birds		
<i>Athene cunicularia hpugaea</i>	Western burrowing owl	NRS 501
<i>Buteo regalis</i>	Ferruginous hawk	NRS 501
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed Cuckoo	NRS 501
<i>Empidonax trailii extimus</i>	Southwestern willow flycatcher	ESA Listed Endangered NRS 501
<i>Falco peregrinus</i>	Peregrine falcon	ESA Listed Endangered NRS 501
<i>Ixobrychus exilis hesperis</i>	Western least bittern	NRS 501
<i>Otus flammeolus</i>	Flammulated owl	NRS 501
<i>Phainopepla nitens</i>	Phainopepla	NRS 501
<i>Rallus longirostris yuanensis</i>	Yuma clipper rail	ESA Listed Endangered NRS 501

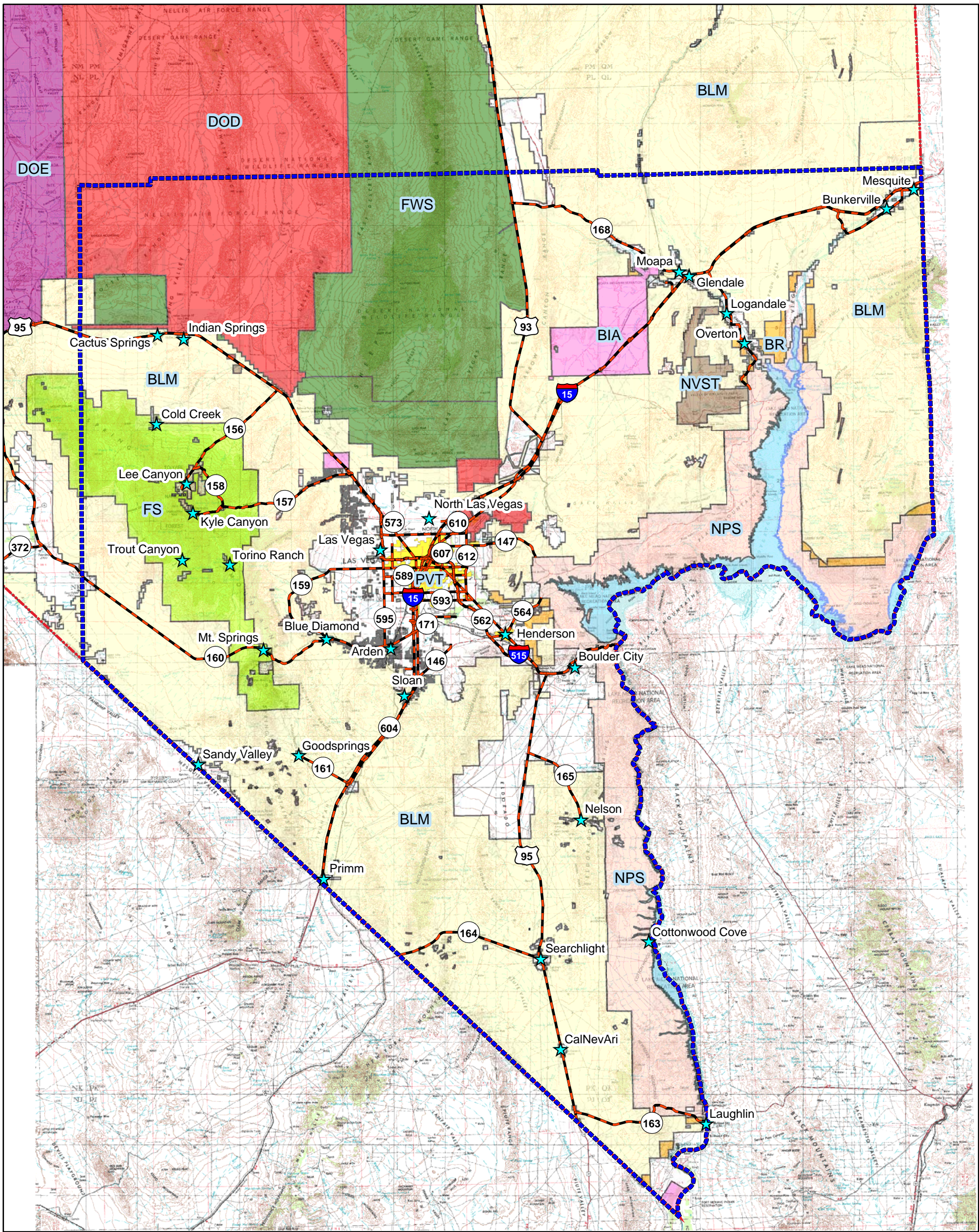
3.4 PREVIOUS FIRE HAZARD REDUCTION PROJECTS

In January 2002, the Bureau of Land Management, the US Forest Service, the Nevada Division of Forestry, and the Clark County Fire Department completed a risk assessment and mitigation plan for the communities of Kyle and Lee Canyons in the Mount Charleston area (Firehouse Inc. 2002). In September of the same year, a Mount Charleston chapter of the Nevada Fire Safe Council was formed and currently serves the Kyle and Lee Canyon communities. The Mount Charleston chapter is currently promoting defensible space improvements and fuels reduction treatments on individual private lots in Kyle Canyon neighborhoods, working with private contractors as well as public agencies. Grants from the Nevada Fire Safe Council and the Nevada Division of Forestry as well as donations of time and equipment from local contractors have helped facilitate this work (D. Grismanauskas, pers. comm.).

Fuels reduction treatments in areas that pre-date this plan are in need of maintenance, as dense shrub vegetation has reestablished in the understory. A joint project between the Nevada Division of Forestry and the US Forest Service to maintain and extend a 3.5 mile shaded fuelbreak along the east side of the Rainbow subdivision is currently in progress. Nevada Division of Forestry anticipates extending fuelbreaks from Poppy Ridge to State Route 157 (S. Bittingham, pers. comm.).

In the fall of 2003, the Bureau of Land Management began work on the Mesquite fuels project. This project includes clearance of 100 to 250 acres of tamarisk forest each year over a ten-year period. Eventually 1,709 acres will be cleared and replaced with native species. This project is intended to reduce the threat of wildfire along ten miles of wildland-urban interface in the Mesquite and Bunkerville communities and to restore native vegetation to this section of the Virgin River floodplain.

In July of 2003 the US Fish and Wildlife Service announced that they would be issuing a contract for hazardous wildland fuels reduction on the Moapa Valley National Wildlife Refuge near the town of Moapa. It was expected that approximately 250 palm trees would be removed and others trimmed to reduce the hazard they present to the refuge and surrounding property. Funding for this contract was made available through the National Fire Plan.



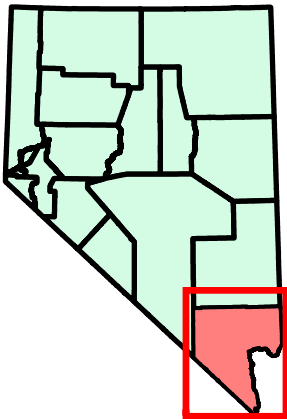
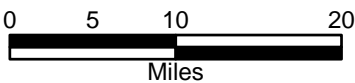
Legend

- ★ Clark County Community
- ▬ Clark County Boundary
- ▬ Highways and State Routes

Land Ownership

- Bureau of Indian Affairs (BIA)
- Bureau of Land Management (BLM)
- Bureau of Reclamation (BR)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Fish and Wildlife Service (FWS)
- Forest Service (FS)
- National Park Service (NPS)
- Nevada State (NVST)
- Private (PVT)
- Water

Figure 3-1. Community Locations and Land Ownership, Clark County, Nevada



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Nevada Community Wildfire Risk / Hazard Assessment Project

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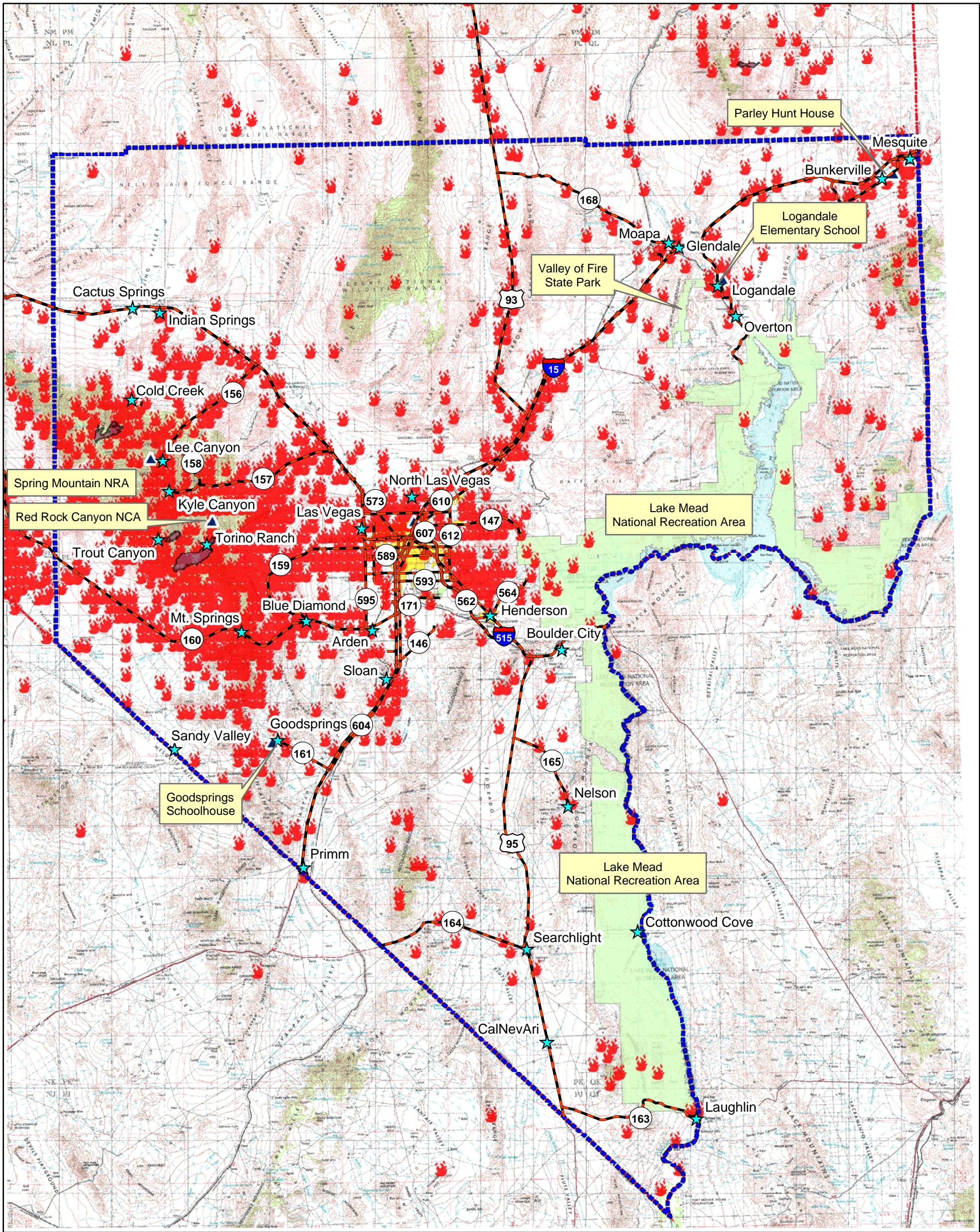
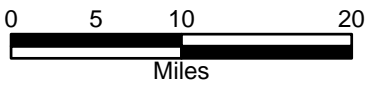


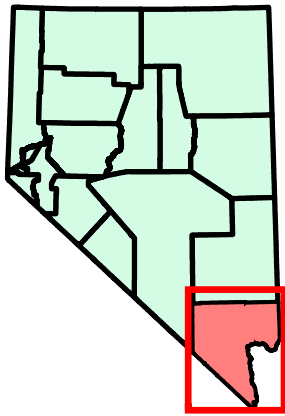
Figure 3-2. Fire History and Critical Features Potentially At Risk, Clark County, Nevada

Legend

- Clark County Boundary
- Clark County Community
- Highways and State Routes
- Fire Boundary
- Fire Ignition
- Recreational Resource
- Clark Historic Site



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4.0 COUNTY-WIDE ASSESSMENT RESULTS

4.1 COUNTY-WIDE RISK AND HAZARD ASSESSMENT OVERVIEW

During March and April of 2004, the RCI Project Team evaluated the thirty communities described in this report. The hazard rating for each community, fuel conditions in the interface areas, and ignition risk are summarized in Table 4-1.

Table 4-1. Assessment Results Summary

COMMUNITY	INTERFACE CONDITION	INTERFACE FUEL HAZARD CONDITION	IGNITION RISK	COMMUNITY HAZARD RATING
HIGH AND EXTREME HAZARD COMMUNITIES				
Cold Creek	Intermix	High to Extreme	Moderate	High
Kyle Canyon	Rural	Extreme	High	Extreme
Lee Canyon	Intermix	Extreme	High	Extreme
Mountain Springs	Intermix	High to Extreme	High	Extreme
Nelson	Intermix	Low to Moderate	Moderate	High
Torino Ranch	Classic	Low to Extreme	High	High
Trout Canyon	Intermix	Extreme	High	Extreme
MODERATE HAZARD COMMUNITIES				
Cactus Springs	Classic	Low	Low	Moderate
Goodsprings	Classic	Moderate	Moderate	Moderate
Moapa	Classic	Low to High	Low	Moderate
Sandy Valley	Intermix	Low	Low	Moderate
Searchlight	Intermix	Low	Low	Moderate
LOW HAZARD COMMUNITIES				
Arden	Occluded	Low	Low	Low
Blue Diamond	Intermix	Low	Low	Low
Boulder City	Classic	Low	Low	Low
Bunkerville	Classic	Low to High	Low	Low
CalNevAri	Classic	Low to Moderate	Low	Low
Cottonwood Cove	Classic	Low	Low	Low
Glendale	Classic	Low to High	Low	Low
Henderson	Classic	Low	Low	Low
Indian Springs	Classic	Low	Low	Low
Las Vegas	Classic	Low	Low	Low
Laughlin	Classic	Low	Low	Low
Logandale	Classic	Low to High	Low	Low
Mesquite	Classic	Low to High	Low	Low
North Las Vegas	Classic	Low	Low	Low
Overton	Classic	Low to High	Low	Low
Palm Gardens Estates	Classic	Low	Low	Low
Primm	Classic	Low	Low	Low
Sloan	Classic	Low	Low	Low

4.1.1 Wildfire Protection Resources

Wildland fire suppression resources in Clark County include the following agencies:

- Clark County Fire Department (CCFD)
- Boulder City Fire Department (BCFD)
- City of Las Vegas Fire Department (LVFD)
- City of Henderson Fire Department (HFD)
- City of North Las Vegas Fire Department (NLVFD)
- City of Mesquite Fire Department (MFD)
- The Nevada Division of Forestry (NDF)
- The US Forest Service (USFS)
- The Bureau of Land Management (BLM)
- The Southern Nevada Interagency Fire Management Partnership (SNIFMP) is composed of the Bureau of Land Management Las Vegas Field Office, the US Fish and Wildlife Service Desert National Wildlife Range Complex, the National Park Service Lake Mead National Recreation Area, and the US Forest Service Spring Mountains National Recreation Area.

Nevada Division of Forestry Suppression Resources

The Nevada Division of Forestry administers a 1,800-acre NRS 473 fire protection district on Mount Charleston. The Mount Charleston Fire Protection District includes 400-500 homes in Kyle and Lee Canyons, a school, and commercial and community buildings. The Nevada Division of Forestry Fire Station in Kyle Canyon provides 24-hour, continuous coverage with a three-person engine company. Staffing is increased seasonally with the addition of a Type III wildland engine crew from April to September. The Nevada Division of Forestry conservation crew stationed in Cactus Springs is dispatched through the Sierra Front Interagency Dispatch Center in Minden, Nevada.

Federal Suppression Resources

The Bureau of Land Management assigns resources to three fire stations in the region on a seasonal basis (from May to September). A Type 4 Brush Engine is assigned to the Fire Station in Pahrump (Nye County). A Type 3 Brush Engine is assigned to the Logandale Bureau of Land Management Station. Two Type 3 Brush Engines are housed in Red Rock Canyon. The Red Rock Canyon station also hosts a 500-person mobile fire cache and the warehouse at the Las Vegas office is equipped with a 100-person fire cache.

The US Forest Service has a Type 3 Brush Engine and patrol vehicles assigned to the Kyle Station, Indian Springs, Pahrump, and Mt. Springs. A ten-member Interagency Helitak team flies out of the North Las Vegas airport carrying crews from the Bureau of Land Management, the US Forest Service, and the National Park Service.

Clark County Fire Department

The Clark County Fire Department is the agency with the most comprehensive geographic coverage in Clark County. As such, this agency responds to wildfires for the majority of the rural communities described in this report. The Clark County Fire Department has 577 firefighters, 57 fire prevention and investigation employees, and 48 administrative, training and other support employees. The department has 24 stations staffed by paid firefighters and thirteen stations staffed by volunteers. There are over 350 volunteer firefighters (Clark County Fire Department 2003 Annual Report).

Wildfire resources may be dispatched at any given time from the nearest Clark County Fire Department station to respond to wildfires in rural communities. Equipment and resources stationed at each rural fire station are described in the community sections of this report.

In 2003, the Clark County Fire Department purchased thirteen portable tanks (pumpkins) with capacities of 5,000 gallons each. These were located in communities with limited water resources.

Interagency Communications

The US Forest Service, the Bureau of Land Management, and the National Park Service are all dispatched through the Las Vegas Interagency Communications Center (LVICC). The federal agencies provide mutual aid to Clark County fire departments and NDF through mutual aid agreements. LVICC coordinates with Clark County's Central Fire Alarm Office (FAO) during incidents that require local, state, and national resources. In 2004 the Nevada Division of Forestry was dispatched through the Sierra Front Interagency Dispatch Center in Minden, Nevada. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols.

Clark County Fire Department Detection and Communication

Clark County's Central Fire Alarm Office (FAO) is supported by the Clark County Fire Department, the Las Vegas Fire Department, and the North Las Vegas Fire Department. The FAO uses a computer aided dispatch (CAD) system to provide 911 service and to dispatch fire and EMS services.

Fires are reported in Clark County through:

- 911 calls and
- Calls to Clark County Emergency Dispatch.

Fires are communicated to fire response personnel through the use of

- Emergency Dispatch through the Clark County Consolidated Fire Alarm Office and
- Radios, pagers, and telephones where volunteer fire stations exist.

The Clark County Sheriff's Office has access to the state mutual aid frequencies, and the radio system is compatible with neighboring agencies. Gaps in radio coverage do exist in some areas.

Fire Protection Personnel Qualifications

The Clark County Fire Department offers monthly fire training on a continuous basis to all volunteer stations with Fire Fighter I training as the primary criteria. In 2003, 47 volunteers and one deputy chief attended Bureau of Land Management Wildland Firefighter Training. These firefighters now hold certifications that are recognized by the National Wildfire Coordinating Group (NWCG).

The Clark County Fire Department and career firefighters from the City of North Las Vegas, Las Vegas, Henderson, Boulder, and Mesquite generally do not receive wildland firefighter training, nor are they normally issued personal protective equipment or tools for wildland fire suppression.

Work Load

In 2003, the Clark County Fire Department responded to 93,206 incidents, 3,880 of which were fire calls. During the interview process, rural stations reported responding to nearly 200 brush fire calls in 2003. Workloads for individual fire stations are provided in the community chapters of this report.

Financial Support

Funding for the Clark County Fire Departments annual operating expenses comes from the County General Fund, which is generated primarily through property taxes in Clark County. In 2003, the Clark County Fire Department also received approximately \$650,000 in funding through the FEMA Assistance to Firefighters Grant.

Community Preparedness

The Clark County Fire Code is contained in County Ordinance No. 2289, which became effective March 30, 1999. The State Fire Marshall's Office at the Nevada Department of Public Safety adopted the ICC fire codes for public and commercial buildings in July of 2004 (effective January 2005). As such, the 2003 International Urban-Wildland Interface Code can be used for guidance on fire safe communities (*R. Nicholson, pers. comm. 22 Feb 2005*).

Public Education

Clark County Fire Department provides numerous programs during Fire Prevention Month and Fire Protection Week. These programs involve presentations at senior citizen centers and at schools for students and teachers.

4.2 EQUIPMENT AND TRAINING CONCERNS

Thousands of acres of wildland-urban interface in Clark County are exposed to the threat of wildland fire. These areas include steep, heavily vegetated, mountainous terrain with dynamic wildland fire histories. Many of the urban fire stations responsible for fire protection in the Las Vegas Valley are within a one-hour response time to many high-hazard wildland areas.

- With the overall increase in the occurrence and intensity of wildfires in the wildland-urban interface, it is extremely important that the responsible officials in the Clark

County Fire Department and the local fire department unions recognize the importance of wildland fire training and equipment to assure firefighter safety and effectiveness in the interface environment during a wildland fire.

The National Wildfire Coordinating Group (NWCG) establishes minimum standards for wildland firefighters in the *Wildland and Prescribed Fire Qualification System Guide PMS 310-1*. Training to satisfying these standards would enhance the safety and effectiveness of urban firefighting crews when they are called to respond to an incident in the wildland-urban interface. The NWCG 310-1 document “recognizes the ability of cooperating agencies at the local level to jointly define certification and qualification standards.” (NWCG, p2). The 310-1 could be used as a framework for establishing certification and qualification for firefighters, captains, and battalion chiefs to better prepare them for the unique conditions that can occur during structure protection in the interface environment.

Requests for mobilization outside of a fire department’s geographic area increase as the frequency and intensity of fires in the wildland-urban interface increase in the western United States. In order to improve firefighter safety and the response effectiveness in a wildland-urban incident, Clark County Fire Department management and the local fire department unions need to give high priority to the following recommendations:

4.2.1 Training

As detailed in the NWCG *Wildland and Prescribed Fire Qualification System Guide PMS 310-1*:

- Provide wildland firefighter training to all fire department members (40-hr. course).
- Provide wildland fire training to all Captains to the level of Engine Boss.
- Provide wildland fire training to all Chief Officers to the level of Strike Team Leader.
- Provide annual wildland firefighting refresher training (8-hour course).
- Provide annual fire shelter training to all qualified department members.

4.2.2 Equipment

Comply with National Wildfire Coordinating Group 310-1 guidelines:

- Provide wildland personal protective equipment for all members.
- Provide wildland firefighting equipment on all engine companies.
- Provide all firefighters with a wildland fire field pocket guide.

4.2.3 Apparatus

- Clark County Fire Department purchase five (5) Type 3 engines.
- North Las Vegas Fire Department purchase two (2) Type 3 engines.
- Henderson Fire Department purchase two (2) Type 3 engines.
- Boulder City Fire Department purchase one (1) Type 3 engine.

HIGH HAZARD COMMUNITIES

5.0 COLD CREEK

5.1 RISK AND HAZARD ASSESSMENT

Cold Creek is located along the north end of the Spring Mountains approximately fifty miles northwest of Las Vegas. The hazard assessment included observations of 72 homes in the interface areas and resulted in classifying Cold Creek in the **High Hazard** category (68 points). The rating is primarily attributed to limited access, poor defensible space, the potential for extreme fire behavior, and structures without fire resistant building materials. Table 5-3 at the end of this section presents a summary of the community hazard rating values for Cold Creek.

5.1.1 Community Design

The area surrounding the community of Cold Creek is characterized as an intermix wildland-urban interface condition: structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space. All lot sizes are less than one acre in size indicating relatively high-density housing.

Access: The primary access into Cold Creek is Cold Creek Road, a two-lane dirt road that is at least 24 feet wide. This is the only access road into and out of the community. The road is approximately eleven miles long and intersects with US Highway 95 approximately 32 miles north of Las Vegas. The road gradient is less than five percent. Six of the secondary roads are dead-end streets and do not have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. However, residential addresses are not visible on about ninety percent of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during wildland fires.

Utilities: Utilities are a low ignition risk because there are no above ground utilities.

5.1.2 Construction Materials

Approximately 95 percent of the homes in the interface are built with non-combustible roofing materials, but only fifteen percent of the homes have fire resistant siding materials. Ninety percent of the homes observed have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

5.1.3 Defensible Space

Only ten percent of the homes observed within the Cold Creek community met the landscaping requirement for defensible space to reduce the risk of property damage or loss of a home during a wildfire.

5.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Fire Station 82, located in Cold Creek, is a volunteer fire department with eleven members. The next nearest resources for initial attack on a wildland fire in the Cold Creek area would come from Clark County Fire Station 83 and the US Forest Service Station at Indian Springs, approximately twenty miles away. Table 5-1 lists the resources that would most likely be the first to respond to a reported wildland fire. This information is based on data available at the time of interviews with local and regional fire authorities and is subject to change.

Table 5-1. Cold Creek Initial Attack Wildfire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine Type 6 Quick Attack Engine BLS Rescue	1 1 1	Clark County Rural Fire Station 82 (Cold Creek)
Type 1 Structure Engine Type 6 Cold Creek Engine BLS Rescue	2 2 1	Clark County Rural Fire Station 83 (Indian Springs)
Type 7 Engine Type 4 Brush Engine	1 1	US Forest Service (Indian Springs Station 83)

Source: Steve McClintock, Kurt Leavitt, Mark Blankensop, pers. comm. March 2004.

It is important to note that fire suppression resources administered by federal agencies such as the US Forest Service equipment assigned to Indian Springs are considered national resources and are commonly reassigned to areas of higher severity during the fire season. In response to a wildland fire call, interagency dispatch centers locate and dispatch the closest available resource according to incident command and computer-aided dispatch protocols.

Water Sources and Infrastructure

Water availability for fire suppression in Cold Creek includes 500 gpm hydrants within 500 feet of structures, community wells, one 500,000-gallon storage tank, ponds, and a 5,000-gallon Fold-a-Tank. The water system is gravity-operated.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Cold Creek have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per NWCG 310-1.

Work Load

Clark County Fire Department Station 82 responded to eight emergency medical calls and sixteen wildland brush fire calls in 2003.

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Detection and Communication

There are no fire lookouts in the Cold Creek area, but reconnaissance flights do occur. Communications by the Clark County Fire Department and neighboring agencies are compatible and there are no gaps in the radio coverage. Pagers, radios, and phones are used to communicate with the firefighters. There are no community sirens for early warnings.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

5.1.5 Factors Affecting Fire Behavior

Cold Creek lies at the base of the Spring Mountains and frequently experiences strong downslope winds. Wheeler Pass, northwest of the community, funnels wind into the area. Fuel loading north of the community is moderate, as the vegetation transitions into a Mojave desert shrub plant community at lower elevations. In general, ground fuels are comprised of annual grasses of varying size and density depending on annual precipitation levels. Grazing by wild horses is currently credited with somewhat reducing these fine fuels. Shrubby vegetation in the area is comprised of cliffrose, approximately eight-feet tall, mixed with white bursage and Mormon tea, two to three feet tall. Pinyon and juniper woodlands occur to the south and the west of the community, and these encroaching woodlands contribute to extreme fuel hazard ratings in those areas. The overall fuel hazard condition was rated High to Extreme. Figure 5-2 illustrates the fuel hazard conditions present in and around Cold Creek during the Project Team field visit in March 2004. Photo points are included in Figure 5-3.

5.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario for the Cold Creek area involves a dry lightning storm in the summer with multiple ignitions on the mountains above and to the south of the community. Winds could drive a fire through heavy brush into the community and exceed initial attack capabilities.

5.1.7 Ignition Risk Assessment

Cold Creek has a moderate ignition risk. The ignition history database recorded three incidents very near the community. A large wildland fire occurred around the community in the early 1980s. The burned area is now characterized by heavy brush that is readily susceptible to ignition, particularly under the low fuel moisture conditions that occur during the summer months.

5.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Cold Creek area is vulnerable to a catastrophic wildfire. Initial attack and pre-fire planning will be critical in managing any wildland fire event in the area. Property owners must take an active role in protecting their private property by completing and maintaining defensible space treatments around their homes and initiating fuels reduction treatments within the community. Coordination between the US Forest Service and the Nevada Division of Forestry will be required to construct fuelbreaks at the boundary between federal and private lands, to improve firefighter access and safety, and to slow down or prevent the advance of a wildfire into the community.

5.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Clear leaves and debris from roofs and rain gutters.
- Clear brush, weeds, and grasses from within a ten-foot wide strip along either side of driveways.
- Thin existing trees to maintain a minimum distance of thirty feet between tree crowns.
- Prune and remove dead and diseased tree branches. Prune pinyon and juniper branches to a minimum of four feet from the ground, not to exceed one-third of the total tree height. Keep the area beneath remaining trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Store firewood a minimum of thirty feet from structures.
- Mow or remove brush growing against fences in the community.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.

- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Where possible, irrigate trees and large shrubs that remain in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Install screens over attic vents to prevent sparks from entering the attic.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

Nevada Division of Forestry and Clark County Fire Department

- Conduct courtesy inspections of defensible space treatments on private property.

5.2.2 Fuels Reduction Treatments

Recommendations provided below focus on the reduction of fuels along county roadways and the development of fuelbreaks in key locations around the Cold Creek community. A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to all treatment areas in this chapter.

- Broadcast seed treatment areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin areas of dense brush so that remaining shrubs have a spacing equal to twice their height between shrub canopies. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- Thin pinyon and juniper trees to a spacing equal to twice their height. Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- Prune pinyon and juniper branches to a minimum of four feet from the ground, not to exceed one-third of the total tree height. Prune and remove dead and diseased tree branches.
- Keep the area within ten feet of pruned trees free of smaller trees, shrubs, duff, and other ladder fuels.

Details and locations for individual features are described below and shown in Figure 5-1.

Clark County

- Because of the limited access into and out of the community, it is imperative that flammable fuel loading is reduced along roadways. This will facilitate safe access to the community by fire suppression equipment, and it will improve evacuation safety out of the community. Mow or clear vegetation from a swath at least 25 feet wide or to the limit of the road right-of-way on both sides of the access road leading into Cold Creek and all community roadways. Reduce fuels to a height of not more than four inches. If necessary reseed according to recommendations in Appendix E to prevent noxious weed invasion. Maintain annually.

US Forest Service

- On the east and north sides of the community, create and maintain a 300-foot wide fuelbreak along the Forest Service / private property boundary. Remove all shrubs within fifteen feet of remaining tree canopies. Thin all other shrubs to a spacing equal to twice their height (canopy to canopy).
- On the west and south sides of the community, remove all trees within a 300-foot fuelbreak along the Forest Service / private property boundary. Reduce remaining shrubby vegetation to eighteen inches in height. Create a second or outer 300-foot wide fuelbreak in which trees and shrubs are thinned to a spacing equal to twice their height (canopy to canopy).

Cold Creek Community

- Thin vegetation for a distance of 200 feet along either side of the Cold Creek drainage where it runs through the community. Thin trees and shrubs to a spacing of two times their height (canopy to canopy).

5.2.3 Community Coordination

Many of the most effective activities aimed at reducing the threat of wildfire require that individual property owners coordinate with each other and with local fire authorities. The Cold Creek local chapter of the Nevada Fire Safe Council can facilitate coordination among homeowners and agencies. Defensible space, for example, is more effective in small communities when applied uniformly throughout entire neighborhoods. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others to follow are just some of the approaches that will be necessary to meet the fire safe goals in the community.

Clark County Fire Department

- Install a community siren to be used as an alarm call for evacuation.

Clark County

- Enforce or develop county laws, regulations, and ordinances that support implementation and maintenance of defensible space and address fuels reduction responsibilities for absentee homeowners and vacant lots.

Private Property Owners

- Ensure 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.
- Work with the Clark County Fire Department and Sheriff's Department to identify any non-ambulatory persons within the community who may need evacuation assistance in the event of an emergency.

5.2.4 Public Education

Clark County Fire Department

Public education focused on increasing community fire safety and the enforcement of defensible space is critical for the Cold Creek community. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents in the wildland-urban interface. Informed community members will be more inclined to take actions to effectively reduce fuels and other wildfire hazards around their home and in their neighborhoods.

- 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.
- Contact the Nevada Division of Forestry, the Humboldt-Toiyabe National Forest, and University of Nevada Cooperative Extension for assistance with public education.

5.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the *Wildland and Prescribed Fire Qualification System Guide PMS 310-1*. (See Section 4.2 of this report for a description of these standards).

5.3 SUMMARY OF RECOMMENDATIONS

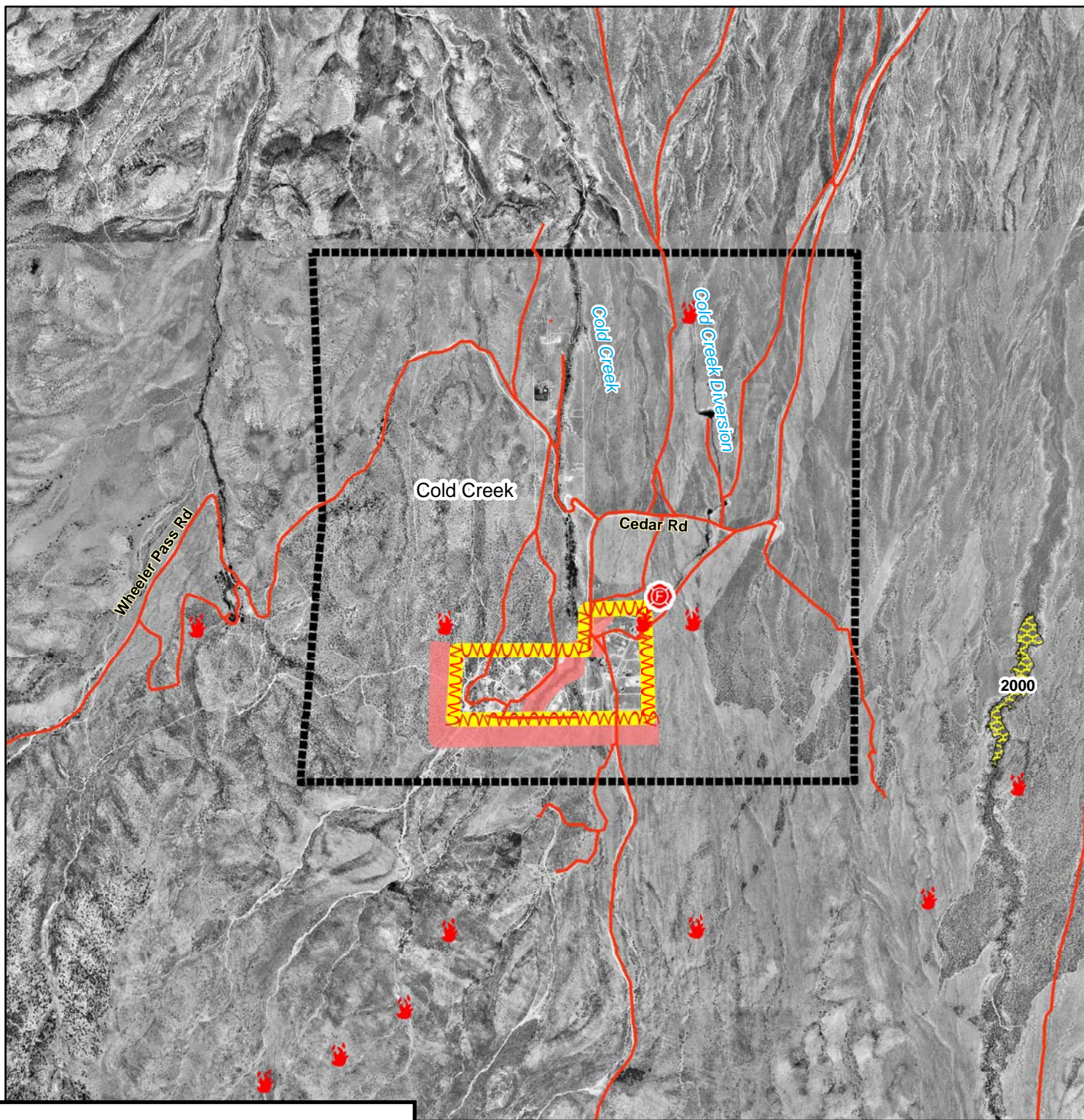
Table 5-2. Cold Creek Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
	Fuels Reduction	Thin vegetation along both sides of the Cold Creek drainage within the community.
	Community Coordination	Ensure that address signs are clearly visible from the road. Identify non-ambulatory persons in need of assistance with evacuation.
Clark County Fire Department Nevada Division of Forestry	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
Clark County Fire Department	Community Coordination	Install a community siren to advise residents of evacuation orders.
	Public Education	Distribute copies of <i>"Living with Fire"</i> to all property owners living in Cold Creek. Contact NDF, the USFS, and the University of Nevada Cooperative Extension for assistance with public education activities.
	Fire Suppression Resources and Training	Comply with <i>NWCG 310-1</i> training and equipment standards.
Clark County	Fuels Reduction	Reduce all vegetation to four inches on both sides of the main access road into Cold Creek. Mow or clear to 25 feet from the edge of pavement or to the limit of the road right-of-way corridor.
	Community Coordination	Develop county ordinances that enforce the implementation and maintenance of defensible space.
US Forest Service	Fuels Reduction	Create and maintain fuelbreaks at the perimeter of the community, along the Forest Service/private property boundary.

Table 5-3. Cold Creek Fire Hazard Ratings Summary

A. Urban Interface Condition 2		TALLIES	
B. Community Design		72 Total Houses	14 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>0</u> not visible <u>14</u> visible <u>100%</u> visible	
2. Width of Road	<u>3</u> /5	B6. Address Signs <u>65</u> not visible <u>7</u> visible <u>10%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>5</u> combust <u>67</u> not combust <u>93%</u> not combust	
4. Secondary Road	<u>3</u> /5	C2. Siding <u>62</u> combust <u>10</u> not combust <u>14%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>65</u> not enclosed <u>7</u> enclosed <u>90%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>72</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>65</u> not adequate <u>7</u> adequate <u>10%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>5</u> /5		
3. Unenclosed Structures	<u>5</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>15</u> /15		
F. Fire Behavior			
1. Fuels	<u>3</u> /5		
2. Fire Behavior	<u>7</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>7</u> /10		

Score 68 /128



Legend








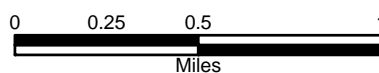
-  Community Boundary
-  Proposed Fuel Reduction Treatment
-  Proposed Fuelbreak
-  Fire Boundary and Date
-  Fire Ignition
-  Fire Station
-  Secondary Roads

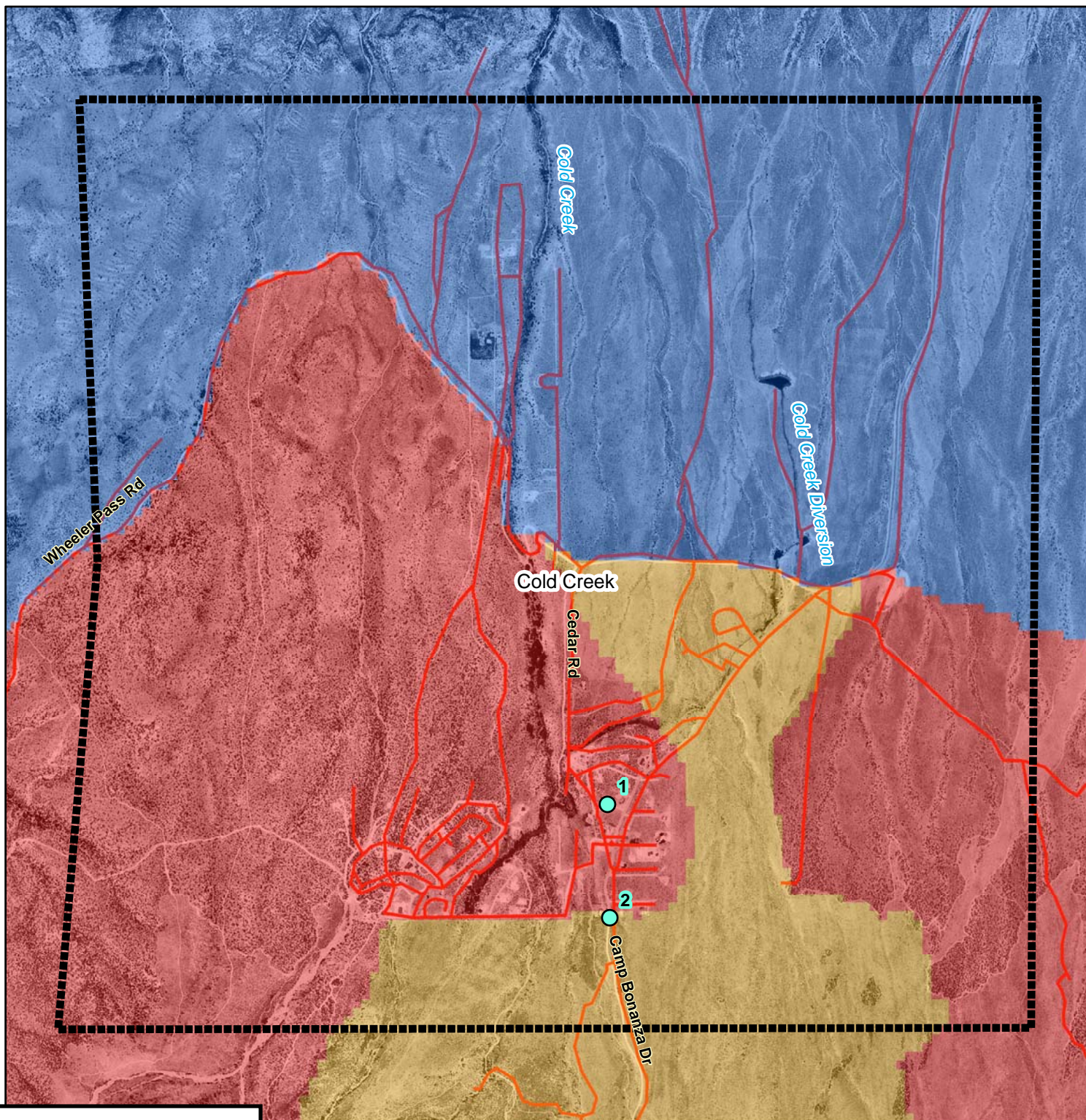
Figure 5-1. Cold Creek
Fire History, Suppression Resources,
and Proposed Mitigation Projects



Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.



Legend

Community Boundary

Secondary Roads

Fuel Hazard

Extreme

High

Moderate

Low

Photo Point

Figure 5-2. Cold Creek
Fuel Hazard Classification

0 500 1,000 2,000
Feet



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Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

Figure 5-3 Cold Creek Fuel Hazard Photo Points



Photo Point 1. 4030698 N. 0613069 E, 166°SE. Heavy fuel loads, estimated at four to five tons per acre, consisting primarily of ephedra, cliffrose, and sagebrush surround residences. Pinyon encroachment into the interface increases the fuel hazard, which was considered extreme in this area.



Photo Point 2. 4030315 N, 613075 E. 192°SE. Vegetative fuels south of the community are composed of ephedra, cliffrose, and sage. Fuel loading was estimated at five tons per acre and was considered a high fuel hazard. This area is the site of a proposed fuel reduction treatment to slow the advance of a wildfire into the community.

Resource Concepts, Inc.

6.0 KYLE CANYON

6.1 RISK AND HAZARD ASSESSMENT

Kyle Canyon is located on the east side of Mt. Charleston in the Spring Mountains, approximately forty miles northwest of Las Vegas. The surrounding terrain is steep and highly dissected. The majority of the housing in the community occurs at the upper end of a narrow canyon. A total of 335 homes were observed for the hazard assessment in the Kyle Canyon community. The assessment resulted in classifying Kyle Canyon in the **Extreme Hazard** category (95 points). The rating is primarily attributed to limited access, poor defensible space, the potential for extreme fire behavior, and structures without fire resistant building materials. Table 6-3 at the end of this section presents a summary of the community hazard rating values for Kyle Canyon.

6.1.1 Community Design

The area surrounding the Kyle Canyon community is characterized as a rural interface condition with small, scattered clusters of structures surrounded and separated by wildland fuels. Each lot observed in the community was smaller than one acre in size indicating high density housing.

Access: The primary access into Kyle Canyon is State Route 157, a paved two-lane road that is between 20 and 24 feet wide. The road extends twenty miles from US Highway 95. This is the only access road into and out of the canyon. In places, the road grade is greater than five percent, which could be problematic for heavy water tenders and engines. The base of the canyon may also be reached via State Route 158 from Lee Canyon. Many secondary roads are paved but generally do not provide adequate room for fire suppression equipment to maneuver. Access for emergency response is further limited in the summer due to highly congested traffic and limited parking available for tourists who currently park along the roadsides.

Signage: Street signs are visible on approximately half of the roads in the community. Residential addresses are visible on about 75 percent of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during a wildland fire.

Utilities: Utilities are a moderate ignition risk. Many areas within power line corridors and around transformers are in need of vegetation clearing and thinning.

6.1.2 Construction Materials

Approximately 95 percent of the homes in the interface area are built with non-combustible roofing materials, but only twenty percent of the homes have fire resistant siding materials. Approximately seventy percent of the homes observed have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

6.1.3 Defensible Space

None of the 355 homes assessed within the Kyle Canyon area met the minimum requirements for defensible space landscaping to minimize damage or loss of homes and

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other structures during a wildfire. The defensible space requirement is based on vegetation and slope as illustrated in Appendix E. The recommended defensible space zone throughout the Kyle Canyon community is 100-200 feet wide *at a minimum*. The terrain is steep, with heavy tree and shrub vegetation in close proximity to the homes. Many homes are in direct contact with tree branches or have trees that overhang roofs and decks.

6.1.4 Suppression Capabilities

Wildfire Protection Resources

The Nevada Division of Forestry administers a 1,800-acre NRS 473 fire protection district on Mount Charleston. The Mount Charleston Fire Protection District includes 400-500 homes in Kyle and Lee Canyons, a school, and commercial and community buildings. The Nevada Division of Forestry Fire Station in Kyle Canyon provides 24-hour, continuous coverage with a three-person engine company. Staffing is increased seasonally with the addition of a Type III wildland engine crew from April to September.

Clark County Rural Fire Station 81 is located in Kyle Canyon, providing services for a volunteer fire department with twenty members. The US Forest Service staffs the Kyle Station seasonally with crews and equipment for wildland fire incidents.

Fire apparatus assigned to Kyle Canyon is summarized in Table 6-1 based on data available at the time of interviews with local and regional fire authorities.

Table 6-1. Kyle Canyon Initial Attack Wildfire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	1	Clark County Rural Fire Station 81 (Kyle Canyon)
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Type 3 Brush Engine	1	US Forest Service (Kyle Station 81 - seasonal)
Type 4 Brush Engine	1	
Type 7 Brush Patrol Engine	1	
Type 1 Structure Engine	1	Nevada Division of Forestry (Kyle Fire Station)
Type 3 Brush Engine	1	

Source: Steve McClintock, Dave Bibee and Steve Brittingham, pers. comm. 20 March 04

Additional county resources would be dispatched through the Clark County Fire Alarm office.

Fire suppression resources administered by federal agencies such as the US Forest Service are listed according to their local assigned area. It is important to note that these apparatuses are considered national resources and are commonly reassigned to areas of higher severity during the fire season. In response to a wildland fire call, interagency dispatch centers locate and dispatch the closest available resource according to incident command and computer-aided dispatch protocols.

Water Sources and Infrastructure

Water available for fire suppression in the Kyle Canyon community includes fire hydrants within 500 feet of structures with a minimum flow capacity of 500 gallons per minute. The water system includes two storage tanks totaling almost 200,000 gallons in the Rainbow subdivision; one water storage tank with 100,000 gallons capacity in the Echo subdivision; one water storage tank with 100,000 gallons capacity at the Mt. Charleston Hotel; and one water storage tank with 25,000 gallons capacity at Mt. Charleston Lodge. An additional 300,000-gallon water storage tank is under construction in the Echo subdivision. Five ponds at three different locations have been identified as dip/drafting sites.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Kyle Canyon have a minimum of NFPA Firefighter I and II training and a limited number have had some wildland firefighting training (NWCG 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per NWCG 310-1.

Work Load

The Nevada Division of Forestry responded to 200 emergency medical calls and thirty wildland brush fire calls in 2003. The Clark County Fire Department responded to 37 emergency medical calls and eight wildland brush fire calls in 2003.

Detection and Communication

There are no fire lookouts in the Mt. Charleston area but there are reconnaissance flights during high-risk periods. Nevada Division of Forestry and the Clark County Fire Department communication systems are compatible with neighboring agencies and there are no gaps in the radio coverage. There are no community sirens for early warnings.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes. Nevada Division of Forestry fire protection is contracted with Clark County.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Nevada Division of Forestry has a fire suppression pre-attack plan for the Kyle Canyon area. It is updated as needed.

Clark County Fire Department and the Nevada Division of Forestry review development plans to ensure compliance with the UFC 1997 fire code. The Nevada Division of Forestry also requests voluntary compliance with defensible space guidelines.

6.1.5 Factors Affecting Fire Behavior

The lower reach of Kyle Canyon along State Route 157, below the intersection with State Route 158, is dominated by cliffrose and bursage, estimated at approximately two to three tons per acre. Ground fuels consist of annual grasses. The fuels are generally continuous with cliffrose reaching approximately six feet in height. The fuel hazard was considered extreme.

Further up the canyon ponderosa pine, mountain mahogany, white fir, aspen, and Gambel's oak are added to the fuel load. Extensive accumulations of dead wood occur throughout the wooded area. Mountain mahogany is extremely dense and tall with abundant dead material persisting on most plants. The Rainbow and Echo Subdivision areas are located near the upper part of a long narrow canyon, within this woody fuel type.

The canyon topography can act as a natural chimney, drawing fire toward these neighborhoods. The steep slopes in this area are commonly covered with continuous fuels that pose a serious threat due to their close proximity to structures. Southern aspects, such as are found in Echo Subdivision, and northern aspects, as the Old Town Lodge site, are present in this canyon community.

At higher elevations in Kyle Canyon, vegetation is characterized with heavy fuels such as pinyon, juniper, and chaparral. The Spring Mountain Correctional Youth Camp, east of State Route 158, is located in a saddle where two drainages converge at a ridgeline. This topographic location presents conditions conducive to frequent winds. Prevailing winds in this area are from the south and southwest. The area has continuous fuels on steep (sixty to eighty percent), south facing slopes. Angel Peak, to the east of the Spring Mountain Youth Camp, has the same vegetation.

6.1.6 Fire Behavior Worst-Case Scenario

The Kyle Canyon area has been described as a disaster waiting to happen. Two general worst-case scenarios are described for the Kyle Canyon community. A third worst-case scenario is described for the Spring Mountain Youth Center and Angel Peak. The conditions for each scenario described would occur on a high visitor day (up to 10,000 vehicle trips per day on weekends in June, July, and August [Grismanauskas, pers comm.]). Parked cars along the road further limit access.

In the first scenario, a dry lightning storm would result in multiple ignitions upslope (west or north) from the community. Fire would be rapidly driven into the community by afternoon down slope winds. Multiple fires could conceivably exceed initial attack capabilities. Additional resources would have difficulty reaching the area by road due to the large amount of traffic exiting the canyon.

In the second scenario, a wildfire ignition from a dry lightning storm or human carelessness would ignite a fire down slope (south and east) of the community. Initially the fire would be pushed down canyon by downslope winds. As the fire becomes larger, it would become a plume-dominated fire. The natural chimney effect of Kyle Canyon would cause the fire to move up canyon into the community.

In both of the above scenarios, evacuations and response of firefighting resources may be compromised because there is only one road leading into and out of the community. The

existing safe zone is not large enough to accommodate the number of people present in the area on a weekend in the summer.

The worst-case scenario for the Spring Mountain Youth Center and Angel Peak area involves a dry lightning storm in the summer with multiple ignitions in the south drainage below the facility. Prevailing south to southwest winds would rapidly drive a fire up the natural chimney. Flame lengths from a crown fire could be in excess of 100 feet in the dense pinyon and juniper. Potential for a similar fire in the north drainage exists during dry lightning storms with strong erratic winds.

6.1.7 Ignition Risk Assessment

The majority of the developed area in Kyle Canyon has a high ignition risk. Ignition history for the area shows numerous lightning strikes and other ignitions. The presence of campgrounds and the high level of visitor traffic during the fire season also contribute to the high rating.

6.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Kyle Canyon area is highly vulnerable to catastrophic fire. It is essential that property owners take a proactive stance in protecting their property through the establishment of good defensible space around all structures and the implementation of fuels reduction treatments within and surrounding their neighborhoods. The Mt. Charleston Chapter of the Nevada Fire Safe Council is an excellent means for organizing these activities. Collaboration with Clark County, the Nevada Division of Forestry, and the US Forest Service is essential to continued installation of fuelbreaks in strategic areas. Annual updates to initial attack and fuels reduction plans are critical for improving and maintaining Kyle Canyon as a fire safe community.

6.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Defensible space is especially important in Kyle Canyon because homes and other structures are amidst heavy wildland vegetative fuels characterized as extreme fuel hazards. Defensible space is the homeowner's responsibility, and it is an essential first line of defense for saving lives and property during a catastrophic wildland fire.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
Lean: There are only small amounts of flammable vegetation.
Clean: There is no accumulation of dead vegetation or other flammable debris.
Green: Existing plants are healthy and green during the fire season.
- Thin existing trees to maintain a minimum distance of thirty feet between tree crowns.
- Thin mountain mahogany, Gambel's oak, and other shrubs and brush to a distance equal to twice their height.
- Prune and remove dead and diseased tree branches. For ponderosa pine and white fir, prune branches a minimum of fifteen feet from the ground, but not more than one-third of the total tree height. For pinyon and juniper, prune all branches minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Clear brush, weeds, and grasses from within a ten-foot wide strip along either side of driveways.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Clear leaves and debris from roofs and rain gutters.
- Store firewood a minimum of thirty feet from structures.
- Mow or remove brush growing against fences in the community.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Where possible, irrigate trees and large shrubs that remain in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Install screens over all exterior vents to prevent sparks from entering the attic and other areas inside the home.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

Clark County Fire Department and Nevada Division of Forestry

- Ensure that Clark County Fire Department and Nevada Division of Forestry personnel are trained and made available to perform courtesy defensible space inspections with homeowners.

6.2.2 Fuels Reduction

Recommendations provided below focus on the reduction of fuels along local roadways and the development of fuelbreaks in key locations around the Kyle Canyon community. A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to fuel reduction treatments in this chapter.

- Broadcast seed fuelbreak areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation, and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin mountain mahogany, pinyon, and juniper trees to a spacing equivalent to twice the height of the trees.
- Thin ponderosa pine and white fir trees to a minimum spacing of twenty to forty feet between tree trunks depending on the diameter of the tree, equivalent to 80 to 100 square feet of basal area per acre. (Refer to Appendix E for guidelines on basal area.) Thinning can be performed in a traditionally even-spaced manner, or trees can be thinned into a cluster-mosaic at the direction of a professional forester.
- Thin trees from below - remove smaller ponderosa pine, Gambel's oak, pinyon pine, and mountain mahogany from under old growth ponderosa pine.
- The Nevada Forest Practice Act restricts the use of heavy equipment on slopes greater than thirty percent. Consult with a professional forester from the Nevada Division of Forestry for technical assistance with marking trees for removal, permitting and special operations on steep slopes.
- Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- For mature large conifers such as ponderosa pine and white fir, prune all branches from six to fifteen feet above the ground, but not more than one-third of the total tree height. For smaller conifers such as pinyon and juniper trees, limb all branches a minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Prune and remove dead and diseased tree branches
- Keep the area within ten feet of pruned trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Thin areas of dense brush to a spacing between shrub canopies equal to twice the shrub height. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.

Details and locations for individual features are described below and illustrated in Figure 6-1.

Mt. Charleston Fire Safe Council Chapter, Old Town, Echo, and Rainbow Subdivisions

- Complete shaded fuelbreaks on each parcel, beginning at the bottom of the canyon and progressing towards the top. Extend the treatment area at least 300 feet beyond the perimeter of the developed parcels.

Clark County Fire Department, Nevada Division of Forestry, US Forest Service

- Construct and maintain a shaded fuelbreak along State Routes 157 and 158 for a width of 300 feet on the uphill side, and for 600 feet on the downhill side of the road. Remove all brush within twenty feet of State Route 157 on both sides of the road.
- Construct and maintain a shaded fuelbreak for a distance of 300 feet around the Kyle, Fletcher View, and Hilltop Campgrounds and the Cathedral Rock Day Use Area. Reduce vegetation within campgrounds, picnic areas, and all other concentrated public-use areas consistent with shaded fuelbreak guidelines.
- Construct and maintain a shaded fuelbreak 300 feet wide on the south side of the US Forest Service Ranger Station.
- Construct and maintain a shaded fuelbreak 600 foot wide along the downhill side of the access road from State Route 158 to the Spring Mountain Youth Camp.
- Construct and maintain a 600 foot wide shaded fuelbreak along both the south and north slopes below the Spring Mountain Youth Camp.
- Construct and maintain a shaded fuelbreak 300 feet wide around the radio radar facilities on Angel Peak east of the Spring Mountain Youth Center.

Utility Company

- Remove trees under utilities rather than topping the trees for power line clearance. Topping trees severely weakens them and predisposes them to attack by bark beetles. The fir engraver bark beetle (*Scolytus ventralis*) causes significant mortality in white fir.
- Clear all vegetation surrounding the electrical transfer station near the bottom of the canyon within thirty feet of the fence. Thin trees to a spacing equivalent to two times the height of the trees from crown to crown for an additional distance of 300 feet.

6.2.3 Community Coordination

Many of the most effective activities aimed at reducing the threat of wildfire require that individual property owners coordinate with each other and with local fire authorities. Defensible space, for example, is more effective in small communities when applied comprehensively throughout entire neighborhoods. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others to follow are just some of the approaches that will be necessary to meet the fire safe goals in the community.

Private Property Owners

- Ensure 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.
- Work with the Nevada Division of Forestry, Clark County Fire Department, and Clark County Sheriff's Department to identify any non-ambulatory persons within the community who may need evacuation assistance in the event of an emergency.

US Forest Service

- Close or extend the road off the east end of the Rainbow subdivision that dead-ends in a thickly wooded area between Rainbow and Highway 157. If it remains an un-gated dead end, there is a risk that it will mistakenly be taken for an escape route during a wildfire. Connecting it to Highway 157 will improve suppression resource access in a heavily wooded area.

Clark County Fire Department, Nevada Division of Forestry, and US Forest Service

- Prepare and distribute copies of the Kyle Canyon emergency evacuation plan to all residents, and post the plan throughout the community. Identify the names and addresses of all non-ambulatory persons within the community who need evacuation assistance. Conduct public workshops annually prior to the tourist/fire season to assure that all residents are fully knowledgeable of evacuation routes, evacuation procedures, designated fire safe zones, and procedures for deploying fire shelters if evacuation becomes infeasible during a fast moving fire storm.
- Complete the installation of a community siren to be used as an alarm call for evacuation.
- Develop and maintain helicopter dip sites for water storage or secure agreements to use existing wells or ponds as water sources for fire suppression.
- Identify or develop fire safe zones and fire safe structures for people to use if they are trapped in the canyon during a wildfire. These areas could include the fire stations, library, school, and a cleared area directly above the community (at least two acres in size). Limit the number of people (residents and tourists) in the canyon on high hazard days according to the capacity of the safety zones (use the estimated capacity of all identified fire safe zones and structures to determine the total number of people allowed in the canyon on a given summer day). Use the Fire Marshall's building capacity when estimating the number of people allowed in structures identified as fire safe.
- Post "No Parking" signs and enforce limited parking along the roadway in areas where roadside parking would restrict emergency access. Locate alternative parking areas for crowded conditions or provide a shuttle service from the bottom of the canyon where more room is available for a public parking area.
- Create turnarounds with a minimum radius of seventy feet and adequate clearance on either side of access roads for large fire engines and other fire apparatus.

Clark County

- Ensure cooperation between the Assessor's Office and the Roads Department to ensure that all roads in new developments are named, mapped, and identified with GPS locations.
- Develop county ordinances that enforce the implementation and maintenance of defensible space, and address fuels reduction responsibilities for absentee homeowners and vacant lots.

6.2.4 Public Education

Public distribution of general information on safety in high fire-risk environments and dissemination of information regarding evacuation plans and with fire safe zones is essential to help residents and property owners in Kyle Canyon make informed decisions prior to and during a wildfire. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents in the wildland-urban interface: informed community members will be more inclined to take actions to effectively reduce fuels and other wildfire hazards around their home and in their neighborhoods.

Clark County Fire Department

- 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.
- Contact the Nevada Division of Forestry, the Humboldt-Toiyabe National Forest, and University of Nevada Cooperative Extension for assistance with public education.

6.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).
- Investigate the purchase of a fire blocking gel for buildings. These products come in the form of gels or foams that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

Property Owners

- Consider purchasing a fire blocking gel for an emergency application to structures.

6.3 SUMMARY OF RECOMMENDATIONS

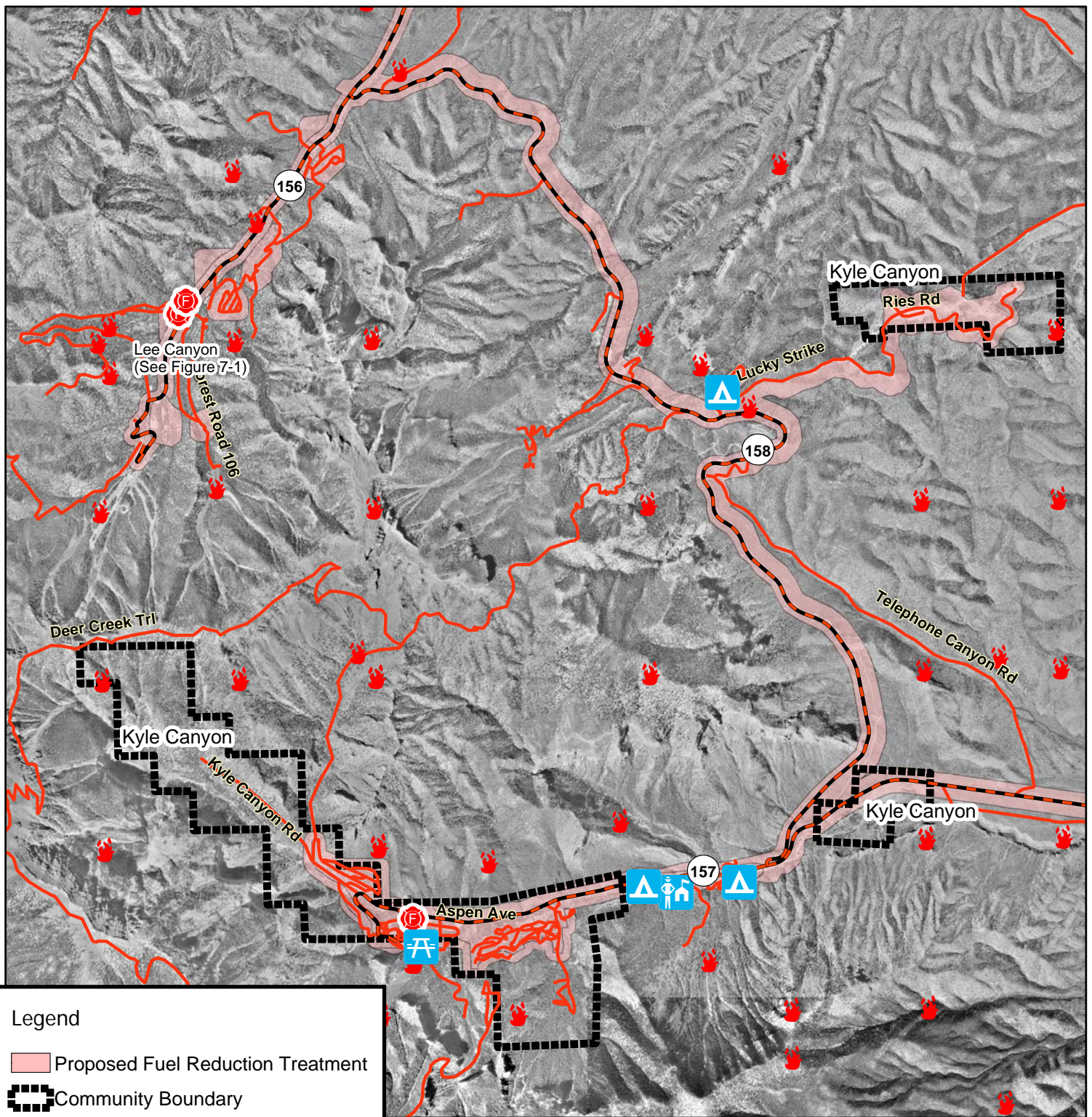
Table 6-2. Kyle Canyon Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Apply and maintain aggressive defensible space treatments according to the guidelines in Appendix E.
	Community Coordination	Ensure that address signs are clearly visible from the road. Identify non-ambulatory persons in need of assistance with evacuation.
	Fire Suppression Resources	Investigate the purchase and use of fire blocking foams and gels for individual property protection in the wildland-urban interface.
Clark County Fire Department Nevada Division of Forestry	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
Property Owners Mt. Charleston Chapter of the Fire Safe Council	Fuels Reduction	Complete shaded fuelbreaks on each parcel in the Old Town, Echo, and Rainbow Subdivisions beginning at the bottom of the canyon and progressing upslope to at least 300 feet beyond developed parcels.
Clark County Fire Department Nevada Division of Forestry US Forest Service	Fuels Reduction	Construct and maintain shaded fuelbreaks: ➤ Along both sides of State Routes 157 and 158. ➤ Within and surrounding all campgrounds, day use, and other concentrated public-use areas. ➤ Along the access road to Spring Mountain Youth Camp, camp facilities, and radio facilities on Angel Peak.
	Community Coordination	Prepare and distribute a Kyle Canyon emergency evacuation plan. Identify and enforce traffic and parking regulations to minimize congestion and standstills during an emergency. Identify and develop fire safe zones and sheltering structures. Limit the number of visitors in the area to the capacity of these safe zones. Install a community siren to advise residents and visitors of evacuation orders. Develop new sources or secure permission to use existing wells and ponds as water reserves for wildfire.
US Forest Service	Community Coordination	Close the dead-end road at the east end of Rainbow subdivision or create a loop road that connects with Highway 157.

Involved Party	Recommended Treatment	Recommendation Description
Utility Company	Fuels Reduction	Remove trees within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles. Clear all vegetation surrounding the electrical transfer station in Kyle Canyon.
Clark County Fire Department	Public Education	Distribute copies of <i>“Living with Fire”</i> to all property owners living in Kyle Canyon. Contact NDF, the USFS, and the University of Nevada Cooperative Extension for assistance with public education activities.
	Fire Suppression Resources and Training	Comply with <i>NWCG 310-1</i> training and equipment standards. Evaluate the use of fire blocking foams and gels for building protection in the wildland-urban interface.
Clark County	Community Coordination	Ensure cooperation between the Assessor’s Office and the Roads Department so that all roads in new developments are named, signed, mapped, and identified with GPS locations. Develop county ordinances that enforce the implementation and maintenance of defensible space.

Table 6-3. Kyle Canyon Fire Hazard Ratings Summary

A. Urban Interface Condition		4	TALLIES	
B. Community Design			335 Total Houses	24 Residential Streets
1. Ingress / Egress	3	/5	B5. Street Signs	
2. Width of Road	3	/5	13 not visible	11 visible 46% visible
3. Accessibility	3	/3	B6. Address Signs	
4. Secondary Road	3	/5	86 not visible	249 visible 74% visible
5. Street Signs	5	/5	C1. Roofs	
6. Address Signs	5	/5	16 combust	319 not combust 95% not combust
7. Utilities	3	/5	C2. Siding	
C. Construction Materials			264 combust	71 not combust 21% not combust
1. Roofs	1	/10	C3. Unenclosed Structures on Lot	
2. Siding	5	/5	230 not enclosed	105 enclosed 69% not enclosed
3. Unenclosed Structures	5	/5	D1. Lot Sizes	
D. Defensible Space			335 <1ac	0 >1ac <10ac 0 >10ac
1. Lot Size	5	/5	D2. Defensible Space	
2. Defensible Space	15	/15	335 not adequate	0 adequate 0% adequate
F. Fire Behavior				
1. Fuels	5	/5		
2. Fire Behavior	10	/10		
3. Slope	10	/10		
4. Aspect	10	/10		
E. Suppression Capabilities				
1. Water Source	1	/10		
2. Department	3	/10		
Score		95	/128	



Legend










-  Proposed Fuel Reduction Treatment
-  Community Boundary
-  Fire Station
-  Fire Ignition
-  Highways and State Routes
-  Secondary Roads
-  Campground
-  Picnic Area
-  Ranger Station

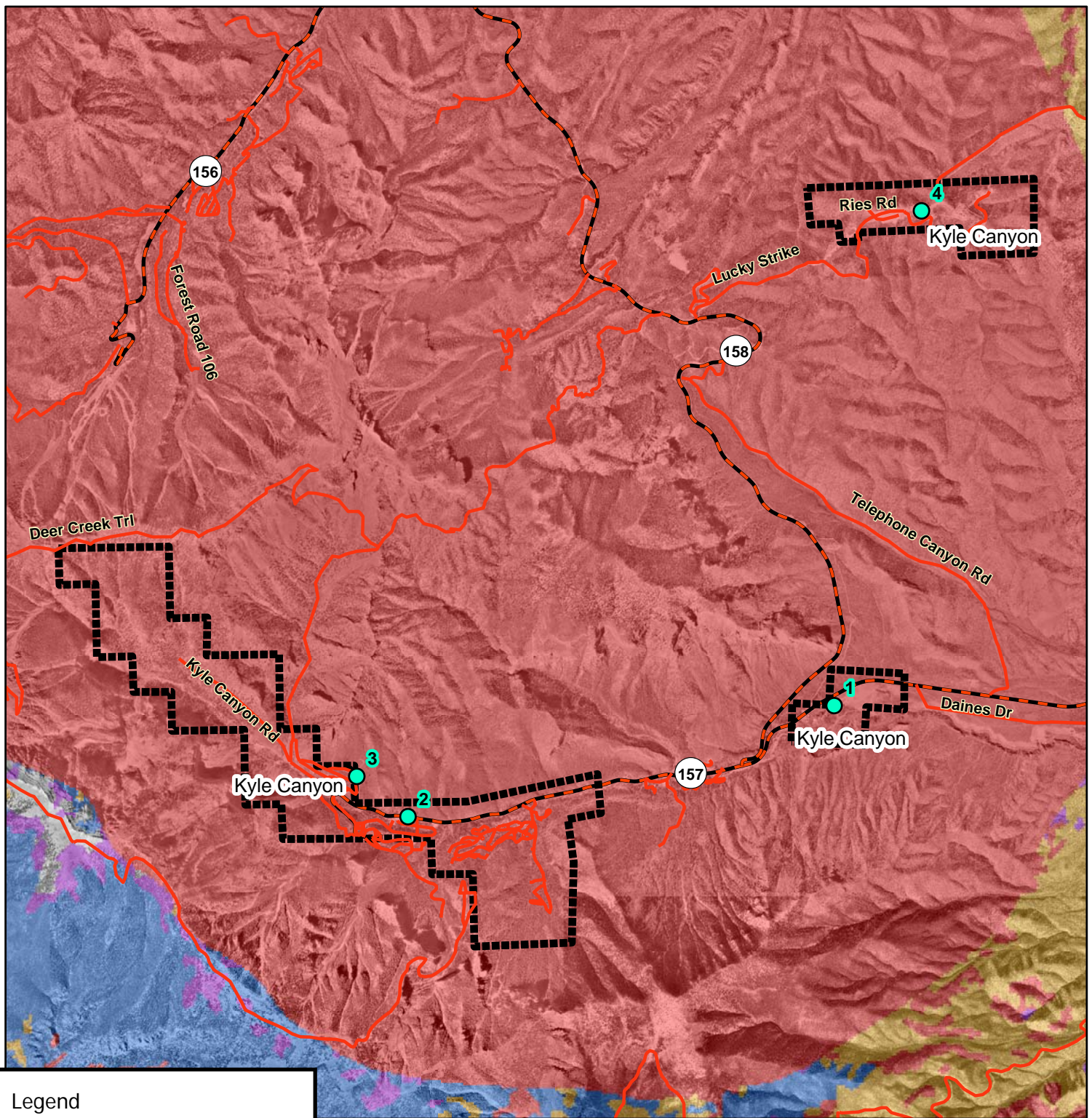
Figure 6-1. Kyle Canyon
Fire History, Suppression Resources,
and Proposed Mitigation Projects






Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.



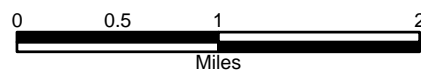
Legend

-  Community Boundary
-  Highways and State Routes
-  Secondary Roads

Wildfire Hazard

-  Low
-  Moderate
-  High
-  Extreme
-  Photo Point

Figure 6-2. Kyle Canyon Fuel Hazard Classification



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Figure 6-3 Kyle Canyon Fuel Hazard Photo Points



Photo 1. 4014820 N. 0626510 E. Direction 242°ESE. Near the Mt. Charleston Hotel in lower Kyle Canyon fuels three to eight feet tall of cliffrose, sagebrush, and rabbitbrush create a continuous understory fuel bed beneath an overstory of pinyon pine, Gambel's oak, and mountain mahogany. The fuel hazard is extreme. Annual grasses in the ground fuels further increase the hazard.

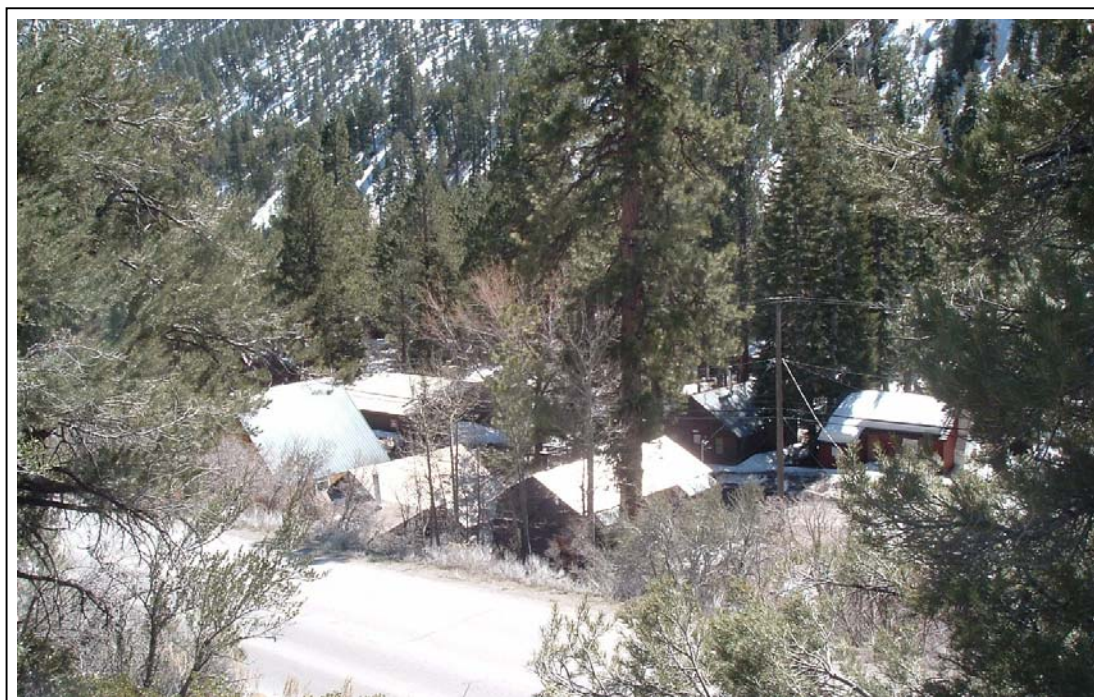


Photo 2. 4013601 N. 0621824 E. Direction 150°N. Residences are scattered throughout the proposed fuel reduction treatment area. Tall shrub layers reach into the tree overstory, creating an extremely hazardous arrangement of ladder fuels. The existing fuel hazard is extreme.

Figure 6-3 Kyle Canyon Fuel Hazard Photo Points (continued)



Photo 3. 4014044 N. 0621261 E. Direction 180°S. Dense mountain mahogany and scattered pine trees surround residences in the Echo subdivision. The fuel hazard is extreme fuel reduction treatment is proposed for this area.

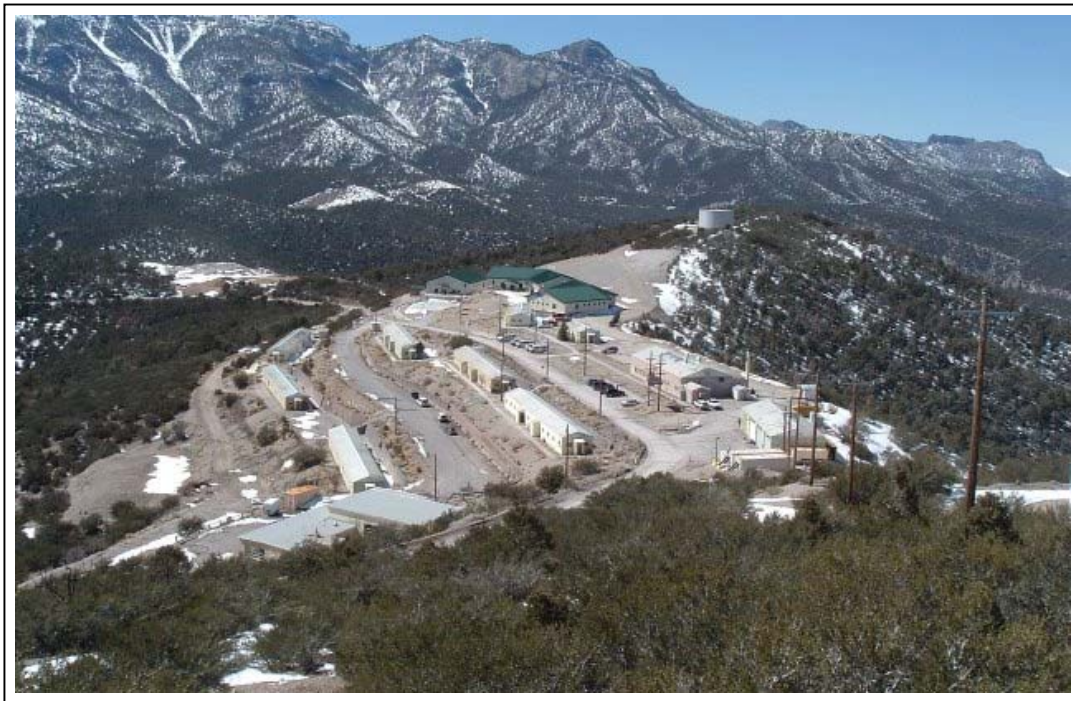


Photo 4. 4020240 N. 621423 E. Direction 260°WSW. The Spring Mountain Youth Camp is located at 8,400 feet in elevation. Heavy fuel loads are composed of mountain mahogany and pinyon pine on step slopes below camp the camp.

7.0 LEE CANYON

7.1 RISK AND HAZARD ASSESSMENT

Lee Canyon is located on the east side of Mt. Charleston in the Spring Mountains, approximately forty miles northwest of Las Vegas. A total of 68 homes were observed during the community assessment in Lee Canyon. The assessment resulted in classifying Lee Canyon in the **Extreme Hazard** category (88 points). The rating is primarily attributed to limited access, poor defensible space, a high potential for extreme fire behavior, and structures without fire resistant building materials. The Mt. Charleston Ski Area is located at the top of Lee Canyon. Lee Canyon and the adjacent Kyle Canyon to the south are popular recreation areas in the summer and winter. Several thousand people visit the Lee and Kyle Canyon areas on a typical summer day (Grismanauskas, pers. comm.). Limited access is further constricted during the summer months as tourists park along the sides of the roads. Table 7-3 at the end of this section presents a summary of the community hazard rating values for Lee Canyon.

7.1.1 Community Design

The area surrounding Lee Canyon is characterized as an intermix interface condition. Structures are scattered throughout the wildland area and there is no clear line of demarcation between wildland fuels buildings and open space throughout the community. All lots are less than one acre in size. The community boundary is shown in Figure 7-1.

Access: The primary access into Lee Canyon is State Route 156, a 20 to 24 foot wide paved two lane road that originates at US 95, sixteen miles down canyon. In places, the road gradient is greater than five percent. The base of the canyon may also be reached via State Route 158 from Kyle Canyon to the south. Secondary roads are mostly gravel and do not provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all but one of the roads in the community. Residential addresses are visible on about ten percent of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that commonly occur during wildland fires.

Utilities: Utilities are a high ignition risk and have not been properly maintained around the Lee Canyon community. Power line corridors and transformer sites should be kept clear of flammable vegetation, as fires have been known to start from arcing power lines during windy conditions or from exploding transformers during peak electricity demand. Energized power lines can also fall during a wildfire creating additional hazards for citizens and firefighters.

7.1.2 Construction Materials

Approximately ninety percent of the homes in the interface are built with non-combustible roofing materials but only three percent of the homes have fire resistant siding materials. Most homes (ninety percent) in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

7.1.3 Defensible Space

The terrain in the Lee Canyon area is generally steep, with dense vegetation. None of the homes in the community meet the minimum requirements for defensible space landscaping in order to minimize property damage or loss of the home during a wildfire. Homes are situated on steep slopes, and in many cases tree branches are in direct contact with homes, overhanging roofs, or decks.

7.1.4 Suppression Capabilities

Wildfire Protection Resources

Improving defensible space around homes and reducing fuel loadings around residential clusters are essential precursors to ensuring that first-alarm (initial attack) firefighting resources are to most effectively protect homes and other resources.

Lee Canyon is included in the Nevada Division of Forestry 473 Fire Protection District for the Mt. Charleston area. A Nevada Division of Forestry fire station in Lee Canyon houses a Type 3 Brush Engine and is staffed with one career firefighter at all times. Additional resources for initial attack would come first from available resources in Kyle Canyon. Nearest suppression apparatus and human resources for initial attack Lee Canyon are summarized in Table 7-1. The numbers quoted below are based on data available at the time of interviews with local and regional fire authorities, and are subject to change.

Table 7-1. Lee Canyon Initial Attack Wildfire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 3 Brush Engine	1	Nevada Division of Forestry (Lee Canyon Station)
Type 1 Structure Engine	1	Clark County Rural Fire Station 81 (Kyle Canyon)
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Type 3 Brush Engine	1	US Forest Service (Kyle Station - seasonal)
Type 4 Brush Engine	1	
Type 7 Brush Patrol Engine	1	
Type 1 Structure Engine	1	Nevada Division of Forestry (Kyle Fire Station)
Type 3 Brush Engine	1	

Source: Steve McClintock, Dave Bibee and Steve Brittingham, pers. comm., March 2004.

Federal fire suppression resources such as those administered by the US Forest Service listed above are reported according to their local assigned area. It is important to note that these apparatus are considered national resources and are commonly reassigned to areas of higher severity during the fire season. In response to a wildland fire call, interagency dispatch centers locate and dispatch the closest available resource according to incident command and computer-aided dispatch protocols.

Water Sources and Infrastructure

There is no community water system or fire hydrants. Water availability for fire suppression in Lee Canyon includes community wells, and three 40,000-gallon storage tanks. The water system operates on gravity and pumps. Lee Canyon has emergency generators for back-up during power outages.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Lee Canyon have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per NWCG 310-1.

Work Load

The Nevada Division of Forestry Fire Station responded to 200 emergency medical calls and 30 wildland brush fire calls in 2003. The Clark County Fire Department station responded to 37 emergency medical calls and eight wildland brush fire calls in 2003.

Detection and Communication

There are no fire lookouts in the Mt. Charleston area but reconnaissance flights do occur. Communications between Nevada Division of Forestry and the Clark County Fire Department are compatible and there are no gaps in radio coverage. There are no community sirens.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes. Financial support for the Nevada Division of Forestry fire protection district comes from a contract with the Clark County Fire Department.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

Nevada Division of Forestry requests volunteer compliance with defensible space. The Nevada Division of Forestry has also participated in the implementation of a shaded fuelbreak in Lee Canyon and fuels reduction around the Clark County Fire Department fire station.

7.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Lee Canyon area is light in the lower reaches and medium in the upper reaches with fuel loading at six to fifteen tons per acre. In lower Lee Canyon from US 95 to mile marker eight the vegetation is Mojave Desert scrub, transitioning into a blackbrush community. In mid Lee Canyon, slopes are up to ten to fifteen percent and the fuels consist of pinyon, juniper, and mountain mahogany. In upper Lee Canyon, where the

majority of homes and buildings are concentrated, slopes are up to 65 percent and fuels consist of white fir, ponderosa pine, some pinyon juniper, mountain mahogany and Gambel's oak. All aspects are found in the canyon but the majority of the structures are located on northeast facing slopes. There are continuous fuels in close proximity to structures and the fuels are conducive to crown fires, as ladder fuels are common.

This combination of factors creates conditions that warrant an extreme fuel hazard rating. The thick brush and trees intermixed with structures increase the potential for an extremely hazardous event.

7.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would occur on a weekend summer day when parked cars along the roadway limit access and many people are in the area. In one scenario multiple ignitions due to a dry lightning storm above and west of the community on a summer weekend afternoon could result in a fast moving fire threatening structures. The fire could overwhelm initial attack resources and be driven by strong downslope winds.

In a second scenario, an ignition down slope of the community could have equally detrimental effects because of the natural chimney effect of Lee Canyon. Smoke plumes from a very large wildland fire can create unique weather conditions and wind. Wind caused by the fire can be stronger and from a different direction than the local gradient winds. A plume-dominated wildfire could rapidly move up the canyon into the community, blocking egress out of the community. In both scenarios, evacuations and response of firefighting resources may be compromised because there is only one road leading into and out of the community. The existing safe zone is not large enough to accommodate the number of people in the area on a weekend in the summer.

7.1.7 Ignition Risk Assessment

Lee Canyon was assigned a high ignition risk rating. Ignition history for the area shows numerous lightning strikes and other ignitions. The presence of campgrounds and the high level of visitor traffic during the dry summer season are also considerations for the high rating.

7.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Lee Canyon area is vulnerable to a catastrophic fire. Property owners need to take an active role in protecting their property by implementing fuels reduction treatments and defensible space treatments in their neighborhoods. The local chapter of the Nevada Fire Safe Council is an excellent means for organizing these activities. Clark County, the Nevada Division of Forestry, and the US Forest Service need to collaborate and implement fuelbreaks in strategic areas. Initial attack will be critical in any fire in the area and additional water resources need to be obtained for the initial attack.

7.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances

of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Defensible space is especially important in Lee Canyon because homes and other structures are amidst heavy wildland vegetative fuels characterized as extreme fuel hazards. Defensible space is the homeowner's responsibility, and it is an essential first line of defense for saving lives and property during a catastrophic wildland fire.

Private Property Owners

- Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Thin existing mature trees to maintain a minimum distance of thirty feet between tree crowns. Clear the area beneath retained trees of smaller trees, shrubs, duff, and other ladder fuels.
- Thin mountain mahogany, Gambel's oak, and other shrubs and brush to a distance equal to twice their height.
- Prune and remove dead and diseased tree branches. For Ponderosa pine and white fir, prune branches a minimum of fifteen feet from the ground, but not more than one-third of the total tree height. For pinyon and juniper, prune all branches minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Clear brush, weeds, and grasses from within a ten-foot wide strip along either side of driveways.
- Enclose wooden decks and porches. Keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Clear pine needles, leaves and debris from roofs and rain gutters.
- Store firewood a minimum of thirty feet from structures.
- Mow or remove brush growing against fences in the community.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.

- Where possible, irrigate trees and large shrubs that remain in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Install screens over all exterior vents to prevent sparks from entering the attic and other areas inside the home.
- Replace all shake roofs and combustible siding with non-combustible materials to reduce the risk of ignition.
- Make sure residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.
- Maintain defensible space annually.

Clark County Fire Department and Nevada Division of Forestry

- Conduct courtesy inspections of home defensible space measures.

7.2.2 Fuel Reduction Treatments

Recommendations provided below focus on the reduction of fuels along county roadways and the development of fuelbreaks in key locations around the Lee Canyon community. A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to fuel reduction treatments in this chapter.

- Broadcast seed treatment areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin mountain mahogany, pinyon, and juniper trees to a spacing equivalent to twice the height of the trees.
- Thin ponderosa pine and white fir trees to a minimum spacing of twenty to forty feet between tree trunks depending on the diameter of the tree, equivalent to 80 to 100 square feet of basal area per acre. (Refer to Appendix E for guidelines on basal area.) Thinning can be performed in a traditionally even-spaced manner, or trees can be thinned into a cluster-mosaic at the direction of a professional forester.
- Thin trees from below - remove smaller ponderosa pine, Gambel's oak, pinyon pine, and mountain mahogany from under old growth ponderosa pine.
- The Nevada Forest Practice Act restricts the use of heavy equipment on slopes greater than thirty percent. Consult with a professional forester from the Nevada

Division of Forestry for technical assistance with marking trees for removal, permitting and special operations on steep slopes.

- Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- For mature large conifers such as ponderosa pine and white fir, prune all branches from six to fifteen feet above the ground, but not more than one-third of the total tree height. For smaller conifers such as pinyon and juniper trees, limb all branches a minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Prune and remove dead and diseased tree branches
- Keep the area within ten feet of pruned trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Thin areas of dense brush to a spacing between shrub canopies equal to twice the shrub height. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- Maintain fuel reduction treatment areas by limiting regrowth and reinvasion of woody species.

Recommended locations of fuel treatment projects are discussed below and illustrated in Figure 7-1.

Property Owners

- Coordinate with the Mt. Charleston Chapter of the Nevada Fire Safe Council to implement and maintain a shaded fuelbreak throughout all of the housing clusters in Lee Canyon.

Clark County, Clark County Fire Department, and Nevada Division of Forestry

- Construct and maintain a shaded fuelbreak within a 600-foot wide buffer around all of the housing clusters in Lee Canyon.
- Implement and maintain a shaded fuelbreak from mile marker eight west to the junction of State Route 156 and State Route 158. The fuelbreak will measure 300 feet wide on both sides of the road.
- Implement and maintain a shaded fuelbreak on both sides of State Route 156 from the junction with State Route 158 to the ski area. The fuelbreak will measure 300 feet wide on the uphill side of the road and 600 feet wide on the downhill side of the road.
- Construct and maintain a shaded fuelbreak for a distance of 300 feet around the McWilliams and Dolomite Campgrounds. Reduce vegetation within these and all other concentrated public-use areas consistent with shaded fuelbreak guidelines.

Utility Company

- Remove entire trees under utilities instead of topping them for power line clearance. Topping trees severely weakens them and predisposes them to attack

by bark beetles. The fir engraver (*Scolytus ventralis*) is causing significant mortality in white fir.

- Completely remove all vegetation within 15 feet of utility poles to prevent structural failure during a wildfire.
- Clear all vegetation surrounding electrical transfer stations within thirty feet of the fence. For a distance of 300 feet, thin trees to a spacing equivalent to twice the height of the trees from crown to crown.

7.2.3 Community Coordination

Clark County Fire Department, Nevada Division of Forestry, and the US Forest Service

Coordination among local, state and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The general goal of community coordination is to make the entire community fire safe. In Lee Canyon, community coordination is needed so people will know what to do in the event of a wildfire in the canyon.

- Develop an evacuation plan. Provide the plan to all homeowners and post copies in public places. Include in the plan locations of non-ambulatory persons within the community who may need evacuation assistance.
- Install a community siren as a communication tool for evacuation.
- Install water tanks with a minimum storage capacity of 1,000 gallons for structure protection.
- Investigate the purchase of a fire blocking gel or foam that can be applied to structures and to vegetation in order to create an additional layer of fire protection.
- Post “No Parking” signs and enforce limited parking along roadways in areas where roadside parking would restrict emergency access.
- Identify or develop fire safe zones and fire safe structures for people to use if they are trapped in the canyon during a wildfire. These areas could include the fire stations, the library, the school, and a cleared area directly above the community (at least two acres in size). Limit the number of people (residents and tourists) in the canyon on high hazard days according to the capacity of the safety zones (use the estimated capacity of all identified fire safe zones and structures to determine the total number of people allowed in the canyon on a given summer day). Use the Fire Marshall’s building capacity when estimating the number of people allowed in structures identified as fire safe.

US Forest Service

- Establish and designate safe zones so that people have a place to go if they become trapped in the canyon and must shelter in place during a wildland fire incident.

Clark County

- Ensure cooperation between the Assessor’s office and the roads department to ensure that all new development roads are named, mapped, and identified with GPS locations.

- Create turnarounds with a minimum radius of seventy feet and adequate clearance on either side of access roads for large fire engines and other fire apparatus.

Property Owners

- Work with the Clark County Fire Department and Sheriff's Department to identify any non-ambulatory persons within the community who may need evacuation assistance in the event of an emergency.

7.2.4 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department, US Forest Service, and Nevada Division of Forestry

- 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.
- Hold an annual community fire awareness event.

7.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).
- Using wells, existing springs, ponds, tanks, etc. identify and develop a helicopter dip site for use during initial attack, especially for use during the summer months. Incorporate this information in to a pre-attack plan that is updated annually.
- Install water tanks with a minimum storage capacity of 1,000 gallons for structure protection.

Clark County

- Improve water storage capacity and install hydrants or standpipes in subdivisions.

Property Owners

- Investigate the purchase of a fire blocking gel or foam that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

7.3 SUMMARY OF RECOMMENDATIONS

Table 7-2. Lee Canyon Risk/Hazard Reduction Priority Recommendations

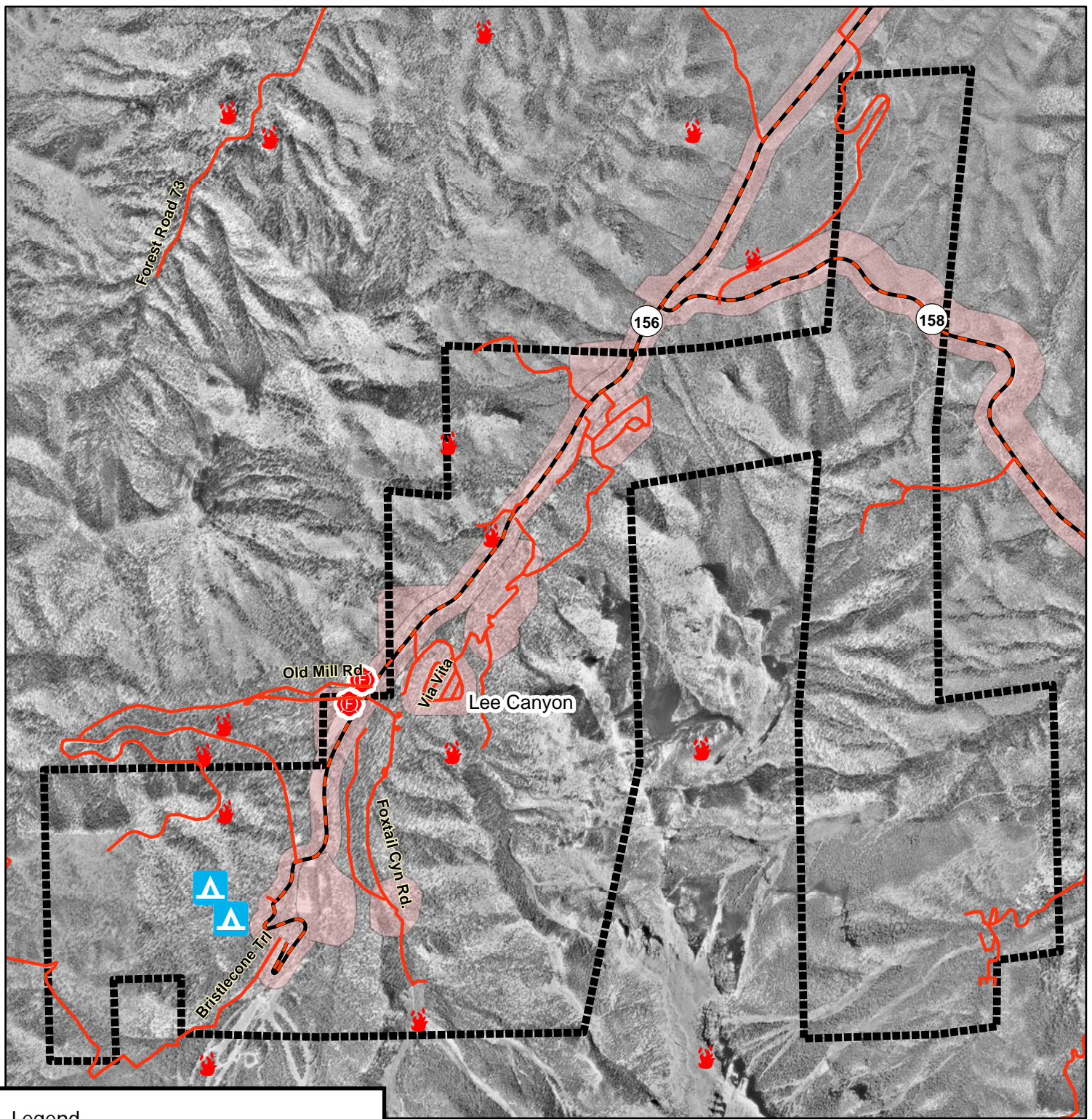
Involved Party	Recommended Treatment	Recommendation Description
Property Owners Clark County	Defensible Space	Apply and maintain aggressive defensible space treatments according to the guidelines in Appendix E. Replace all shake roofs and combustible siding with non-combustible materials.
	Community Coordination	Ensure that address signs are clearly visible from the road. Identify non-ambulatory persons in need of assistance with evacuation.
	Fire Suppression Resources and Training	Investigate the purchase and use of fire blocking foams and gels for individual property protection in the wildland-urban interface.
	Fuels Reduction	Coordinate with the local Fire Safe Chapter to implement and maintain shaded fuelbreaks throughout all housing clusters in Lee Canyon.
Clark County Fire Department Nevada Division of Forestry US Forest Service	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Fuels Reduction	Construct and maintain shaded fuelbreaks: <ul style="list-style-type: none"> ➤ In a buffer around the housing clusters in Lee Canyon. ➤ Along both sides of State Routes 156. Within and surrounding all campgrounds, day use, and other concentrated public-use areas.
	Public Education	Distribute copies of <i>"Living with Fire"</i> to all property owners living in Lee Canyon. Hold annual community fire awareness event. Contact NDF, the USFS, and the University of Nevada Cooperative Extension for assistance with public education activities.
	Community Coordination	Prepare an emergency evacuation plan for Lee Canyon. Distribute copies of this plan to homeowners in the area and post versions of the plan in public places. Identify and develop fire safe zones and sheltering structures. Limit the number of visitors in the area to the capacity of these safe zones. Install a community siren to advise residents and visitors of evacuation orders. Develop a helicopter dip site using wells, existing springs, ponds, and tanks.

Involved Party	Recommended Treatment	Recommendation Description
Clark County Fire Department	Fire Suppression Resources and Training	<p>Comply with <i>NWCG 310-1</i> training and equipment standards.</p> <p>Evaluate the use of fire blocking foams and gels for individual building protection in the wildland-urban interface.</p> <p>Improve water storage capacity and install hydrants or standpipes in subdivisions.</p>
Clark County	Community Coordination	<p>Ensure cooperation between the Assessor's Office and the Roads Department so that all roads in new developments are named, signed, mapped, and identified with GPS locations.</p> <p>Develop county ordinances that enforce the implementation and maintenance of defensible space.</p>
Utility Company	Fuels Reduction	<p>Remove trees within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles.</p> <p>Clear all vegetation surrounding electrical transfer stations in Lee Canyon.</p>

Table 7-3. Lee Canyon Fire Hazard Ratings Summary

A. Urban Interface Condition 2		TALLIES	
B. Community Design		68 Total Houses	8 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>1</u> not visible <u>7</u> visible <u>88%</u> visible	
2. Width of Road	<u>3</u> /5	B6. Address Signs <u>62</u> not visible <u>6</u> visible <u>9%</u> visible	
3. Accessibility	<u>3</u> /3	C1. Roofs <u>9</u> combust <u>59</u> not combust <u>87%</u> not combust	
4. Secondary Road	<u>3</u> /5	C2. Siding <u>66</u> combust <u>2</u> not combust <u>3%</u> not combust	
5. Street Signs	<u>3</u> /5	C3. Unenclosed Structures on Lot <u>62</u> not enclosed <u>6</u> enclosed <u>91%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>68</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>5</u> /5	D2. Defensible Space <u>68</u> not adequate <u>0</u> adequate <u>0%</u> adequate	
C. Construction Materials			
1. Roofs	<u>5</u> /10		
2. Siding	<u>5</u> /5		
3. Unenclosed Structures	<u>5</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>15</u> /15		
F. Fire Behavior			
1. Fuels	<u>3</u> /5		
2. Fire Behavior	<u>7</u> /10		
3. Slope	<u>10</u> /10		
4. Aspect	<u>3</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>2</u> /10		
2. Department	<u>3</u> /10		

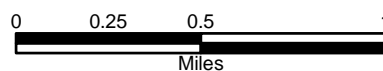
Score 88 /128



Legend

- Proposed Fuel Reduction Treatment
- Community Boundary
- Highways and State Routes
- Secondary Roads
- F Fire Station
- Fire Ignition
- ▲ Campground

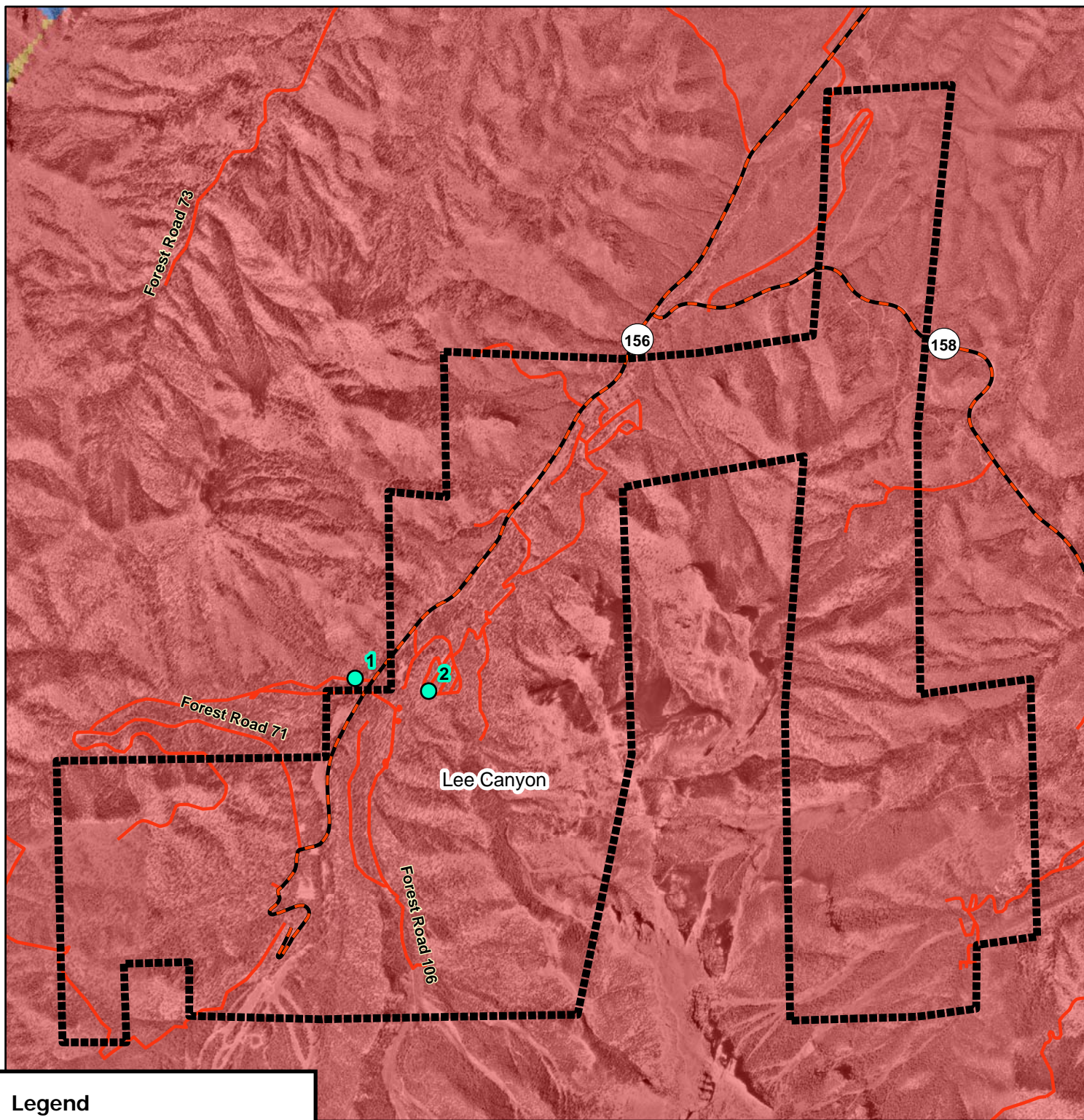
Figure 7-1. Lee Canyon
Fire History, Suppression Resources,
and Proposed Mitigation Projects



Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.



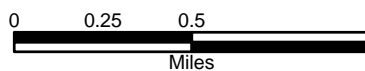
Legend

- Photo Point
- Community Boundary
- Highways and State Routes
- Secondary Roads

Fuel Hazard

- Extreme
- High
- Moderate
- Low

Figure 7-2. Lee Canyon
Fuel Hazard Classification



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Figure 7-3 Lee Canyon Fuel Hazard Photo Points



Photo 1. 4020301 N. 0619088 E. Direction 135°SE. Overstocked stands of ponderosa pine have established in the absence of understory thinning activities or low-intensity ground fires. The proposed fuel reduction treatment for this area is to thin trees to a spacing of twenty to forty feet between tree trunks, depending upon tree diameter, to achieve a basal area of 80 to 100 square feet per acre. A professional forester should be consulted for tree marking prior to removal.



Photo 2. 4020222 N. 0619545 E. Direction 285°WNW. Inadequate defensible space is very common in Lee Canyon. Fuel reduction treatments are recommended for the Via Vita neighborhood and others in Lee Canyon.

8.0 MT. SPRINGS

8.1 RISK AND HAZARD ASSESSMENT

Mt. Springs is located at the south end of the Spring Mountains approximately thirty miles southwest of Las Vegas. A total of 36 homes were observed in the Mt. Springs area during the hazard assessment, which resulted in classifying Mt. Springs in the **Extreme Hazard** category (84 points). The rating is primarily attributed to limited access, poor defensible space, the potential for extreme fire behavior, and limited fire protection resources. Table 8-3 at the end of this section presents a summary of the community hazard rating values for Mt. Springs.

8.1.1 Community Design

The area surrounding Mt. Springs is an intermix wildland-urban interface condition. Structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space throughout the community. A majority of the parcels in the community are between one and ten acres in size. The community boundary is shown in Figure 8-1.

Access: The primary access road into Mt. Springs is State Route 160, a paved two-lane road that is more than 24 feet wide. The road gradient is less than five percent. This is the only primary access road into and out of the community, and many of the secondary roads are dead-end streets without adequate turnaround space for fire suppression equipment.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on less than 75 percent of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that may be present during a wildland fire.

Utilities: There are two types of power lines in Mt. Springs. Power is provided to the homes via above ground lines. There is also a large transmission line supported by wooden poles that runs through the community. This power line is considered to be at risk for damage during a wildfire because the power line corridor is in need of vegetation clearing.

8.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and approximately 85 percent of the homes have fire resistant siding materials. Nearly one quarter of the homes in the community (22 percent) have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

8.1.3 Defensible Space

Approximately 25 percent of the homes within the Mt. Springs community meet the defensible space requirement for landscaping to minimize damage to the home during a wildfire. The guideline for the minimum defensible space requirement is included in Appendix E.

8.1.4 Suppression Capabilities

Wildfire Protection Resources

The Clark County Fire Department Station 79 in Mt. Springs houses equipment for the twelve member volunteer fire department. Five of these members were reported as holding a Red Card certification that would allow them to participate on a wildfire response with a federal incident command. The station is shared with the seasonal US Forest Service crew. Table 8-1 lists the wildfire resources assigned to the Mt. Springs community. The figures quoted are based on data available at the time of interviews with local and regional fire authorities, and are subject to change.

Table 8-1. Mt. Springs Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 79 (Mt. Springs)
Type 6 Quick Attack Engine	1	
Type 3 Brush Engine	2	US Forest Service (Mt. Springs Station 79)
Type 7 Brush Patrol Engine	1	

Source: Steve McClintock, pers. comm., 29 March 2004.

Fire suppression resources administered by federal agencies such as the US Forest Service are listed according to their local assigned area. It is important to note that these apparatus are considered national resources and are commonly reassigned to areas of higher severity during the fire season. In response to a wildland fire call, interagency dispatch centers locate and dispatch the closest available resource according to incident command and computer-aided dispatch protocols.

Water Sources and Infrastructure

Water availability for fire suppression in Mt. Springs include community wells, one 35,000-gallon storage tank, one 10,000-gallon storage tank, ponds, and a 5,000-gallon Fold-a-tank. The water system operates on gravity. Water sources are available within a 20 minute round trip.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Mt. Springs have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per NWCG 310-1.

Work Load

The Clark County Fire Department station responded to 98 emergency medical calls and 21 wildland brush fire calls in 2003.

Detection and Communication

There are no fire lookouts in the Mt. Springs area but reconnaissance flights do occur. Communications by the Clark County Fire Department are compatible with neighboring agencies and there are no gaps in the radio coverage. There are no community sirens.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Clark County Fire Department reviews development plans to ensure compliance with the VFC 1997 fire code.

8.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Mt. Springs area is generally heavy throughout the community and slopes range from flat to forty percent. Ground fuels consist of annual grasses, perennial grasses, and Russian thistle. The shrub layer is dominated by bursage (two to three feet tall), fourwing saltbush (four to six feet tall), and four to five foot tall rabbitbrush, mountain mahogany, prickly pear, whitethorn, acacia, cliffrose, and ephedra. The tree layer is dominated by pinyon and juniper, both reaching thirty feet in height. The crowns of the trees touch in many areas. These features combine to result in a high to extreme fuel hazard rating for this community. The community is situated in a saddle area and winds are funneled from the west through the community, topographic conditions that could further exacerbate fire behavior.

8.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would occur on a summer afternoon during normal working hours when many volunteer firefighters may not be immediately available. A fire originating south of the community could quickly spread through heavy fuels present in the community. Winds in saddle areas are often very strong. Under windy conditions, a wildfire could quickly escape initial attack capabilities before additional fire suppression resources would have time to arrive.

8.1.7 Ignition Risk Assessment

Mt. Springs has a high ignition risk rating, primarily due to heavy visitor traffic through the area. Annual plants in the understory provide a receptive fuel bed for any ignition that would readily burn into the thick brush and trees.

8.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Mt. Springs area is vulnerable to a large fire. Property owners need to take an active role in protecting their property by implementing defensible space treatments, and agencies need to conduct fuels reduction projects. Forming a local chapter of the Nevada Fire Safe Council is an excellent way to begin getting the community oriented on many of the recommendations included below.

8.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Limb deciduous and coniferous tree branches a minimum of four feet from the ground to reduce ladder fuels. Remove all dead and diseased branches and duff from beneath remaining trees.
- If residents elect to keep some pinyon or juniper trees close to the home for aesthetic reasons, there must not be any other native trees or ladder fuels (shrubs or debris) underneath the trees or within a minimum of thirty feet of the crown of the tree.
- Clear brush, weeds, and grasses from within a ten-foot wide strip along either side of driveways. Remove pinyon and juniper trees and thin ground fuels to a spacing of two times their height. Prune shrubs taller than eighteen inches reduce their height.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet or twice the height of pinyon and juniper trees, whichever is the greatest distance.
- Clear pine needles, leaves, and debris from roofs and rain gutters.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Store firewood a minimum of thirty feet from structures.

- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Install screens over all exterior vents to prevent sparks from entering the attic and other areas inside the home.
- Create a clearing with a radius of thirty feet around power poles with transformers. Thin or remove brush and all flammable vegetation within this area.
- Maintain defensible space annually.

Clark County Fire Department

- Conduct courtesy inspections of home defensible space measures.

8.2.2 Fuel Reduction Treatments

Recommendations provided below focus on the reduction of fuels along county roadways and the development of fuelbreaks in key locations around the Mt. Springs community. The clearing of fuels along roadways is essential in order to ensure safe ingress and egress for rescue workers, suppression equipment, and residents during a wildland fire event. Because roads and community boundaries can fall under the jurisdiction and responsibility of multiple agencies, cooperation among these parties will be essential in implementing successful and effective fuelbreaks.

A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to fuel reduction treatments in this chapter.

- Broadcast seed in fuelbreak areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin pinyon and juniper trees to a spacing equal to twice their height.
- Thin areas of dense brush so that remaining shrubs have a spacing equal to twice their height between canopies. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- Limb tree branches to a minimum of four feet from the ground, not to exceed one-third of the total tree height. Remove dead and diseased tree branches.
- Keep the area within ten feet of limbed trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- Maintain the shaded fuelbreak, thereby limiting the reinvasion of woody species.

Details and locations for individual features are described below and illustrated in Figure 8-1.

Clark County Fire Department, US Forest Service, Nevada Department of Transportation

- Create a shaded fuelbreak fifty feet in width along each side of Highway 160 from 0.5 miles south of Pinyon, north to Williams Ranch Road where flammable vegetation and topography create the greatest hazard.
- For areas along the east side of Benedict, create a 200-foot wide shaded fuelbreak for the south community boundary from Highway 160 west to the corner and then north again to Highway 160 and along Williams Ranch Road.

Clark County Fire Department

- Work with homeowners to thin fuels for a width of fifty feet along each side of all community roads where homes are present. Within the first 25 feet, remove all pinyon and juniper trees. Within the outer 25 feet, thin trees to a spacing equal to twice the tree height.
- Double these treatment specifications where roads border unimproved lots. Establish a 100-foot fuelbreak by removing all trees for the first fifty feet and thinning to a spacing of two times the tree height for the remaining fifty feet.

Utility Company

- Clear the vegetation surrounding electrical transfer stations within thirty feet of the fence.
- Remove all trees from beneath transmission lines. Trim brush to eighteen inches tall and thin to a distance two times shrub height.

8.2.3 Community Coordination

Private Property Owners

- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from the threat of wildfire in Nevada's communities. Through the establishment of a local Chapter, communities will become part of a large network for sharing information and notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

Nevada Fire Safe Council
1187 Charles Drive
Reno, Nevada 89509
www.nvfsc.org

- Make sure residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.
- Work with the Clark County Fire Department and Sheriff's Department to identify any non-ambulatory persons within the community who may need evacuation assistance in the event of an emergency.

Clark County

Coordination among local, state and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

- Develop and enforce brush clearance and biomass disposal programs as a component of the fuelbreak and defensible space recommendations above.
- Allow backyard open burning only under a permit process or establish designated community burning days.
- Ensure cooperation between the Assessor's Office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.

8.2.4 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale that will effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- 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.
- Develop public education materials on the wildland fire dangers of fireworks.
- Hold an annual community fire awareness event in cooperation with the local fire Safe Council Chapter.

8.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).
- Establish and publicize a safe zone, such as the fire station, where people can safely gather during a wildfire event or other emergency.
- Install a community siren as a communication tool for evacuation.

- Develop a helicopter dip site for use during initial attack such as ponds, tanks, etc. Wells or existing springs can be used to develop dip sites for use during the summer. Initial attack will be critical for the Mt. Springs area.
- Move additional resources into the area on high hazard days, if available, or ensure volunteer resources are adequate for high hazard days.
- Investigate the purchase of a fire blocking gel or foam that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

8.3 SUMMARY OF RECOMMENDATIONS

Table 8-2. Mt. Springs Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Apply and maintain aggressive defensible space treatments according to the guidelines in Appendix E.
	Community Coordination	Ensure that address signs are clearly visible from the road. Form a local chapter of the Nevada Fire Safe Council.
Property Owners Clark County Fire Department	Fuels Reduction	Thin fuels along all community roads according to standard shaded fuelbreak guidelines.
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Fire Suppression Resources and Training	Comply with <i>NWCG 310-1</i> training and equipment standards. Develop and publicize a fire safe zone where residents can gather during a wildfire. Install a community siren to advise residents of evacuation orders. Strengthen initial attack capabilities by developing helicopter dip sites and requesting the placement of additional resources in the region during high hazard days. Investigate the purchase and use of fire blocking foams and gels for additional structure protection in the wildland-urban interface.
	Public Education	Distribute copies of <i>“Living with Fire”</i> to all property owners living in Lee Canyon. Develop an annual community fire awareness event and educational materials that highlight the wildland fire dangers of fireworks. Contact NDF, the USFS, and the University of Nevada Cooperative Extension for assistance with public education activities.
US Forest Service Nevada Department of Transportation	Fuels Reduction	Construct and maintain shaded fuelbreaks: ➤ Along both sides of State Route 160. ➤ Along the east side of Benedict Road. ➤ Along the south and west sides of the community, and north along Williams Ranch Road.

Involved Party	Recommended Treatment	Recommendation Description
Clark County Fire Department Clark County	Community Coordination	Develop county ordinances that enforce the implementation and maintenance of defensible space. Develop regular brush clearance, biomass disposal, and open burn permitting programs. Ensure cooperation between the Assessor's Office and the Roads Department so that all roads in new developments are named, signed, mapped, and identified with GPS locations.
Utility Company	Fuels Reduction	Remove trees within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles. Clear all vegetation surrounding electrical transfer stations.

Table 8-3. Mt. Springs Fire Hazard Ratings Summary

A. Urban Interface Condition 2

B. Community Design

- | | | |
|---------------------|----------|----|
| 1. Ingress / Egress | <u>3</u> | /5 |
| 2. Width of Road | <u>1</u> | /5 |
| 3. Accessibility | <u>1</u> | /3 |
| 4. Secondary Road | <u>5</u> | /5 |
| 5. Street Signs | <u>1</u> | /5 |
| 6. Address Signs | <u>5</u> | /5 |
| 7. Utilities | <u>3</u> | /5 |

C. Construction Materials

- | | | |
|--------------------------|----------|-----|
| 1. Roofs | <u>1</u> | /10 |
| 2. Siding | <u>1</u> | /5 |
| 3. Unenclosed Structures | <u>1</u> | /5 |

D. Defensible Space

- | | | |
|---------------------|-----------|-----|
| 1. Lot Size | <u>3</u> | /5 |
| 2. Defensible Space | <u>15</u> | /15 |

F. Fire Behavior

- | | | |
|------------------|-----------|-----|
| 1. Fuels | <u>5</u> | /5 |
| 2. Fire Behavior | <u>10</u> | /10 |
| 3. Slope | <u>7</u> | /10 |
| 4. Aspect | <u>10</u> | /10 |

E. Suppression Capabilities

- | | | |
|-----------------|----------|-----|
| 1. Water Source | <u>5</u> | /10 |
| 2. Department | <u>7</u> | /10 |

TALLIES

36 Total Houses

10 Residential Streets

B5. Street Signs

<u>0</u>	not visible	<u>10</u>	visible	<u>100%</u>	visible
----------	-------------	-----------	---------	-------------	---------

B6. Address Signs

<u>30</u>	not visible	<u>6</u>	visible	<u>17%</u>	visible
-----------	-------------	----------	---------	------------	---------

C1. Roofs

<u>0</u>	combust	<u>36</u>	not combust	<u>100%</u>	not combust
----------	---------	-----------	-------------	-------------	-------------

C2. Siding

<u>5</u>	combust	<u>31</u>	not combust	<u>86%</u>	not combust
----------	---------	-----------	-------------	------------	-------------

C3. Unenclosed Structures on Lot

<u>8</u>	not enclosed	<u>28</u>	enclosed	<u>22%</u>	not enclosed
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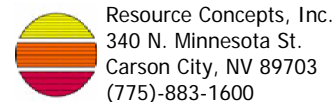
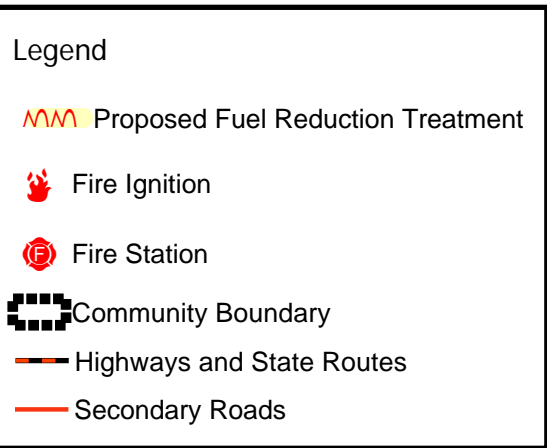
D1. Lot Sizes

<u>2</u>	<1ac	<u>34</u>	>1ac <10ac	<u>0</u>	>10ac
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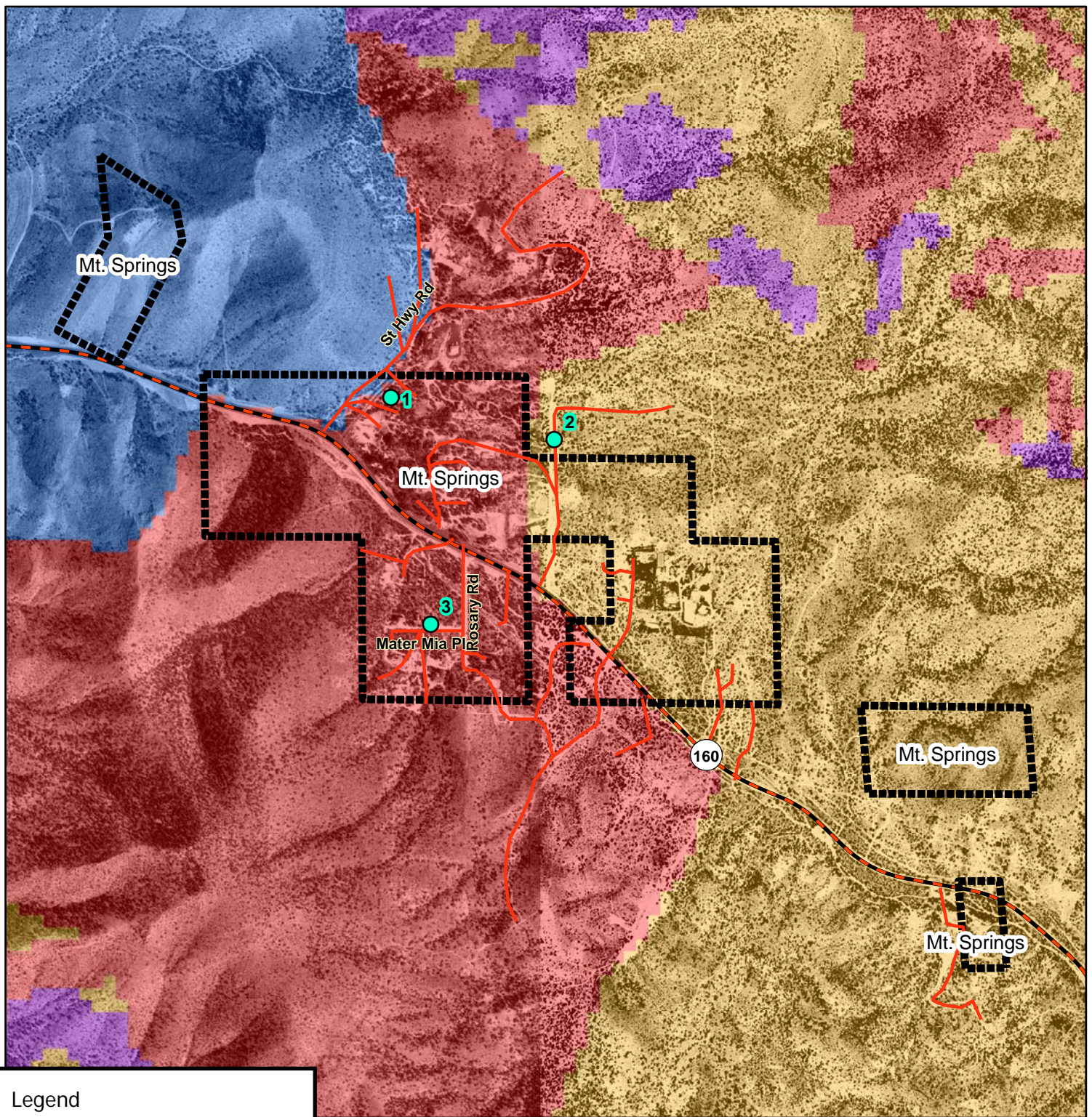
D2. Defensible Space

<u>26</u>	not adequate	<u>10</u>	adequate	<u>28%</u>	adequate
-----------	--------------	-----------	----------	------------	----------




Score 84 /128



Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.



Legend

-  Community Boundary
-  Highways and State Routes
-  Secondary Roads

Wildfire Hazard






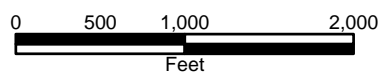
-  Extreme
-  High
-  Medium
-  Low
-  Photo Point

Figure 8-2. Mt. Springs
Fuel Hazard Classification



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Figure 8-3 Mt. Springs Fuel Hazard Photo Points



Photo 1. 3987366 N. 0634387 E. Direction 180°S. The typical extreme fuel hazard on the west side of Mt. Springs is dominated by pinyon and juniper that will burn with sufficient intensity to damage power poles and overhead lines. Homeowners and utility managers are recommended to remove trees within power line corridors. A thirty-foot cleared area is recommended around transformers.

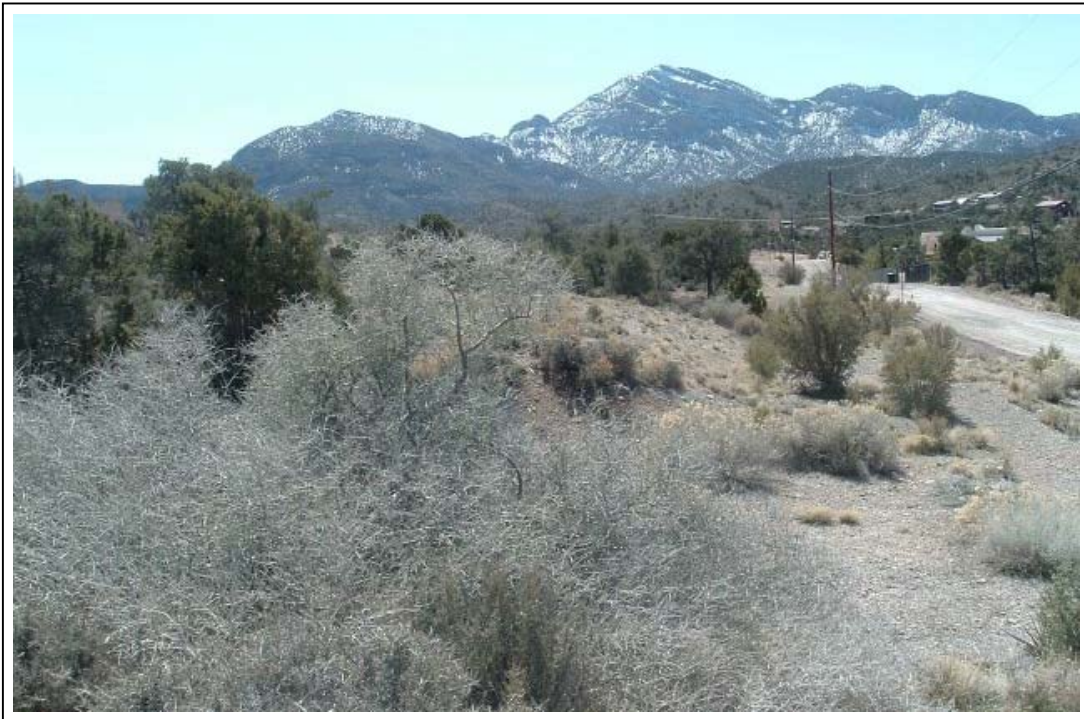


Photo 2. 3987262 N. 0634793 E. Direction 120°ESE. Fuel reduction treatment on this site will protect residences in the north part of Mt. Springs from wildfires encroaching from the west. Fuels here consist primarily of sagebrush, fourwing saltbush, rabbitbrush, pinyon, and juniper and were considered an extreme fuel hazard.

Resource Concepts, Inc.

Figure 8-3 Mt. Springs Fuel Hazard Photo Points



Photo 3. 3986804 N. 0634486 E. Direction 270°W. Homeowners with properties in high fuel hazard areas such as this are recommended to thin fuels for a width of twenty feet along each side of driveways. Pinyon and juniper trees should be removed and ground fuels thinned to a spacing of two times their height.

9.0 NELSON

9.1 RISK AND HAZARD ASSESSMENT

Nelson is located in the upper reaches of El Dorado Canyon near the Colorado River, approximately forty miles southeast of Las Vegas. Forty homes in the Nelson area were assessed. This assessment resulted in classifying Nelson in the **High Hazard** category (seventy points). The rating is primarily attributed to limited access in and out of the community, poor defensible space, and limited fire protection resources. Table 9-3 at the end of this section presents a summary of the community hazard rating values for Nelson.

9.1.1 Community Design

The area surrounding Nelson is characterized by an intermix wildland-urban interface condition: structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space throughout the community. The majority of the lots are less than one acre in size. The community boundary is shown in Figure 9-1.

Access: Primary access into Nelson is via State Route 165, a paved two-lane road that is greater than 24 feet in width and has a gradient of less than five percent. This is the only access road in and out of the community. The majority of the secondary roads provide adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on all of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during a wildland fire.

Utilities: Power lines have not been properly maintained. Power line corridors and transformer sites should be kept clear of flammable vegetation, as fires have been known to start from arcing power lines during windy conditions. Fire damage to power lines often creates power failures that can be especially dangerous in communities without a backup energy source. Energized power lines can also fall during a wildfire creating additional hazards for citizens and firefighters.

9.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and all but one of the homes has fire resistant siding materials. Approximately one-third of the homes in the community (36 percent) have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

9.1.3 Defensible Space

Approximately ten percent of the homes in Nelson have landscaping that meets the minimum requirement for defensible space in order to minimize property damage or loss of the home during a wildfire.

9.1.4 Suppression Capabilities

Wildfire Protection Resources

Nelson has no organized fire department. The nearest trained fire responders are municipal resources located in Boulder City, approximately 25 miles to the north.

Table 9-1. Nelson First Initial Attack Wildfire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	1	Boulder City Fire Department (Boulder City)
Advanced Life Support (ALS) Rescue	1	
Type 3 Brush Engine	1	National Park Service (Boulder City)
Type 6 Brush Patrol Engine	1	
Type 1 Structure Engine	2	Clark County Fire Department (Nearest Resource)
Type 6 Quick Attack Engine	2	
Basic Life Support (BLS) Rescue	1	

Source: Steve McClintock, Kurt Leavitt, Mark Blankensop, pers. comm. March 2004. K. Oliver, pers. comm. 12 Oct 2004

In the event of a wildfire in the Nelson area, County resources would be dispatched through the Clark County Fire Alarm Office. Federal resources are dispatched through the Las Vegas Interagency Communications Center. State resources are dispatched through the Sierra Front Interagency Dispatch in Minden, Nevada. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. Suppression resources administered by federal agencies such as the US Forest Service and the Bureau of Land Management are considered national resources and are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Nelson includes community wells.

Fire Protection Personnel Qualifications

There are no trained firefighters in the Nelson area. The closest stations are approximately 25 miles to the north in Boulder City or Henderson.

Detection and Communication

There are no formal fire detection and communication tools available other than 911. There are no community sirens.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

9.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Nelson area is generally moderate within the town itself and low outside of the community. Ground fuels consist of annual grasses. The shrub layer is dominated by bursage (one to three feet tall) and creosote bush (four to six feet tall). Some trees are planted near structures. The fuel hazard rating for Nelson is reported as Low to Moderate.

Slopes reach up to ten percent within the community, which is situated in a long narrow canyon. Strong winds funneled up and down through the canyon can contribute to erratic fire behavior making suppression and control of wildfire more difficult.

9.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario for the community of Nelson and the old mining store would be an ignition that started down canyon (east) from the community with strong upslope winds pushing the fire toward the community. In a wet year, dried grasses and annual plants would provide a receptive fuel bed for ignition. Under strong winds, a fire could be pushed through the bursage/creosote bush fuels. Structures that are intermixed throughout the interface contribute to the hazard. Firebrands could ignite structure fires within the community. Because resources are one hour away, several structures could be lost before fire suppression assistance is provided.

9.1.7 Ignition Risk Assessment

Nelson has a moderate ignition risk rating. Dried annual grasses and forbs create a fuel bed receptive for ignitions.

9.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Nelson area is vulnerable to a large fire. Property owners need to take an active role in protecting their property by implementing defensible space treatments, and agencies need to conduct fuels reduction projects. Defensible space is especially important in the Nelson area because it is vulnerable to a large fire. Defensible space is the homeowner's responsibility, and it is an essential first line of defense for saving lives and property during a catastrophic wildland fire.

9.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:

Lean: There are only small amounts of flammable vegetation.

Clean: There is no accumulation of dead vegetation or other flammable debris.

Green: Existing plants are healthy and green during the fire season.

- For deciduous and coniferous trees within the defensible space zone, limb branches a minimum of four feet from the ground. Remove all dead and diseased branches and duff from beneath remaining trees to reduce ladder fuels.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Mow or cut grass to a maximum height of four inches.
- Clear brush, weeds, and grasses from within a ten-foot wide strip along either side of driveways.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Enclose wood decks and porches. If this is not possible, maintain these areas free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Install screens over all exterior vents to prevent sparks from entering the attic and other areas inside the home.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

Clark County Fire Department and Nevada Division of Forestry

- Conduct courtesy inspections of home defensible space measures.

9.2.2 Community Coordination

Coordination among local, state, and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

Private Property Owners

- Remove abandoned or boarded up trailers.
- Work with the Clark County Fire Department and the Sheriff's Department to identify any non-ambulatory persons within the community who may need evacuation assistance in the event of an emergency.

- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from the threat of wildfire in Nevada's communities. Through the establishment of a local Chapter, communities will become part of a large network for sharing information and notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

Nevada Fire Safe Council
1187 Charles Drive
Reno, Nevada 89509
www.nvfsc.org

Clark County

- Form a volunteer Clark County Fire Department for coordinating training, equipment, and seasonal personnel for fire suppression in the community.
- Encourage cooperation between the Assessor's Office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.
- Pursue grant funding and station a pick-up truck and a one-piece, slip-on, 100 to 200-gallon tank and pump unit with hose and hose reel in Nelson during the fire season. This equipment, fitted properly for the size and weight limitations of the truck, can be used to provide initial attack of small ignitions.

9.2.3 Fuels Reduction

Utility Company

- Clear vegetation within thirty feet of the fence surrounding electrical transfer stations.
- Remove all trees from beneath transmission lines. Trim brush to eighteen inches tall and thin to a distance two times shrub height.

9.2.4 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- 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.

9.3 SUMMARY OF RECOMMENDATIONS

Table 9-2. Nelson Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
	Community Coordination	Form a local chapter of the Nevada Fire Safe Council. Remove boarded up and abandoned trailers.
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Public Education	Distribute copies of <i>“Living with Fire”</i> to all property owners living in Nelson.
Clark County	Community Coordination	Authorize the formation of a Clark County Volunteer Fire Department in Nelson for coordinating recruitment, training, and equipping of local volunteers. Station a pick-up truck with a tank, pump unit, and hose reel in Nelson during the fire season. Ensure cooperation between the Assessor’s Office and the Roads Department so that all roads in new developments are named, signed, mapped, and identified with GPS locations.
Utility Company	Fuels Reduction	Clear vegetation within thirty feet of the fence surrounding the electrical transfer station. Remove trees and trim shrubs within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles.

Table 9-3. Nelson Fire Hazard Ratings Summary

A. Urban Interface Condition 2		TALLIES	
B. Community Design		42 Total Houses	5 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>0</u> not visible <u>5</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>0</u> not visible <u>42</u> visible <u>100%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>42</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>1</u> combust <u>41</u> not combust <u>98%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>15</u> not enclosed <u>27</u> enclosed <u>36%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>40</u> <1ac <u>2</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>3</u> /5	D2. Defensible Space <u>38</u> not adequate <u>4</u> adequate <u>10%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>3</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>15</u> /15		
F. Fire Behavior			
1. Fuels	<u>3</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>4</u> /10		
4. Aspect	<u>3</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>10</u> /10		
2. Department	<u>10</u> /10		

Score 69 /128

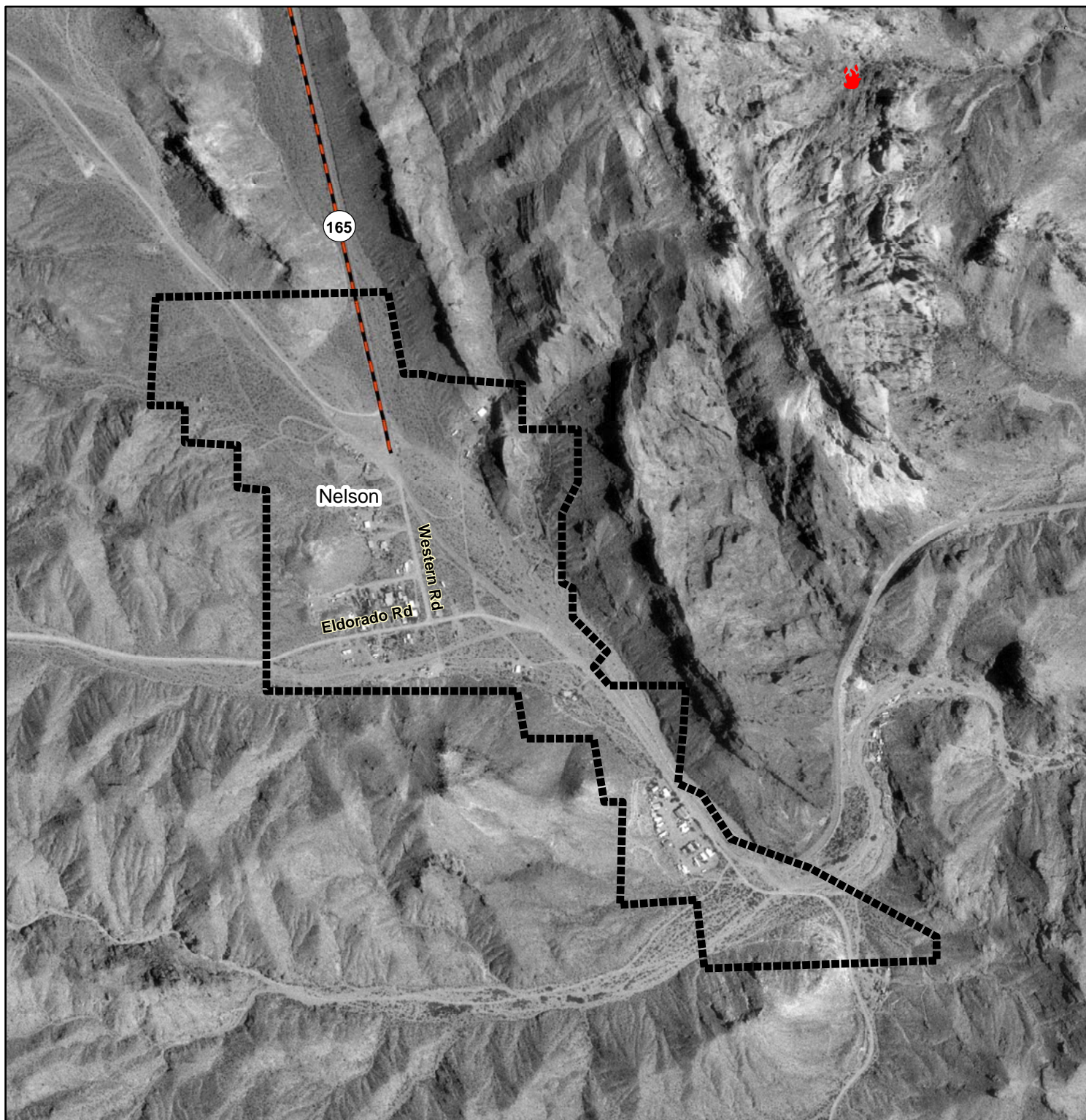





Figure 9-1. Nelson
Fire History



Legend

 Community Boundary

 Fire Ignition

 Highways and State Routes

0 500 1,000 2,000
Feet



Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

10.0 TORINO RANCH

10.1 RISK AND HAZARD ASSESSMENT

Torino Ranch is located along the west side of the Spring Mountains at approximately 5,800 feet in elevation. The community is approximately eight miles west of Mt. Springs on Highway 160 and three miles north of Highway 160. There are approximately thirty structures in the Torino Ranch area. The ranch is used to provide summer camp opportunities for children. The assessment resulted in classifying Torino Ranch in the **High Hazard** category (67 points). The rating is primarily attributed to limited access, the potential for extreme fire behavior, and the absence of formally organized fire suppression resources. Table 10-3 at the end of this section presents a summary of the community hazard rating for Torino Ranch.

10.1.1 Community Design

The area surrounding Torino Ranch is characterized as a classic interface condition, with a clear line of demarcation where buildings abut wildland fuels. Wildland vegetation typically does not continue into developed areas where ranch buildings are clustered. The community boundary is shown in Figure 10-1.

Access: The primary access into Torino Ranch is Lovell Canyon Road, a two-lane paved road that is between 20 and 24 feet wide. This is the only access road in and out of the ranch. The road is approximately three miles long and intersects with Highway 160 approximately eight miles west of Mt. Springs. The road gradient is steeper than five percent in places. Many of the secondary roads are dead-end streets and do not have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Because the area is a ranch, there are no street signs or building numbers.

Utilities: Power lines and propane tanks in the Torino Ranch area have been maintained and generally pose a low ignition risk.

10.1.2 Construction Materials

Almost all of the structures (93 percent) in the interface are built with non-combustible roofing materials and fire resistant siding materials. None of the structures have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

10.1.3 Defensible Space

The Torino Ranch meets the defensible space landscaping requirement to minimize damage to the home or loss during a wildfire.

10.1.4 Suppression Capabilities

Wildfire Protection Resources

The nearest fire suppression resources for this area are the county and federal resources assigned to Mt. Springs, over twenty miles away, or those located in Pahrump in neighboring Nye County, nearly forty miles away.

Table 10-1. Torino Ranch Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
(No formal local resources)		Torino Ranch
Type 1 Structure Engine	1	Clark County Rural Fire Station 79 (Mountain Springs)
Water Tender	1	
Type 6 Quick Attack Engine	1	
Type 3 Brush Engine	2	US Forest Service (Station 79, Mountain Springs)
Type 7 Brush Patrol Engine	1	
Type 3 Brush Engine	1	Pahrump Fire Department (Pahrump)
Type 1 Structure Engine	1	
Water Tender	1	
Type 4 Brush Engine	1	Bureau of Land Management (Pahrump)
Type 4 Brush Engine	1	US Forest Service (Pahrump)

In the event of a wildfire in the Torino Ranch area, County resources would be dispatched through the Clark County Fire Alarm office. Federal resources are dispatched through the Las Vegas Interagency Communications Center. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. Suppression resources administered by federal agencies such as the US Forest Service and the Bureau of Land Management are considered national resources and are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Torino Ranch has a large pond, a pool, and a water tank. The pond is large enough for a helicopter dip site and to draft water for fire suppression. Water sources from Mt. Springs would require 45 minutes or more round trip.

Detection and Communication

There are no fire lookouts in the Torino Ranch area but the area is included in the reconnaissance flights conducted for the Spring Mountains. There are no community sirens.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

10.1.5 Factors Affecting Fire Behavior

The 2001 Lost Cabin Fire burned around Torino Ranch on two sides. The vegetative fuel density in the unburned areas is generally heavy. Ground fuels consist of annual grasses. The shrub layer is dominated by bursage (four feet tall), rabbit brush (six feet tall), ephedra (four feet tall), and manzanita (four foot tall). The tree layer is dominated by pinyon and juniper, both reaching twenty feet in height. These factors combine to give the Torino Ranch an extreme fuel hazard rating.

The ranch is situated in a major southwest to northeast drainage on the west side of the Spring Mountains. The narrow canyon could act as a chimney resulting in strong winds during a fire. These topographic influences can intensify fire behavior.

10.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would occur on a summer afternoon during normal working hours when many volunteer firefighters in Mt. Springs may not be immediately available. A fire resulting from a dry lightning storm with multiple ignitions south of the ranch could block the road and prevent people from evacuating and suppression equipment from entering the area. A fire could be pushed through the heavy fuels into the ranch structures. Initial attack resources must travel thirty to forty minutes to reach the ranch. A fire could easily escape initial attack efforts.

10.1.7 Ignition Risk Assessment

Torino Ranch has a high ignition risk rating. In wet years, high volumes of dried annual grasses and forbs provide a receptive fuel bed for any ignition. The structures intermixed throughout the area contribute to the hazard.

10.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

If an ignition starts, the Torino Ranch area is vulnerable to a catastrophic fire due to the remote location of the ranch. Recommendations to mitigate hazards focus on expanding defensible space areas, developing a fire safe area in the event of a fire, and expanding firefighting capabilities in the area.

10.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
Lean: There are only small amounts of flammable vegetation.
Clean: There is no accumulation of dead vegetation or other flammable debris.
Green: Existing plants are healthy and green during the fire season.
- Prune and remove dead and diseased tree branches. For pinyon and juniper trees, prune all branches a minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Remove all duff, shrubs, and other ladder fuels from beneath the crowns of limbed trees to a distance of ten feet from the drip line of the tree crown.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Control annual grasses and weeds by mowing or by treating weedy areas with pre-emergent herbicides to prevent their seeds from germinating.
- Cut grass and weeds for a distance of twenty feet on either side of all driveways.
- Clear all vegetation and combustible materials from around propane tanks for a minimum distance of ten feet, or twice the height of pinyon and juniper trees, whichever is the greater distance.
- Remove other debris and flammable materials.
- Clear pine needles, leaves, and debris from roofs and rain gutters.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Establish defensible space around bunkhouses and outbuildings.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Install screens over all exterior vents to prevent sparks from entering the attic and other areas inside the home.
- Maintain defensible space annually.

Clark County Fire Department

- Conduct courtesy inspections of ranch defensible space measures.

10.2.2 Fuel Reduction Treatments

Recommendations provided below focus on the reduction of fuels along county roadways and the development of fuelbreaks in key locations around the Torino Ranch community. A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to fuel reduction treatments in this chapter.

- Broadcast seed in fuelbreak areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin trees to a spacing equivalent to two times the height of the trees. The Nevada Forest Practice Act restricts the use of heavy equipment on slopes greater than thirty percent. Consult with a forester from the Nevada Division of Forestry for technical guidance about permitting and carrying out thinning operations on steep slopes.
- If a traditional, even-spaced thinning is not desired, it is permissible to thin trees in a cluster-mosaic formation laid out by a forestry professional.
- Limb tree branches on pinyon and juniper trees a minimum of four feet from the ground, not to exceed one-third the total tree height.
- Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- Keep the area within ten feet of limbed trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Thin areas of dense brush so that remaining shrubs have a spacing (canopy to canopy) equal to twice their height. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- Maintain the shaded fuelbreak, thereby limiting the regrowth of woody species.

Details and locations for individual features are described below and shown in Figure 10-1.

Clark County and Bureau of Land Management

- Remove annual grasses, weeds, and shrubs for a distance of thirty feet from both edges along both sides of the road from the ranch to Lovell Summit Road. Thin all shrubs to a spacing not less than two times their height.
- Construct a 300 foot wide shaded fuelbreak along the west side of Lovell Canyon, as illustrated by Figure 10-1.
- Construct a shaded fuelbreak on the east side of Lovell Canyon and north of the Lovell Summit road up the northeast canyon for a distance of 300 feet from structures.
- Maintain the shaded fuelbreak to prevent regrowth and reinvasion of woody species.

Utility Company

- Remove brush in an area equivalent to a radius of fifteen feet around all power poles.

- Remove all trees from beneath transmission lines. Trim brush to a maximum height of eighteen inches and thin to a distance of two times the remaining shrub height.

10.2.3 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- Distribute copies of the publication *“Living with Fire”* to the ranch managers. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.
- Hold an annual community fire awareness event with ranch personnel.

10.2.4 Fire Suppression Resources

Private Property Owners

- Install standpipes or hydrants on the water system. Install dry hydrant at the pond for drafting by engines. Install sprinkler systems around structures tied to pumps with auxiliary power for pumps. The goal of this recommendation is to improve water availability for fire suppression.
- Investigate the purchase of a fire blocking gel or foam that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

10.3 SUMMARY OF RECOMMENDATIONS

Table 10-2. Torino Ranch Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain aggressive defensible space treatments lean, clean, and green.
	Fire Suppression Resources	Install standpipes or hydrants on the existing water system and a dry hydrant at the pond. Investigate the purchase and use of fire blocking foams and gels to enhance property protection capabilities.
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on Ranch facilities.
	Public Education	Distribute copies of <i>“Living with Fire”</i> to staff and residents at Torino Ranch. Hold an annual fire awareness event with ranch personnel.
Clark County Bureau of Land Management	Fuels Reduction	Remove annual grasses and weeds and thin shrubs from roadsides from the Ranch to Lovell Summit Road. Construct and maintain shaded fuelbreaks along the west side of Lovell Canyon and in the First Creek drainage.
Utility Company	Fuels Reduction	Clear all vegetation surrounding the electrical transfer station. Remove trees and trim shrubs within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles.

Table 10-3. Torino Ranch Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		30 Total Houses	1 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>0</u> not visible <u>1</u> visible <u>100%</u> visible	
2. Width of Road	<u>5</u> /5	B6. Address Signs <u>0</u> not visible <u>30</u> visible <u>100%</u> visible	
3. Accessibility	<u>3</u> /3	C1. Roofs <u>2</u> combust <u>28</u> not combust <u>93%</u> not combust	
4. Secondary Road	<u>3</u> /5	C2. Siding <u>2</u> combust <u>28</u> not combust <u>93%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>0</u> not enclosed <u>30</u> enclosed <u>0%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>0</u> <1ac <u>30</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>3</u> /5	D2. Defensible Space <u>0</u> not adequat <u>30</u> adequate <u>100%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>3</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>5</u> /5		
2. Fire Behavior	<u>10</u> /10		
3. Slope	<u>7</u> /10		
4. Aspect	<u>10</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>10</u> /10		

Score 69 /128

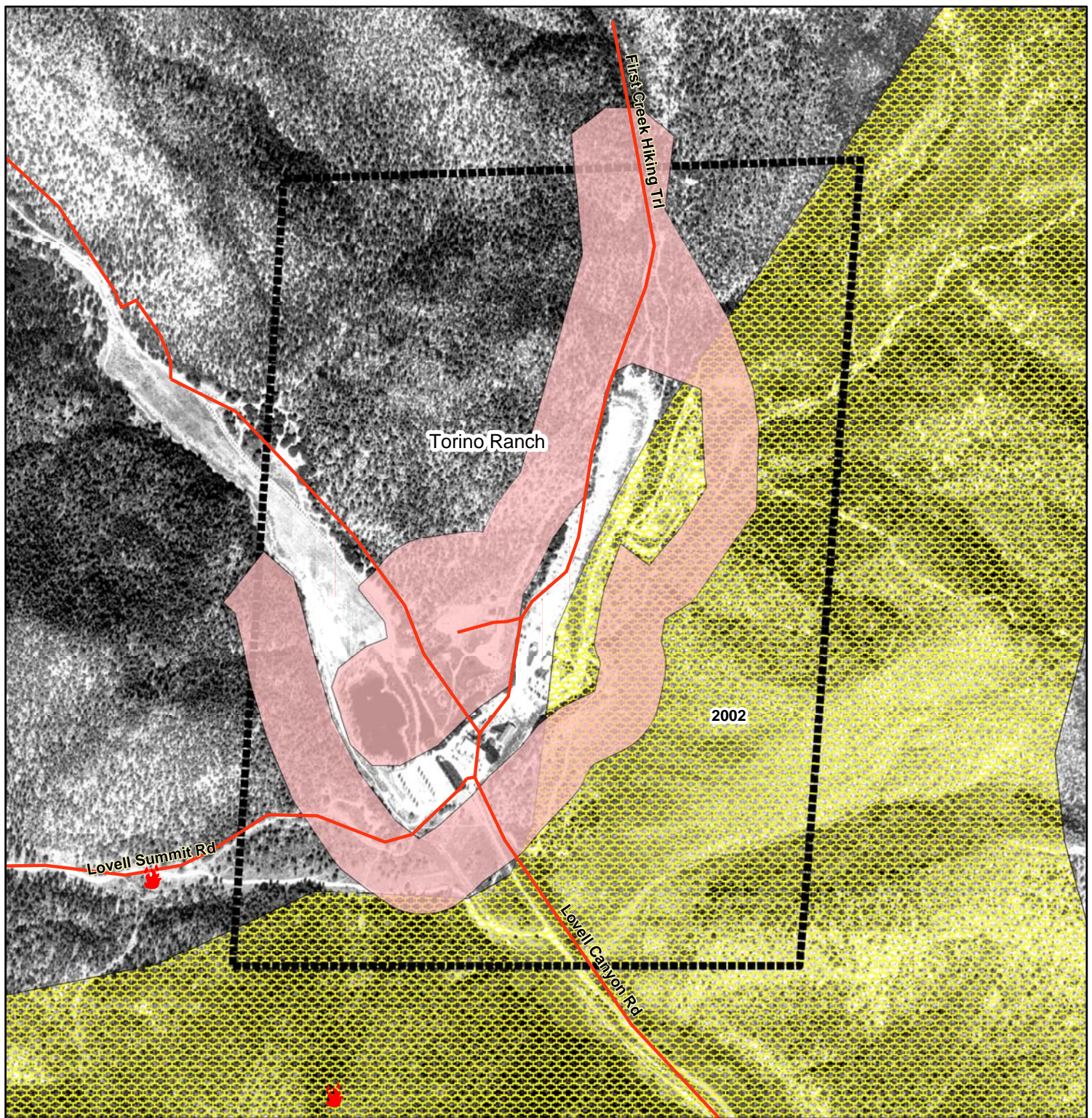


Figure 10-1. Torino Ranch
Fire History and
Proposed Mitigation Projects

Legend

- Proposed Fuel Reduction Treatment
- Community Boundary
- Fire Boundary and Date
- Fire Ignition
- Secondary Roads

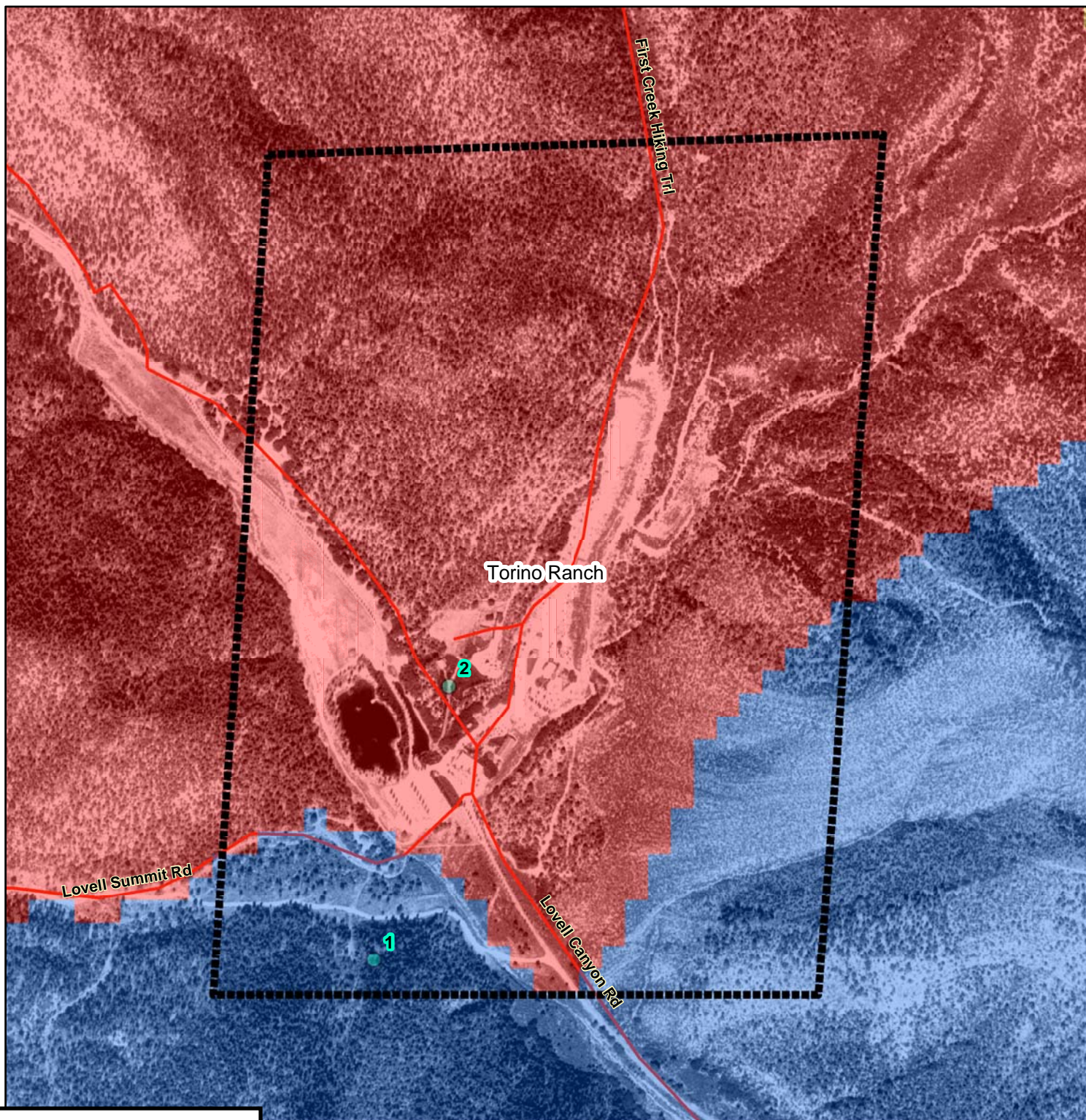
0 250 500 1,000
Feet



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Legend

Community Boundary

Secondary Roads

Wildfire Hazard

Extreme

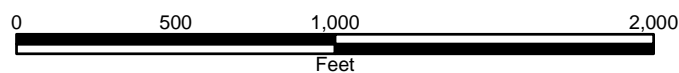
High

Moderate

Low

Photo Point

Figure 10-2. Torino Ranch
Fuel Hazard Classification



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Figure 10-3 Torino Ranch Fuel Hazard Photo Points



Photo 1. 4003285 N. 0627737 E. Direction 020°NNE. Fuel types surrounding the Torino Ranch community include the 2001 Lost Cabin Fire (upper right) and unburned woodlands including pinyon and juniper with a shrub layer of rabbitbrush, sagebrush, manzanita, and ephedra. Fuel loading was estimated at ten tons per acre in the unburned areas. Fuel reduction treatments are recommended for the perimeter of the meadow and ranch building areas.



Photo 2. 4003643 N. 0627835 E. Pinyon and juniper fuels, fifteen to twenty feet in height on steep slopes present an extreme fuel hazard. A shrub layer of rabbit brush, sagebrush, and manzanita is also present. A fuel reduction treatment is recommended for the toe of the slope.

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11.0 TROUT CANYON

11.1 RISK AND HAZARD ASSESSMENT

Trout Canyon is located on the west side of the Spring Mountains at approximately 5,800 feet in elevation and approximately thirteen miles east of Pahrump. A total of 35 homes were observed in the Trout Canyon area during the hazard assessment, which resulted in classifying Trout Canyon in the **Extreme Hazard** category (95 points). The rating is primarily attributed to limited access, poor signage, poor defensible space, the potential for extreme fire behavior, and the absence of an organized fire department. Table 11-3 at the end of this section presents a summary of the community hazard rating values for Trout Canyon.

11.1.1 Community Design

The area surrounding Trout Canyon is defined as an intermix wildland-urban interface condition: structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space. The majority of the lots are between one and ten acres in size. The community boundary is shown in Figure 11-1.

Access: The primary access into Trout Canyon is via Trout Canyon Road, a dirt two-lane road that is between 20 and 24 feet wide. This is the only primary access road into and out of the community. The road is approximately eleven miles long and intersects with Highway 160 approximately three miles east of Pahrump. The road gradient is steeper than five percent in places. Many of the secondary roads are dead-end streets or do not have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs are visible on half (two) of the roads in the community. Residential addresses are not visible on any of the homes in the community. .

Utilities: The utilities are both above and below ground and are a moderate to high ignition risk due to areas with heavy vegetation.

11.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials. Approximately 95 percent of the homes have fire resistant siding materials. Over one-half of the homes in the community (57 percent) have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

11.1.3 Defensible Space

Only 25 percent of the homes within the Trout Canyon community meet the minimum requirement for defensible space landscaping in order to minimize damage to the home during a wildfire.

11.1.4 Suppression Capabilities

Wildfire Protection Resources

The nearest formal fire suppression resources are located over twenty miles away. The resources assigned to the Mt. Springs fire station (Clark County Fire Department 79) are listed in Table 11-1. Resources assigned to Pahrump, Mountain Springs, and Blue Diamond represent the next nearest firefighting resources. The figures quoted are based on data available at the time of interviews with local and regional fire authorities and are subject to change.

Table 11-1. Trout Canyon Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
(No formal local resources)		Trout Canyon
Type 1 Structure Engine	1	Clark County Rural Fire Station 79 (Mountain Springs)
Water Tender	1	
Type 6 Quick Attack Engine	1	
Type 3 Brush Engine	2	US Forest Service (Station 79, Mountain Springs)
Type 7 Brush Patrol Engine	1	
Type 3 Brush Engine	1	Pahrump Fire Department (Pahrump)
Type 1 Structure Engine	1	
Water Tender	1	
Type 4 Brush Engine	1	Bureau of Land Management (Pahrump)
Type 4 Brush Engine	1	US Forest Service (Pahrump)
Type 1 Structure Engine	1	Clark County Rural Fire Station 80 (Blue Diamond)
Type 3 Brush Engine	1	

Source: Pers. comm. B. Kourim, March 2004, K. Oliver and C. Gould, October 2004.

It is important to note that fire suppression resources administered by federal agencies such as the US Forest Service or the Bureau of Land Management station across the county line in Pahrump, are considered national resources and are commonly reassigned to areas of higher severity during the fire season. In response to a wildland fire call, interagency dispatch centers locate and dispatch the closest available resource according to incident command and computer-aided dispatch protocols.

Water Sources and Infrastructure

Ponds and reservoirs of various capacities are present on many of the properties in Trout Canyon. These could be utilized as an emergency drafting source in the event of a wildland fire. The next nearest water source is in Mt. Springs 32 miles away.

Work Load

The Clark County Fire Department station in Mt. Springs responded to 98 emergency medical calls and 21 wildland brush fire calls in 2003.

Detection and Communication

There are no fire lookouts in the Trout Canyon area but reconnaissance flights are conducted for the Spring Mountains area. No community sirens are installed.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

11.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Trout Canyon area is generally heavy throughout the community. Ground fuels consist of annual grasses. The shrub layer is dominated by big sagebrush (four feet tall), cliffrose (five feet tall), greasewood (five feet tall), ephedra (three feet tall) and manzanita (four feet tall). The tree layer is dominated by pinyon and juniper (twenty feet tall). There have been several fires in the area, most recently the Lost Cabin Fire, which occurred southeast of the community. Vegetative and topographic factors give the Trout Canyon area an extreme fuel hazard rating.

The community is situated in a distinct east-west drainage on the west side of the Spring Mountains. The area acts as a chimney within a narrow canyon resulting in strong erratic winds. These topographic conditions can serve to worsen fire behavior and make control efforts more difficult.

11.1.6 Fire Behavior Worst-Case Scenario

The area has a history of large and moderate fire occurrences. The worst-case scenario for this area would occur on a summer afternoon. A fire resulting from a dry lightning storm with multiple ignitions southwest of the community could block the road and prevent people from evacuating and likewise prevent access by suppression equipment to the area. Under windy conditions a fire could be pushed through the heavy fuels downslope into the community. A wildfire ignition in this area has a high potential to escape initial attack efforts, as those resources must travel thirty to forty minutes to reach the community.

11.1.7 Ignition Risk Assessment

Trout Canyon has a high ignition risk rating. The thick brush and trees create a fuel bed receptive to ignition, and the structures intermixed throughout contribute to the hazard. The potential for an ignition to spread is facilitated by the strong winds that often travel through the canyon.

11.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Trout Canyon area is vulnerable to a large fire. Property owners need to take an active role in protecting their property by implementing defensible space treatments, and agencies need to conduct fuels reduction projects.

11.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Limb deciduous and coniferous tree branches a minimum of four feet from the ground, but remove no more than one-third of the original canopy. Remove all dead and diseased branches, duff, and shrubs from beneath trees to prevent fire from climbing into the tree canopy.
- If residents elect to keep some pinyon or juniper trees close to the home for aesthetic reasons, remove other native trees or ladder fuels (shrubs or debris) from underneath the trees or from within a minimum of thirty feet of the tree crown.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Thin fuels for a distance of thirty feet on either side of all driveways. Remove pinyon and juniper trees and thin ground fuels to a spacing of two times their height. Prune tall shrubs to eighteen inches in height.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Clear pine needles, leaves, and debris from roofs and rain gutters.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Install screens over attic vents to prevent sparks from entering the attic.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

Clark County Fire Department

- Conduct courtesy inspections of home defensible space measures.

11.2.2 Fuel Reduction Treatments

Recommendations provided below focus on the reduction of fuels along county roadways and the development of fuelbreaks in key locations around the Trout Canyon community. A shaded fuelbreak is a fuels reduction treatment that alters the spacing and arrangement of combustible fuels in areas where the current fuel arrangement could support a catastrophic wildfire. If properly maintained, a shaded fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Shaded Fuelbreak and Fuel Reduction Treatment Guidelines

The following specifications apply to all treatment areas in this chapter.

- Broadcast seed in fuelbreak areas prior to fuel removal to enhance soil stabilization and the establishment of fire-resistant vegetation and to prevent noxious weed invasions. Use a pre-suppression seed mixture appropriate for the local climate and soil conditions, such as the one recommended in Appendix E.
- Thin trees to a spacing equivalent to two times the height of the trees. The Nevada Forest Practice Act restricts the use of heavy equipment on slopes greater than thirty percent. Consult with a forester from the Nevada Division of Forestry for technical guidance about permitting and carrying out thinning operations on steep slopes.
- If a traditional, even-spaced thinning is not desired, it is permissible to thin trees in a cluster-mosaic formation laid out by a forestry professional.
- Limb all branches on pinyon and juniper trees a minimum of four feet from the ground, not to exceed one-third of the total tree height.
- Where trees are removed, cut stumps as close to the ground as possible, leaving no stump higher than four inches.
- Keep the area within ten feet of limbed trees free of smaller trees, shrubs, duff, and other ladder fuels.
- Thin areas of dense brush so that remaining shrubs have a spacing (canopy to canopy) equal to twice their height. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- Maintain the shaded fuelbreak, thereby limiting the regrowth of woody species.

Property Owners and US Forest Service

- Establish and maintain a 300 foot shaded fuelbreak around structures within and around the community as shown in Figure 11-1.
- Remove annual grasses, weeds, and shrubs for a distance of thirty feet from each edge of the Trout Creek Road. Thin shrubs to a spacing of two times their height.

Clark County Fire Department

- Establish and promote a program for cleaning weeds and debris from around structures and fences in the community.
- Develop a biomass disposal program to facilitate implementation of defensible space and fuel reduction treatments.

Utility Company

- Maintain utility right-of-ways by removing trees and thinning shrubs from beneath power lines and removing all vegetation within fifteen feet of utility poles.

11.2.3 Community Coordination

Coordination among local, state, and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

Private Property Owners

- Ensure residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Coordinate with the Clark County Fire Department and the Clark County Sheriff's Department to identify any non-ambulatory persons within the community that will need evacuation assistance in the event of a wildland fire.
- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from the threat of wildfire in Nevada's communities. Through the establishment of a local Chapter, communities will become part of a large network for sharing information and notifications of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

Nevada Fire Safe Council
1187 Charles Drive
Reno, Nevada 89509
www.nvfsc.org

Clark County

- Ensure cooperation between the Assessor's office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.
- Adopt local ordinances that require all future development in the county to meet the National Fire Codes regarding to road and building construction, water supply, and fire service needs (turnaround space, pull-outs, etc.).

- Adopt local ordinances to require implementation of fuel reduction treatments and defensible space prior to issuing building permits.

Clark County Fire Department

- Develop and enforce brush clearance and biomass disposal programs.
- Install a community siren as a communication tool for evacuation.

11.2.4 Public Education

Public education is critical in communities such as Trout Canyon that have limited fire suppression resources. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- 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.
- Hold an annual community fire awareness event and distribute public education materials on the dangers of fireworks.
- Contact the University of Nevada Cooperative Extension and the Bureau of Land Management for assistance with public education.

11.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Comply with *National Wildfire Coordinating Group 310-1* standards for wildland fire training and equipment.

Bureau of Land Management and US Forest Service

- Move additional resources into the area on high hazard days if available or ensure volunteer resources are adequate for high hazard days.

Bureau of Land Management and Clark County Fire Department

- Develop a helicopter dip site for use during initial attack such as ponds, tanks, etc. Repair existing pond sites to serve as dip sites for helicopters or drafting sites for engines and tenders.
- Investigate the purchase of fire blocking gels or foams that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

Private Property Owners

- Install 1,000-gallon water storage tanks for use during structure protection efforts, especially during wildland fire events. These tanks should be gravity operated or have pumps equipped with generators in the event that a wildland fire eliminates electrical power to the community.

- Investigate the purchase of a fire blocking gel for buildings. These products come in the form of gels or foams that can be applied to structures and to vegetation in order to create an additional layer of fire protection.

11.3 SUMMARY OF RECOMMENDATIONS

Table 11-2. Trout Canyon Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce and replace vegetation around home according to the defensible space guidelines in Appendix E.
	Community Coordination	Ensure that address signs are clearly visible from the road. Form a local chapter of the Nevada Fire Safe Council. Identify non-ambulatory residents in the community that may need assistance with evacuation
	Fire Suppression Resources and Training	Install 1,000-gallon water storage tanks for fire suppression. Investigate the purchase and use of fire blocking foams and gels for individual property protection in the wildland-urban interface.
Property Owners and US Forest Service	Fuels Reduction	Construct and maintain a shaded fuelbreak 300 feet wide around structures within and surrounding the community. Remove annual grasses and weeds and thin shrubs along Trout Creek Road.
US Forest Service and Bureau of Land Management	Fire Suppression Resources and Training	Move additional resources into the area on high fire hazard days.
Clark County	Community Coordination	Ensure cooperation between the Assessor's Office and the Roads Department so that all roads in new developments are named, signed, mapped, and identified with GPS locations. Adopt county ordinances that enforce the implementation and maintenance of defensible space. Require all future development in the County meet the National Fire Codes with regard to community design, building construction and spacing, road construction, water supply, and emergency access.

Involved Party	Recommended Treatment	Recommendation Description
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Fuels Reduction	Establish and promote a program for cleaning weeds and debris from around structures and fences in the community. Develop a biomass disposal program.
	Fire Suppression Resources and Training	Comply with <i>NWCG 310-1</i> training and equipment standards. Evaluate the use of fire blocking foams and gels for additional building protection in the wildland-urban interface.
	Public Education	Distribute copies of “ <i>Living with Fire</i> ” to all property owners living in Trout Canyon. Hold an annual community fire awareness event and distribute educational materials on the wildland fire dangers of fireworks. Contact the Bureau of Land Management and the University of Nevada Cooperative Extension for assistance with public education activities.
	Community Coordination	Install a community siren to advise residents of evacuation orders. Repair existing ponds and develop new sources as dip sites for helicopters and drafting sites for engines and tenders.
Utility Company	Fuels Reduction	Remove trees within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles.

Table 11-3. Trout Canyon Fire Hazard Ratings Summary

A. Urban Interface Condition 2		TALLIES	
B. Community Design		35 Total Houses	4 Residential Streets
1. Ingress / Egress	<u>5</u> /5	B5. Street Signs <u>2</u> not visible <u>2</u> visible <u>50%</u> visible	
2. Width of Road	<u>3</u> /5	B6. Address Signs <u>35</u> not visible <u>0</u> visible <u>0%</u> visible	
3. Accessibility	<u>3</u> /3	C1. Roofs <u>0</u> combust <u>35</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>5</u> /5	C2. Siding <u>2</u> combust <u>33</u> not combust <u>94%</u> not combust	
5. Street Signs	<u>5</u> /5	C3. Unenclosed Structures on Lot <u>20</u> not enclosed <u>15</u> enclosed <u>57%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>1</u> <1ac <u>34</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>3</u> /5	D2. Defensible Space <u>27</u> not adequate <u>8</u> adequate <u>23%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>5</u> /5		
D. Defensible Space			
1. Lot Size	<u>3</u> /5		
2. Defensible Space	<u>15</u> /15		
F. Fire Behavior			
1. Fuels	<u>5</u> /5		
2. Fire Behavior	<u>10</u> /10		
3. Slope	<u>4</u> /10		
4. Aspect	<u>7</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>5</u> /10		
2. Department	<u>10</u> /10		

Score 95 /128

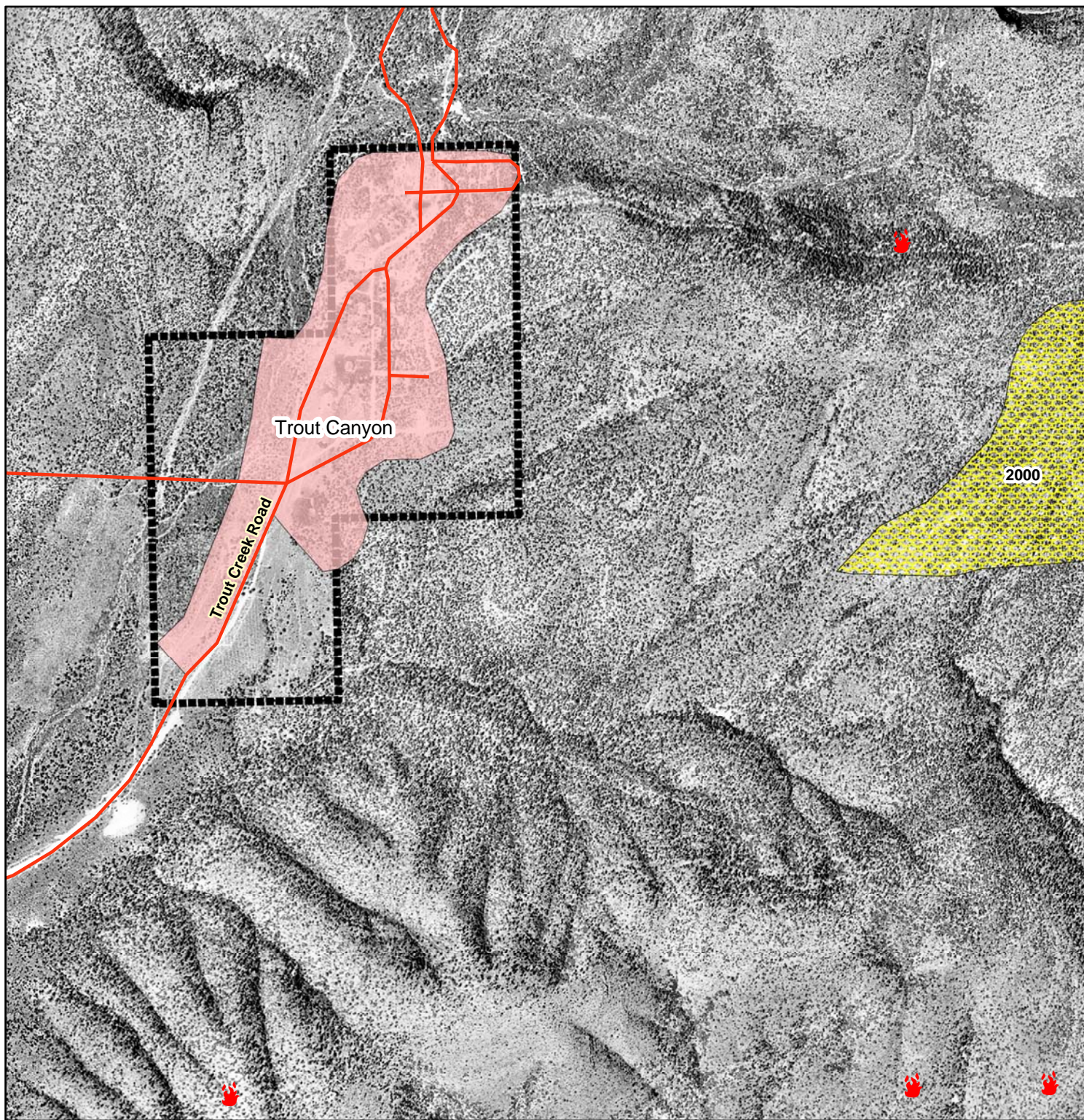







Figure 11-1. Trout Canyon
Fire History and Proposed
Mitigation Projects

Legend

-  Community Boundary
-  Proposed Fuel Reduction Treatment
-  Fire Boundary and Date
-  Fire Ignition
-  Secondary Roads

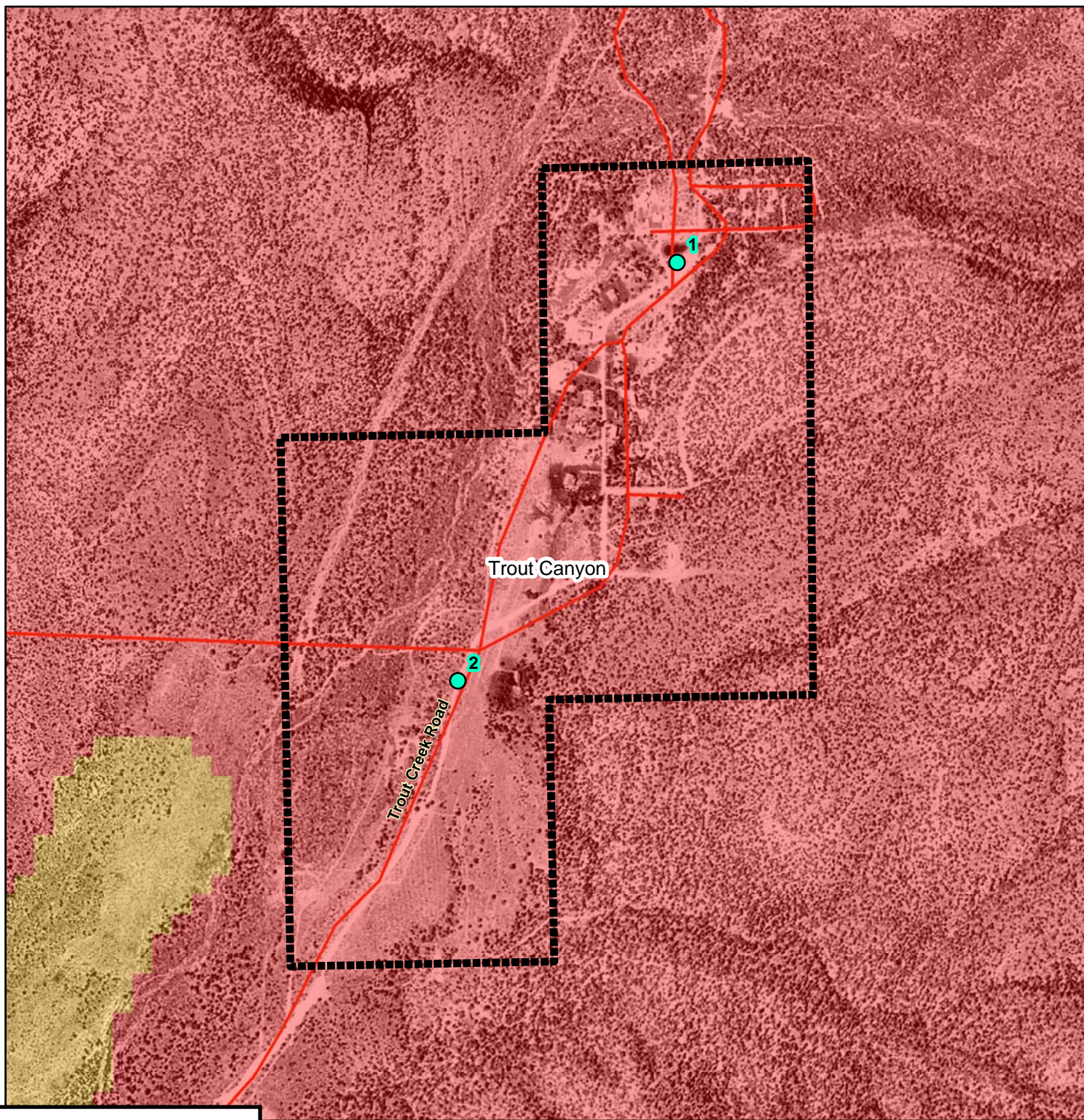
0 500 1,000 2,000
Feet



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Legend

Community Boundary

Secondary Roads

Wildfire Hazard

Extreme

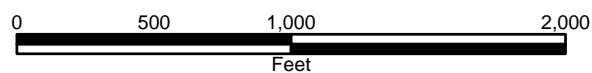
High

Moderate

Low

Photo Point

Figure 11-2. Trout Canyon
Fuel Hazard Classification



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Figure 11-3 Trout Canyon Fuel Hazard Photo Points



Photo 1. 4005164 N. 0618845 E. Direction 148°SSE. Dense pinyon adjacent to structures creates an extreme fire hazard and potential for loss of the home. Creation of adequate defensible space is recommended for property owners in this community.



Photo 2. 4004528 N. 0618511 E. Direction 010°NNE. Extreme fuel hazard in the interface area around Trout Canyon is created by dense sagebrush, cliffrose, and Utah juniper. Fuel loading was estimated at eight to ten tons per acre. A fuel reduction treatment is recommended for the perimeter of the community.

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Moderate Hazard Communities

12.0 CACTUS SPRINGS

12.1 RISK AND HAZARD ASSESSMENT

Cactus Springs is 48 miles northwest of Las Vegas on US Highway 95, adjacent to a military installation. The area on the east side of the highway was previously commercial but the businesses are now abandoned. Five residences were observed in Cactus Springs. The community was placed in the **Moderate Hazard** category (46 points). The moderate rating is primarily attributed to the lack of local fire suppression personnel, local water sources, and defensible space. Table 12-3 at the end of this section presents a summary of the community hazard rating values for Cactus Springs.

12.1.1 Community Design

Cactus Springs demonstrates a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Residential structures are located mainly along the highway. Parcels are less than one acre in size. The community boundary is shown in Figure 12-1.

Access: Cactus Springs lies along US Highway 95, a paved four-lane road. All secondary roads are unpaved. There is adequate room for fire suppression equipment to maneuver.

Signage: Clear and visible street signs and residential addresses are always important in locating homes, especially for rescue personnel unfamiliar with an area and the low visibility conditions that may occur during a wildfire. Due to the very limited number of residences in Cactus Springs, there is little chance that fire suppression personnel would be unable to locate a particular structure in need of protection.

Utilities: Utilities are both above and below ground. Utility corridors are well maintained and pose a low ignition risk.

12.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing and siding materials. Four of the five homes in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

12.1.3 Defensible Space

Four of the five homes do not meet the defensible space landscaping requirement to minimize the risk of property damage or loss of a home during a wildfire. Accumulations of weeds and debris along fences and near residential structures are common.

12.1.4 Suppression Capabilities

Wildfire Protection Resources

The nearest fire protection resources for Cactus Springs are located at Indian Springs, three miles to the east. These resources include a 36-member volunteer fire department

and fire suppression resources attached to the US Air Force installation at Indian Springs. The Nevada Division of Forestry also administers a conservation work camp at Indian Springs with the capacity to house a fire crew of a dozen. Additional County resources would be dispatched through the Clark County Fire Alarm office. Table 12-1 lists the resources most likely be the first to respond to a reported wildland fire. This information is based on data available at the time of interviews with local and regional fire authorities and are subject to change.

Table 12-1. Cactus Springs Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	1	Clark County Fire Department (Indian Springs Station 83)
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Type 4 Brush Engine	1	US Forest Service (Indian Springs Station 83)
Type 6 Brush Patrol Engine	1	
Type 1 Structure Engine	1	Clark County Fire Department (Cold Creek Station 82)
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	

Source: Steve McClintock, Kurt Leavitt, Mark Blankensop, pers. comm. March 2004.

Federal resources called to respond to a fire in Cactus Springs would be dispatched through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry conservation crew stationed in Cactus Springs is dispatched through the Sierra Front Interagency Dispatch Center in Minden, Nevada. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that Federal resources are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Cactus Springs includes wells and a 40,000-gallon storage tanks at Indian Springs.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Cactus Springs have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per National Wildfire Coordinating Group 310-1.

Work Load

In 2003 the Indian Springs Fire Department responded to 42 emergency medical calls and thirteen wildland brush fire calls.

Financial Support

Financial support for the Clark County Fire Department in Indian Springs comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Cactus Springs is covered under the Clark County All-Risk Emergency Plan. The Clark County Fire Department reviews development plans for the entire County to ensure compliance with the 1997 (with amendments) Uniform Fire Code standards. There are no brush clearance programs in Cactus Springs.

12.1.5 Factors Affecting Fire Behavior

The dominant vegetation in the Cactus Springs area is Mojave Desert shrub consisting of creosote bush with an understory of annual grasses. There are scattered mesquite and poplar trees. The fuel density is light, estimated at less than one ton per acre, which was considered a low fuel hazard.

12.1.6 Fire Behavior Worst-Case Scenario

Winds from the south/southwest would drive a fire through the community. Weed accumulations along fences and surrounding homes would fuel a fire, and the lack of defensible space would allow the fire to spread from these fuels directly to homes. The lack of fire protection and water sources increases the risk of property loss from a fire.

12.1.7 Ignition Risk Assessment

Cactus Springs has a low ignition risk rating. There is no recorded wildfire history in the areas surrounding the community, and database records show the nearest ignitions to have occurred more than 25 miles away.

12.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Cactus Springs Risk Reduction Recommendations focus on defensible space. Specific recommendations are detailed below.

12.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

The lack of fire suppression resources increases the risk of damage and property loss due to a fire before fire protection resources could arrive from Indian Springs. It is important for the residents of Cactus Springs to take precautions to reduce fire hazards in their community.

Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Remove shrubs and annual vegetation from vacant lots in the community.
- Mow and remove annual grasses from along fences and from areas surrounding homes and other structures.
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Maintain defensible space annually.

12.2.2 Fuel Reduction Treatments

Recommendations provided below focus on the reduction of fuels along roadways in key locations around the Cactus Springs community. If properly maintained, a roadside fuelbreak can eliminate the continuity of fuels in the tree, shrub, and ground layers. As a result, the heat intensity and rate of spread of an oncoming wildfire can be reduced considerably, offering conditions where a fire can be more safely and effectively managed on the ground.

Nevada Department of Transportation

- Reduce or remove red brome and other annuals along US Highway 95 and local roadways by mowing or applying pre-emergent herbicide prior to seed maturity. Treatments may need to be repeated in successive years. Reseed with fire resistant species such as recommended in Appendix E if necessary to control invasion of noxious weeds.

12.2.3 Public Education

- Distribute copies of the publication “*Living with Fire.*” This publication is available free of charge from the University of Nevada Cooperative Extension.

12.3 SUMMARY OF RECOMMENDATIONS

Table 12.2. Cactus Springs Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
	Public Education	Request copies of the publication <i>“Living with Fire”</i> from the University of Nevada Cooperative Extension.
Nevada Department of Transportation	Fuels Reduction	Remove flammable annual grasses from roadsides and reseed with fire resistant species.

Table 12-3. Cactus Springs Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES		
B. Community Design			5 Total Houses	1 Residential Streets	
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs		
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible <u>1</u> visible <u>100%</u> visible		
3. Accessibility	<u>1</u>	/3	B6. Address Signs		
4. Secondary Road	<u>1</u>	/5	<u>0</u> not visible <u>5</u> visible <u>100%</u> visible		
5. Street Signs	<u>1</u>	/5	C1. Roofs		
6. Address Signs	<u>1</u>	/5	<u>0</u> combust <u>5</u> not combust <u>100%</u> not combust		
7. Utilities	<u>1</u>	/5	C2. Siding		
C. Construction Materials			<u>0</u> combust <u>5</u> not combust <u>100%</u> not combust		
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot		
2. Siding	<u>1</u>	/5	<u>4</u> not enclosed <u>1</u> enclosed <u>80%</u> not enclosed		
3. Unenclosed Structures	<u>5</u>	/5	D1. Lot Sizes		
D. Defensible Space			<u>5</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac		
1. Lot Size	<u>5</u>	/5	D2. Defensible Space		
2. Defensible Space	<u>15</u>	/15	<u>4</u> not adequate <u>1</u> adequate <u>20%</u> adequate		
F. Fire Behavior					
1. Fuels	<u>1</u>	/5			
2. Fire Behavior	<u>3</u>	/10			
3. Slope	<u>1</u>	/10			
4. Aspect	<u>1</u>	/10			
E. Suppression Capabilities					
1. Water Source	<u>1</u>	/10			
2. Department	<u>7</u>	/10			
Score		<u>48</u> /128			

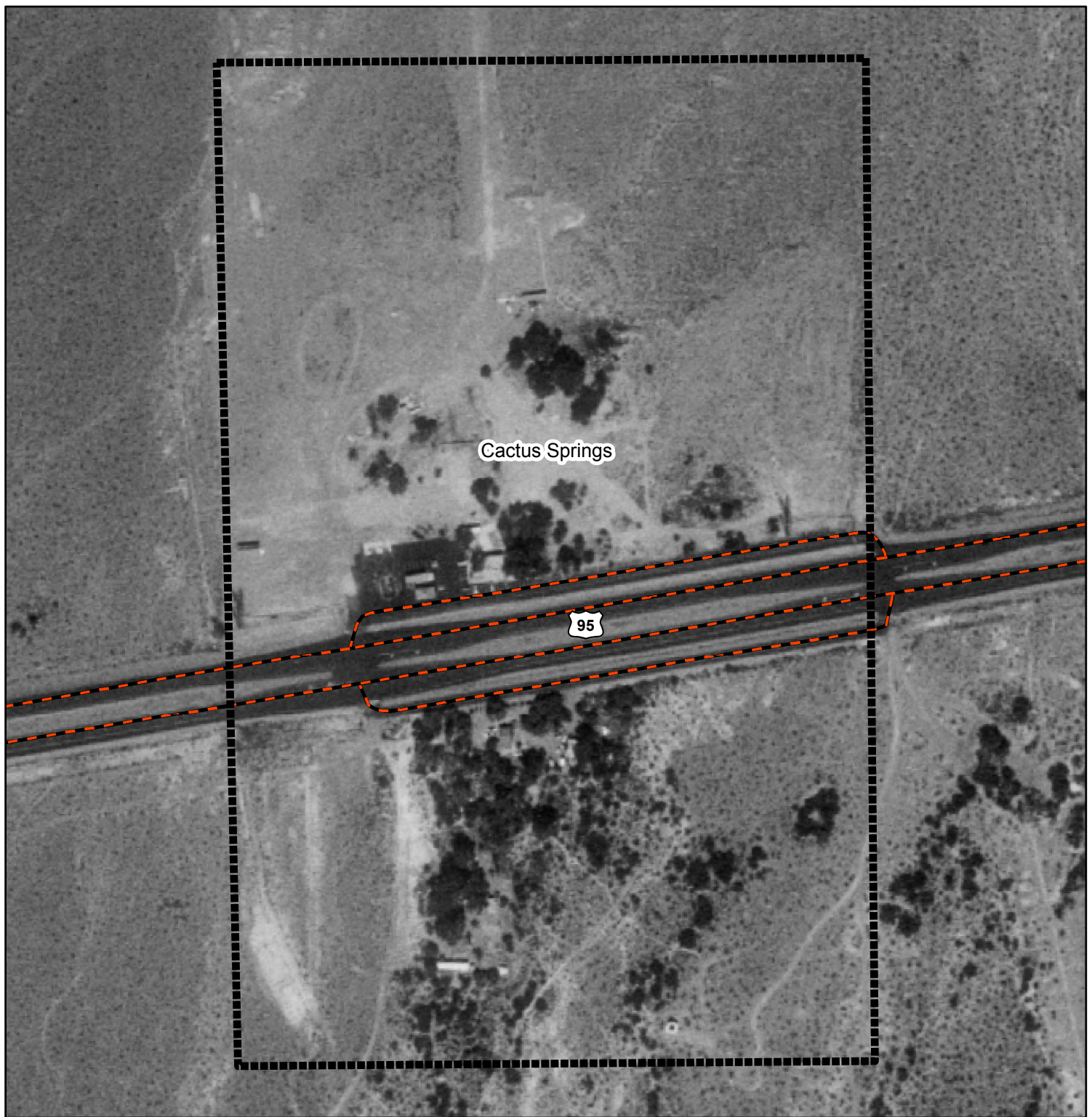


Figure 12-1. Cactus Springs



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340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Legend



Community Boundary



Highways and State Routes

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

13.0 GOODSPRINGS

13.1 RISK AND HAZARD ASSESSMENT

Goodsprings is located along Interstate 15 at the California/Nevada border, forty miles south of Las Vegas. Goodsprings is a small community with approximately 100 structures. The assessment resulted in classifying Goodsprings in the **Moderate Hazard** category (48 points). The rating is primarily attributed to moderate fuel loading and limited water sources. Table 13-3 at the end of this section presents a summary of the community hazard rating values for Goodsprings.

13.1.1 Community Design

The area surrounding Goodsprings is characteristic of a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. There are areas of moderate brush and debris within the community. Eighty percent of residential lots are less than one acre in size; the other twenty percent are on parcels measuring between one and ten acres. The community boundary is shown in Figure 13-1.

Access: The primary access to Goodsprings is State Route 161. The road gradient is less than five percent. There is adequate turnaround space for fire suppression equipment to maneuver in the community.

Signage: Street signs are visible on all of the roads in the community. Addresses are visible on half of the houses. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during a wildland fire.

Utilities: Power lines and right-of ways in Goodsprings have been maintained and generally pose a low ignition risk.

13.1.2 Construction Materials

All structures in the interface are built with non-combustible roofing materials and 85 percent have fire resistant siding materials. Approximately one-quarter of the structures in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

13.1.3 Defensible Space

Approximately seventy percent of the structures within the Goodsprings community meet the minimum requirements for defensible space landscaping to minimize property damage or loss of the home during a wildfire.

13.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Fire Department Station 78, located in Goodsprings, is an all volunteer fire department that reported having eight members at the time that interviews were

conducted for this report. Table 13-1 lists the fire suppression resources assigned to the volunteer fire department and additional County resources that would be dispatched through the Clark County Fire Alarm office to respond to a reported wildland fire.

Table 13-1. Goodsprings Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 78 (Goodsprings)
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Type 3 Brush Engine	1	US Forest Service (Station 79, Mountain Springs)
Type 7 Brush Patrol Engine	1	

Source: Steve McClintock, pers. comm., April and October 2004.

The US Forest Service, the Bureau of Land Management, and the Nevada Division of Forestry provide mutual aid - the federal agencies through the Las Vegas Interagency Communications Center and the Nevada Division of Forestry through the Sierra Front Interagency Dispatch in Minden, Nevada. These systems locate the nearest available fire suppression resource according to computer aided dispatch protocols. It is important to note that these resources are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Goodsprings is limited but additional water is available within a twenty minute round trip. Water supply is from wells and one 10,000-gallon storage tank. The water system operates on gravity.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Goodsprings have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel met minimum requirements per National Wildfire Coordinating Group 310-1.

Work Load

The Clark County Fire Department station responded to fifteen emergency medical calls and nine wildland brush fire calls in 2003.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office, and local dispatch relay fires to local fire departments.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning committee and has adopted an all-risk multi-agency emergency plan. The plan is reviewed annually and updated as needed. The Clark County Fire Department reviews proposed development plans for compliance with fire safe codes and ordinances.

13.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Goodsprings area is generally moderate throughout the interface area and the fuel hazard was considered moderate. Ground fuels consist of annual grasses. The shrub layer is dominated by bursage (two to four feet tall), and creosote bush (two to eight feet tall). The community is situated in a flat area with a saddle on the south side of town. Surrounding slopes are moderate with a topographic saddle in the hills to the south which may intensify fire behavior.

13.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would be a fire starting south of the saddle on the south side of town with strong wind conditions. A wind driven fire would be rapidly funneled through the saddle and pushed towards structures. Firebrands could ignite areas of heavy vegetation or areas needing defensible space or general cleanup and quickly spreading to nearby structures.

13.1.7 Ignition Risk Assessment

Goodsprings has a moderate ignition risk based on the ignition history at the interface.

13.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Primary recommendations for Goodsprings include the maintenance of defensible space and ongoing community cleanup activities.

13.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Property Owners

Density and type of fuel around a home determines the potential fire exposure levels to the home. The goal of defensible space is to reduce the chances of a wildfire spreading

onto property and burning through to the home; properly maintained defensible space also gives firefighting personnel enhanced conditions to protect property. General guidelines for improving defensible space around residences and structures in the community are provided below.

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Remove dead and diseased tree branches. For deciduous and coniferous trees, limb branches a minimum of four feet from the ground, but not more than one-third of the tree crown, to reduce ladder fuels. Remove all dead and diseased branches and duff from beneath remaining trees.
- Thin shrubs and other brush to a distance equal to twice their height (crown to crown).
- Enclose wood decks and porches. If this is not possible, keep the area beneath wood decks and porches free of weeds and other flammable debris. Where possible, install screens around unenclosed overhangs.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Clear leaves and debris from roofs and rain gutters.
- Mow grass to a height of no more than three inches.
- Coordinate a general community cleanup effort.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Remove all abandoned wood structures in order to reduce the fuel hazard that these buildings present.
- Install screens over attic vents to prevent sparks from entering the attic.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

Clark County Fire Department

- Conduct courtesy inspections of home defensible space measures.

13.2.2 Fuel Reduction Treatments

As noted above, primary recommendations for Goodsprings includes the maintenance of defensible space and ongoing community cleanup activities. Larger-scale fuels reduction projects are not proposed. Fuels reduction activities are proposed along utility lines.

Utility Company

- Remove vegetation for a distance of thirty feet around power poles with transformers. It is important to keep power line corridors clear of flammable vegetation, especially around power poles and beneath transformers, as fires have been known to start from arcing power lines during windy conditions. Keeping flammable vegetation cleared from beneath power lines and around power poles reduces additional threats that wildfires present to electric utility infrastructure.

13.2.3 Community Coordination

Coordination among local, state and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

Private Property Owners

- Make sure residential addresses are visible from the road. Address characters should be at least four inches in height and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.
- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from the threat of wildfire in Nevada's communities. Through the establishment of a local Chapter, local communities will become part of a large network for sharing information and receive notifications of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members and promote success stories of its members. To form a local Chapter or for more information contact the:

Nevada Fire Safe Council
1187 Charles Drive
Reno, Nevada 89509
www.nvfsc.org

Clark County

- Allow burning only under a permit process or establish designated community burning days.

13.2.4 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale that can effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- 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.

13.2.5 Fire Suppression Resources and Training

Clark County Fire Department

- Install a 50,000-gallon water tank for firefighting resources.
- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).

13.3 SUMMARY OF RECOMMENDATIONS

Table 13.2. Goodsprings Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
	Community Coordination	Make sure that residential addresses are clearly visible from the road Form a local chapter of the Nevada Fire Safe Council.
Clark County Fire Department	Public Education	Distribute copies of “ <i>Living with Fire</i> ” to all property owners living in Lee Canyon.
	Fire Suppression Resources and Training	Install a 50,000 gallon water tank. Comply with <i>NWCG 310-1</i> training and equipment standards.
Clark County	Community Coordination	Allow burning only under a permit process or on designated community burn days.
Utility Company	Fuels Reduction	Clear all vegetation surrounding the electrical transfer station. Remove trees and trim shrubs within overhead utilities corridors; completely remove all vegetation within fifteen feet of utility poles.

Table 13-3. Goodsprings Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			98 Total Houses	22 Residential Streets
1. Ingress / Egress	<u>3</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible	<u>22</u> visible <u>100%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>43</u> not visible	<u>55</u> visible <u>56%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>5</u>	/5	<u>0</u> combust	<u>98</u> not combust <u>100%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>16</u> combust	<u>82</u> not combust <u>84%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>27</u> not enclosed	<u>71</u> enclosed <u>28%</u> not enclosed
3. Unenclosed Structures	<u>3</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>79</u> <1ac	<u>19</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>29</u> not adequate	<u>69</u> adequate <u>70%</u> adequate
F. Fire Behavior				
1. Fuels	<u>3</u>	/5		
2. Fire Behavior	<u>7</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>5</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>48</u> /128		

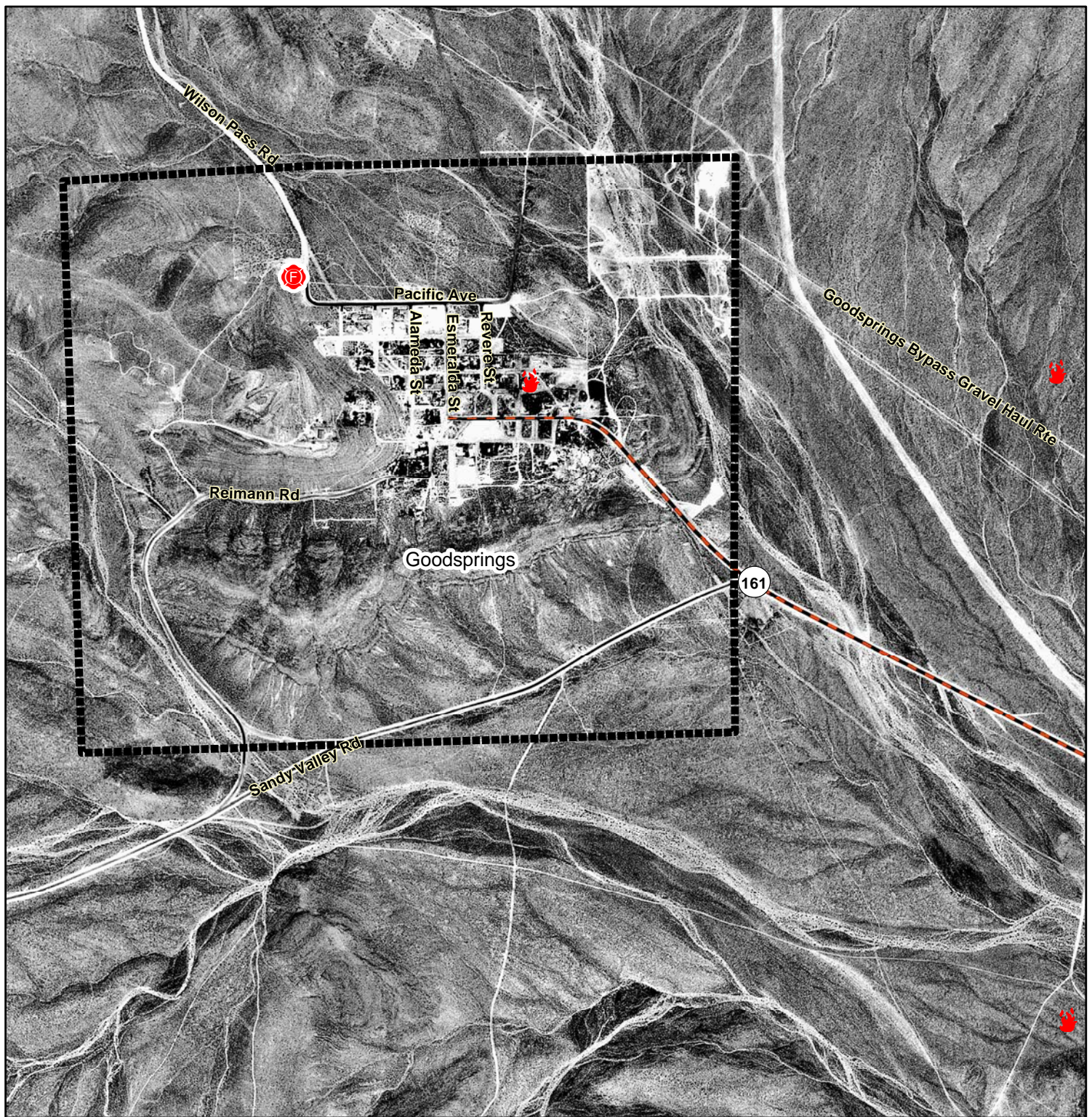




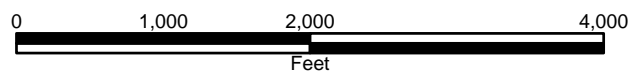


Figure 13-1. Goodsprings
Fire History and Suppression Resources



Legend

-  Community Boundary
-  Fire Ignition
-  Fire Station
-  Highways and State Routes



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340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

14.0 MOAPA

14.1 RISK AND HAZARD ASSESSMENT

Moapa is located along the Muddy River in northeast Clark County, three miles north of Interstate 15 and 48 miles east of Las Vegas. A total of seventy homes in the Moapa area were observed during the community assessment, which resulted in classifying Moapa in the **Moderate Hazard** category (49 points). The moderate rating is primarily attributed to a potential for strong fire behavior, limited water, and limited fire suppression resources. These adverse conditions are somewhat mitigated by good access, adequate defensible space, and fire resistant building materials. Table 14-3 at the end of this section presents a summary of the community hazard rating values for Moapa.

14.1.1 Community Design

The area surrounding Moapa is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. Most lots are on parcels of less than one acre in size. The community boundary is shown in Figure 14-1.

Access: Moapa is accessed via State Route 168 that intersects with Interstate 15 approximately three miles south of the community. State Road 168 is a paved two-lane road greater than 24 feet in width. Secondary roads provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on a little more than half of all the homes in the community. Clear and visible residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during a wildland fire.

Utilities: New development areas have underground utilities. Older neighborhoods have above ground utilities. The utilities appear to be a low ignition risk.

14.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and 94 percent of the homes have fire resistant siding materials. Approximately one-third of the homes in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

14.1.3 Defensible Space

Approximately ninety percent of the homes have landscaping that meets the defensible space requirement to minimize the potential for property damage or loss of the home during a wildfire. There are some exceptions where residences have excess vegetation, stacked wood, or debris in close proximity to the structure.

14.1.4 Suppression Capabilities

Wildfire Protection Resources

The Clark County Fire Department Station 72 in Moapa is an all-volunteer fire department that reported having seven members at the time interviews were conducted for this project. Table 14-1 lists the resources most likely to first respond to a reported wildland fire. Additional County resources are stationed in Logandale and Overton. The Clark County Fire Alarm Office would dispatch neighboring resources as needed.

Table 14-1. Moapa First Alarm/Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender Type 1 Structure Engine Type 6 Quick Attack Engine Basic Life Support (BLS) Rescue	1 1 1 1	Clark County Rural Fire Station 72 (Moapa)
Water Tender Type 1 Structure Engine Type 6 Quick Attack Engine Advanced Life Support (ALS) Rescue	1 1 1 1	Clark County Rural Fire Station 73 (Logandale)
Water Tender Type 1 Structure Engine Type 6 Quick Attack Engine Advanced Life Support (ALS) Rescue	1 1 1 1	Clark County Rural Fire Station 74 (Overton)
Type 3 Brush Engine	1	Bureau of Land Management (Logandale Station)

Source: Steve McClintock, Kurt Leavitt pers. comm., 30 March 2004.

The Mesquite Fire department provides mutual aid through the Las Vegas Fire Alarm Office and federal mutual aid is provided by the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry provides mutual aid as coordinated through the Sierra Front Interagency Dispatch in Minden, Nevada. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols; it is important to note that Federal resources are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Moapa includes community wells and two tanks with a combined capacity of four million gallons. The water system operates on gravity. Moapa also has access to the Muddy River and several ponds for drafting and helicopter dip sites.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Moapa have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per National Wildfire Coordinating Group 310-1.

Work Load

The Moapa Fire Department responded to 136 emergency medical calls and seven wildland brush fire calls in 2003.

Financial Support

The Clark County Fire Department station in Moapa is a tax based fire district. Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Detection and Communication

Fire detection and communication is facilitated by the consolidated Fire Alarm Office in Las Vegas. There is no community siren.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

14.1.5 Factors Affecting Fire Behavior

There are two distinct vegetative fuel types in the Moapa interface area: the Muddy River riparian zone and upland Mojave Desert. Vegetative fuel density along the Muddy River corridor in the Moapa interface area is high and was considered a high fuel hazard. The primary ground fuel is saltgrass. The shrub layer consists of fourwing saltbush, approximately two to four feet in height and creosote bush. Trees ranging from ten to forty feet tall include tamarisk, mesquite, willow, poplar, and palm and are the major components of the fuel load. The fuel load was estimated at four tons per acre and ranged as high as eight tons per acre in the areas with palm trees.

The vegetative fuel density in the uplands is light and consists of creosote bush, fourwing saltbush, and bursage. There is no tree layer. The fuel hazard in the upland areas was considered low.

14.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would begin with a fire started in the Muddy River bottom in the late afternoon in the summer. A wind driven fire would put structures along the riparian corridor at risk and threaten structures that lack adequate defensible space.

14.1.7 Ignition Risk Assessment

Moapa has a low ignition risk rating. There is neither significant wildfire history nor recorded historical ignitions in the area surrounding the community. The low, sparse brush in and around the community facilitates these low ignition rates.

14.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The Moapa Risk Reduction Recommendations focus on tamarisk reduction along the river bottom and wildland training for all firefighters in the Clark County Fire Department. The recommendations are detailed below.

14.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Property Owner Recommendations

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Enclose wood decks and porches. If this is not possible, maintain the areas to be free of weeds and other flammable debris.
- Make sure residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Install screens over attic vents to prevent sparks from entering the attic.
- Ensure that all branches are at least fifteen feet from chimneys and other heat sources. Install spark arrestors or screens on fireplace and wood stove chimneys.
- Maintain defensible space annually.

14.2.2 Fuels Reduction

The goal of the fuels reduction treatments is to reduce the fuel hazard due to tamarisk and to allow safe ingress and egress to the community during a wildfire.

Bureau of Land Management

- Continue the tamarisk fuels reduction project in the Muddy River drainage.

Union Pacific Railroad

- Continue to keep the railroad corridor clear of flammable vegetation for a distance of fifteen feet on both sides of the tracks.

Nevada Department of Transportation and Clark County

- Mow roadside vegetation to a maximum height of four inches within thirty feet from the edge of the pavement along both sides of State Route 168 from Interstate 15 through Moapa. Implement similar fuel reduction treatments along the primary roadways in the Moapa community.

14.2.3 Wildland Fire Training and Equipment

Clark County Fire Department Recommendations

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).

14.3 SUMMARY OF RECOMMENDATIONS

Table 14-2. Moapa Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
Nevada Department of Transportation and Clark County	Fuels Reduction	Mow vegetation to a maximum height of four inches along both sides of State Route 168 from I-15 north through the community of Moapa. Implement similar roadside treatments along primary roads within the community.
Bureau of Land Management	Fuels Reduction	Continue tamarisk abatement projects in the Muddy River drainage.
Union Pacific Railroad	Fuels Reduction	Maintain railroad corridor clear of flammable vegetation.
Clark County Fire Department	Fire Suppression Equipment and Training	Comply with <i>NWCG 310-1</i> training and equipment standards.

Table 14-3. Moapa Fire Hazard Ratings Summary

A. Urban Interface Condition <u>1</u>		TALLIES	
B. Community Design		71 Total Houses	6 Residential Streets
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>0</u> not visible <u>6</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>29</u> not visible <u>42</u> visible <u>59%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>71</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>4</u> combust <u>67</u> not combust <u>94%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>23</u> not enclosed <u>48</u> enclosed <u>32%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>70</u> <1ac <u>1</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>8</u> not adequat <u>63</u> adequate <u>89%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>3</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>3</u> /5		
2. Fire Behavior	<u>10</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>5</u> /10		
2. Department	<u>7</u> /10		
Score <u>49</u> /128			

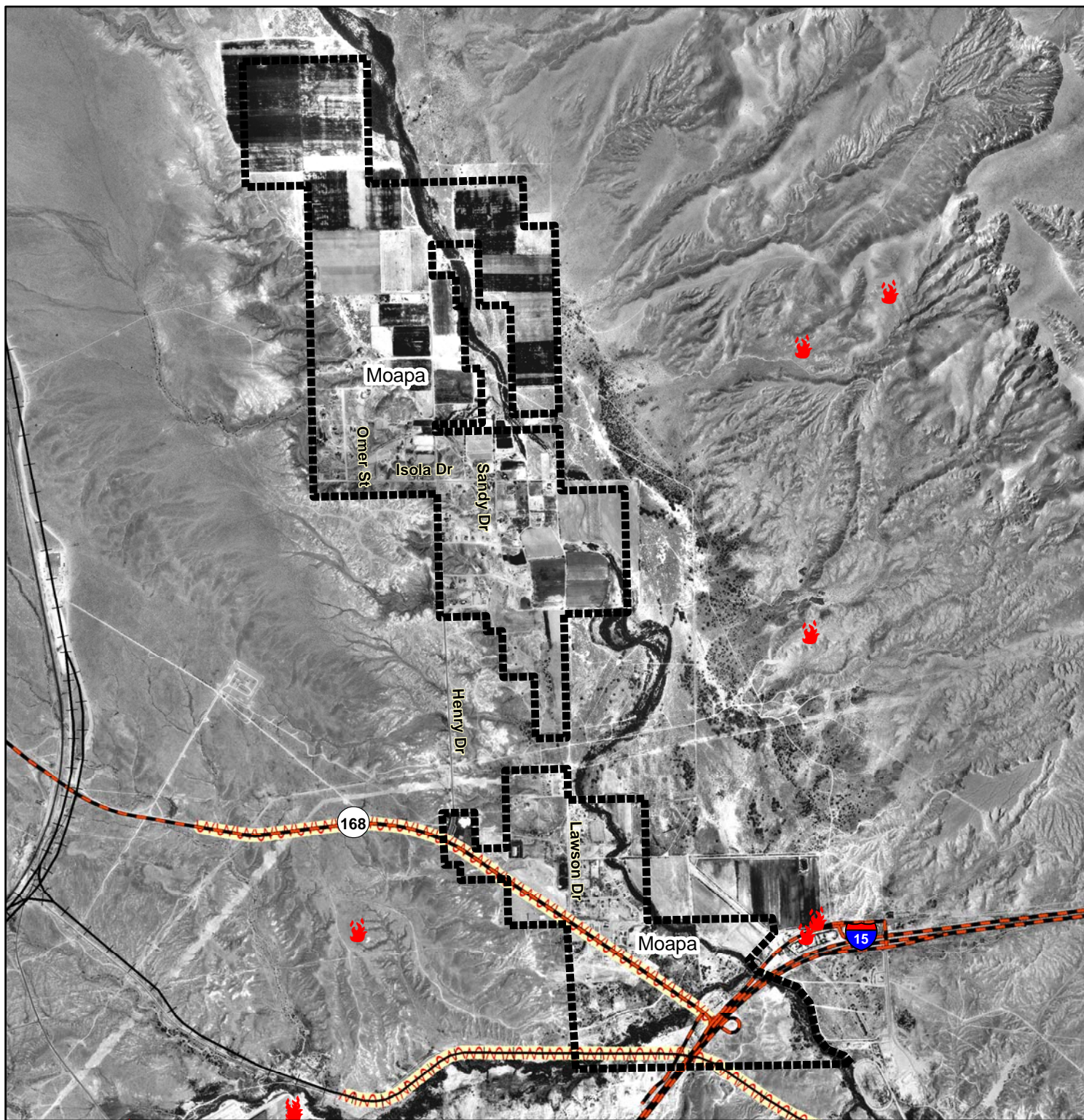


Figure 14-1. Moapa
Fire History and
Proposed Mitigation Projects



0 1,000 2,000 4,000
Feet








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Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

Legend

-  Community Boundary
-  Highways and State Routes
-  Railroad
-  Proposed Fuel Reduction Treatment
-  Fire Ignition

15.0 SANDY VALLEY

15.1 RISK AND HAZARD ASSESSMENT

Sandy Valley is located on the California/Nevada border approximately ten miles east of Goodsprings on State Route 161. There are over 800 homes in the Sandy Valley area. The assessment resulted in classifying Sandy Valley in the **Moderate Hazard** category (42 points). This rating is primarily attributed to limited water sources, inadequate street and address signage, and limited fire suppression resources. Table 15-3 at the end of this section presents a summary of the community hazard rating values for Sandy Valley.

15.1.1 Community Design

The Sandy Valley community is characterized by an intermix wildland-urban interface condition: structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space. Approximately three quarters of the homes are on lots between one and ten acres and the remainder are on lots less than one acre in size. The community boundary is shown in Figure 15-1.

The Sandy Valley community is classified as an intermix condition. Structures are scattered throughout the wildland area. There is no clear line of demarcation between structures and wildland fuels along roads, back fences, etc.

Access: The primary access to Sandy Valley is State Route 161. This is the only road into or out of the community. The road grade is less than five percent. There is adequate turnaround space for fire suppression equipment to maneuver in the community.

Signage: Street signs are visible on approximately 75 percent of the roads in the community. Addresses are visible on half of the houses. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that may be present during a wildland fire.

Utilities: Utilities in Sandy Valley are a low ignition risk.

15.1.2 Construction Materials

All structures in the interface are built with non-combustible roofing materials and ninety percent have fire resistant siding materials. Approximately one-third of the structures in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

15.1.3 Defensible Space

Approximately eighty percent of the structures within the Sandy Valley community meet the defensible space landscaping requirements to minimize damage to the home or loss during a wildfire.

15.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Rural Fire Station 77 in Sandy Valley is an all-volunteer department that reported fifteen members at the time the interview were conducted for this project. Additional county resources are dispatched through the consolidated Fire Alarm Office in Las Vegas. Apparatus located onsite in Sandy Valley is summarized in Table 15-1. Numbers quoted are based on data available at the time of interviews with local and regional fire authorities and are subject to change.

Table 15-1. Sandy Valley Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine Water Tender Type 6 Quick Attack Engine Basic Life Support (BLS) Rescue	1 1 1 1	Clark County Rural Fire Station 77 (Sandy Valley)
Water Tender Type 6 Quick Attack Engine Basic Life Support (BLS) Rescue	1 1 1	Clark County Rural Fire (Nearest Available)
Type 3 Brush Engine	1	Bureau of Land Management (Nearest Available)
Type 3 Brush Engine Type 6 Brush Patrol Engine	2 2	US Forest Service (Nearest Available)

Source: Steve McClintock, pers. comm., 21 April 2004.

The US Forest Service and the Bureau of Land Management provide mutual aid dispatched through the Las Vegas Interagency Communications Center. This system locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols; it is important to note that federal resources are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Sandy Valley is limited. Water for wildfire suppression is from community wells and one 10,000-gallon storage tank. The water system operates on gravity and electric pumps.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Sandy Valley have a minimum of NFPA firefighter I and II training and a limited number have had some wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per National Wildfire Coordinating Group 310-1.

Work Load

The Clark County Fire Department station responded to 149 emergency medical calls and eight wildland brush fire calls in 2003.

Detection and Communication

Detection and communication is facilitated by 911 calls and the fire dispatch. Communication is compatible with neighboring agencies.

Financial Support

Funding for Clark County Fire Department annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

15.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Sandy Valley area is generally light with isolated areas of denser vegetation. Ground fuels consist of annual grasses. The shrub layer is dominated by sparsely spaced bursage (two to four feet tall). Trees and bamboo are used for windbreaks along some property lines. Some trees have been planted near structures for landscaping. The fuel hazard in the interface area around Sandy Valley is low.

15.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would be a fire starting on the south side of town. In a year with high annual grass production, a wind driven fire could be carried through the shrubs. Strong winds could send firebrands into areas of dense vegetation and landscaped areas needing defensible space or general cleanup. These interior fires could spread into structures.

15.1.7 Ignition Risk Assessment

Sandy Valley has a low ignition risk rating. There is no significant wildfire history in the area surrounding the community, and the recorded history of lightning strikes and other ignitions shows only one incident.

15.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Primary recommendations for Sandy Valley are to maintain defensible space and initiate community cleanup.

15.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances

of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- For deciduous and coniferous trees within the defensible space zone, prune trees so that branches are at least fifteen feet away from chimneys, structures, and power lines. Limbed trees to a height of four feet, but not more than one-third of the tree crown. Remove all dead and diseased branches and duff from beneath the remaining trees.
- Keep grass and weeds mowed to a maximum of three inches in height.
- Enclose wood decks and porches. If this is not possible, maintain the areas to be free of weeds and other flammable debris.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Coordinate a general community clean-up effort and remove abandoned mobile homes.
- Install screens over attic vents to prevent sparks from entering the attic.
- Maintain defensible space annually.
- Have a back-up generator for pumping domestic wells, or install gravity operated water storage tanks in the event that a fire eliminates power to the community.

Clark County Fire Department

- Conduct courtesy inspections of home defensible space measures.

15.2.2 Fuels Reduction

The goal of the identified fuels reduction treatment is to reduce the fuel hazard along community roadways, thereby ensuring safe ingress and egress during a wildfire.

Clark County

- Create a fuelbreak thirty feet in width along each side of State Route 161 through Sandy Valley. Mow or remove brush growing within this fuelbreak. Establish similar fuelbreaks along all roadways in the Sandy Valley community.

15.2.3 Community Coordination

Coordination among community members, local, state, and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

Clark County

- Allow burning only under a permit process or on designated community burning days.

15.2.4 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department

- 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.

15.2.5 Wildland Fire Suppression, Training, and Equipment

Clark County Fire Department

- Improve water availability for firefighting by obtaining a 50,000-gallon water tank for firefighting resources.
- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).

15.3 SUMMARY OF RECOMMENDATIONS

Table 15.2. Sandy Valley Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Public Education	Distribute copies of <i>“Living with Fire”</i> to all property owners living in Sandy Valley.
	Training and Equipment	Install 50,000 gallons of additional water reserves for firefighting. Comply with <i>NWCG 310-1</i> training and equipment standards.
Nevada Department of Transportation	Fuels Reduction	Create a fuelbreak along both sides of State Route 161 through Sandy Valley.
Clark County	Community Coordination	Allow burning under a permit process or on designated burn days.

Table 15-3. Sandy Valley Fire Hazard Ratings Summary

A. Urban Interface Condition		2	TALLIES	
B. Community Design			833 Total Houses	111 Residential Streets
1. Ingress / Egress	<u>3</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>27</u> not visible	<u>84</u> visible <u>76%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>386</u> not visible	<u>447</u> visible <u>54%</u> visible
5. Street Signs	<u>3</u>	/5	C1. Roofs	
6. Address Signs	<u>5</u>	/5	<u>0</u> combust	<u>833</u> not combust <u>100%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>96</u> combust	<u>737</u> not combust <u>88%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>315</u> not enclosed	<u>518</u> enclosed <u>38%</u> not enclosed
3. Unenclosed Structures	<u>3</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>197</u> <1ac	<u>636</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>3</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>195</u> not adequate	<u>638</u> adequate <u>77%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>5</u>	/10		
2. Department	<u>7</u>	/10		

Score 42 /128

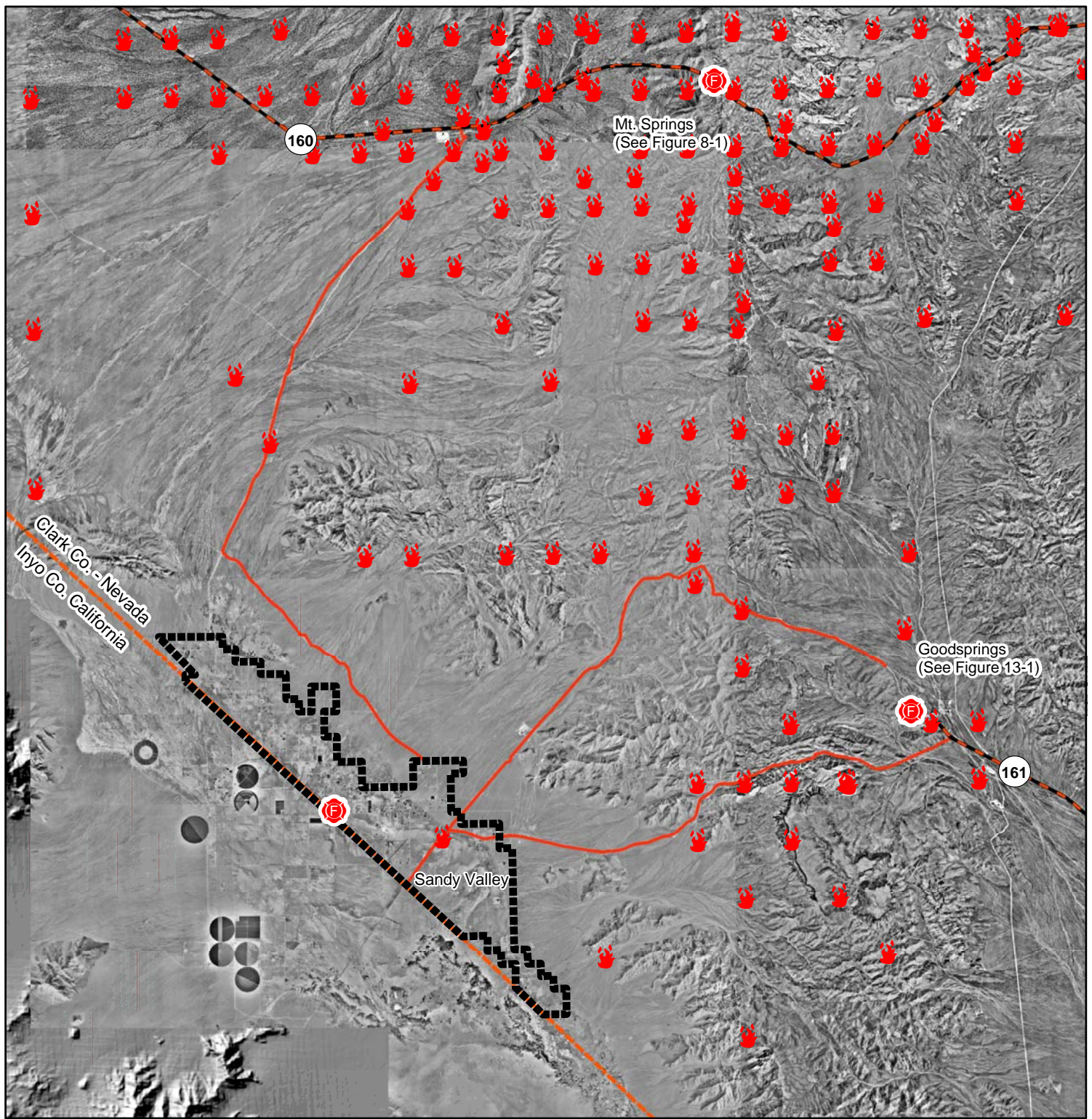


Figure 15-1. Sandy Valley
Fire History and Suppression Resources

Legend

-  Community Boundary
-  County/State Boundary
-  Highways and State Routes
-  Secondary Roads
-  Fire Ignition
-  Fire Station

0 0.5 1 2
Miles



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Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

16.0 SEARCHLIGHT

16.1 RISK AND HAZARD ASSESSMENT

Searchlight is located at the south end of Clark County at the junction of Interstate 95 and State Route 164 approximately sixty miles south of Las Vegas. A total of 165 homes in the Searchlight area were observed during the community hazard assessment that resulted in classifying Searchlight in the **Moderate Hazard** category (48 points). The rating is primarily attributed to steep topography and limited fire protection resources. Table 16-3 at the end of this section presents a summary of the community hazard rating values for Searchlight.

16.1.1 Community Design

The urban interface condition surrounding Searchlight is classified as an intermix wildland-urban interface condition: structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and open space. The majority of the lots assessed are on parcels of less than one acre in size. The community boundary is shown in Figure 16-1.

Access: Searchlight has several access roads. The primary roads are State Route 164 and Interstate 95. The road to Cottonwood Cove also runs through the community. The primary access roads are paved and more than 24 feet wide. The road grade is less than five percent. There are twenty secondary roads and five are dead-end streets without adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs are visible on all but two of the roads in the community. Residential addresses are visible on 75 percent of the homes in the community. Clear and visible street signs and residential addresses are important to aid firefighters in locating homes during low visibility conditions that occur during a wildland fire.

Utilities: Overhead power lines and propane tanks in Searchlight pose a low ignition risk to the community.

16.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and approximately 82 percent of the homes have fire resistant siding materials. Approximately 29 percent of the homes in the community have unenclosed balconies, decks, porches, eaves, or attic vents that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

16.1.3 Defensible Space

Approximately three quarters of the homes within the Searchlight community met the defensible space landscaping requirement to minimize damage to the home or loss during a wildfire.

16.1.4 Suppression Capabilities

Wildfire Protection Resources

The Clark County Fire Department maintains Station 75 in Searchlight, an all-volunteer fire department that reported having twelve members at the time that interviews were conducted for this report. Additional County resources are dispatched through the Clark County Fire Alarm Office as needed. Suppression apparatus located onsite in Searchlight and available for initial attack are summarized in Table 16-1. Numbers quoted are based on data available at the time of interviews with local and regional fire authorities and are subject to change.

Table 16-1. Searchlight Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 75 (Searchlight)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Water Tender	1	Clark County Rural Fire Station 84 (CalNevAri)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Basic Life Support (BLS) Rescue	1	
Type 3 Brush Engine	1	Boulder City Fire Department
Type 3 Brush Engine	1	Bureau of Land Management (Nearest Available)
Type 3 Brush Engine	1	National Park Service (Nearest Available)

Source: Steve McClintock, pers. comm., April 2004.

The US Forest Service, the Bureau of Land Management, and the National Park Service provide mutual aid through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid as dispatched through the Sierra Front Interagency Dispatch Center in Minden, Nevada. These systems locate the nearest available fire suppression resource according to incident command and computer aided dispatch protocols; it is important to note that Federal resources are commonly reassigned to areas of higher severity during the fire season.

Water Sources and Infrastructure

Water availability for fire suppression in Searchlight includes 500 GPM hydrants within 500 feet of the structures, community wells, and two one million gallon storage tanks. The water system operates on gravity.

Fire Protection Personnel Qualifications

Volunteer and career firefighters who would respond to a wildfire near Searchlight have a minimum of NFPA firefighter I and II training and a limited number have had some

wildland firefighting training (National Wildfire Coordinating Group 310-1). The Nevada Division of Forestry and US Forest Service personnel meet minimum requirements per National Wildfire Coordinating Group 310-1.

Work Load

The Clark County Fire Department station responded to 274 emergency medical calls and one wildland brush fire calls in 2003.

Detection and Communication

Detection and communication is facilitated by 911 calls and the fire dispatch.

Financial Support

Funding for the Clark County Fire Department's annual operating expenses comes from the County General Fund, which is generated primarily through property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

16.1.5 Factors Affecting Fire Behavior

The steepest slopes in the community are between ten and forty percent and face the southwest. These topographic conditions can intensify fire behavior. The vegetative fuel density in the Searchlight area is generally light throughout the community. Ground fuels consist of annual grasses. The shrub layer is dominated by bursage (one to two feet tall), creosote bush (four to six feet tall), and Joshua trees. Vegetation is widely spaced and the terrain is very rocky. The fuel hazard is considered low.

16.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario would occur on a summer afternoon during normal working hours when many volunteer firefighters may not be available for immediate response. An ignition source close to the south side of the community, with strong winds from the south would present the most hazardous conditions. Generally, fuels are sparse, but in a year with above normal annual grass growth, a fire could be pushed upslope and threaten structures.

16.1.7 Ignition Risk Assessment

Searchlight has a low ignition risk rating. There is no significant wildfire history in the area surrounding the community, and the recorded history of lightning strikes and other ignitions shows no reported incidents.

16.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Primary recommendations for Searchlight are to maintain defensible space and initiate community cleanup. These recommendations are detailed below.

16.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. These conditions define the defensible space area required for individual homes. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home. In turn, this lowers the chances of a wildfire spreading onto adjacent properties and it aids firefighters in their efforts to protect property against an approaching wildfire. Guidelines for establishing and improving defensible space around residences and structures in the community are given below and described in greater detail in Appendix E.

Private Property Owners

- Remove, reduce, and replace vegetation around homes. Keep this area:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Limb trees so that branches are at least fifteen feet away from chimneys, structures, and power lines. Limb trees to a height of four feet, but not more than one-third of the tree crown. Remove all dead and diseased branches and duff from beneath the remaining trees.
- Keep grass and weeds mowed to a maximum of three inches in height.
- Enclose wood decks and porches. If this is not possible, maintain the areas to be free of weeds and other flammable debris.
- Clear vegetation and combustible materials from around propane tanks for a minimum of ten feet.
- Immediately remove all cleared vegetation to an approved disposal site. This material dries quickly and poses a fire risk if left on site.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Coordinate a general community clean-up effort and remove abandoned mobile homes.
- Install screens over attic vents to prevent sparks from entering the attic.
- Maintain defensible space annually.
- Have a back-up generator for pumping domestic wells or install gravity operated water storage tanks in the event that a fire eliminates power to the community.

Clark County Fire Department

- Conduct courtesy inspections of home defensible space measures.

16.2.2 Community Coordination

Coordination among local, state and federal fire suppression agencies is important in the day-to-day fire prevention activities and becomes critical in the event of a wildland fire. The goal of community coordination is to make the entire community fire safe.

Clark County Fire Department

- Allow burning only under a permit process or establish designated community burning days.
- Remove all abandoned wood structures.

16.2.3 Public Education

Public education is an important tool to engage public participation in making a community fire safe. Informed community members will take the initiative required to lead efforts of a scale sufficient to effectively reduce the threat that wildland fires present to the entire interface community.

Clark County Fire Department Recommendations

- 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.

16.2.4 Wildland Fire Training and Equipment

Clark County Fire Department

- Comply with minimum standards regarding training and personal protective equipment for all firefighters in accordance with the Wildland and Prescribed Fire Qualification System Guide PMS 310-1. (See Section 4.2 of this report for a description of these standards).

16.3 SUMMARY OF RECOMMENDATIONS

Table 16-2. Searchlight Risk/Hazard Reduction Priority Recommendations

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green.
Clark County Fire Department	Defensible Space	Conduct courtesy inspections of defensible space condition and defensible space treatments on private property.
	Community Coordination	Allow burning only under a permit process or on designated community burn days. Remove all abandoned wood structures
	Public Education	Distribute copies of <i>“Living with Fire”</i> to all property owners living in Lee Canyon.
	Training and Equipment	Comply with <i>NWCG 310-1</i> training and equipment standards.

Table 16-3. Searchlight Fire Hazard Ratings Summary

A. Urban Interface Condition		2	TALLIES	
B. Community Design			165 Total Houses	20 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>2</u> not visible	<u>18</u> visible <u>90%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>42</u> not visible	<u>123</u> visible <u>75%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>5</u>	/5	<u>0</u> combust	<u>165</u> not combust <u>100%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>30</u> combust	<u>135</u> not combust <u>82%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>48</u> not enclosed	<u>117</u> enclosed <u>29%</u> not enclosed
3. Unenclosed Structures	<u>3</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>161</u> <1ac	<u>4</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>38</u> not adequate	<u>127</u> adequate <u>77%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>7</u>	/10		
4. Aspect	<u>7</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>48</u> /128		

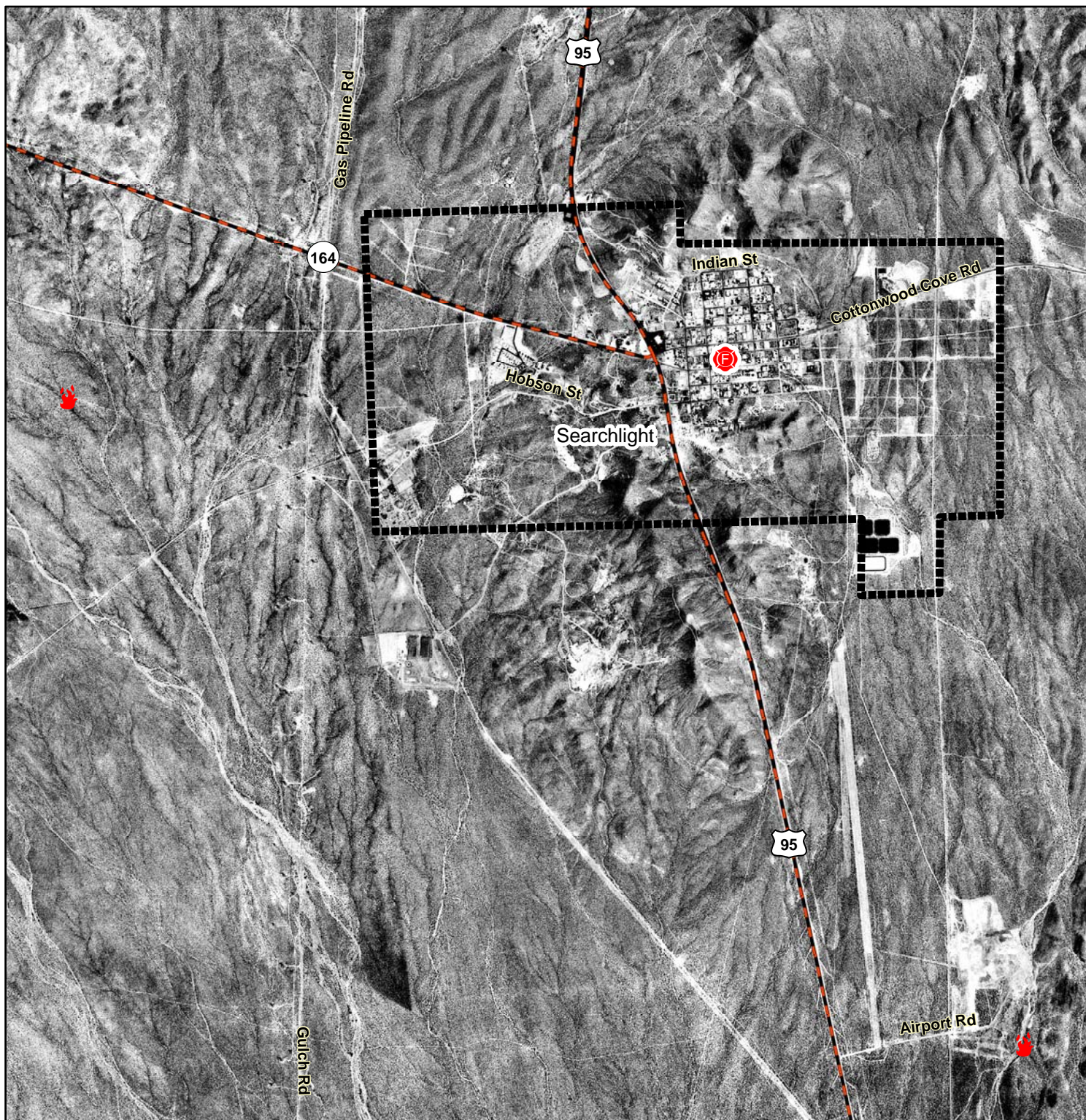
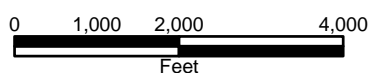






Figure 16-1. Searchlight
Fire History and Suppression Resources



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Legend

-  Community Boundary
-  Fire Ignition
-  Fire Station
-  Highways and State Routes

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Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

LOW HAZARD COMMUNITIES

17.0 ARDEN

17.1 RISK AND HAZARD ASSESSMENT

Arden is located southwest of Las Vegas in southeastern Clark County. The town is situated in the Las Vegas Valley and surrounded by Mojave Desert scrub vegetation. The community hazard assessment resulted in classifying Arden in the **Low Hazard** category (30 points). This low score is attributed primarily to the sparse vegetation surrounding the community, relatively flat terrain, and the fire safe construction of many of the structures in the interface area. A summary of the conditions that contributed to the hazard rating for Arden is included in Table 17-3 at the end of this section. The Arden community boundary is shown in Figure 17-1.

17.1.1 Community Design

The wildland-urban interface surrounding Arden is an occluded condition. Structures within the community abut an island of wildland fuels (open space managed by the BLM). There is a clear line of demarcation between expanses of wildland fuels and private property along roads, fence lines, and property boundaries. Two-thirds of the homes were on lot sizes of less than one acre; the rest were on parcels of one to ten acres in size.

Access: Major roads near Arden include State Route 160 and Interstate 15. Within Arden, roads are typically paved, greater than 24 feet wide, and allow adequate room for fire suppression equipment to maneuver. All roads have less than a five percent gradient.

Signage: Street signs are present and visible along fifty percent of the streets. Residential addresses are visible on about one-third of the homes surveyed.

Utilities: All of the electrical utilities were underground and therefore do not pose an ignition risk.

17.1.2 Construction Materials

All of the homes observed in the interface area are built with fire resistant siding materials. Only five percent of the homes assessed have unenclosed balconies, porches, decks or other architectural features that create drafts and provide places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home. All homes had fire resistant roofing materials such as composition, metal, or tile.

17.1.3 Defensible Space

Ninety-three percent of the homes had landscaping that meets the minimum requirement for defensible space to reduce the risk of property damage or loss of a home during a wildfire.

17.1.4 Suppression Capabilities

Wildfire Protection Resources

In Arden, Clark County Fire Stations 24 and 65 provide the nearest fire suppression resources for immediate response to a wildland fire call. These stations are primarily

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equipped to respond to urban fire and emergency situations. Additional county resources would be available upon the Battalion Chief's request through the Clark County Fire Alarm Office.

Table 17-1. Arden Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	FIRE DEPARTMENT (RESOURCE LOCATION)
Type 1 Structure Engine	3	Clark County Rural Fire Stations 24 and 65 (Arden)
Patrol Truck	1	
Advanced Life Support (ALS) Rescue	1	
Battalion Chief	1	

Source: Steve McClintock, Clark County Fire Rural Coordinator

Mutual aid can be requested from the USFS and the BLM through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Arden include 500 gpm fire hydrants within 500 feet of structures.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County Fire Department has broad community preparedness and public education programs. The Clark County Emergency Response Plan is updated annually. The Clark County Fire Department reviews development plans to ensure compliance with the 1997 Fire Code.

17.1.5 Factors Affecting Fire Behavior

The terrain around Arden is mostly flat. The vegetative fuel density in the interface area is light. Fuel consists primarily of widely spaced greasewood shrubs one to two feet tall and sparse creosote bushes one to four feet tall. There is some tamarisk in the washes where the plants are generally more robust. The fuel load was estimated at less than one ton per acre and considered a low fuel hazard. The predominant wind is from the south/southwest in the late afternoon.

17.1.6 Fire Behavior Worst-case Scenario

Due to the very sparse fuels, the overall fire danger is very low. The largest accumulation of flammable materials is construction debris and framed houses under construction. The worst-case scenario would be a wind driven fire in the large undeveloped areas that would be pushed into the construction areas. There have been several large construction site fires in the Las Vegas area in the past. A construction site fire could also ignite the surrounding open space areas.

17.1.7 Ignition Risk Assessment

Arden has a low ignition risk rating. There is no significant wildfire history on the public lands surrounding Arden, though there is a history of ignitions in and around the community.

17.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The risk and hazard reduction recommendations for Arden focus primarily on efforts that can be initiated by community members and public agencies to increase wildland fire safety through the reduction of fuels that pose a hazard. Other recommendations pertain to community coordination and public education efforts that could be undertaken to enhance fire safety in Arden.

17.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove flammable vegetation and debris from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Assure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.

17.2.2 Community Coordination

The following community development coordination recommendations are made to ensure that future residential growth in the urban-wildland interface is fire safe.

Clark County

- Facilitate cooperation between the Assessor's Office and the Roads Department to ensure that all roads in new residential developments are named, mapped, and identified with GPS locations.
- Require all future development in the county to meet or exceed the 2000 International Fire Codes and defensible space requirements. Special attention should be paid to fire-safe construction specifications, road construction, water supply, fire service needs (such as turnaround space), and the establishment of defensible space requirements before construction begins.

17.2.3 Fire Suppression Resources

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training. See section 4.2 for further discussion on this recommendation.

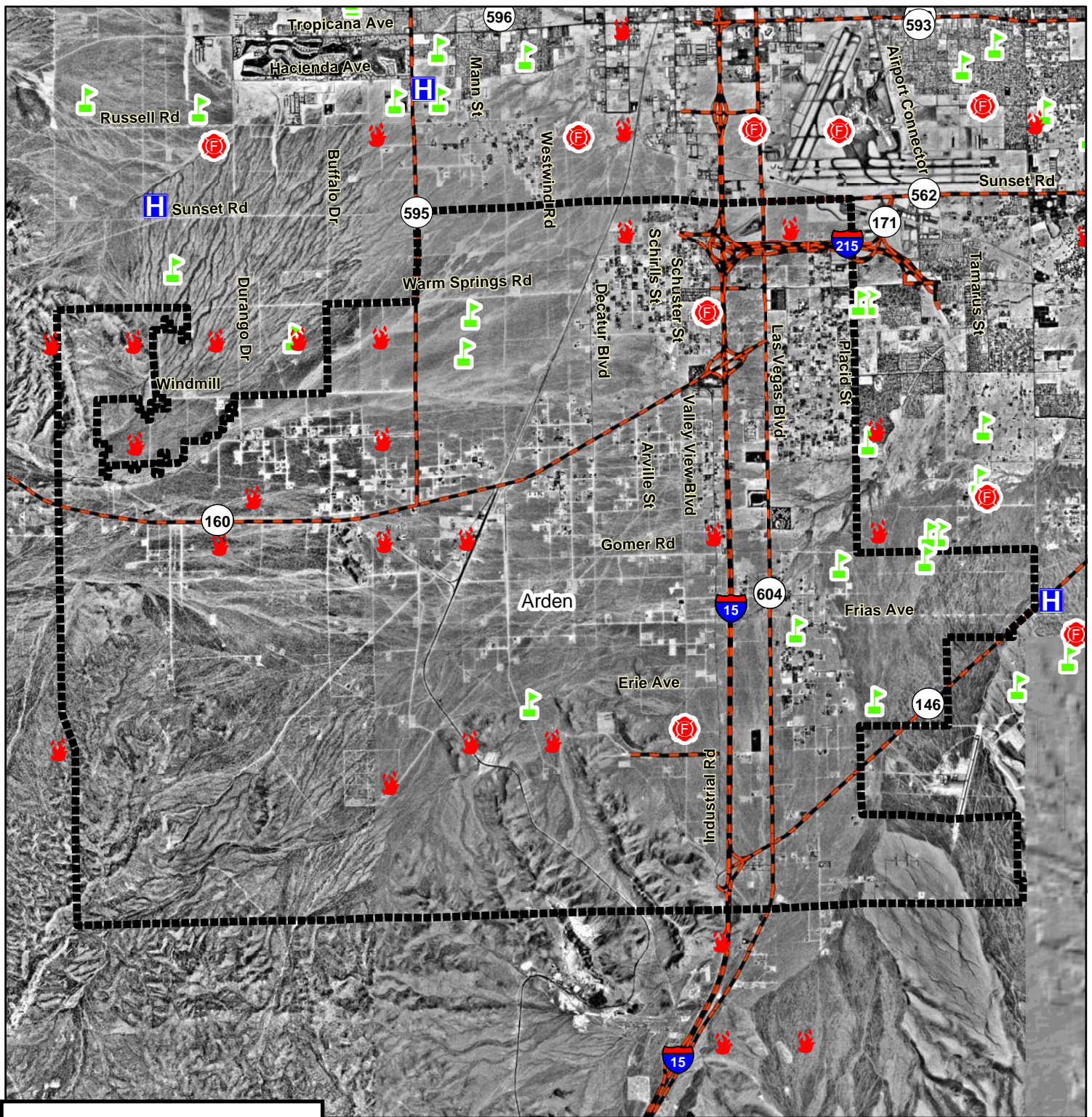
17.3 SUMMARY OF RECOMMENDATIONS

Table 17-2. Arden Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Continue to maintain defensible space as needed to keep the space lean, clean, and green. Assure that residential addresses are visible from the road.
Clark County	Community Coordination	Facilitate cooperation between the Assessor's Office and the Roads Department to ensure that all roads in new residential developments are named, mapped, and identified with GPS locations. Require that all future development to meet or exceed the 2000 International Fire Codes and the defensible space recommendations in Appendix E.
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment and annual refresher courses.

Table 17-3. Arden Fire Hazard Ratings Summary

A. Urban Interface Condition 3		TALLIES	
B. Community Design		431 Total Houses 60 Residential Streets	
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>6</u> not visible <u>54</u> visible <u>90%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>152</u> not visible <u>279</u> visible <u>65%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>5</u> combust <u>426</u> not combust <u>99%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>5</u> combust <u>426</u> not combust <u>99%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>18</u> not enclosed <u>413</u> enclosed <u>4%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>260</u> <1ac <u>170</u> >1ac <10ac <u>1</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>32</u> not adequat <u>399</u> adequate <u>93%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>3</u> /10		
Score 30 /128			



Legend







-  Community Boundary
-  School
-  Hospital
-  Fire Ignition
-  Fire Station
-  Highways and State Routes

Figure 17-1. Arden
Fire History, Suppression Resources,
and Critical Features



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Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

18.0 BLUE DIAMOND

18.1 RISK AND HAZARD ASSESSMENT

Blue Diamond is a small community located southwest of Las Vegas along State Routes 159 and 160 in southeastern Clark County. The town is situated in the Las Vegas Valley and is surrounded by undeveloped Mojave Desert scrub vegetation. The community hazard assessment resulted in classifying Blue Diamond in the **Low Hazard** category (36 points). This low score is attributed primarily to the sparse vegetation surrounding the community, the relatively flat terrain, and the fire safe construction of many of the structures in the interface area. A summary of the conditions that contributed to the hazard rating for Blue Diamond is included in Table 18-3 at the end of this section. The Blue Diamond community boundary is shown in Figure 18-1.

18.1.1 Community Design

The wildland-urban interface surrounding the community of Blue Diamond is an intermix condition. Structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels and the buildings and open space throughout the community. Eighty two percent of the homes are on parcels between one and ten acres in size; the remaining parcels are less than one acre.

Access: Blue Diamond is accessed by State Routes 159 and 160. Several streets lead into the community from these highways. Within Blue Diamond, roads are typically paved, greater than 24 feet in width, and have adequate room for fire suppression equipment to maneuver. All roads have less than a five percent gradient.

Signage: Street signs are present and visible along 95 percent of the streets. Residential addresses are visible on only one-third of the homes surveyed.

Utilities: All of the utilities were underground and do not pose an ignition risk to the community.

18.1.2 Construction Materials

Ninety-five percent of the homes observed in the interface area are built with fire resistant siding materials, and 98 percent were built with fire resistant roofing materials such as composition, metal, or tile. Twenty percent of the homes observed had unenclosed balconies, porches, decks, or other architectural features that create drafts and provide places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

18.1.3 Defensible Space

Eighty-one percent of the homes have landscaping that meet the minimum requirement for defensible space to reduce the risk of property damage or loss of a home during a wildfire.

18.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Rural Fire Station 80 in Blue Diamond is an all-volunteer fire department that reported having twelve members at the time interviews were conducted for this report. Additional County resources are dispatched through the Clark County Fire Alarm Office as needed. Resources that would respond to a reported wildland fire call near Blue Diamond are summarized in Table 18-1. Numbers quoted are based on data available at the time of interviews with local and regional fire authorities and are subject to change.

Table 18-1. Blue Diamond Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Engine	1	Clark County Rural Fire Station 80 (Blue Diamond)
Type 6 Quick Attack Engine	2	
Water Tender	2	
Advanced Life Support (ALS) Rescue	1	

Source: Steve McClintock, Clark County Fire Rural Coordinator and Ken Moultray Volunteer Chief, Blue Diamond Volunteer Fire Station 3-04.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Blue Diamond includes 500 gpm fire hydrants within 500 feet of structures, wells, and two 100,000-gallon storage tanks. The water system is gravity operated.

Fire Protection Personnel Qualifications

Volunteer firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County Fire Department has broad community preparedness and public education programs and reviews development plans to ensure compliance with the 1997 Fire Code. The Clark County Emergency Response Plan is updated annually.

The Blue Diamond Volunteer Fire Station holds an annual community awareness program to educate residents and promote defensible space.

18.1.5 Factors Affecting Fire Behavior

The terrain around the Blue Diamond community is mostly flat with slopes less than five percent. The vegetative fuel density in the interface area is light and consists primarily of annual grasses, greasewood, fourwing saltbush, and creosote bush. Greasewood and the fourwing saltbush shrubs are between two and three feet in height; creosote bush is four to five feet tall. There are a few mesquite trees in the area. Fuel density in this area was estimated to be less than one ton per acre and was considered a low fuel hazard. The predominant wind is from the south/southwest in the late afternoon.

18.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would occur on a mid-summer afternoon of a high precipitation year with maximum productivity of annual plants. An ignition upslope (west) of the upper Blue Diamond community could be pushed by strong winds through the ephemeral drainage channel and could potentially be driven toward the intersection of Highway 159 and 160.

18.1.7 Ignition Risk Assessment

Blue Diamond has a low ignition risk rating. There is no significant wildfire history on the public lands surrounding the community, although a light ignition history is reported in the area. Low ignition rates are facilitated in the low, sparse brush in and around the community.

18.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The responsibility to keep a community fire safe falls not only on the local fire department but also on the residents of the community and local governments. The risk and hazard recommendations for Blue Diamond focus primarily on fuel reduction efforts.

18.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove flammable vegetation and debris from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Assure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under low visibility conditions during a wildland fire.

18.2.2 Community Coordination

Clark County

- Allow burning only under a permit process or on designated community burn days. See Appendix F for a sample burn permit.
- Facilitate cooperation between the Assessor's Office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.

18.2.3 Fire Suppression Resources

Clark County Fire Department Blue Diamond Station

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training each year.

18.2.4 Public Education

Clark County Fire Department

- 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.

18.3 SUMMARY OF RECOMMENDATIONS

Table 18-2. Blue Diamond Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. Maintain defensible space as needed to keep the space lean, clean, and green. Assure that address signs are visible from the road.
Clark County	Community Coordination	Facilitate cooperation between the Assessor's Office and the Roads Department to ensure that all roads in new residential developments are named, mapped, and identified with GPS locations. Allow burning only under a permit process or on designated community burn days.
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment and annual refresher courses.
	Public Education	Distribute copies of the publication " <i>Living With Fire</i> " to all property owners. Request copies from the University of Nevada Cooperative Extension.

Table 18-3. Blue Diamond Fire Hazard Ratings Summary

A. Urban Interface Condition 2		TALLIES	
B. Community Design		85 Total Houses	12 Residential Streets
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>4</u> not visible <u>8</u> visible <u>67%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>60</u> not visible <u>25</u> visible <u>29%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>2</u> combust <u>83</u> not combust <u>98%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>4</u> combust <u>81</u> not combust <u>95%</u> not combust	
5. Street Signs	<u>5</u> /5	C3. Unenclosed Structures on Lot <u>16</u> not enclosed <u>69</u> enclosed <u>19%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>15</u> <1ac <u>70</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>16</u> not adequat <u>69</u> adequate <u>81%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>3</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>7</u> /10		
Score 36 /128			

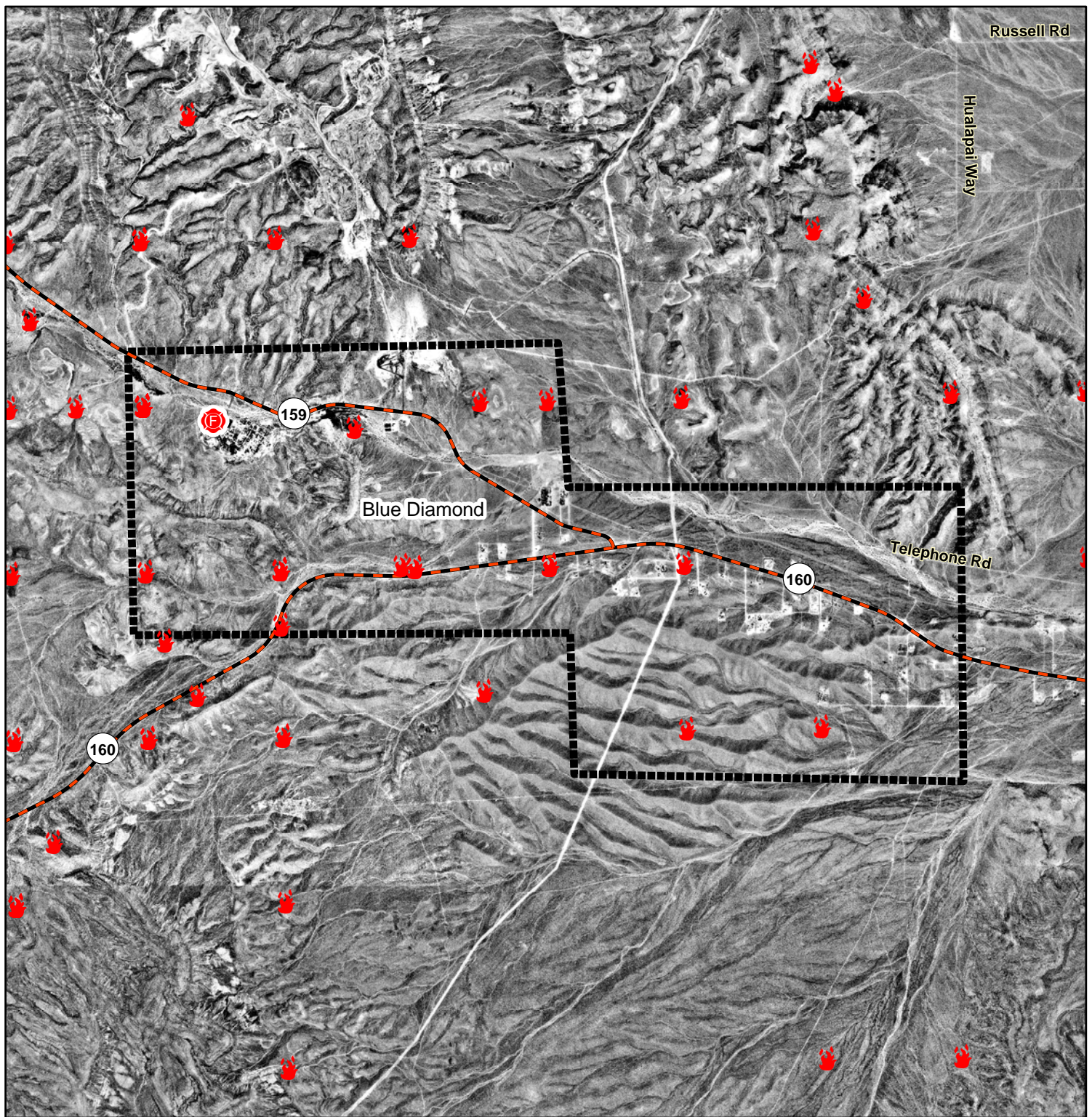
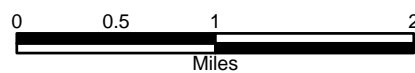


Figure 18-1. Blue Diamond
Fire History and Suppression Resources



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Legend

Community Boundary

Fire Station

Fire Ignition

Highways and State Routes

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

19.0 BOULDER CITY

19.1 RISK AND HAZARD ASSESSMENT

The Community of Boulder City is located southeast of Las Vegas in southeastern Clark County. The hazard assessment resulted in classifying Boulder City in the **Low Hazard** category (30 points). The low rating is primarily attributed to good access and signage, adequate defensible space, and the use of fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Boulder City is included in Table 19-3 at the end of this section. The Boulder City community boundary is shown in Figure 19-1.

19.1.1 Community Design

The area surrounding Boulder City is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. There are several clusters of homes on the outskirts of town, but wildland vegetation typically does not continue into the development areas. Most residences were on parcels of less than one acre in size.

Access: Boulder City is accessed via US Highway 93, which becomes Veterans Blvd. in town. The highway is a paved two-lane road. All secondary roads were paved and provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on about 88 percent of the homes in the community.

Utilities: Utilities are both above and below ground. Utility rights-of-way were well maintained and pose a low ignition risk.

19.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing and siding materials.

Twelve percent of the homes in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

19.1.3 Defensible Space

Eighty-two percent of the homes have landscaping that meets the minimum requirement for defensible space to reduce the risk of property damage or loss of a home during a wildfire.

19.1.4 Suppression Capabilities

Wildfire Protection Resources

The Boulder City Fire Department (BCFD) is staffed by eighteen career firefighters and 24 paid on-call firefighters. The fire department was established in 1959 with the incorporation of Boulder City and currently serves a population of 15,000 people over a service area of 206 square miles. In the event of a wildland fire, County resources could be called in through mutual aid agreements and the Clark County Fire Alarm Office.

Suppression resources located at Nellis Air Force Base, the Clark County Fire Department, and the Henderson Fire Department provide mutual aid through pre-existing agreements.

Table 19-1. Boulder City First Initial Attack Wildfire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 3 Engine 4X4 Rescue/Squad	1	Boulder City Fire Department
Advanced Life Support (ALS) Rescue	1	
Type 3 Brush Engine	1	National Park Service (Boulder City)
Type 6 Brush Patrol Engine	1	

Source: Steve McClintock, Kurt Leavitt, Mark Blankensop, pers. comm. March 2004. K. Oliver, pers. comm. 12 Oct 2004

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Boulder City includes fire hydrants within 500 feet of structures with a minimum of 500 gpm flow capacity and four water storage tanks totaling 19.5 million gallons. The water system operates by gravity.

Fire Protection Personnel Qualifications

All firefighters are trained to the State of Nevada Fire Marshal Firefighter II qualifications, in compliance with NFPA standards.

Work Load

The Boulder City Fire Department responded to 1,389 emergency medical calls, no wildland brush fire calls, and 594 other calls in 2003.

Financial Support

Financial support for the Boulder City Fire Department comes from the Town General Fund.

Community Preparedness

Boulder City has several plans for community preparedness. All plans are updated annually. These plans include:

- Emergency Plan,
- Pre-Attack Plan,

- Disaster Plan, and
- Emergency Evacuation Plan.

The City Manager, Fire Chief, Police Chief, and Public Works Director are all authorized to activate the Emergency Evacuation Plan.

The Boulder City Fire Department reviews development plans to ensure compliance with the 1997 Uniform Fire Code Standards (with amendments).

19.1.5 Factors Affecting Fire Behavior

The vegetative community in the Boulder City area is Mojave Desert scrub dominated by creosote bush, cholla cactus, and Mojave prickly pear cactus. Tamarisk trees dominate the fuels in the drainages. In general, fuels are light and the fuel hazard in the interface area was considered low.

19.1.6 Fire Behavior Worst-case Scenario

Boulder City is located in the hills between Henderson and Lake Mead. In years with above average precipitation, annual grass production can create a fine continuous fuel bed that is susceptible to ignitions and capable of supporting a fast moving fire that can spread to the shrub layer. The typical afternoon winds from the south to southwest could push a grass fire through the canyons toward the community. However, paved streets and block walls protect most structures from the threat of wildfire.

19.1.7 Ignition Risk Assessment

Boulder City has a low ignition risk rating. There is no significant wildfire history reported for the lands surrounding the community, and the ignition history shows very few incidents.

19.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Boulder City focus on weed control and firefighter training and equipment.

19.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- In years of above normal precipitation, mow and remove annual grasses and weeds along roadways, fences, and buildings.
- Clean up yards annually prevent dried weeds from accumulating against buildings, vehicles, and fences.

19.2.2 Wildland Fire Training and Equipment

Boulder City Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

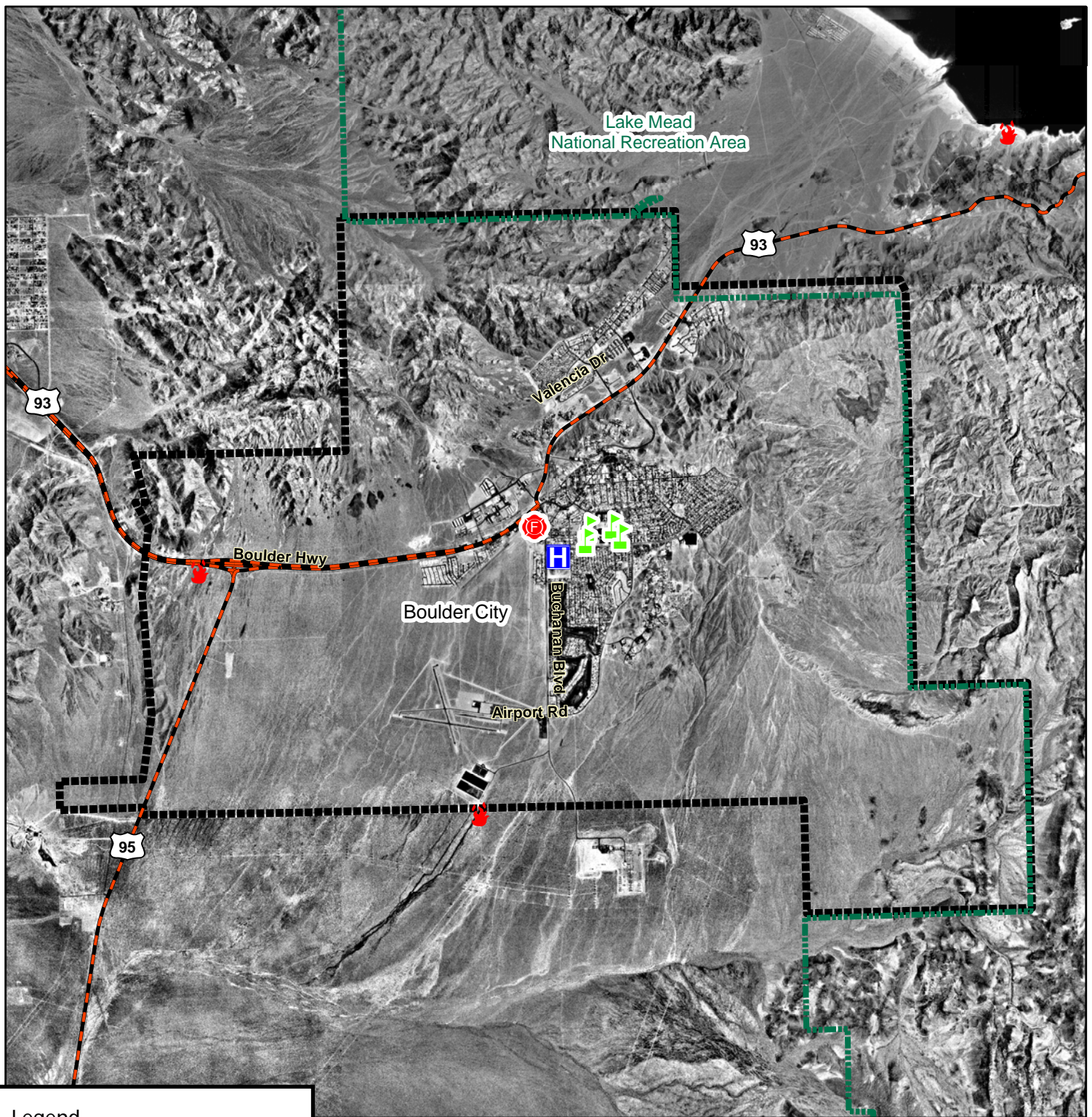
19.3 SUMMARY OF RECOMMENDATIONS

Table 19-2. Boulder City Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	In years of above normal precipitation, mow and remove annual grasses and weeds along roadways, fences, and buildings. Clean up yards annually to prevent dried weeds from collecting against homes, vehicles, and fences.
Boulder City Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment and annual refresher courses.

Table 19-3. Boulder City Fire Hazard Ratings Summary

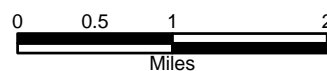
A. Urban Interface Condition		1	TALLIES	
B. Community Design			491 Total Houses	79 Residential Streets
1. Ingress / Egress	3	/5	B5. Street Signs	
2. Width of Road	1	/5	0 not visible	79 visible 100% visible
3. Accessibility	3	/3	B6. Address Signs	
4. Secondary Road	1	/5	58 not visible	433 visible 88% visible
5. Street Signs	1	/5	C1. Roofs	
6. Address Signs	3	/5	2 combust	489 not combust 100% not combust
7. Utilities	1	/5	C2. Siding	
C. Construction Materials			2 combust	489 not combust 100% not combust
1. Roofs	1	/10	C3. Unenclosed Structures on Lot	
2. Siding	1	/5	60 not enclosed	431 enclosed 12% not enclosed
3. Unenclosed Structures	1	/5	D1. Lot Sizes	
D. Defensible Space			436 <1ac	55 >1ac <10ac 0 >10ac
1. Lot Size	5	/5	D2. Defensible Space	
2. Defensible Space	1	/15	90 not adequate	401 adequate 82% adequate
F. Fire Behavior				
1. Fuels	1	/5		
2. Fire Behavior	3	/10		
3. Slope	1	/10		
4. Aspect	1	/10		
E. Suppression Capabilities				
1. Water Source	1	/10		
2. Department	1	/10		
Score		30	/128	



Legend

-  Community Boundary
-  Lake Mead NRA
-  School
-  Hospital
-  Fire Ignition
-  Fire Station
-  Highways and State Routes

Figure 19-1. Boulder City
Fire History, Suppression Resources,
and Critical Features



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Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

20.0 BUNKERVILLE

20.1 RISK AND HAZARD ASSESSMENT

Bunkerville is located along the Virgin River in eastern Clark County approximately five miles west of the Arizona border and one mile south of Interstate 15. The community hazard assessment resulted in classifying Bunkerville in the **Low Hazard** category (38 points). The low rating is primarily attributed to good access, adequate defensible space, and fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Bunkerville is included in Table 20-3 at the end of this section. The Bunkerville community boundary is shown in Figure 20-1.

20.1.1 Community Design

The area surrounding Bunkerville is characteristic of a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. Most lots are on parcels of less than one acre in size.

Access: Bunkerville is accessed via State Route 170 (Riverside Road), a paved two-lane road. Secondary roads provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on about 85 percent of the roads in the community. Residential addresses are visible on about eighty percent of the homes in the community.

Utilities: Utilities are both above and below ground. The power line corridors are well maintained and pose a low ignition risk.

20.1.2 Construction Materials

Approximately 99 percent of the homes assessed in the interface are built with non-combustible roofing materials, and approximately 94 percent had fire resistant siding materials.

Over half of the homes in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

20.1.3 Defensible Space

The majority of the homes (91 percent) have landscaping that meets the minimum requirement for defensible space to reduce the risk of property damage or loss of a home during a wildfire.

20.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Rural Fire Station 71 in Bunkerville provides fire protection for the community, with a thirteen member volunteer fire department. Additional county resources are dispatched through the Clark County Fire Alarm Office as needed. Fire protection equipment available for initial attack response is summarized in Table 20-1.

Table 20-1. Bunkerville Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	2	Clark County Rural Fire Station 71 (Bunkerville) CCFD Station 72 (Moapa)
Type 1 Engine	2	
Type 6 Quick Attack Engine	2	
Advance Life Support (ALS) Rescue	1	
Basic Life Support (BLS) Rescue	1	
Water Tender	2	Clark County Rural Fire Station 73 (Logandale) Clark County Rural Fire Station 74 (Overton)
Type 1 Engine	2	
Type 6 Quick Attack Engine	2	
Advanced Life Support (ALS) Rescue	2	
Type 3 Brush Engine	1	Bureau of Land Management (Logandale Station)

Source: Steve McClintock, pers. comm., 3/2004, K. Oliver, 12 Oct. 04.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season. A mutual aid agreement is also in place with the City of Mesquite Fire and Rescue Department.

Water Sources and Infrastructure

Water available for fire suppression in Bunkerville includes fire hydrants within 500 feet of structures with a minimum 500-gpm flow capacity, community wells, and three one-million gallon tanks. The water system operates on gravity. The Virgin River and several ponds in the area could also be used for drafting or helicopter dip sites.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training, and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The Bunkerville Volunteer Fire Department responded to 118 emergency medical calls and sixteen wildland brush fire calls in 2003.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Clark County Fire Department reviews development plans to ensure compliance with the UFC 1997 fire code. Effective January 2005, the State Fire Marshall's Office adopted the 2003 International Fire Code, which includes an Urban-Wildland Interface Code that can be used as a guideline for new and existing developments.

20.1.5 Factors Affecting Fire Behavior

There are two vegetation types in the Bunkerville wildland-urban interface area: the Virgin River riparian corridor and the upland Mojave Desert scrub.

Fuel density in the Virgin River riparian corridor is heavily dominated by four to five foot tall fourwing saltbush and a tree layer consisting of tamarisk, mesquite, and willow that is eight to twelve feet tall. The fuel load was estimated at eight tons per acre and considered a high fuel hazard.

Upland areas surrounding the community have much lower fuel loads, estimated at less than one ton per acre. The dominant species are creosote bush, cholla cactus, and fourwing saltbush with annual grasses and Russian thistle in the disturbed areas along the roads. The fuel hazard in the uplands was considered low.

In the fall of 2003, the Bureau of Land Management began work on the "Mesquite Fuels Project." This ten-year project will clear 100 to 250 acres of tamarisk per year. Eventually 1,709 acres will be removed and replaced with native riparian species. This project will reduce the threat of fire within the river corridor.

20.1.6 Fire Behavior Worst-case Scenario

In a year with higher than normal precipitation and annual plant growth, an ignition on a mid-summer day with high wind conditions could be pushed toward the south end of the community.

20.1.7 Ignition Risk Assessment

Bunkerville has a low ignition risk rating. Prior fires in the area have been human caused and are most often started by ditch burning that escaped into heavy stands of tamarisk along the banks of the river. The ignition record for the area shows few incidents.

20.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Risk and hazard reduction recommendations for Bunkerville focus on fuel reduction treatments.

20.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove flammable vegetation and debris from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Continue to maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Assure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.

20.2.2 Fuel Reduction Treatments

Bureau of Land Management

- Continue the tamarisk reduction project and reseed cleared areas with native species. Maintain these treated areas as needed.

Clark County

- Maintain vegetation clearance along road rights-of-way. The goal of fuel reduction treatment recommendations is to reduce the existing fuel hazard and the chance of wildfire.

20.2.3 Fire Suppression Resources and Training

Bunkerville Volunteer Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire*

Qualification System Guide 310-1. Provide annual wildland firefighting refresher training and fire shelter training.

20.2.4 Public Education

Bunkerville Volunteer Fire Department

- 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.

20.3 SUMMARY OF RECOMMENDATIONS

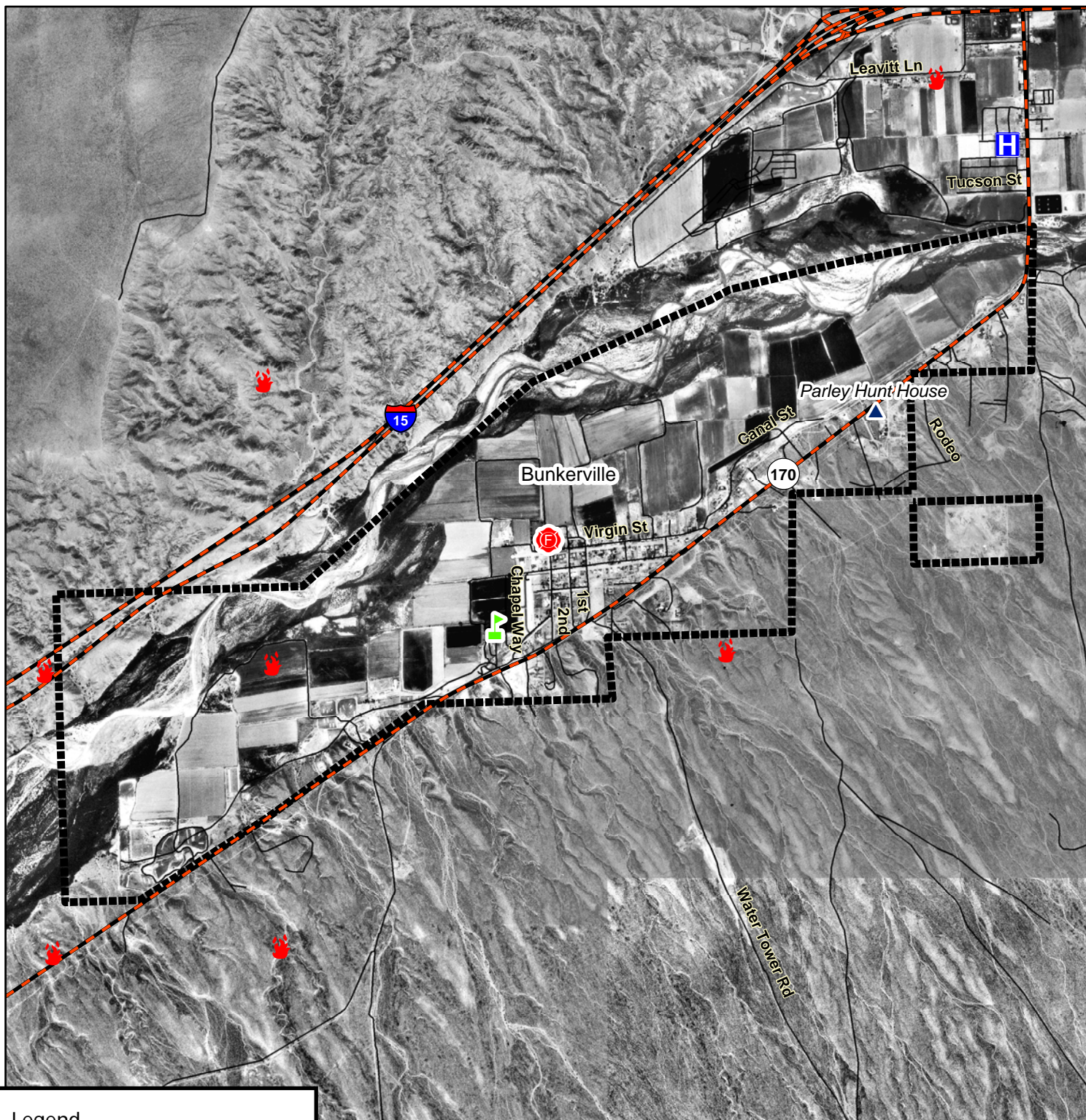
Table 20-2. Bunkerville Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Continue to maintain defensible space around residences and outbuildings as needed to keep the space <i>lean, clean, and green</i> . Assure that residential addresses are visible from the road.
Bureau of Land Management	Fuels Reduction	Continue the tamarisk reduction and replacement project.
Clark County	Fuels Reduction	Maintain vegetation clearance along County road right-of-ways.
Clark County Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment.
	Public Education	Distribute copies of the publication “ <i>Living With Fire</i> ” to all property owners.

Table 20-3. Bunkerville Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			275 Total Houses	21 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>3</u> not visible	<u>18</u> visible <u>86%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>57</u> not visible	<u>218</u> visible <u>79%</u> visible
5. Street Signs	<u>3</u>	/5	C1. Roofs	
6. Address Signs	<u>3</u>	/5	<u>2</u> combust	<u>273</u> not combust <u>99%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>17</u> combust	<u>258</u> not combust <u>94%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>159</u> not enclosed	<u>116</u> enclosed <u>58%</u> not enclosed
3. Unenclosed Structures	<u>5</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>273</u> <1ac	<u>2</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>26</u> not adequate	<u>249</u> adequate <u>91%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>7</u>	/10		

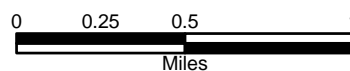
Score 38 /128



Legend

- Community Boundary
- School
- Hospital
- Highways and State Routes
- Cultural Resource
- Fire Ignition
- Fire Station

Figure 20-1. Bunkerville
Fire History, Suppression Resources,
and Critical Features



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21.0 CALNEVARI

21.1 RISK AND HAZARD ASSESSMENT

CalNevAri is located in southern Clark County on Interstate 95, approximately ten miles south of Searchlight. Approximately 110 homes were observed in the CalNevAri community. The community hazard assessment resulted in classifying CalNevAri in the **Low Hazard** category (36 points). The rating is primarily attributed to good access, good defensible space, and non-combustible construction materials. Table 21-3 at the end of this section presents a summary of the fire hazard rating values for the community. See Figure 21-1 for a detail of the community boundary.

21.1.1 Community Design

The area surrounding the community of CalNevAri is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into residential areas. Most lots are on parcels of less than one acre in size.

Access: The primary road into CalNevAri is Interstate-95. The primary access road is paved and more than 24 feet wide. The road grade is less than five percent. There are several secondary roads and all roads are either loop roads or have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs were visible on all but two of the roads in the community. Residential addresses were visible on over eighty percent of the homes in the community.

Utilities: Utilities include overhead power lines and propane tanks. These utilities pose a low ignition risk due to the sparse fuels.

21.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials, and approximately 98 percent of the homes have fire resistant siding materials.

Approximately fourteen percent of the homes assessed in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

21.1.3 Defensible Space

Approximately 93 percent of the homes within the CalNevAri community meet the defensible space landscaping requirement to reduce the risk of property damage or loss of a home during a wildfire.

21.1.4 Suppression Capabilities

Wildfire Protection Resources

Clark County Rural Fire Station 84 in CalNevAri is a volunteer fire department. The fire station recently burned down and is in the process of being rebuilt. At the time that information was acquired for this report, the Clark County Rural Fire Department had supplied or replaced the equipment listed below. Clark County Rural Fire Station 75 in Searchlight and the Boulder City Fire Department provide additional fire protection for CalNevAri. Table 21-1 lists the types of wildfire resources, cooperating partners and equipment available to CalNevAri to respond to a reported wildland fire.

Table 21-1. CalNevAri Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	2	Clark County Rural Fire Station 84 (CalNevAri)
Type 1 Structure Engine	2	
Type 6 Quick Attack Engine	2	
ILS Rescue	2	
Type 3 Engine 4X4 Rescue/Squad	1	Boulder City Fire Department
Type 3 Brush Engine	1	Bureau of Land Management (Nearest available)
Type 3 Brush Engine	1	National Park Service (Boulder City)

Source: Steve McClintock, pers. comm., March 2004.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

The community of CalNevAri has municipal fire hydrants for fire suppression.

Fire Protection Personnel Qualifications

The volunteer firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The CCFD station in Searchlight responded to 274 emergency medical calls and one wildland brush fire call in 2003.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

21.1.5 Factors Affecting Fire Behavior

The vegetative fuel hazard in and around the CalNevAri community ranges from low to high. The high hazard areas are confined to the drainages around the community dominated by fourwing saltbush that is four to six feet tall. The majority of the interface area is characterized by sparse Mojave Desert Scrub including creosote bush and bursage with some annual grasses. Dense accumulation of Russian thistle were noted along roadways.

21.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would be a wind driven fire southwest of town pushing the fire northeast into the south and west side of the community along the dry wash. Structures in the southwest part of the community with poor defensible space could be ignited by a wind driven fire.

21.1.7 Ignition Risk Assessment

CalNevAri has a low ignition risk rating. There is no history of large wildfires or ignitions in the area around CalNevAri.

21.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Primary recommendations for CalNevAri are defensible space and a fuel break along the south and west perimeter of the community. Due to the remote location and the limited fire resources in the area, defensible space is this community's best line of defense from a wildland fire.

21.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove debris and flammable materials from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.

- Maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.

21.2.2 Fuel Reduction Treatments

Clark County

- Clear brush and weeds within twenty feet of the pavement along both sides of road right-of-ways.

Bureau of Land Management

- Create a 100-foot wide fuel break along the south and west perimeter line of the community as illustrated by Figure 21-1. Shrubs should be thinned to a spacing equal to twice their height. Remaining shrubs should be trimmed to a maximum height of three feet.

21.2.3 Fire Suppression Resources

Clark County Fire Department CalNevAri Station

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310-1). Provide annual wildland firefighting refresher training and fire shelter training.

21.2.4 Public Education

Clark County Fire Department CalNevAri Station

- 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.

21.3 SUMMARY OF RECOMMENDATIONS

Table 21-2. CalNevAri Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Maintain defensible space around residences and outbuildings as needed to keep the space <i>lean, clean, and green</i> . Ensure that addresses are visible from the road.
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment.
	Public Education	Distribute copies of the publication “ <i>Living With Fire</i> ” to all property owners.
Clark County	Fuels Reduction	Clear vegetation along county roads for a width of twenty feet on both sides of the pavement.
BLM	Fuels Reduction	Create a 100-foot wide fuelbreak along the south and west perimeter line of the community as shown in Figure 21-1.

Table 21-3. CalNevAri Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		110 Total Houses	11 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>2</u> not visible <u>9</u> visible <u>82%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>18</u> not visible <u>92</u> visible <u>84%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>110</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>2</u> combust <u>108</u> not combust <u>98%</u> not combust	
5. Street Signs	<u>3</u> /5	C3. Unenclosed Structures on Lot <u>15</u> not enclosed <u>95</u> enclosed <u>14%</u> not enclosed	
6. Address Signs	<u>3</u> /5	D1. Lot Sizes <u>99</u> <1ac <u>11</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>8</u> not adequat <u>102</u> adequate <u>93%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>7</u> /10		

Score 36 /128

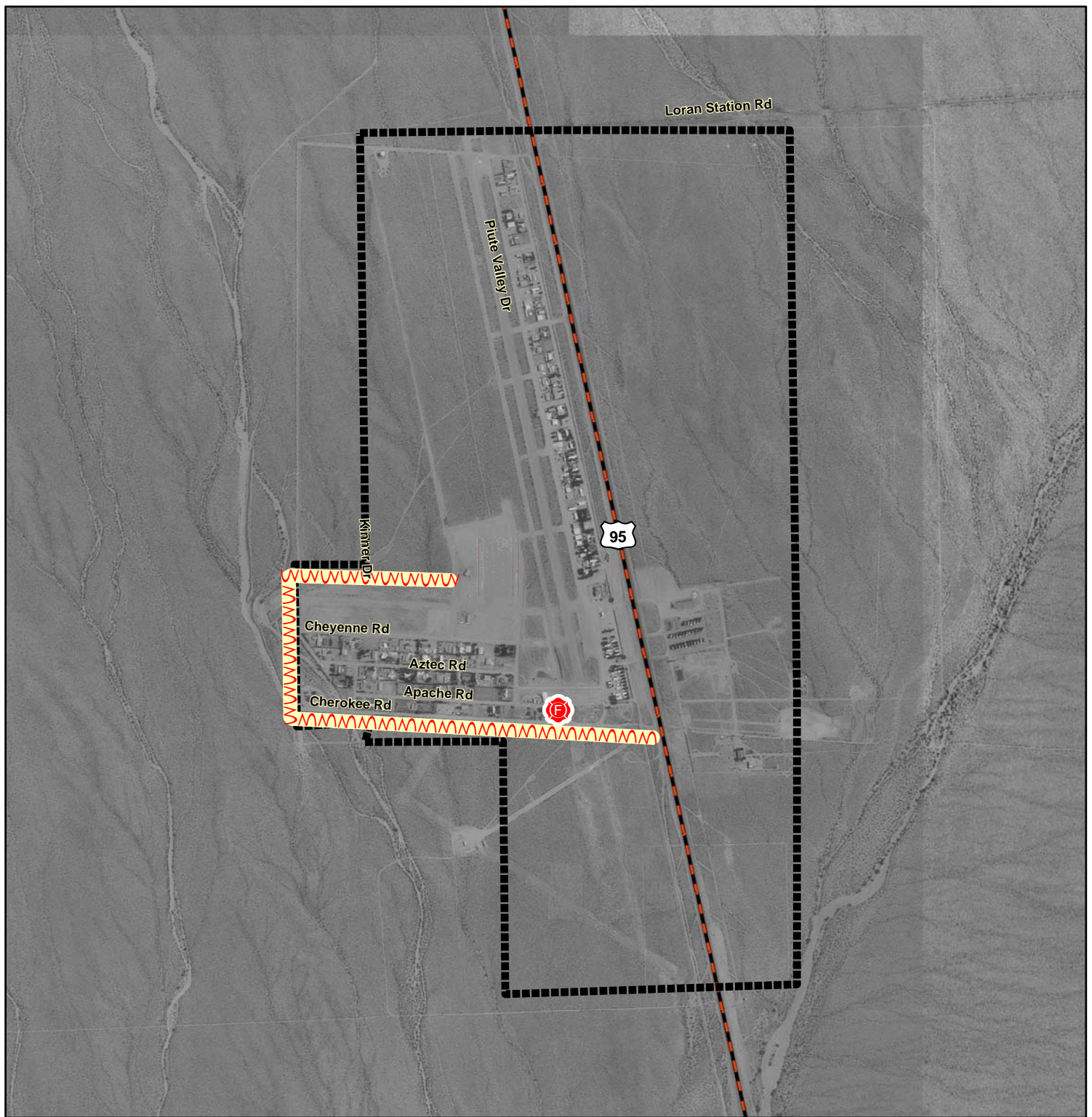
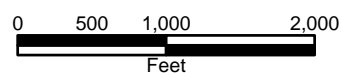






Figure 21-1. CalNevAri
Suppression Resources
and Proposed Mitigation Projects



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Legend

-  Community Boundary
-  Highways and State Routes
-  Proposed Fuel Reduction
-  Fire Station

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

22.0 COTTONWOOD COVE

22.1 RISK AND HAZARD ASSESSMENT

Cottonwood Cove is located in southern Clark County along the Colorado River approximately thirteen miles east of Searchlight. There are approximately 88 homes in the Cottonwood Cove area. The community hazard assessment resulted in classifying Cottonwood Cove in the **Low Hazard** category (38 points). The rating is primarily attributed to high-density housing, steep slopes, and limited fire protection resources. A summary of the conditions that contributed to the hazard rating for Cottonwood Cove is included in Table 22-3 at the end of this section. The Cottonwood Cove community boundary is shown in Figure 22-1.

22.1.1 Community Design

Cottonwood Cove is a classic wildland-urban interface condition community. There is a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. All lots are less than one acre in size.

Access: The primary access road into Cottonwood Cove is State Route 164. The road is paved and more than 24 feet wide. It is the only access in or out of the community, other than the river. The road grade is less than five percent. There are four secondary roads and all have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs were visible on all of the roads in the community.

Utilities: There are overhead power lines and propane tanks in Cottonwood Cove. These pose a low ignition risk due to the sparse fuels.

22.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and fire resistant siding materials.

Only one of the 88 residences assessed in the community has an unenclosed feature such as a porch or a deck that could create drafts and provide areas where sparks and embers could be trapped, smolder, ignite, and rapidly spread fire to the home.

22.1.3 Defensible Space

Almost 90 percent of the residences observed in Cottonwood Cove meet the defensible space landscaping requirement to reduce the risk of property damage or loss of a home during a wildfire.

22.1.4 Suppression Capabilities

Wildfire Protection Resources

Cottonwood Cove does not have a fire department, although the National Park Service does have a Type 1 Structure engine assigned to Cottonwood Cove. The Clark County Rural Fire Stations in Searchlight and CalNevAri are thirteen and 26 miles away, respectively, and would provide initial attack to a reported wildland fire near Cottonwood Cove. Table 22-1 lists the types of wildfire resources, cooperating partners and equipment available to Cottonwood Cove to respond to a reported wildland fire. Response times depend on firefighter availability.

Table 22-1. Cottonwood Cove Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	1	National Park Service (Nearest available)
Water Tender	2	Clark Count Rural Fire Stations 84 and 75 (CalNevAri Station 84) (Searchlight Station 75)
Type 1 Structure Engine	2	
Type 6 Quick Attack Engine	2	
ILS Rescue	2	
Type 3 Engine 4X4 Rescue/Squad	1	Boulder City Fire Department
Type 3 Brush Engine	1	Bureau of Land Management (Nearest available)

Source: Steve McClintock, March 2004; and K. Oliver, October 2004, pers. comm.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Cottonwood Cove includes two one-million gallon storage tanks located in Searchlight, greater than twenty minutes round trip from the community. Lake Mojave is available for drafting and could be used as a helicopter dip site.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some have wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The Searchlight CCFD station responded to 274 emergency medical calls and one wildland brush fire call in 2003.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

Clark County Fire Department reviews development plans to ensure compliance with the VFC 1997 fire code.

22.1.5 Factors Affecting Fire Behavior

The vegetative fuel density is light throughout the Cottonwood Cove interface area and was considered a low fuel hazard. White bursage and creosote bush are widely spaced with little or no ground fuels in the interspaces. The community is situated in a large east-west oriented drainage.

22.1.6 Fire Behavior Worst-case Scenario

Due to extremely sparse fuel, wildland fire danger is very low. Structures would not be threatened in the unlikely event of a wildfire.

22.1.7 Ignition Risk Assessment

Cottonwood Cove has a low ignition risk rating. There are no wildfire history or ignition incidents on record in the areas surrounding the community. The low ignition potential is facilitated by the low, sparse brush and rocky hillsides in and around the community.

22.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The primary recommendation for Cottonwood Cove is to continue to maintain defensible space.

22.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended

defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owner Recommendations

- During years of increased precipitation and resultant vegetation growth, landowners should implement defensible space for a minimum of thirty feet around all structures by mowing or otherwise eliminating annual grasses and dried weeds.

22.2.2 Fuel Reduction Treatments

Nevada Department of Transportation and Clark County

- Clear vegetation along State Route 164 for a distance of ten feet on each side of the road within the community.
- Following a year of higher than normal precipitation, control annual grass around campgrounds and roads.

22.3 SUMMARY OF RECOMMENDATIONS

Table 22-2. Cottonwood Cove Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	During years of increased precipitation and resultant vegetation growth, landowners should implement defensible space for a minimum of thirty feet around all structures by mowing or otherwise eliminating annual grasses.
NDOT/Clark County	Fuels Reduction	Clear vegetation along SR 164 for a distance of ten feet on each side of the road within the community. Following a wet winter, control annual grass around campgrounds and roads.

Table 22-3. Cottonwood Cove Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			88 Total Houses	4 Residential Streets
1. Ingress / Egress	<u>3</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible	<u>4</u> visible <u>100%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>0</u> not visible	<u>88</u> visible <u>100%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>1</u>	/5	<u>0</u> combust	<u>88</u> not combust <u>100%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>0</u> combust	<u>88</u> not combust <u>100%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>1</u> not enclosed	<u>87</u> enclosed <u>1%</u> not enclosed
3. Unenclosed Structures	<u>1</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>88</u> <1ac	<u>0</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>10</u> not adequate	<u>78</u> adequate <u>89%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>7</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>38</u> /128		

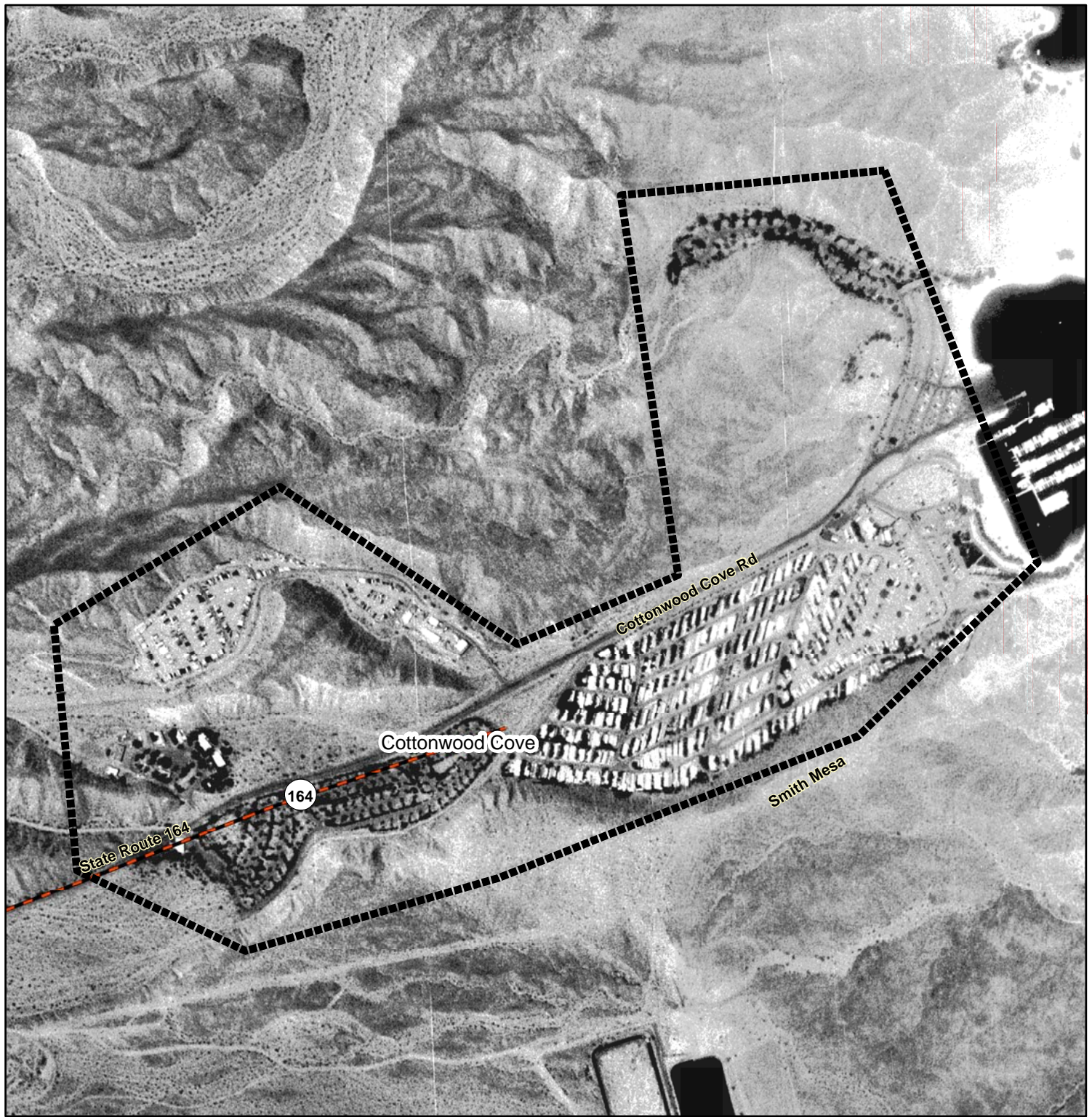
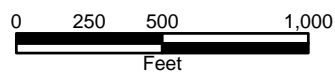




Figure 22-1. Cottonwood Cove



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Legend

-  Community Boundary
-  Highways and State Routes

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

23.0 GLENDALE

23.1 RISK AND HAZARD ASSESSMENT

Glendale is a small community located along the Muddy River in northeastern Clark County at the intersection of Interstate 15 and State Route 168 approximately 45 miles east of Las Vegas. The community hazard assessment resulted in classifying Glendale in the **Low Hazard** category (40 points). The low rating is primarily attributed to sparse fuels, good access, adequate defensible space and fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Glendale is included in Table 23-3 at the end of this section. The Glendale community boundary is shown in Figure 23-1.

23.1.1 Community Design

The area surrounding Glendale is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. All lots are less than one acre in size.

Access: Glendale is accessed via State Route 168 which intersects with Interstate 15 approximately just south of the community. State Route 168 is a paved two-lane road greater than 24 feet in width. Secondary roads provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs were visible on all of the roads in the community. Residential addresses were visible approximately 25 percent of all the homes in the community.

Utilities: Glendale has above and below ground utilities. The utilities pose a low ignition risk due to well maintained utility corridors and sparse vegetation.

23.1.2 Construction Materials

All of the homes in the interface were built with non-combustible roofing materials and fire resistant siding materials.

Half of the homes in the community had unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

23.1.3 Defensible Space

All of the homes had the minimum defensible space required to reduce the risk of property damage or loss of a home during a wildfire.

23.1.4 Suppression Capabilities

Wildfire Protection Resources

The community of Glendale does not have a fire department. Clark County Rural Fire Station 72 in Moapa, an all-volunteer department that reported having seven volunteers at the time that interviews were conducted for this report, provides fire protection for the Glendale community. The volunteer stations in the communities of Logandale and

Overton are located to the south, nine and sixteen miles away, respectively. Table 23-1 lists the types of wildfire resources, cooperating partners and equipment available to Glendale to respond to a reported wildland fire. Response times depend on firefighter availability.

Table 23-1. Glendale Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 72 (Moapa)
Type 1 Structure Engine	1	
Type 4 Quick Attack Engine	1	
Intermediate Life Support (ILS) Rescue	1	
Water Tender	1	Clark County Rural Fire Station 73 (Logandale)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advance Life Support (ALS) Rescue	1	
Water Tender	1	Clark County Rural Fire Station 74 (Overton)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advance Life Support (ALS) Rescue	1	
Type 3 Brush Engine	1	Bureau of Land Management (Logandale Station)

Source: Steve McClintock, Kurt Leavitt, pers. comm., March 2004.

Mutual aid can be requested from the Mesquite Fire Department, the US Forest Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The Moapa Fire Department responded to 136 emergency medical calls and seven wildland brush fire calls in 2003.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Clark County Fire Department reviews development plans to ensure compliance with the VFC 1997 fire code.

23.1.5 Factors Affecting Fire Behavior

The interface area around Glendale is flat. There are three vegetative fuel types in the area: the Muddy River riparian corridor, agricultural lands, and the upland Mojave Desert scrub. The vegetative fuels along the Muddy River corridor and along ditches are dense, dominated by tamarisk, mesquite, and willow, ranging from eight to eighteen feet tall. The fuel density was estimated to be six tons per acre and considered a high fuel hazard. Irrigated agricultural lands and upland dominated by sparse creosote bush and white bursage were considered low fuel hazards.

23.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would begin with a fire in the Muddy River corridor in the late afternoon in the summer, south of the community. There is some potential for fire to spread along the ditch banks and fences due to weed accumulations. The agricultural lands between the river, the community, and the sparse upland vegetation provide a measure of protection from wildfires to the structures in the community.

23.1.7 Ignition Risk Assessment

Glendale has a low wildfire ignition risk potential. There is no significant wildfire history reported for the areas surrounding the community and the ignitions recorded are few.

23.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Glendale focus on defensible space, tamarisk reduction along the river corridor, and wildland fire training for all firefighters.

23.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove debris and flammable materials from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Assure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.

23.2.2 Fuel Reduction Treatments

Property Owners/Clark County

- Remove weeds along fences and irrigation ditches.

Bureau of Land Management

- Continue the tamarisk fuel removal and replacement project in the Muddy River watershed.

Union Pacific Railroad

- Maintain railroad right-of-ways free of encroaching vegetation to reduce ignition risks and to function as firebreaks.

23.2.3 Fire Suppression Resources

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide PMS 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

23.3 SUMMARY OF RECOMMENDATIONS

Table 23-2. Glendale Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Continue to maintain the defensible space as needed to keep the space lean, clean, and green. Ensure residential addresses are visible from the road.
	Fuels Reduction	Remove weeds along fences and irrigation ditches.
Bureau of Land Management	Fuels Reduction	Continue to remove and replace tamarisk in the Muddy River riparian area.
Union Pacific Railroad	Fuels Reduction	Maintain railroad right-of-ways free of encroaching vegetation to reduce ignition risks and to act as firebreaks.
Clark County Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment.

Table 23-3. Glendale Fire Hazard Ratings Summary

A. Urban Interface Condition <u>1</u>		TALLIES	
B. Community Design		4 Total Houses	1 Residential Streets
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>0</u> not visible <u>1</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>3</u> not visible <u>1</u> visible <u>25%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>4</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>0</u> combust <u>4</u> not combust <u>100%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>2</u> not enclosed <u>2</u> enclosed <u>50%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>4</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>0</u> not adequat <u>4</u> adequate <u>100%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>3</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>5</u> /10		
2. Department	<u>7</u> /10		

Score 40 /128

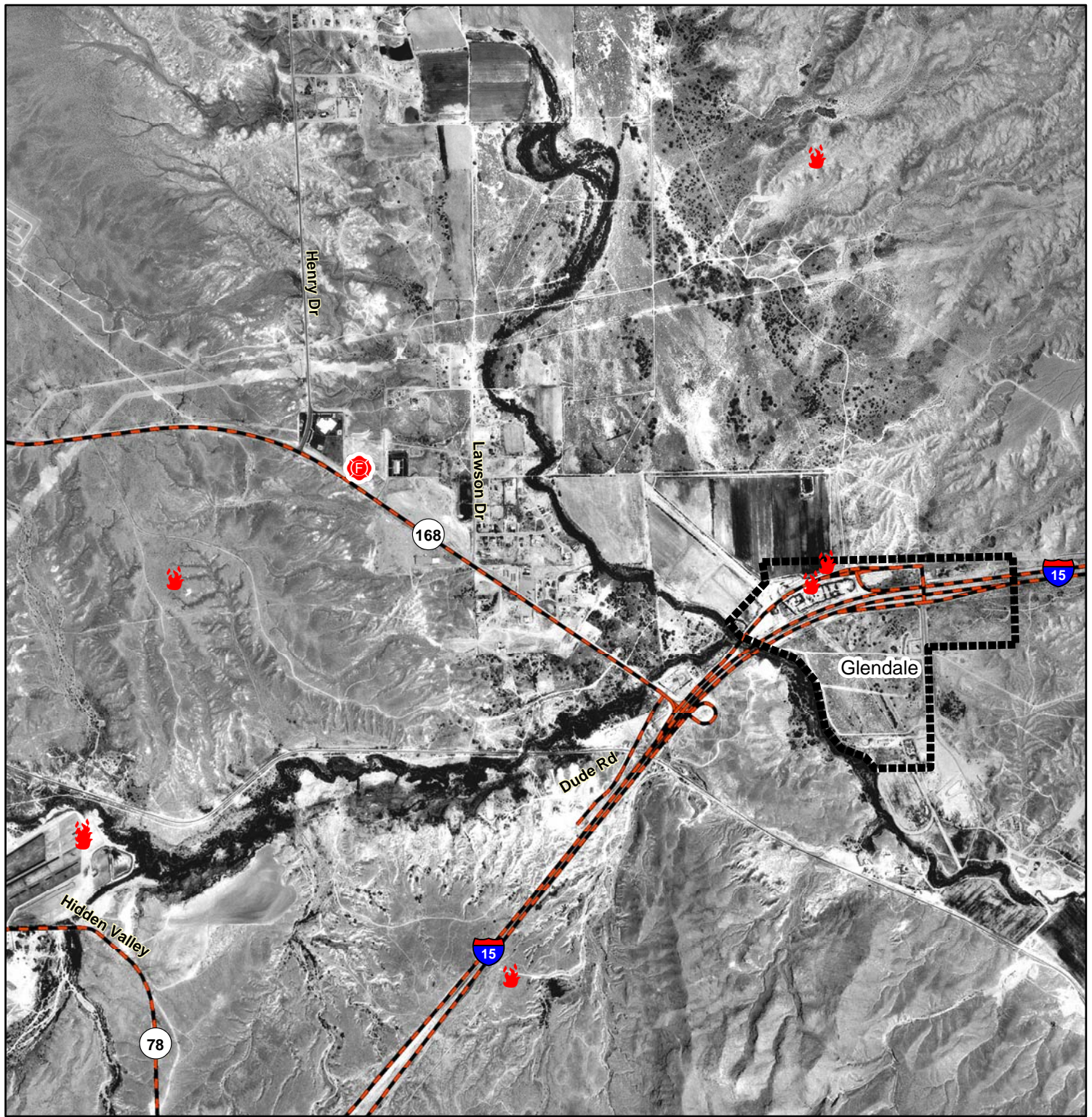
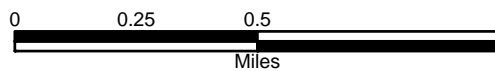


Figure 23-1. Glendale
Fire History and Suppression Resources



Legend

- Community Boundary
- Highways and State Routes
- Fire Ignition
- Fire Station



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Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

24.0 HENDERSON

24.1 RISK AND HAZARD ASSESSMENT

Henderson is south of and adjacent to Las Vegas in southeastern Clark County. The community hazard assessment resulted in classifying Henderson in the **Low Hazard** category (31 points). The low rating is primarily attributed to good access and signage, adequate defensible space, sparse wildland fuels, fire resistant building materials, and sufficient fire suppression resources. A summary of the conditions that contributed to the hazard rating for Henderson is included in Table 24-3 at the end of this section. The Henderson community boundary is shown in Figure 24-1.

24.1.1 Community Design

The area surrounding Henderson is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. Five percent of the homes were on lots between one and ten acres in size; the rest were on parcels of less than one acre.

Access: Henderson is accessed via Interstate 95/93 and numerous state routes. Secondary roads are generally wide, paved, two-lane roads and provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on about 99 percent of the homes in the community.

Utilities: Utilities are both above and below ground. Utility right-of-ways are well maintained and pose a low ignition risk.

24.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing and siding materials.

Approximately seventy percent of the homes observed in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

24.1.3 Defensible Space

Ninety-eight percent of the homes have landscaping that meets the minimum requirement for defensible space to minimize property damage and the risk of loss to the home during a wildfire.

24.1.4 Suppression Capabilities

Wildfire Protection Resources

The Henderson Fire Department has nine stations throughout the city. There are approximately fifty personnel on duty for each shift providing 24-hour coverage. Each station has Paramedic/Advanced Life Support capability. All nine stations are staffed

with a fire engine manned by four personnel, a Captain, an Engineer, a Firefighter, and a Firefighter/Paramedic. Four fire stations are staffed with a paramedic ambulance that provides emergency response and transport to medical facilities within the valley (www.cityofhenderson.com/fire).

Table 24-1. Henderson Initial Attack Fire Suppression Resources

TYPE OF RESOURCE	AMOUNT OF EQUIPMENT	RESOURCE LOCATION
Type 1 Structure Engine	4	Henderson Fire Department.
Ladder Truck	1	
Ambulance / Rescue	2	
Battalion Chief	1	

Source: Jim Cavalieria, pers. comm., March 2004.

This fire department is primarily equipped and trained to respond to urban incidents and emergencies. Specialized equipment and personnel trained in standard operating guidelines for wildland fire suppression in the interface currently comes from agencies external to the Henderson Fire Department.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Henderson includes fire hydrants within 500 feet of structures with a minimum capacity of 500 gpm flows. Numerous water storage tanks operate by gravity flow and electric pumps.

Fire Protection Personnel Qualifications

Henderson Fire Department firefighters are trained to the State of Nevada Fire Marshal Firefighter I and II. Some are trained in Hazardous Materials operations and rescue.

Work Load

The Fire Rescue Operations Division responded to 12,198 emergency medical calls, small number of wildland / brush calls, and 6,400 other calls in 2003.

Financial Support

Financial support for the Henderson Fire Department comes from the Henderson General Fund.

Community Preparedness

The City of Henderson has an All Risk Emergency Plan and a Pre-attack Plan. These plans are updated as needed.

The Henderson Fire Department reviews development plans to ensure compliance with the 2000 UBC fire code. The HFD reviews development plans.

24.1.5 Factors that Affect Fire Behavior

The majority of the area around the City of Henderson, with the exception of Las Vegas Wash north of Henderson, is Mojave Desert shrub with short, widely spaced annual grasses, bursage, and creosote bush. Much of the area is rocky. The fuel load was estimated at less than one ton per acre and considered a low fuel hazard. Above normal precipitation could increase fuel loading of the annual grasses. Areas of heavier fuels are mostly associated with topographic depressions.

Along the Las Vegas Wash in the Desert Wetlands Park, fuel loading is dangerously high, estimated at ten to twenty tons per acre. The fuel load consists of tamarisk ten to twenty feet tall, mesquite up to twelve feet tall, and creosote bush and fourwing saltbush up to six feet tall. Urban garbage dumps increase the fuel load in certain areas. There is a history of fire occurrences in the Wash.

24.1.6 Fire Behavior Worst-case Scenario

The worst-case for a wildland fire would occur along the Las Vegas Wash in the Desert Wetlands Park. This area contains the greatest fuel loading in the Las Vegas-Henderson area. A fire in the late afternoon on a summer day would be wind driven, influenced by predominately south-southwest winds or erratic winds from thunder storm activity. This would be a rapidly moving high intensity fire with the potential for hazardous materials releases from garbage dumps. Structures west of the wash would be threatened from a wildfire if erratic winds shifted and came from the east. A fire in the Las Vegas Wash represents one of the highest safety concerns for firefighters in Clark County. Clark County firefighters do not receive regular wildland fire training, they are not issued wildland fire protective equipment or fire shelters, and there are no standard operating guidelines for wildland firefighting.

The worst-case scenario wildland fire outside of the Las Vegas wash would occur during a year with above normal precipitation and high annual grass and forb production. High amounts of dried grasses could be ignited and spread fire through the shrubs under high wind conditions. Existing good defensible space conditions and rapid initial attack should be sufficient to control a fire under these conditions before structures would be threatened.

24.1.7 Ignition Risk Assessment

Henderson has a low ignition risk. There is no significant wildfire or ignition history recorded for the area. The low ignition potential is facilitated by the low, sparse brush in and around the community.

24.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Henderson focus on the Las Vegas Wash, weed control, and firefighter training.

24.2.1 Defensible Space Treatments

Most of the homes in the interface area are of new construction with good defensible space. Landscaping is done with rock and desert vegetation. Landowners need to keep or prevent annual grass from becoming established in new landscaping.

Property Owners

- Control weeds and annual grass within thirty feet of structures, along driveways, and in disturbed areas by mowing to a height of three inches. This is especially important in years with above normal precipitation.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.

Henderson Fire Department

- Establish and enforce a defensible space program for structures within thick vegetation near the wash.

24.2.2 Fuel Reduction Treatments

City of Henderson

The primary goal for the fuel reduction recommendations is to reduce the fuel hazard from tamarisk trees and other weedy species.

- Work with Clark County and the Nevada Division of Forestry to implement tamarisk reduction projects along the Las Vegas Wash and convert the area back to native vegetation. The Bureau of Land Management has experience implementing this type of program in Clark County.
- Control annual weeds along the edges of roadways and disturbed areas.

24.2.3 Fire Suppression Resources

Henderson Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

24.3 SUMMARY OF RECOMMENDATIONS

Table 24-2. Henderson Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	<p>Control weeds and annual grass within thirty feet of structures, along driveways, and disturbed areas by mowing to a height of three inches. This is especially important after winters with above normal precipitation.</p> <p>Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.</p> <p>Maintain this defensible space as needed to keep the space lean, clean, and green.</p>
Henderson Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment.
	Defensible Space	Establish and enforce a defensible space program for structures within thick vegetation near the wash.

Table 24-3. Henderson Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		1489 Total Houses 131 Residential Streets	
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>0</u> not visible <u>131</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>15</u> not visible <u>1474</u> visible <u>99%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>1489</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>2</u> combust <u>1487</u> not combust <u>100%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>1035</u> not enclosed <u>454</u> enclosed <u>70%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>1413</u> <1ac <u>76</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>33</u> not adequat <u>1456</u> adequate <u>98%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>5</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>4</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>1</u> /10		
Score <u>31</u> /128			

25.0 INDIAN SPRINGS

25.1 RISK AND HAZARD ASSESSMENT

The community of Indian Springs lies 45 miles northwest of Las Vegas on US Highway 95. Indian Springs is located adjacent to an Air Force base installation. The community hazard assessment resulted in classifying Indian Springs in the **Low Hazard** category (34 points). The low rating is primarily attributed to good access, fire-resistant building materials, adequate water for fire suppression, and sparse vegetation. A summary of the conditions that contributed to the hazard rating for Indian Springs is included in Table 25-3 at the end of this section. The Indian Springs community boundary is shown in Figure 25-1.

25.1.1 Community Design

The urban interface condition surrounding Indian Springs is a classic interface condition. There is a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. All residential lots are on parcels of less than one acre in size.

Access: Indian Springs lies along US Highway 95, a paved four-lane road. The secondary roads are paved and there is adequate room for fire suppression equipment to maneuver.

Signage: All of the streets have clearly posted and visible signs. Only 76 percent of the homes have address signs that are visible from the road.

Utilities: Utilities are both above and below ground. Utility corridors were well maintained and pose a low ignition risk.

25.1.2 Construction Materials

Ninety-nine percent of the homes in the interface are built with non-combustible roofing and 93 percent are constructed of non-combustible siding materials.

Nearly half of the homes in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

25.1.3 Defensible Space

Eighty-six percent of the homes assessed have landscaping that meets the minimum requirement for defensible space to minimize property damage or the risk of loss to the home during a wildfire.

25.1.4 Suppression Capabilities

Wildfire Protection Resources

Indian Springs has a local volunteer fire department, Station 83 that reported having 36 members at the time that interviews were conducted for this report. The community also relies on fire protection from the nearby Indian Springs Air Force Auxiliary Field.

Additional resources are available through the Clark County Fire Department and the Nevada Division of Forestry Indian Springs Conservation Camp. Table 25-1 lists the types of wildfire resources, cooperating partners, and equipment available to Indian Springs to respond to a reported wildland fire. Response times depend on firefighter availability.

Table 25-1. Indian Springs Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	Cooperating Partner (RESOURCE LOCATION)
Type 1 Structure Engine Type 6 Quick Attack Engine ILS Rescue	1 1 1	Clark County Rural Fire Station 83 (Indian Springs)
Type 4 Brush Engine Type 6 Brush Patrol Engine	1 1	US Forest Service (Indian Springs Station 83)

Source: Steve McClintock, Kurt Leavitt, Mark Blankensop, pers. comm. March 2004.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Indian Springs includes fire hydrants within 500 feet of structures with minimum flow capacities of 500 gpm, community wells with electric pumps, and 40,000 gallon storage tanks

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some have wildland firefighting training (National Wildfire Coordinating Group 310-1). The National Red Card wildland certification system is used once a volunteer receives the appropriate training.

Work Load

In 2003 the Indian Springs Fire Department responded to 42 emergency medical calls and thirteen wildland brush fire calls.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Indian Springs is covered under the Clark County All-Risk Emergency Plan. The Clark County Fire Department reviews development plans for the entire county to ensure compliance with the 1997 (with amendments) Uniform Fire Code standards. There are no brush clearance programs in Indian Springs.

25.1.5 Factors Affecting Fire Behavior

The vegetative community in the Indian Springs area is Mojave Desert shrub, consisting of a sparse distribution of creosote bush, fourwing saltbush, greasewood, and occasional mesquite trees. The fuel density is light, estimated at less than one ton per acre, and considered a low fuel hazard. Much of the fuel loading in Indian Springs is composed of annual grasses and other plants on vacant lots within the community, which, when unmanaged, dry out and pose a high risk of ignition.

25.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario for Indian Springs would be a fire ignition in one of several vacant lots present within the community that accumulated a higher fuel load. Strong winds from the south/southwest could drive the fire through the rest of the community.

25.1.7 Ignition Risk Assessment

Indian Springs has a low wildfire ignition risk potential. There is no significant wildfire history reported in the area surrounding the community, though there are two ignitions recorded in the interface. The low ignition potential is facilitated by the low, sparse brush in and around the community.

25.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Indian Springs focus on fuel reduction and defensible space. The recommendations are described in detail below.

25.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove debris and flammable materials from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.

- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.

25.2.2 Fuel Reduction Treatments

Property Owners and Indian Springs Volunteer Fire Department

- Remove and reduce flammable vegetation and debris in vacant lots in the community. Reseed with fire-resistant species such as the mixture recommended in Appendix E if necessary to control annual plant reestablishment.

25.2.3 Fire Suppression Resources

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

25.2.4 Public Education

Clark County Fire Department

- Distribute copies of the publication *“Living With Fire”*. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.

25.3 SUMMARY OF RECOMMENDATIONS

Table 25-2. Indian Springs Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, or replace flammable vegetation to create a buffer zone around residences and outbuildings in the interface according to the guidelines in Appendix E of this report. Maintain defensible space around residences and outbuildings as needed to keep the space <i>lean, clean, and green</i> . Ensure that addresses are clearly visible from the street. Clear vegetation from vacant lots within the community.
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment.
	Public Education	Distribute copies of the publication “ <i>Living With Fire</i> ” to all property owners.
Indian Springs Volunteer Fire Department	Fuels Reduction	Coordinate programs to clear flammable vegetation and debris from vacant lots within the community.

Table 25-3. Indian Springs Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			188 Total Houses	16 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible	<u>16</u> visible <u>100%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>46</u> not visible	<u>142</u> visible <u>76%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>3</u>	/5	<u>2</u> combust	<u>186</u> not combust <u>99%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>13</u> combust	<u>175</u> not combust <u>93%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>81</u> not enclosed	<u>107</u> enclosed <u>43%</u> not enclosed
3. Unenclosed Structures	<u>3</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>188</u> <1ac	<u>0</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>26</u> not adequate	<u>162</u> adequate <u>86%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>34</u> /128		

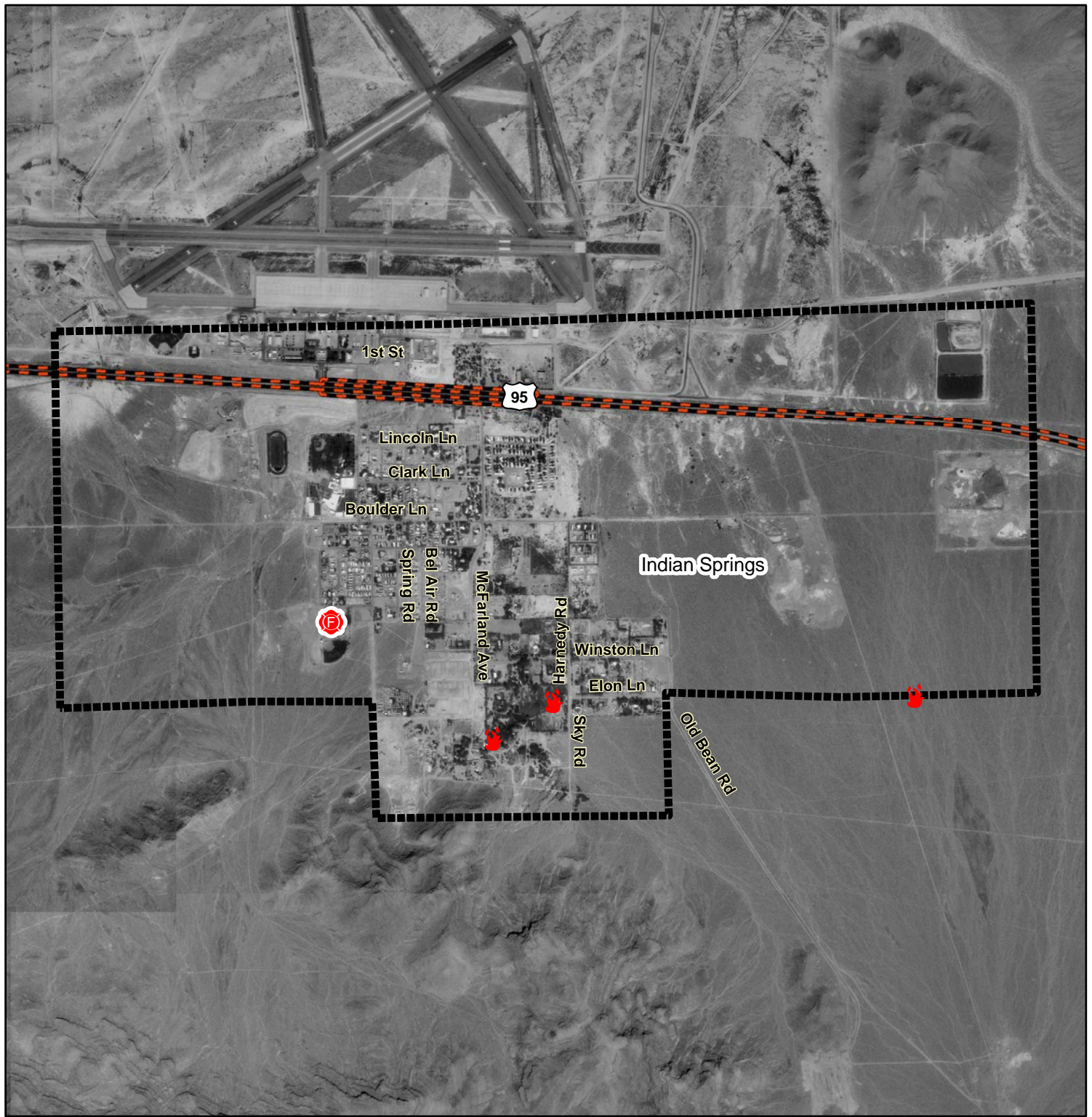
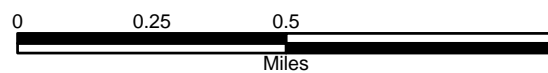


Figure 25-1. Indian Springs
Fire History and Suppression Resources



Legend

- Community Boundary
- Fire Ignition
- Fire Station
- Highways and State Routes



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26.0 LAS VEGAS

26.1 RISK AND HAZARD ASSESSMENT

Las Vegas is located in central Clark County. The community hazard assessment resulted in classifying Las Vegas in the **Low Hazard** category (30 points). The low rating is primarily attributed to good access, adequate defensible space, sparse wildland fuels, fire resistant building materials, and sufficient fire suppression resources. A summary of the conditions that contributed to the hazard rating for Las Vegas is included in Table 26-2 at the end of this section. The Las Vegas community boundary is shown in Figure 26-1.

26.1.1 Community Design

The area surrounding Las Vegas is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. Two-thirds of the homes were on lots of less than one acre in size; the rest were on parcels of one to ten acres in size.

Access: Las Vegas is accessed via Interstate 95, Interstate 93, Interstate 15, and numerous state routes. Secondary roads are generally wide paved two-lane roads with adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on approximately ninety percent of the roads in the interface areas and residential addresses are visible on about 75 percent of the homes.

Utilities: Utilities are both above and below ground. Utility right-of-ways are well maintained and pose a low ignition risk.

26.1.2 Construction Materials

All of the homes in the interface were built with non-combustible roofing and siding materials.

Only three percent of the homes observed in the community had unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can smolder and rapidly spread fire if the home ignites.

26.1.3 Defensible Space

Ninety-two percent of the homes observed in the interface meet the minimum requirement for defensible space landscaping to minimize property damage or the risk of loss to the home during a wildfire.

26.1.4 Suppression Capabilities

Wildfire Protection Resources

The Las Vegas Fire Department (LVFD) has fifteen stations throughout the city staffed by 600 career firefighters. Automatic aid is available from Clark County Fire Department and North Las Vegas. The closest engine will respond to the fire. Mutual aid is provided by Nellis Air Force Base and the Bureau of Land Management.

In the city limits of Las Vegas, there is no formal first alarm brush fire dispatch because of the very limited brush within the city limits. Normal dispatch to a brush or grass fire within the city would be one engine (Gammon 2004).

The Las Vegas Fire Department is primarily equipped and trained to respond to urban incidents and emergencies. Specialized equipment and personnel trained in standard operating guidelines for wildland fire suppression in the interface currently comes from mutual aid agencies.

Water Sources and Infrastructure

Water available for fire suppression in Las Vegas includes fire hydrants within 500 feet of structures with minimum flow capacities of 500 gpm.

Fire Protection Personnel Qualifications

Las Vegas Fire Department firefighters are trained to the State of Nevada Fire Marshal Firefighter I and II and some are trained to EMT I.

Work Load

The Las Vegas Fire Department responds to approximately 68,000 calls annually. Approximately 82 percent are emergency medical calls. Occasionally they are called to small grass fires but they are rarely involved in wildland firefighting.

Financial Support

Financial support for the Las Vegas Fire Department comes from the City General Fund.

Community Preparedness

The City of Las Vegas has an Emergency Operations Plan. This plan is prepared by the Emergency Management Office of the Fire Department and is updated as needed.

The Las Vegas Fire Department reviews development plans to ensure compliance with the 2003 NFPA-1 fire code.

26.1.5 Factors Affecting Fire Behavior

The City of Las Vegas is characterized by flat terrain. There is very little brush within the city limits. The vegetative community around the Las Vegas area is Mojave Desert shrub. Fuels consist of annual grasses and bursage, which was considered a low fuel hazard. In the Las Vegas Wash, the fuel hazard is dangerously high, estimated at ten to twenty tons per acre. The fuel load consists of tamarisk ten to twenty feet tall, mesquite up to twelve feet tall, and creosote bush and fourwing saltbush up to six feet tall. Urban garbage dumps increase the fuel load in certain areas. There is a history of fire occurrences in the Las Vegas Wash.

26.1.6 Fire Behavior Worst-case Scenario

The worst-case for a wildland fire would occur along the Las Vegas Wash in the Desert Wetlands Park. This area contains the greatest fuel loading in the Las Vegas-Henderson area. A fire in the late afternoon in the summer would be wind driven, influenced by predominately south-southwest winds or erratic winds from thunder storm activity. This would be a rapidly moving high intensity fire with the potential for hazardous materials releases from garbage dumps. Structures west of the wash would be threatened from a wildfire if erratic winds shifted and came from the east. A fire in the Las Vegas Wash represents one of the highest safety concerns for firefighters in Clark County. Clark County firefighters do not receive regular wildland fire training, they are not issued wildland fire protective equipment or fire shelters, and there are no standard operating guidelines for wildland firefighting.

The worst-case scenario wildland fire outside of the Las Vegas wash would occur during a year with above normal precipitation and high annual grass and forb production. High amounts of dried grasses could be ignited and spread fire through the shrubs under high wind conditions. Existing good defensible space conditions and rapid initial attack should be sufficient to control a fire under these conditions before structures would be threatened.

26.1.7 Ignition Risk Assessment

Las Vegas has a low wildfire ignition risk potential. While a history of ignitions was reported, the low, sparse brush in and around the community effectively prevents ignitions from developing into wildfires of significant size.

26.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations Las Vegas focus on weed control and firefighter training.

26.2.1 Defensible Space Treatments

Property Owners

- Homeowners should ensure their address is visible from the road in at least four-inch reflective numbers.
- Clear all vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Mow and maintain weeds and grass within thirty feet of structures to a height of no more than three inches to prevent dried annual grasses and weeds from collecting against homes, vehicles, and fences.

26.2.2 Fire Suppression Resources and Training

Las Vegas Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire*

Qualification System Guide (PMS 310-1). Provide annual wildland firefighting refresher training and fire shelter training.

26.2.3 Fuel Reduction Treatments

Las Vegas Fire Department

- Establish and enforce a brush clearance program to reduce fuel hazards in the few areas where they occur within the Las Vegas community boundary.

26.3 SUMMARY OF RECOMMENDATIONS

Table 26-1. Las Vegas Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Mow and maintain weeds and grass within thirty feet of structures to a height of no more than three inches to prevent dried annual grasses and weeds from collecting against homes, vehicles, and fences. Clear all vegetation and combustible materials around propane tanks for a minimum of ten feet. Ensure that address signs are clearly visible from the access road.
Las Vegas Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment.
	Fuels Reduction	Establish and enforce a brush clearance program to reduce fuels in the few areas where they occur within the city.

Table 26-2. Las Vegas Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		456 Total Houses 97 Residential Streets	
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>11</u> not visible <u>86</u> visible <u>89%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>115</u> not visible <u>341</u> visible <u>75%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>456</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>1</u> combust <u>455</u> not combust <u>100%</u> not combust	
5. Street Signs	<u>3</u> /5	C3. Unenclosed Structures on Lot <u>15</u> not enclosed <u>441</u> enclosed <u>3%</u> not enclosed	
6. Address Signs	<u>5</u> /5	D1. Lot Sizes <u>310</u> <1ac <u>146</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>38</u> not adequate <u>418</u> adequate <u>92%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>1</u> /10		
Score 30 /128			

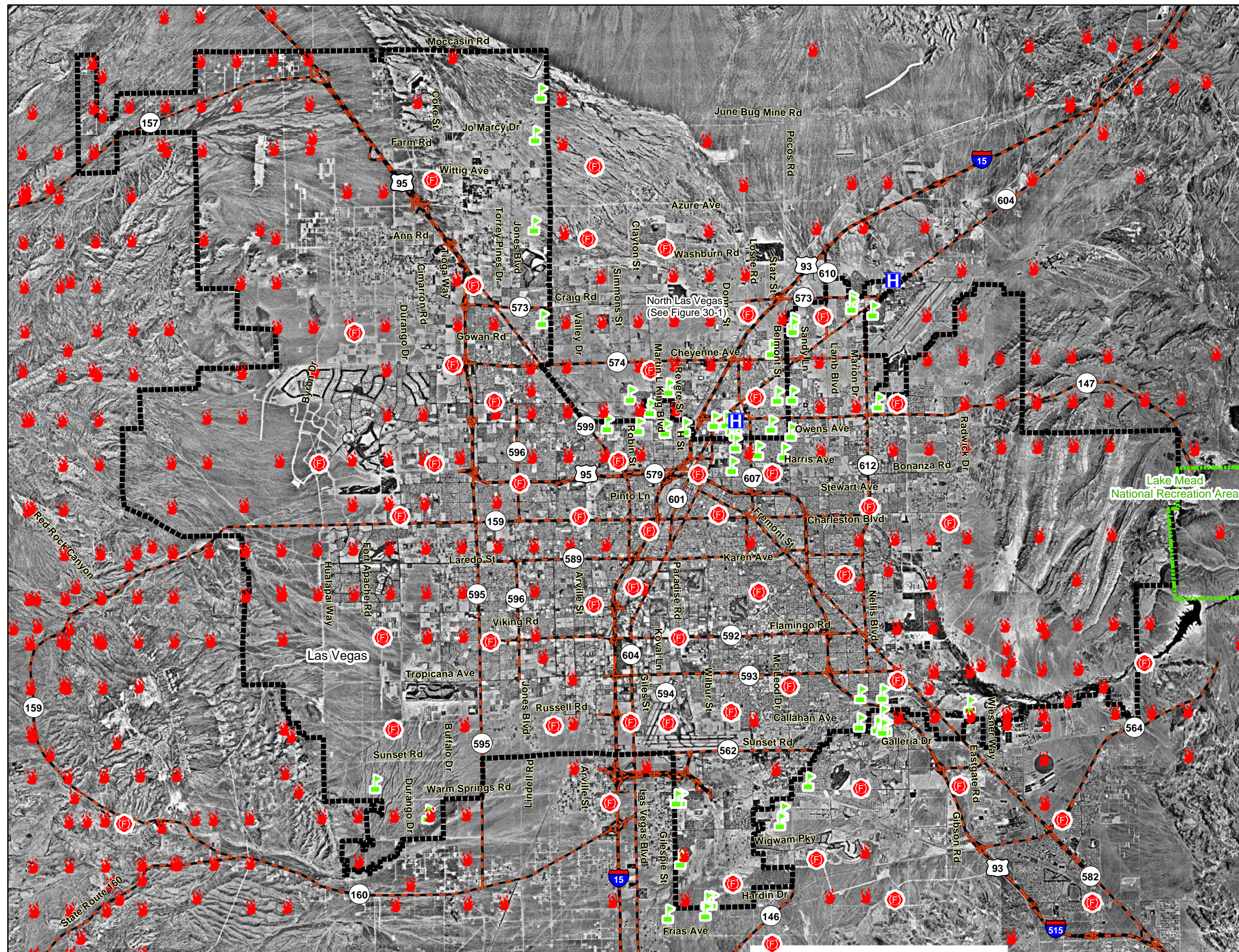
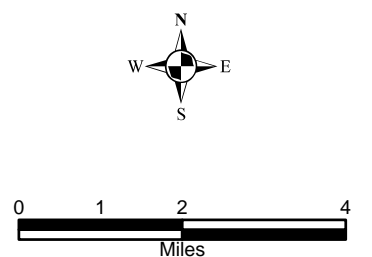
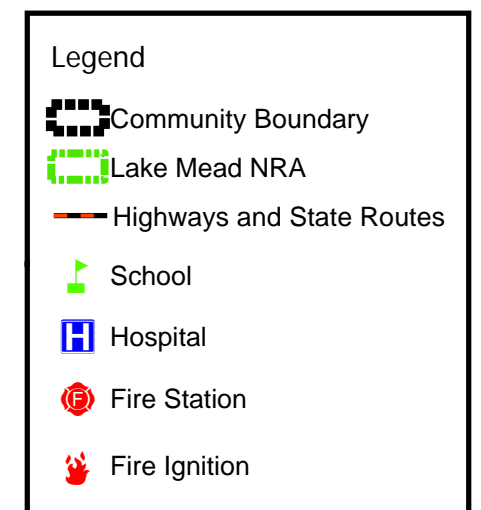



Figure 26-1. Las Vegas
Fire History, Suppression
Resources, and Critical Features



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27.0 LAUGHLIN

27.1 RISK AND HAZARD ASSESSMENT

Laughlin is located in southern Clark County along the Arizona/Nevada border on the Colorado River. Laughlin is primarily a tourist destination. The community hazard assessment resulted in classifying Laughlin in the **Low Hazard** category (26 points). The rating is primarily attributed to good access, good defensible space, non-combustible construction materials, light fuels, and good fire suppression resources. A summary of the conditions that contributed to the hazard rating for Laughlin is included in Table 27-3 at the end of this section. The Laughlin community boundary is shown in Figure 27-1.

27.1.1 Community Design

Laughlin has a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. Most homes are on lots of less than one acre in size.

Access: The primary road into Laughlin is State Route 163. The primary access road is paved and more than 24 feet wide with a road grade less than five percent. There are several secondary roads and all roads are either loop roads or have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on all of the homes in the community.

Utilities: Utilities provided to the community are underground and thus do not pose an ignition risk.

27.1.2 Construction Materials

All of the homes in the interface were built with non-combustible roofing materials and fire resistant siding materials.

None of the homes in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

27.1.3 Defensible Space

Ninety-six percent of the homes within the Laughlin community meet the minimum requirements for defensible space landscaping to minimize property damage or the risk of loss to the home during a wildfire.

27.1.4 Suppression Capabilities

Wildfire Protection Resources

Local fire suppression for Laughlin is provided by Clark County Rural Fire Stations 76 in Laughlin and Station 84 in CalNevAri. Laughlin has a career station with fourteen firefighters on duty each day. These stations are primarily equipped to respond to urban

fire and emergency situations. Additional county resources are dispatched through the Clark County Fire Alarm Office as needed. The available equipment for initial attack is summarized in Table 27-1.

Table 27-1. Laughlin Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	2	Clark County Rural Fire Station 76 (Laughlin)
Ladder Truck	1	
Rescue	1	
Type 1 Engine	1	National Park Service (Nearest Available)
Type 1 Structure Engine	1	Clark County Rural Fire Station 84 (CalNevAri)
Water Tender	1	
Type 6 Quick Attack Engine	1	
Intermediate Life Support (ILS) Rescue	1	
Type 6 Brush Patrol Engine	1	Bureau of Land Management (Nearest Available)

Source: Steve McClintock, pers. comm., April 2004.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Laughlin includes fire hydrants within 500 feet of structures with a minimum flow capacity of 500 gpm, community wells operated by gravity and electric pumps with back-up generators, and water storage facilities with a capacity of over three million gallons. The Colorado River can also be used as a drafting site and helicopter dip spot.

Fire Protection Personnel Qualifications

Firefighters are trained to the State of Nevada entry-level firefighter qualifications (NFPA Firefighter I and II).

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments.

Financial Support

Annual operating funds for the Clark County Fire Department comes from the County General Fund, which is generated through the collection of property taxes.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

27.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in and around Laughlin is generally light. Sparse shrubs include creosote bush and greasewood with occasional grasses in the interspaces. The fuel hazard was considered low. Along the Colorado River riparian area the fuel hazard is high due to tall and dense tamarisk and mesquite near the Big Bend RV Campground.

27.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would be a fire burning along the Colorado River south of Laughlin with a south wind pushing the fire north along the river. No structures would be directly threatened and rapid initial attack should be sufficient to control a fire under these conditions.

27.1.7 Ignition Risk Assessment

Laughlin has a low wildfire ignition risk potential. No significant wildfire history is reported for the area surrounding the community and reported ignitions are few. The low, sparse fuels in and around the community contribute to the low ignition potential.

27.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

Primary recommendation for Laughlin is defensible space for structures along the river corridor and firefighter training.

27.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove, reduce, and replace vegetation and flammable debris from around homes according to the guidelines in Appendix E. This area should be kept:
 - Lean: There are only small amounts of flammable vegetation,
 - Clean: There is no accumulation of dead vegetation or other flammable debris,
 - Green: Existing plants are healthy and green during the fire season.

- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed.

27.2.2 Community Coordination

Clark County

- Facilitate cooperation between the Assessor's office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.

27.2.3 Fire Suppression Resources

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310-1). Provide annual wildland firefighting refresher training and fire shelter training.

27.3 SUMMARY OF RECOMMENDATIONS

Table 27-2. Laughlin Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation and flammable debris from around homes according to the guidelines in Appendix E. Maintain defensible space as needed.
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment and annual refresher courses.
Clark County	Community Coordination	Facilitate cooperation between the Assessor's office and the Roads Department to ensure that all new development roads are named, mapped, and identified with GPS locations.

Table 27-3. Laughlin Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			27 Total Houses	2 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible <u>2</u> visible <u>100%</u> visible	
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>0</u> not visible <u>27</u> visible <u>100%</u> visible	
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>1</u>	/5	<u>0</u> combust <u>27</u> not combust <u>100%</u> not combust	
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>0</u> combust <u>27</u> not combust <u>100%</u> not combust	
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>0</u> not enclosed <u>27</u> enclosed <u>0%</u> not enclosed	
3. Unenclosed Structures	<u>1</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>27</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>1</u> not adequate <u>26</u> adequate <u>96%</u> adequate	
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>3</u>	/10		

Score 26 /128

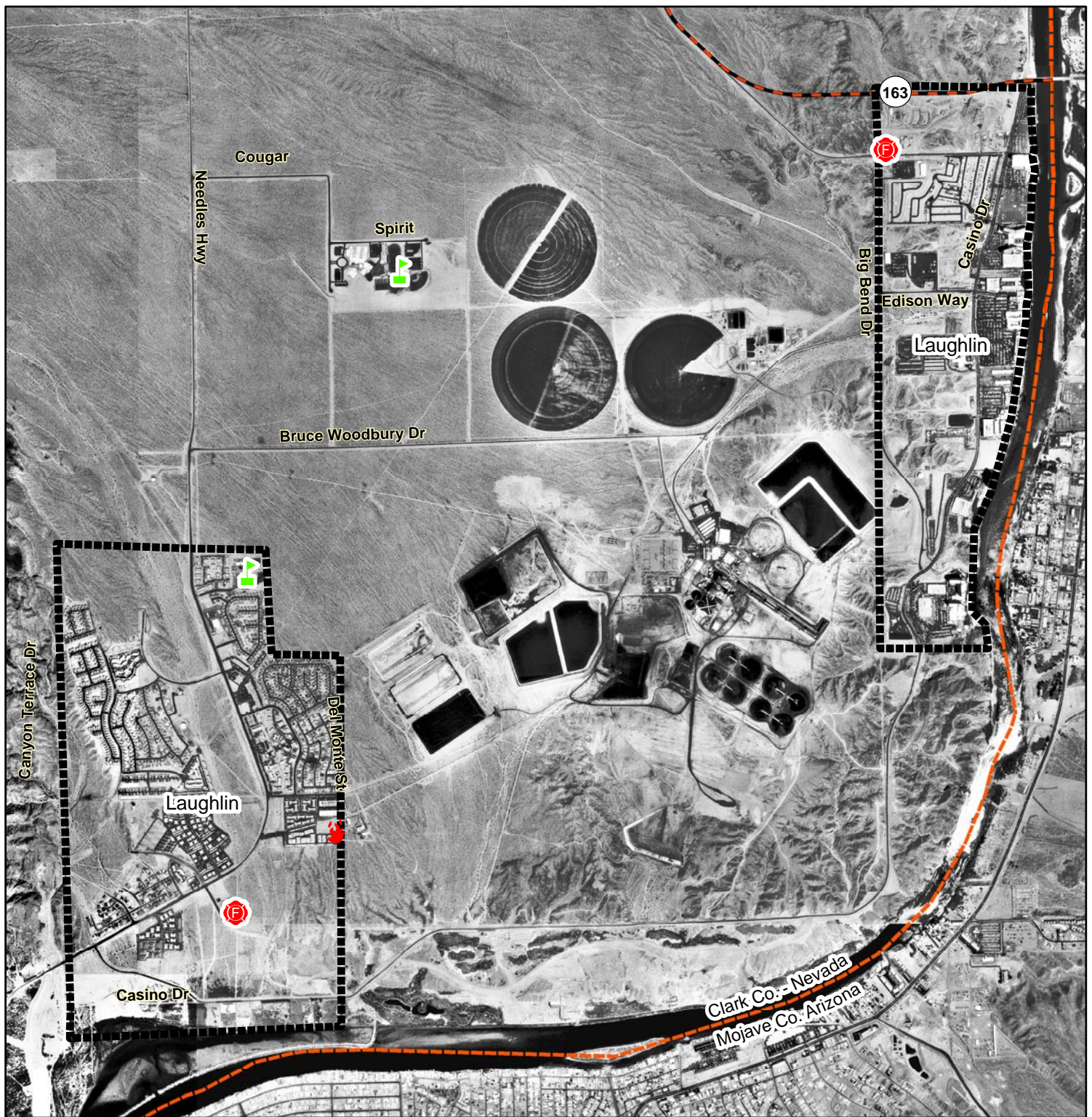


Figure 27-1. Laughlin
Fire History, Suppression Resources,
and Critical Features

Legend

Community Boundary

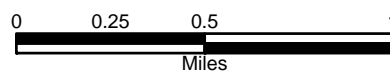
School

Fire Ignition

Fire Station

County Boundary

Highways and State Routes



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28.0 LOGANDALE

28.1 RISK AND HAZARD ASSESSMENT

Logandale is located in northeastern Clark County on State Route 169 approximately five miles south of the intersection with Interstate 15. Approximately 325 homes were assessed in the Logandale interface area. The community hazard assessment resulted in classifying Logandale in the **Low Hazard** category (39 points). The low rating is primarily attributed to sparse fuels, good access, adequate defensible space, and fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Logandale is included in Table 28-3 at the end of this section. The Logandale community boundary is shown in Figure 28-1.

28.1.1 Community Design

The area surrounding Logandale is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. Almost all homes are on lots less than one acre in size; approximately five percent were on parcels between one and ten acres in size.

Access: Logandale is accessed via State Route 169, a paved two-lane road greater than 24 feet in width. Secondary roads provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on approximately 85 percent of the roads observed in the community. Residential addresses are visible on 75 percent of the homes observed in the interface area.

Utilities: Utility lines in Logandale are both above and below ground. The utilities pose a low ignition risk.

28.1.2 Construction Materials

Approximately 99 percent of the homes in the interface are built with non-combustible roofing materials and 94 percent have fire resistant siding materials.

Over half of the homes in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spreading fire to the home.

28.1.3 Defensible Space

Approximately three-quarters of the homes have landscaping that meets the minimum requirements for defensible space to minimize property damage or loss of the home during a wildfire.

28.1.4 Suppression Capabilities

Wildfire Protection Resources

Logandale is protected by a Clark County Fire Rural Fire Station 73, an all volunteer fire department that reported having 34 volunteer firefighters at the time interviews were conducted for this report. Nearby Clark County Rural Fire Stations are located in Overton and Moapa. Table 28-1 lists the fire suppression resources available for first response to a reported wildland fire.

Table 28-1. Logandale Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 73) (Logandale)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advance Life Support (ALS) Rescue	1	
Type 3 Brush Engine	1	Bureau of Land Management (Logandale Station)
Water Tender	1	Clark County Rural Fire Station 74) (Overton)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advanced Life Support (ALS) Rescue	1	
Water Tender	1	Clark County Rural Fire Station 72) (Moapa)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advanced Life Support (ALS) Rescue	1	

Source: Steve McClintock, pers. comm., March 2004, K. Oliver 12 October 2004.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water sources available for fire suppression include fire hydrants within 1,000 feet of structures with a minimum flow capacity of 500 gpm, community wells, and one 2.5 million gallon storage tank. The water system is gravity operated. Logandale also has access to the Muddy River for use as a drafting site or helicopter dip spot.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The Logandale Fire Department responded to 374 emergency medical calls and 24 wildland brush fire calls in 2003.

Financial Support

The Clark County Fire Department in Logandale is a taxed base fire district.

Detection and Communication

Reports of wildland fire are communicated by 911 calls that are transferred to the consolidated Fire Alarm Office in Las Vegas. Fire department radios are compatible with neighboring agencies. There is no community siren.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Clark County Fire Department reviews development plans to ensure compliance with the VFC 1997 fire code.

28.1.5 Factors Affecting Fire Behavior

Logandale is an agricultural area surrounded by Mojave Desert scrub vegetation. The heaviest fuel concentrations are along ditch banks and along the Muddy River.

The vegetative fuel density along the Muddy River is moderate to heavy dominated by brush and trees up to twelve feet tall including tamarisk, mesquite, willow, and fourwing saltbush. The fuel density was estimated to be one to five tons per acre and was considered a high fuel hazard.

The vegetative fuel density is light in the agricultural fields and upland areas surrounding the community and was considered a low fuel hazard. Non-irrigated lands consist of annual grass, creosote bush, bursage, and fourwing saltbush.

28.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would be a wind driven fire through tamarisk in the river bottom in the late afternoon in the summer, south of the community. Agricultural lands and defensible space around structures would confine the fire to the river bottom.

28.1.7 Ignition Risk Assessment

Logandale has a low wildfire ignition risk potential. There is no significant wildfire history reported for the area surrounding the community. Although a small number of ignitions are

reported, the low, sparse brush in and around the community effectively mitigates the ignition potential. Escaped agricultural burns present the most common type of ignition risk.

28.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Logandale focus on tamarisk reduction along the river bottom and maintenance of defensible space treatments for residences.

28.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove, reduce, and replace vegetation and flammable debris from around homes according to the guidelines in Appendix E. This area should be kept:
 - Lean: There are only small amounts of flammable vegetation,
 - Clean: There is no accumulation of dead vegetation or other flammable debris,
 - Green: Existing plants are healthy and green during the fire season.
- Immediately remove cleared vegetation to an appropriate disposal site when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed.
- Maintain the area underneath porches and decks free of weeds and other flammable debris.
- Clear vegetation and combustible materials around propane tanks for a minimum distance of ten feet.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Remove weeds along fences and irrigation ditches.

28.2.2 Fuel Reduction Treatments

Bureau of Land Management

- Implement a tamarisk fuel reduction and tamarisk replacement project in the Muddy River drainage.

Union Pacific Railroad

- Maintain vegetation clearance along the railroad right-of-way.

28.2.3 Fire Suppression Resources

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide 310-1. Provide annual wildland firefighting refresher training and fire shelter training.

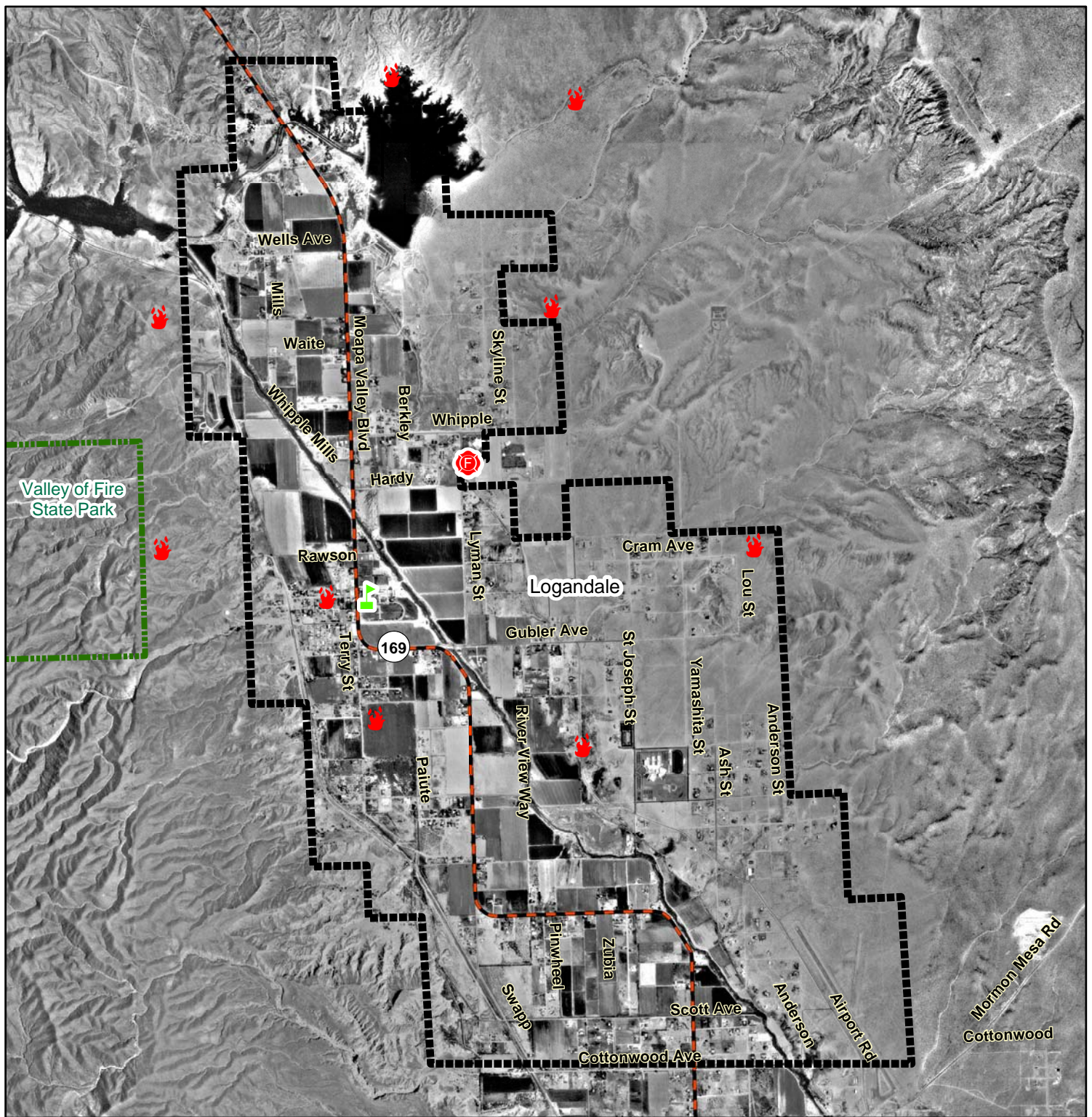
28.3 SUMMARY OF RECOMMENDATIONS

Table 28-2. Logandale Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, or replace flammable vegetation to create a buffer zone around residences and outbuildings in the interface according to the guidelines in Appendix E. Remove weeds along fences and irrigation ditches. Maintain defensible space annually
Clark County Fire Department	Fire Suppression Resources	Provide all firefighters with basic wildland fire training and equipment and annual refresher courses.
Bureau of Land Management	Fuels Reduction	Initiate and maintain fuel reduction and tamarisk replacement treatments along the Muddy River.
Union Pacific Railroad	Fuels Reduction	Maintain vegetation clearance along the railroad right-of-way.

Table 28-3. Logandale Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			327 Total Houses	42 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>6</u> not visible	<u>36</u> visible <u>86%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>81</u> not visible	<u>246</u> visible <u>75%</u> visible
5. Street Signs	<u>3</u>	/5	C1. Roofs	
6. Address Signs	<u>3</u>	/5	<u>4</u> combust	<u>323</u> not combust <u>99%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>19</u> combust	<u>308</u> not combust <u>94%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>178</u> not enclosed	<u>149</u> enclosed <u>54%</u> not enclosed
3. Unenclosed Structures	<u>5</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>310</u> <1ac	<u>16</u> >1ac <10ac <u>1</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>71</u> not adequate	<u>256</u> adequate <u>78%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>2</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>39</u> /128		



Legend







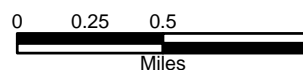
-  Community Boundary
-  Valley of Fire State Park
-  School
-  Fire Ignition
-  Fire Station
-  Highways and State Routes

Figure 28-1. Logandale
Fire History, Suppression Resources,
and Critical Features



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Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

29.0 MESQUITE

29.1 RISK AND HAZARD ASSESSMENT

Mesquite is located along the Virgin River in eastern Clark County adjacent to the Arizona border and Interstate 15. There are approximately 300 homes in the Mesquite area. The community hazard assessment resulted in classifying Mesquite in the **Low Hazard** category (30 points). The low rating is primarily attributed to good access, adequate defensible space, and fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Mesquite is included in Table 29-3 at the end of this section. The Mesquite community boundary is shown in Figure 29-1.

29.1.1 Community Design

The area surrounding Mesquite is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. Most parcels measure less than one acre in size.

Access: Mesquite is accessed via Interstate 15, a paved road greater than 24 feet in width. Secondary roads are paved and provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses are visible on all of the homes in the community.

Utilities: New development areas have underground utilities. Older neighborhoods have above ground utilities. The utilities pose a low ignition risk.

29.1.2 Construction Materials

Approximately 99 percent of the homes in the interface are built with non-combustible roofing materials and 98 percent of the homes have fire resistant siding materials.

Approximately half of the homes in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

29.1.3 Defensible Space

Approximately 99 percent of the homes have landscaping that meets the minimum requirements for defensible space to reduce the chance of property damage or loss of the home during a wildfire.

29.1.4 Suppression Capabilities

Wildfire Protection Resources

The Mesquite Fire Department has a combination career/volunteer fire station that reported having thirteen career and 25 volunteer firefighters at the time interviews were conducted for this report. Additional resources are available through the Clark County

Rural Fire Station in Bunkerville. Table 29-1 lists the nearest wildfire resources and equipment available in Mesquite to respond to a reported wildland fire.

Table 29-1. Mesquite Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	2	Mesquite Fire Department
Advanced Life Support (ALS) Rescue Type 6 Quick Attack Engine	1 1	Clark County Rural Fire Station 71 (Bunkerville)

Source: Chief Derek Hughes, pers. comm., 23 March 2004.

A mutual aid agreement exists with the Beaverdam Littlefield Fire District in neighboring Arizona. Mutual aid can also be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Mesquite includes fire hydrants with a minimum flow capacity of 1,000 gpm within 500 feet of structures. The community has nine community wells capable of producing nineteen million gallons per day and several water storage tanks totaling twelve million gallons.

The water system operates on gravity as well as electrical pumps with emergency backup generators. The Virgin River could also provide water for drafting and helicopter dip sites, and there are several ponds in the area.

Fire Protection Personnel Qualifications

The Mesquite Fire Department firefighters are trained to the State of Nevada entry-level firefighter qualifications (FM FF I and II).

Work Load

The Mesquite Fire Department responded to 1,400 emergency medical calls and 25 wildland brush fire calls in 2003.

Financial Support

Financial support for the Mesquite Fire Department comes from the City of Mesquite municipal general fund.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments. Radios are compatible with neighboring agencies.

Community Preparedness

The City of Mesquite has an All Hazard Emergency Plan, which includes a Disaster Plan and an Emergency Evacuation Plan. These plans are updated annually or as needed. The Police Chief and the Fire Chief have the authority to authorize the Emergency Evacuation Plan. The plan contains an emergency alert system with the County LEPC.

The Mesquite Fire Department reviews development plans to ensure compliance with the 1997 fire code.

29.1.5 Factors Affecting Fire Behavior

There are three types of vegetative communities in the Mesquite area: the Virgin River riparian corridor, agricultural fields, and upland Mojave Desert scrub. Dense vegetative along the Virgin River corridor in the Mesquite interface area consists of a fine fuel component of salt grass, foxtail, and Russian thistle. The overstory includes fourwing saltbush, tamarisk, mesquite, and willow. The tree layer is continuous with no space between the plants, that range between eight and twelve feet tall. The fuel density was estimated to be eight tons per acre and was considered a high fuel hazard.

The vegetative fuel density in the upland areas surrounding the community is light. Ground fuels consist of annual grasses and Russian thistle along the roads. The shrub layer is dominated by creosote bush, cholla cactus, and fourwing saltbush. The upland areas and the agricultural lands were considered a low fuel hazard.

29.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would begin with an agricultural burn that escaped its boundaries south of town on a windy summer day. Irrigated fields between the community and the heavy fuels in the river bottom help to protect residences; however, scattered farm structures in this area could be damaged by an escaped fire.

29.1.7 Ignition Risk Assessment

Mesquite has a low ignition risk rating. There is no significant wildfire history in the area surrounding the community, and the low, sparse brush in the area effectively mitigates the ignition risk shown in the ignition history for the area.

29.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The risk and hazard reduction recommendations for Mesquite focus on tamarisk reduction along the river bottom and wildland training for all firefighters in the Mesquite Fire Department.

29.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove debris and flammable materials from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.
- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and posted where the road and driveway meet. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate an area during a wildland fire.

29.2.2 Fuel Reduction Treatments

The goal of fuel reduction treatments is to reduce the fuel hazard due to tamarisk, to allow safe access into and out of the community during a wildfire, and to improve the defensible space conditions of the homes near the Virgin River corridor.

Bureau of Land Management

- Continue the tamarisk reduction project and revegetate areas with native species. Monitor and maintain areas as needed.

Clark County

- Maintain vegetation clearance within twenty feet along road shoulders by mowing to a height of four inches.

29.2.3 Fire Suppression Resources and Training

Mesquite Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

29.3 SUMMARY OF RECOMMENDATIONS

Table 29-2. Mesquite Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, or replace flammable vegetation to create a buffer zone around residences and outbuildings in the interface according to the guidelines in Appendix E of this report. Maintain defensible space around residences and outbuildings as needed to keep the space <i>lean, clean, and green</i> . Ensure that addresses are clearly visible from the street.
Bureau of Land Management	Fuels Reduction	Continue the tamarisk reduction project and revegetate native species. Monitor and maintain areas as needed.
Clark County	Fuels Reduction	Maintain a vegetation clearance twenty feet wide along road shoulders.
Mesquite Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment and provide annual refresher courses.

Table 29-3. Mesquite Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		289 Total Houses	21 Residential Streets
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>0</u> not visible <u>21</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>1</u> not visible <u>288</u> visible <u>100%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>2</u> combust <u>287</u> not combust <u>99%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>7</u> combust <u>282</u> not combust <u>98%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>150</u> not enclosed <u>139</u> enclosed <u>52%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>288</u> <1ac <u>1</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>3</u> not adequat <u>286</u> adequate <u>99%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>5</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>3</u> /10		
Score 30 /128			

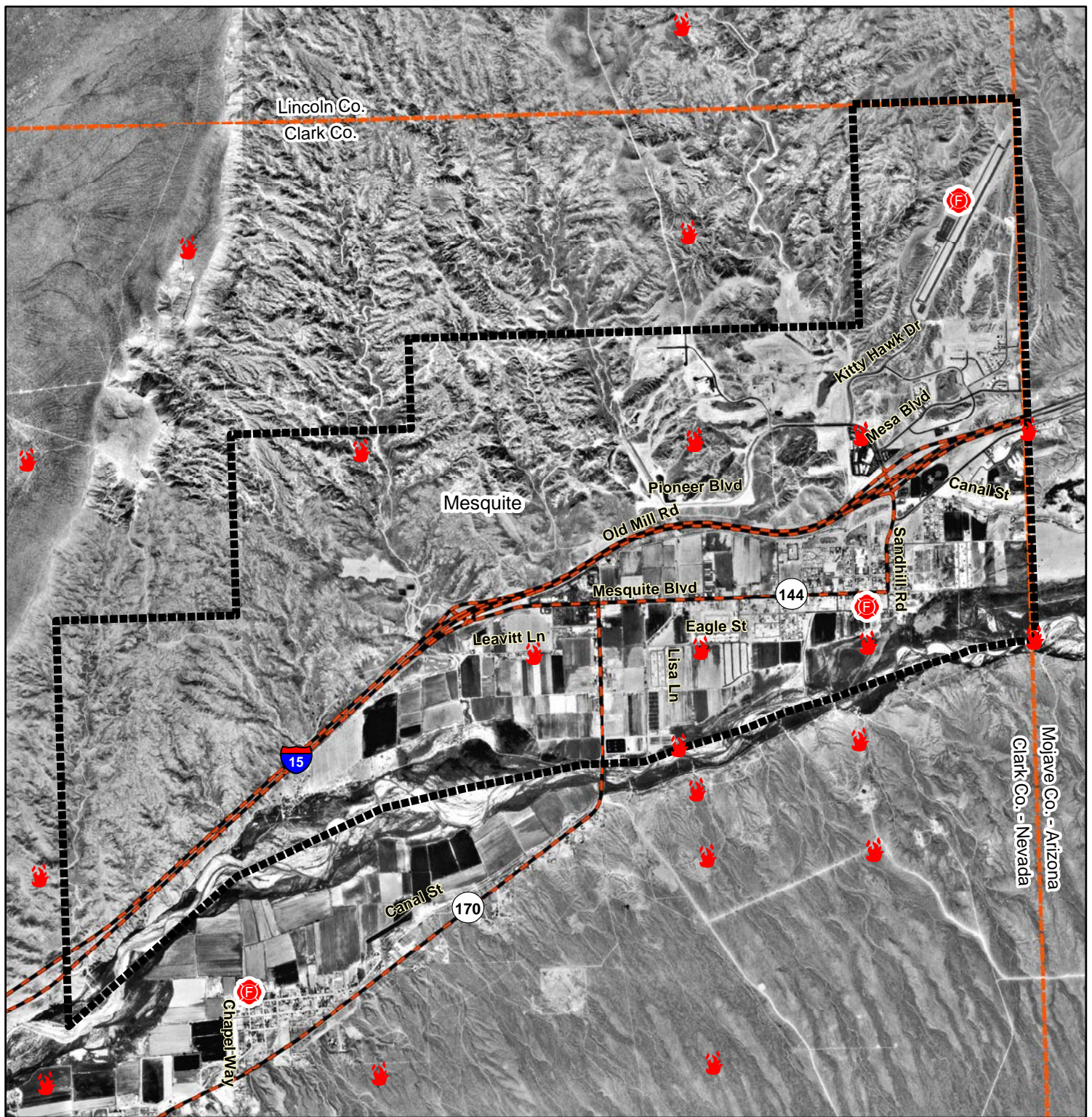
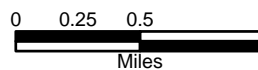


Figure 29-1. Mesquite
Fire History and Suppression Resources



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Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

Legend

- County Boundary
- Community Boundary
- Fire Ignition
- Fire Station
- Highways and State Routes

30.0 NORTH LAS VEGAS

30.1 RISK AND HAZARD ASSESSMENT

North Las Vegas is adjacent to Las Vegas in southeastern Clark County. The community hazard assessment resulted in classifying North Las Vegas in the **Low Hazard** category (24 points). The low rating is primarily attributed to good access and signage, adequate defensible space, sparse wildland fuels, fire resistant building materials, and sufficient fire suppression resources. A summary of the conditions that contributed to the hazard rating for North Las Vegas is included in Table 30-3 at the end of this section. The North Las Vegas community boundary is shown in Figure 30-1.

30.1.1 Community Design

The area surrounding North Las Vegas is primarily characterized as a classic interface condition. Structures abut wildland fuels and there is a clear line of demarcation between the structures and the wildland area. Approximately half of the homes are on lots of less than one acre in size; the other half are on parcels between one and ten acres in size.

Access: North Las Vegas is accessed via Interstate 95, Interstate 93, Interstate 15, and numerous state routes. Secondary roads are generally wide, paved two-lane roads that provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs were visible on all of the roads observed in the community. Residential addresses were visible on about 95 percent of the homes observed in the interface area.

Utilities: Utilities are both above and below ground. Utility right-of-ways are well maintained and pose a low ignition potential.

30.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing and siding materials.

Only ten percent of the homes observed in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

30.1.3 Defensible Space

Ninety-one percent of the homes have landscaping that meets the minimum requirement for defensible space in order to minimize damage to the home or property loss during a wildfire.

30.1.4 Suppression Capabilities

Wildfire Protection Resources

The North Las Vegas Fire Department has six stations throughout its 84-square mile coverage area. The stations are staffed by 147 career firefighters. Automatic aid is available from the Clark County Fire Department and the Las Vegas Fire Department through the Clark County Fire Alarm Office. Nellis Air Force Base, the Nevada Division

of Forestry, and the Bureau of Land Management also provide mutual aid assistance to the North Las Vegas area.

The North Las Vegas Fire Department is primarily equipped and trained to respond to urban incidents and emergencies. Specialized equipment and personnel trained in standard operating guidelines for wildland fire suppression in the North Las Vegas wildland-urban interface currently comes from outside agencies.

In the city limits of North Las Vegas, there is no formal first alarm brush fire dispatch because of the very limited brush within the city limits. Normal dispatch to a brush or grass fire at the wildland-urban interface would be one Type I structure engine (Chief Tarbett 2004).

Table 30-1. North Las Vegas Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	RESOURCE LOCATION
Type 1 Structure Engine	1	North Las Vegas Fire Department

Source: Chief Tarbett, pers. comm., 24 March 2004.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in North Las Vegas includes fire hydrants structures with a minimum flow capacity of 500 gpm within 500 feet of.

Fire Protection Personnel Qualifications

Firefighters are trained to the State of Nevada Fire Marshal Firefighter I and II and some are trained to EMT-B. The North Las Vegas Fire Department does not offer wildland fire training.

Work Load

The North Las Vegas Fire Department generally responds to 20,000 calls annually. Approximately 82 percent are emergency medical calls. Occasionally they are called to small grass fires.

Financial Support

Financial support for the North Las Vegas Fire Department comes from the City General Fund.

Community Preparedness

The City of North Las Vegas has an Emergency Operations Plan. This plan is prepared by the Emergency Management Office of the Fire Department and is updated as needed.

The North Las Vegas Fire Department reviews development plans to ensure compliance with the 2000 UFC fire code.

30.1.5 Factors Affecting Fire Behavior

The City of North Las Vegas is characterized by flat terrain. There are a few sites with brush accumulations within the city limits. The vegetative community around the North Las Vegas area is Mojave Desert shrub. Fuels consist of annual grasses and bursage. Heavier fuels occur in the washes. The fuel hazard in the interface area was considered low.

30.1.6 Fire Behavior Worst-case Scenario

The worst-case for a wildland fire would be a fire starting near a construction site in a wash with dense fuels or somewhere within the city in a brushy area. A wind driven wildland fire could send flying embers into the construction sites, igniting woody debris or buildings under construction. Conversely, a fire originating at a construction site could spread into the adjacent wildland areas. A rapid initial attack should be sufficient to control a fire under these conditions.

30.1.7 Ignition Risk Assessment

North Las Vegas has a very low wildfire ignition risk potential. The area does not have a history of large wildfires and the few recorded historical ignitions indicate that low, sparse brush in and around the community is not conducive to frequent or intense fires.

30.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for North Las Vegas focus on weed control and firefighter training.

30.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area) Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove debris and flammable vegetation from within the defensible space area.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed to keep the space lean, clean, and green.

- Maintain the areas underneath decks, porches, etc. free of weeds and other flammable debris to prevent sparks lodging, smoldering, and spreading fire to the home.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.

30.2.2 Fire Suppression Resources

North Las Vegas Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide (PMS 310-1)*. Provide annual wildland firefighting refresher training.

30.2.3 Fuel Reduction Treatments

North Las Vegas Fire Department

- Establish and enforce a brush clearance program to target the few fuel hazard areas remaining within the community.

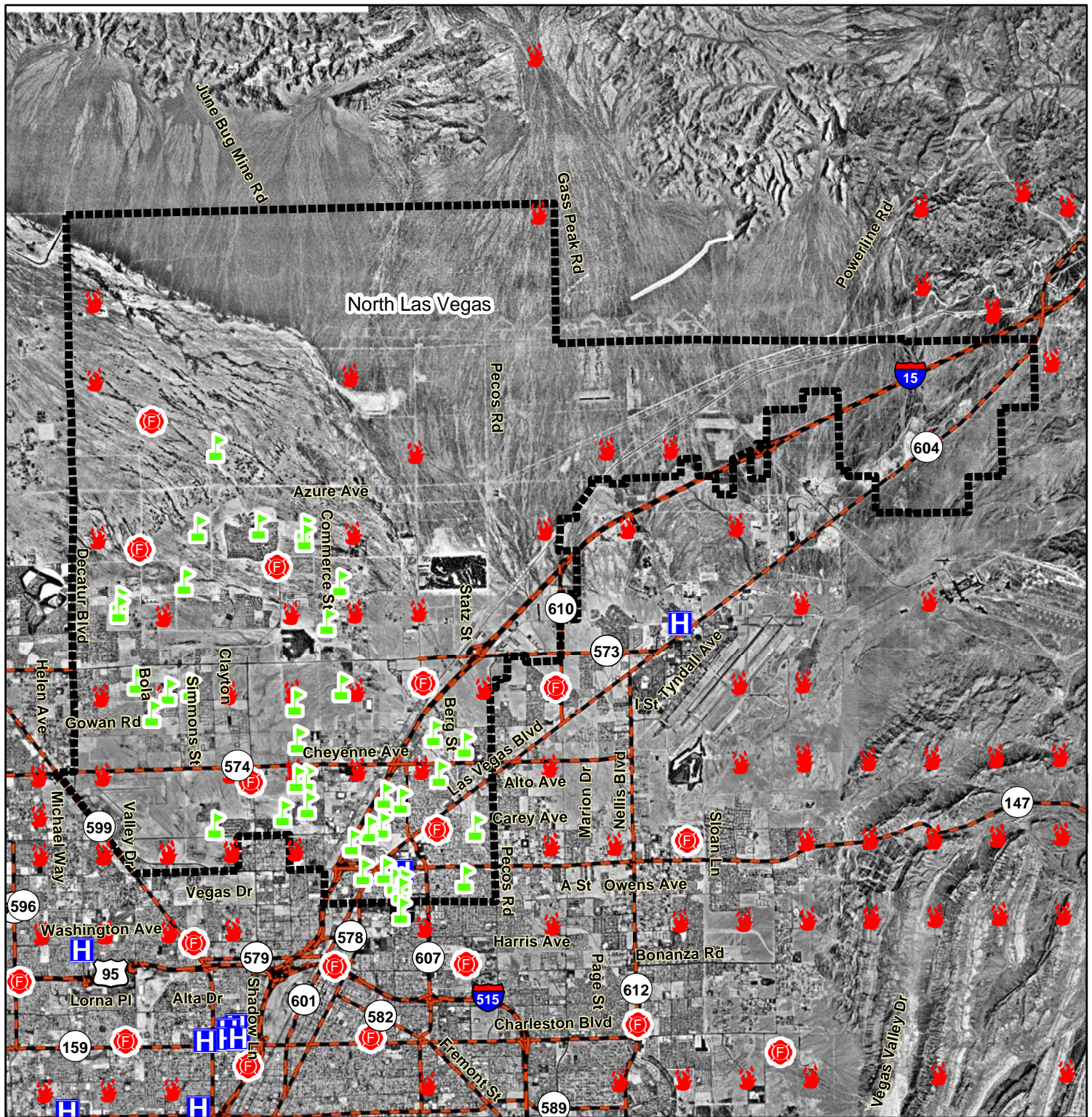
30.3 SUMMARY OF RECOMMENDATIONS

Table 30-2. North Las Vegas Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove debris and flammable vegetation from within the defensible space area according to the guidelines in Appendix E. Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site. Maintain this defensible space as needed.
North Las Vegas Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment and provide refresher training annually.
	Fuels Reduction	Establish and enforce a brush clearance program to target areas with brushy fuels within the community.

Table 30-3. N. Las Vegas Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			58 Total Houses	7 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>0</u> not visible	<u>7</u> visible <u>100%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>3</u> not visible	<u>55</u> visible <u>95%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>1</u>	/5	<u>0</u> combust	<u>58</u> not combust <u>100%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>2</u> combust	<u>56</u> not combust <u>97%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>6</u> not enclosed	<u>52</u> enclosed <u>10%</u> not enclosed
3. Unenclosed Structures	<u>1</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>33</u> <1ac	<u>25</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>5</u> not adequate	<u>53</u> adequate <u>91%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>1</u>	/10		
Score		<u>24</u> /128		



Legend





-  Community Boundary
-  School
-  Hospital
-  Fire Station
-  Fire Ignition
-  Highways and State Routes

Figure 30-1. North Las Vegas
Fire History, Suppression Resources,
and Critical Features



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Nevada Community Wildfire Risk / Hazard Assessment Project

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31.0 OVERTON

31.1 RISK AND HAZARD ASSESSMENT

Overton is located in northeast Clark County on State Route 169 approximately eleven miles south of the intersection with Interstate 15. There are approximately 200 homes in the Overton area. The community hazard assessment resulted in classifying Overton in the **Low Hazard** category (36 points). The low rating is primarily attributed to sparse fuels, good access, adequate defensible space, and fire resistant building materials. A summary of the conditions that contributed to the hazard rating for Overton is included in Table 31-3 at the end of this section. The Overton community boundary is shown in Figure 31-1.

31.1.1 Community Design

The area surrounding Overton is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. Almost all homes were on lots of less than one acre in size; approximately ten percent were on parcels between one and ten acres in size.

Access: Overton is accessed via State Route 169, a paved two-lane road greater than 24 feet in width. Secondary roads provide adequate room for fire suppression equipment to maneuver.

Signage: Street signs are visible on all of the roads in the community. Residential addresses were visible on eighty percent of the homes in the interface areas.

Utilities: Overton has both above and below ground utilities. The utilities pose a low ignition risk.

31.1.2 Construction Materials

Approximately 98 percent of the homes in the interface are built with non-combustible roofing materials and ninety percent have fire resistant siding materials.

Over half of the homes in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

31.1.3 Defensible Space

Approximately three-quarters of the homes have landscaping that meets the defensible space requirement to minimize damage to the home or loss during a wildfire.

31.1.4 Suppression Capabilities

Wildfire Protection Resources

Fire protection is provided by the Clark County Rural Fire Station 74, a volunteer fire department that reported having 23 members at the time interviews were conducted for this report. Nearby Moapa and Logandale also provide fire protection services through

the Clark County Rural Fire Departments. Equipment available for initial attack is listed in Table 31-1.

Table 31-1. Overton Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 74) (Overton)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advanced Life Support (ALS) Rescue	1	
Water Tender	1	Clark County Rural Fire Station 73) (Logandale)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Advanced Life Support (ALS) Rescue	1	
Type 3 Brush Engine	1	Bureau of Land Management (Logandale Station)

Source: Steve McClintock, Kurt Leavitt, pers. comm., 30 March 2004.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water sources available for fire suppression include fire hydrants with a flow capacity of 50 gpm, within 500 feet of structures community wells, and one 1.5 million gallon storage tank. The water system is operated by gravity. Overton also has access to the Muddy River as a drafting site or helicopter dip spot.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1).

Work Load

The Overton Volunteer Fire Department responded to 278 emergency medical calls and fourteen wildland brush fire calls in 2003.

Financial Support

Annual operating funds for the Clark County Fire Department come from the County General Fund, which is generated through the collection of property taxes.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments. There is no community siren.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The CCFD reviews development plans to ensure compliance with the VFC 1997 fire code.

31.1.5 Factors Affecting Fire Behavior

Overton is an agricultural area surrounded by Mojave Desert scrub vegetation. The heaviest fuel concentrations are weeds along ditch banks, the Muddy River riparian corridor, and the Nevada Department of Wildlife Refuge southeast of the community. The Muddy River riparian area is characterized by tall and dense tamarisk, willow, and fourwing saltbush. The fuel density was estimated to be three tons per acre and considered a high fuel hazard. The fuel hazard in the upland areas surrounding the community and the agricultural fields as considered low. Native upland fuels consist of annual grass, creosote bush, bursage, and mesquite.

31.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would begin with a fire south of the community in the Muddy River corridor late in the afternoon on a hot summer day. Agricultural lands and defensible space around structures would confine the fire in the river bottom.

31.1.7 Ignition Risk Assessment

Overton has a low wildfire ignition risk potential. There is no widespread wildfire history in the area surrounding the community and the ignition history shows infrequent incidents. There is no fire history of accidental ignitions from ditch burning or fires in the dense tamarisk riparian area. The wildlife refuge has had escaped controlled burns in the past. The wildlife refuge now has a fuel break between the refuge and the town that consists of ponds, bare ground, and irrigated fields. Mechanical means are used to reduce brush fuel loading.

31.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The hazard reduction recommendations for Overton focus on tamarisk reduction along the Muddy River.

31.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended

defensible space area) Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. This area should be kept:
 - Lean: There are only small amounts of flammable vegetation.
 - Clean: There is no accumulation of dead vegetation or other flammable debris.
 - Green: Existing plants are healthy and green during the fire season.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed.
- Maintain underneath porches and decks free of weeds and other flammable debris.
- Clear vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate during a wildland fire.
- Remove weeds along fences and irrigation ditches to reduce fuel loading and the potential for ignitions in these areas.

31.2.2 Fuel Reduction Treatments

Bureau of Land Management

- Initiate a fuel reduction to remove and replace tamarisk in the Muddy River riparian area.

Union Pacific Railroad

- Clear vegetation a minimum distance of fifteen feet on either side of railroad tracks.

Clark County

- Maintain road right-of-ways.

31.2.3 Fire Suppression Resources and Training

Clark County Fire Department

- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

31.3 SUMMARY OF RECOMMENDATIONS

Table 31-2. Overton Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation and flammable debris from around homes according to the guidelines in Appendix E. Maintain this defensible space as needed. Ensure that residential addresses are visible from the road. Address characters should be at least four inches high and reflective. Remove weeds along fences and irrigation ditches.
Clark County	Fuels Reduction	Maintain right-of-ways.
Bureau of Land Management	Fuels Reduction	Initiate a fuel reduction project to remove and replace tamarisk in the Muddy River riparian corridor.
Union Pacific Railroad	Fuels Reduction	Clear vegetation from railroad right-of-way for a minimum width of fifteen feet.
Clark County Fire Department	Fire Suppression Resources and Training	Provide all firefighters with basic wildland fire training and equipment and conduct refresher training annually

Table 31-3. Overton Fire Hazard Ratings Summary

A. Urban Interface Condition		1	TALLIES	
B. Community Design			206 Total Houses	48 Residential Streets
1. Ingress / Egress	<u>1</u>	/5	B5. Street Signs	
2. Width of Road	<u>1</u>	/5	<u>1</u> not visible	<u>47</u> visible <u>98%</u> visible
3. Accessibility	<u>1</u>	/3	B6. Address Signs	
4. Secondary Road	<u>1</u>	/5	<u>42</u> not visible	<u>164</u> visible <u>80%</u> visible
5. Street Signs	<u>1</u>	/5	C1. Roofs	
6. Address Signs	<u>3</u>	/5	<u>4</u> combust	<u>202</u> not combust <u>98%</u> not combust
7. Utilities	<u>1</u>	/5	C2. Siding	
C. Construction Materials			<u>18</u> combust	<u>188</u> not combust <u>91%</u> not combust
1. Roofs	<u>1</u>	/10	C3. Unenclosed Structures on Lot	
2. Siding	<u>1</u>	/5	<u>131</u> not enclosed	<u>75</u> enclosed <u>64%</u> not enclosed
3. Unenclosed Structures	<u>5</u>	/5	D1. Lot Sizes	
D. Defensible Space			<u>188</u> <1ac	<u>18</u> >1ac <10ac <u>0</u> >10ac
1. Lot Size	<u>5</u>	/5	D2. Defensible Space	
2. Defensible Space	<u>1</u>	/15	<u>47</u> not adequate	<u>159</u> adequate <u>77%</u> adequate
F. Fire Behavior				
1. Fuels	<u>1</u>	/5		
2. Fire Behavior	<u>3</u>	/10		
3. Slope	<u>1</u>	/10		
4. Aspect	<u>1</u>	/10		
E. Suppression Capabilities				
1. Water Source	<u>1</u>	/10		
2. Department	<u>7</u>	/10		
Score		<u>36</u> /128		

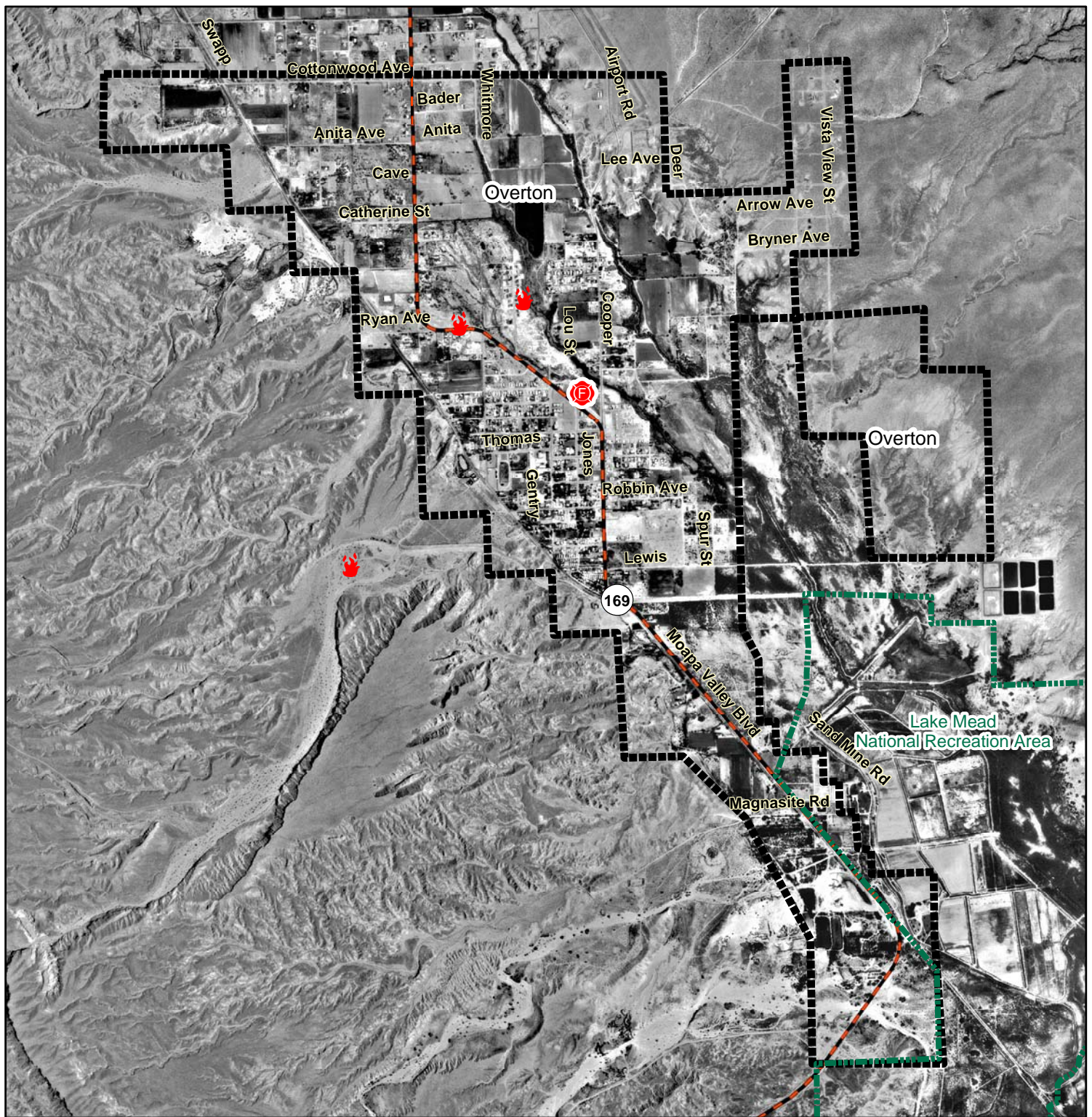
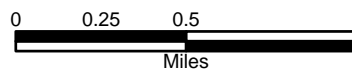


Figure 31-1. Overton
Fire History and Suppression Resources



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Legend

Community Boundary

Lake Mead NRA

Fire Ignition

Fire Station

Highways and State Routes

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

32.0 PALM GARDEN ESTATES

32.1 RISK AND HAZARD ASSESSMENT

Palm Garden Estates is located in southern Clark County along Interstate 95, approximately seven miles south of CalNevAri. The community primarily consists of a mobile home park, with only four lots located in the wildland-urban interface. The community hazard assessment resulted in classifying Palm Garden Estates in the **Low Hazard** category (35 points). The rating is primarily attributed to good defensible space, sparse fuels, and non-combustible construction materials. A summary of the conditions that contributed to the hazard rating for Palm Garden Estates is included in Table 32-3 at the end of this section. The Palm Garden Estates community boundary is shown in Figure 32-1.

32.1.1 Community Design

The area surrounding Palm Garden Estates has a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. All homes are on lots of less than one acre in size.

Access: The primary road into Palm Garden Estates is Interstate 95. The secondary roads have adequate turnaround space for fire suppression equipment to maneuver.

Signage: Street signs and addresses are clearly visible throughout the community.

Utilities: The utilities in Palm Garden Estates pose a low ignition risk.

32.1.2 Construction Materials

All of the homes in the interface are built with non-combustible roofing materials and have fire resistant siding materials.

None of the homes in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

32.1.3 Defensible Space

All of the homes within the Palm Garden Estates community meet the defensible space landscaping requirement to minimize damage to the home or loss during a wildfire.

32.1.4 Suppression Capabilities

Wildfire Protection Resources

Fire suppression for Palm Garden Estates comes from CalNevAri, seven miles to the north on Interstate-95. The Clark County Fire Station 84 in CalNevAri is staffed by volunteer firefighters. Table 32-1 lists the suppression resources available to respond to a reported wildland fire in the Palm Garden Estates area. Additional municipal and county resources would be dispatched through the Clark County Fire Alarm Office.

Table 32-1. Palm Garden Estates Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 84 (CalNevAri)
Type 1 Structure Engine	1	
Type 6 Quick Attack Engine	1	
Intermediate Life Support (ILS) Rescue	1	

Source: Homeowner, pers. comm., March 2004.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Palm Garden Estates includes 500 gpm fire hydrants within 500 feet of the structures.

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

32.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in and around the Palm Garden Estates community is light dominated by sparse bursage, creosote bush, and annual grasses. The fuel hazard was considered low.

32.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would be a fire southwest of town driven by strong winds pushing fire northeast into the south and west side of the community. Structures have good defensible space, are fire resistant, and most likely would not be threatened in the unlikely event of a wildland fire.

32.1.7 Ignition Risk Assessment

Palm Garden Estates has a low wildfire ignition risk potential. There is no significant wildfire history in the area surrounding the community, and the recorded history of lightning strikes

and other ignitions shows few incidents. The low ignition potential is facilitated by the low, sparse brush in and around the community.

32.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

32.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area) Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Continue to maintain a minimum of thirty feet of defensible space around homes and property.

32.2.2 Fuel Reduction Treatments

Bureau of Land Management

Create and maintain a fuelbreak thirty feet wide around the perimeter of the community as shown in Figure 32-1. Mow vegetation to a maximum height of four inches.

32.3 SUMMARY OF RECOMMENDATIONS

Table 32-2. Palm Garden Estates Risk and Hazard Reduction Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Continue to maintain a minimum thirty feet of defensible space as needed.
Bureau of Land Management	Fuels Reduction	Create and maintain a fuelbreak thirty feet wide around the community perimeter.

Table 32-3. Palm Garden Estates Fire Hazard Ratings Summary

A. Urban Interface Condition 1		TALLIES	
B. Community Design		4 Total Houses 1 Residential Streets	
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>0</u> not visible <u>1</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>0</u> not visible <u>4</u> visible <u>100%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>4</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>0</u> combust <u>4</u> not combust <u>100%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>0</u> not enclosed <u>4</u> enclosed <u>0%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>4</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>0</u> not adequat <u>4</u> adequate <u>100%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>10</u> /10		
Score 35 /128			

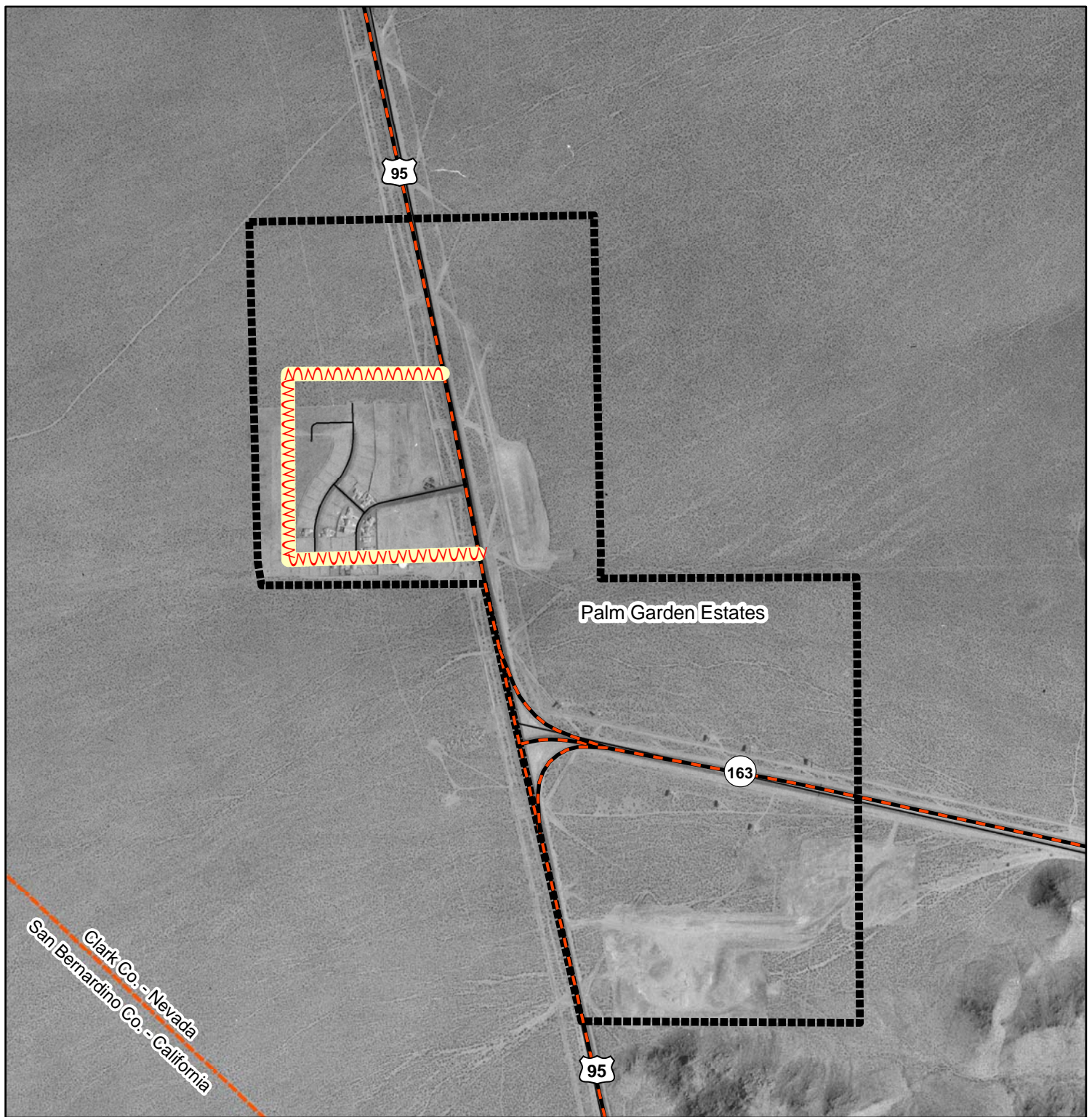
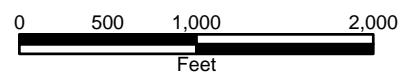






Figure 32-1. Palm Garden Estates
Proposed Mitigation Projects



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Legend

-  Proposed Fuel Reduction Treatment
-  Community Boundary
-  County Boundary
-  Highways and State Routes

Nevada Community Wildfire Risk / Hazard Assessment Project

Resources Concepts, Inc. has made every effort to accurately compile the information depicted on this map but cannot warrant the reliability or completeness of the source data.

33.0 PRIMM

33.1 RISK AND HAZARD ASSESSMENT

Primm is located in southern Clark County on the California/Nevada border along Interstate 15, approximately forty miles south of Las Vegas. The community hazard assessment resulted in classifying Primm in the **Low Hazard** category (28 points). The rating is primarily attributed to sparse vegetation and sufficient defensible space. A summary of the conditions that contributed to the hazard rating for Primm is included in Table 33-3 at the end of this section. The Primm community boundary is shown in Figure 33-1.

33.1.1 Community Design

The area surrounding the Primm community is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the development areas. All homes are on lots of less than one acre in size.

Access: The primary access to Primm is Interstate 15. The road grade is less than five percent. There is adequate turnaround space for fire suppression equipment to maneuver in the community.

Signage: There are no secondary streets with signs or houses. Clear and visible street signs and residential addresses are important in locating homes during low visibility conditions that may occur during a wildfire. Currently, the residences in Primm are situated in such a manner that there would be little chance of fire suppression personnel being unable to locate a particular structure that needed protection even under the low visibility conditions. However, if the development becomes fully built out, the need for address and street signs will be very important.

Utilities: Utilities in Primm pose a low ignition risk.

33.1.2 Construction Materials

All structures in the interface are built with non-combustible roofing materials and have fire resistant siding materials.

None of the structures in the community have unenclosed balconies, porches, decks or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

33.1.3 Defensible Space

All structures in Primm meet the defensible space landscaping requirements to minimize damage to the home or property loss during a wildfire.

33.1.4 Suppression Capabilities

Wildfire Protection Resources

There is no fire department in Primm. The closest resources to respond to a wildland fire threatening the community would come from Clark County Fire Department Station 78 in Goodsprings, approximately thirty miles to the north. Wildfire suppression resources that would respond to a reported wildland fire near Primm are listed in Table 33-1.

Table 33-1. Primm Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Water Tender	1	Clark County Rural Fire Station 78 (Goodsprings)
Type 6 Quick Attack Engine	1	
Intermediate Life Support (ILS) Rescue	1	
Type 1 Structure Engine	2	Clark County Rural Fire (Nearest available)
ALS/ILS Rescue	1	
Ladder Truck	1	
Battalion Chief	1	
Type 3 Brush Engine	1	US Forest Service (Nearest available)
Type 6 Brush Patrol Engine	1	

Source: Steve McClintock, pers. comm. April 2004.

Mutual aid can be requested from the US Forest Service, the National Park Service, and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

Water available for fire suppression in Primm includes fire hydrants with a minimum flow capacity of 500 gpm, within 500 feet of structures community wells that operate on electric pumps (with emergency back-up), and a one-million gallon storage tank.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some have wildland firefighting training (National Wildfire Coordinating Group 310-1).

Detection and Communication

Wildland fires are reported by calls to 911. The Las Vegas Fire Alarm Office and local dispatch relay fires to local fire departments.

Community Preparedness

Clark County has an active Local Emergency Planning Committee and has adopted an all-risk, multi-agency emergency plan. The plan is reviewed annually and updated as needed.

The Clark County Fire Department reviews development plans to ensure compliance with the VFC 1997 fire code.

33.1.5 Factors Affecting Fire Behavior

The community is situated in a very rocky mountainous area with all aspects and sparse fuels. The vegetative fuel density in the Primm area is generally light dominated by widely spaced creosote bush, Joshua trees, and yucca.

33.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would occur on an August afternoon with an ignition along Interstate 15 south of town. Strong wind could push a fire through sparse vegetation. There is low fire danger with very low probability of structure loss if minimum defensible space is maintained.

33.1.7 Ignition Risk Assessment

Primm has a low wildfire ignition risk potential. There is no significant wildfire history in the area surrounding the community, and the recorded history of lightning strikes and other ignitions shows only one incident.

33.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

33.2.1 Fuel Reduction Treatments

Union Pacific Railroad

- Maintain clearance within the railroad right of way. Clear and maintain free of vegetation a minimum space of fifteen feet on either side of the railroad. The goal of this recommendation is to reduce the ignition risk along the railroad.

33.2.2 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Continue to maintain defensible space around all structures.

33.3 SUMMARY OF RECOMMENDATIONS

Table 33-2. Primm Risk and Hazard Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Union Pacific Rail Road	Fuels Reduction	Maintain a fifteen foot clearance on both sides of the railroad tracks.
Property Owners	Defensible Space	Continue to maintain defensible space around structures.

Table 33-3. Primm Fire Hazard Ratings Summary

A. Urban Interface Condition <u>1</u>		TALLIES	
B. Community Design		143 Total Houses	1 Residential Streets
1. Ingress / Egress	<u>3</u> /5	B5. Street Signs <u>0</u> not visible <u>1</u> visible <u>100%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>0</u> not visible <u>143</u> visible <u>100%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>143</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>0</u> combust <u>143</u> not combust <u>100%</u> not combust	
5. Street Signs	<u>1</u> /5	C3. Unenclosed Structures on Lot <u>0</u> not enclosed <u>143</u> enclosed <u>0%</u> not enclosed	
6. Address Signs	<u>1</u> /5	D1. Lot Sizes <u>143</u> <1ac <u>0</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>0</u> not adequat <u>143</u> adequate <u>100%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>1</u> /10		
2. Department	<u>3</u> /10		
Score <u>28</u> /128			

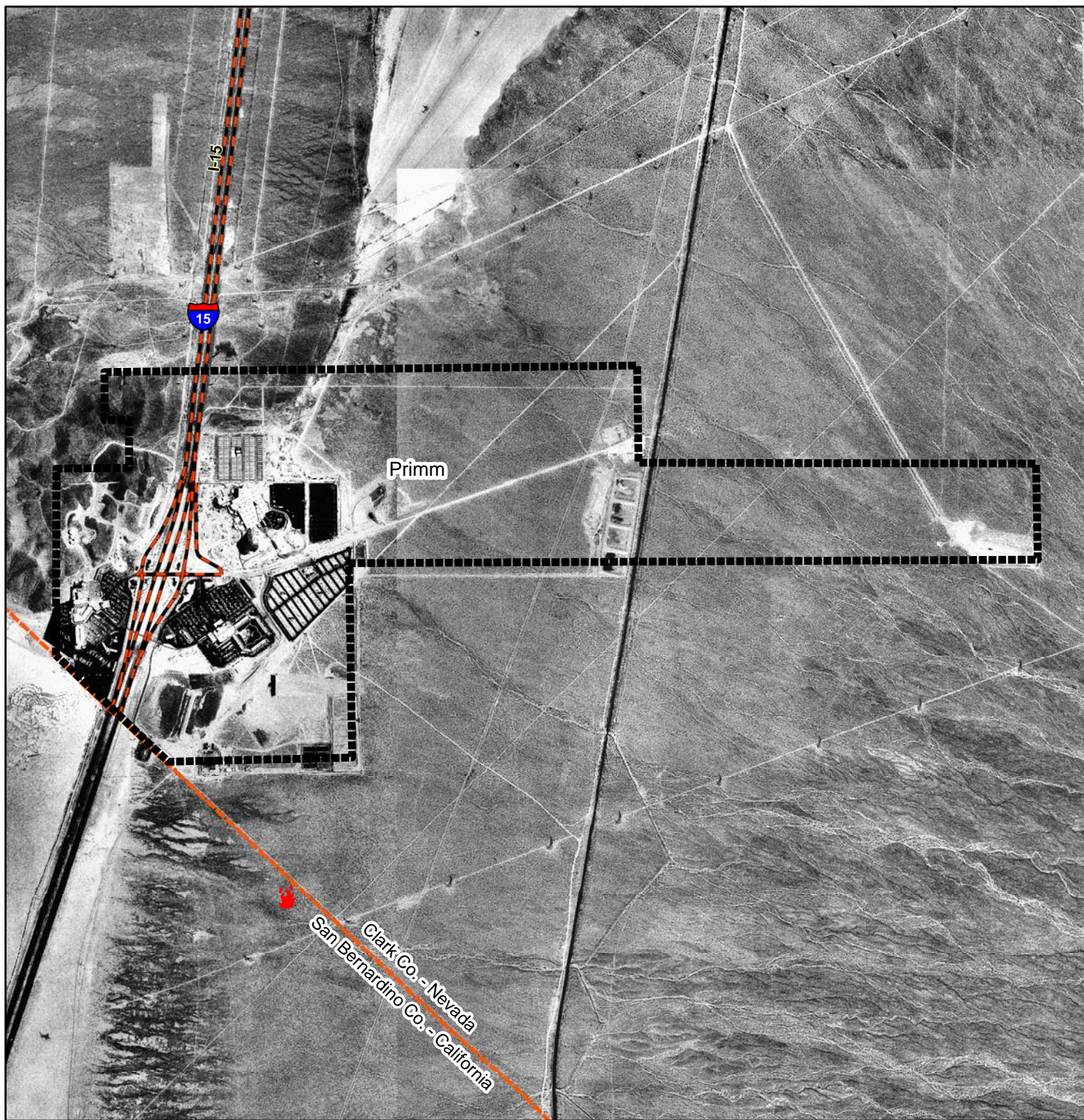




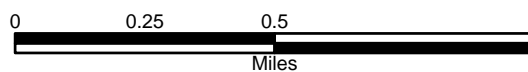


Figure 33-1. Primm
Fire History



Legend

-  Community Boundary
-  Fire Ignition
-  County Boundary
-  Highways and State Routes



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34.0 SLOAN

34.1 RISK AND HAZARD ASSESSMENT

Sloan is a small community located south of Las Vegas in southern Clark County. The town is situated in the Las Vegas valley and is surrounded by undeveloped Mojave Desert land. The community hazard assessment resulted in classifying Sloan in the **Low Hazard** category (37 points). Although the community has sparse vegetation, there is no local water source and fire protection services must travel further than 45 minutes round trip for water. A summary of the conditions that contributed to the hazard rating for Sloan is included in Table 5-3 at the end of this section. The Sloan community boundary is shown in Figure 34-1.

34.1.1 Community Design

The area surrounding Sloan is a classic wildland-urban interface condition, with a clear line of demarcation between building structures and wildland fuels. Wildland vegetation typically does not continue into the developed areas. A quarter of the homes were on parcels between one and ten acres in size; the rest of the homes were on lots of less than one acre in size.

Access: Sloan is accessed by Interstate 15. Several streets lead into the community from these highways. Within Sloan, there is adequate room for fire suppression equipment to maneuver. All roads had less than a five percent gradient.

Signage: Only one of the six secondary streets in Sloan has a clearly posted street sign. Residential addresses are visible on only one-half of the homes surveyed.

Utilities: Due to sparse fuels, utilities pose a low ignition risk.

34.1.2 Construction Materials

All of the homes observed in the interface area are built with fire resistant roofing materials and ninety percent have fire resistant siding materials.

One third of the homes in the community have unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the home.

34.1.3 Defensible Space

Eighty-seven percent of the homes observed have landscaping that meets the defensible space landscaping requirement to minimize damage to the home or loss during a wildfire.

34.1.4 Suppression Capabilities

Wildfire Protection Resources

Sloan has no fire department in the community. The closest fire protection services for Sloan would come from Clark County Rural Fire Station 24 in Arden, Henderson Station 99, or Clark County Rural Fire Station 87 in Goodsprings, approximately twenty miles to

the south. Goodsprings is an all-volunteer fire department with eight volunteers. Resources that would respond for initial attack of a wildland fire near Sloan are summarized in Table 34-1.

Table 34-1. Sloan Initial Attack Fire Suppression Resources

TYPE OF EQUIPMENT	AMOUNT OF EQUIPMENT	COOPERATING PARTNER (RESOURCE LOCATION)
Type 1 Structure Engine	1	Clark County Rural Fire Station 24 (Arden)
Water Tender	1	
Type 6 Quick Attack Engine	1	
ILS Rescue	1	
Type 1 Structure Engine	2	Clark County Rural Fire (Nearest available)
ALS/ILS Rescue	1	
Ladder Truck	1	
Battalion Chief	1	

Source: Steve McClintock, pers. comm. April 2004.

Mutual aid can be requested from the US Forest Service and the Bureau of Land Management through the Las Vegas Interagency Communications Center. The Nevada Division of Forestry also provides mutual aid dispatched from the Sierra Front Interagency Dispatch Center in Minden, Nevada, which locates the nearest available fire suppression resource according to incident command and computer aided dispatch protocols. It is important to note that these resources can be assigned to other emergency incidents during the fire season.

Water Sources and Infrastructure

There is no water designated for fire suppression in Sloan. Water for firefighting must be transported and requires over 45 minutes round trip.

Fire Protection Personnel Qualifications

The firefighters have a minimum of NFPA Firefighter I and II training and a limited number of volunteer firefighters have some wildland firefighting training (National Wildfire Coordinating Group 310-1). The National Red Card wildland certification system is used once a volunteer receives the appropriate training.

Community Preparedness

Clark County Fire Department has broad community preparedness and public education programs. The Clark County Emergency Response Plan is updated annually. The Clark County Fire Department reviews development plans to ensure compliance with the 1997 Fire Code.

34.1.5 Factors Affecting Fire Behavior

The vegetative fuel density in the Sloan area is light. Fuel consists primarily of sparse greasewood and creosote bush. The vegetation is generally more robust in the washes than on the fans. Fuel density in this area was estimated to be less than one ton per acre and was considered a low fuel hazard.

The terrain is mostly flat with minimal slope (less than five percent). The predominant wind is from the south/southwest in the late afternoon.

34.1.6 Fire Behavior Worst-case Scenario

The worst-case scenario would occur on an August afternoon with an ignition along Interstate 15 south of Sloan. Strong wind could push a fire through sparse vegetation. There is low fire danger with very low probability of structure loss if minimum defensible space is maintained.

34.1.7 Ignition Risk Assessment

Sloan has a low wildfire ignition risk potential. There is no significant wildfire history reported for the area surrounding the community. Low ignition potential is facilitated by the low, sparse fuels in and around the community.

34.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS

The primary recommendation for Sloan is to obtain a water source for fire suppression.

34.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended defensible space area) Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owners

- Remove, reduce, and replace vegetation around homes according to the guidelines in Appendix E. This area should be kept:
 - Lean: There are only small amounts of flammable vegetation,
 - Clean: There is no accumulation of dead vegetation or other flammable debris,
 - Green: Existing plants are healthy and green during the fire season.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire risk if left on site.
- Maintain this defensible space as needed.

34.2.2 Fire Suppression Resources

Clark County Fire Department

- Install a 5,000 gallon water storage tank for fire suppression.
- Provide all firefighters with basic wildland fire training and equipment as described in the National Wildfire Coordinating Group (NWCG) *Wildland and Prescribed Fire Qualification System Guide 310-1*. Provide annual wildland firefighting refresher training and fire shelter training.

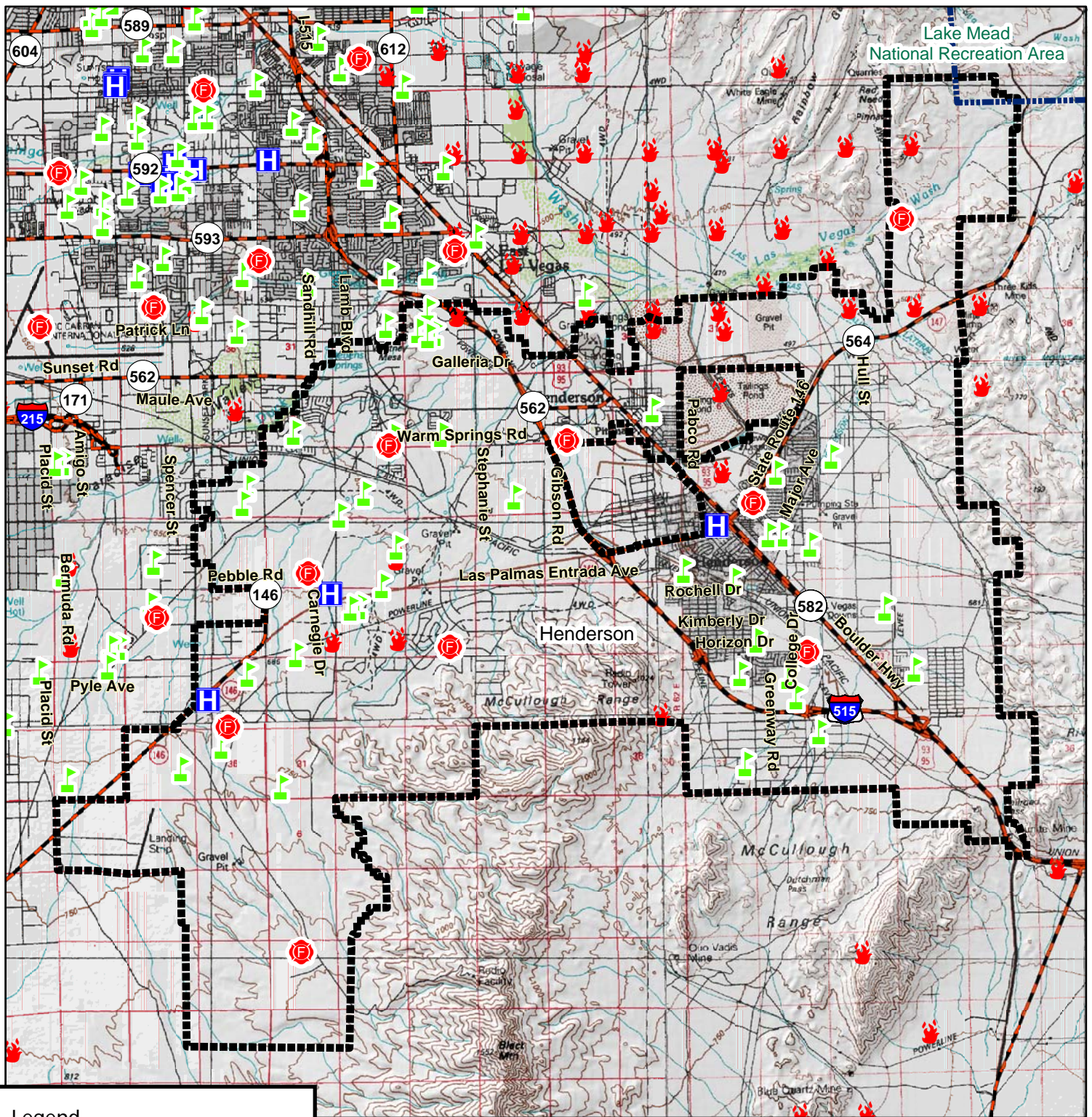
34.3 SUMMARY OF RECOMMENDATIONS

Table 34-2. Sloan Risk and Hazard Priority Recommendations

INVOLVED PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Continue to maintain defensible space according to the guidelines in Appendix E.
Clark County Fire Department	Fire Suppression Resources	Install a 5,000-gallon water storage tanks for fire suppression. Provide all firefighters with basic wildland fire training and equipment and conduct annual refresher courses.

Table 34-3. Sloan Fire Hazard Ratings Summary

A. Urban Interface Condition <u>1</u>		TALLIES	
B. Community Design		39 Total Houses	6 Residential Streets
1. Ingress / Egress	<u>1</u> /5	B5. Street Signs <u>1</u> not visible <u>5</u> visible <u>83%</u> visible	
2. Width of Road	<u>1</u> /5	B6. Address Signs <u>5</u> not visible <u>34</u> visible <u>87%</u> visible	
3. Accessibility	<u>1</u> /3	C1. Roofs <u>0</u> combust <u>39</u> not combust <u>100%</u> not combust	
4. Secondary Road	<u>1</u> /5	C2. Siding <u>4</u> combust <u>35</u> not combust <u>90%</u> not combust	
5. Street Signs	<u>3</u> /5	C3. Unenclosed Structures on Lot <u>5</u> not enclosed <u>34</u> enclosed <u>13%</u> not enclosed	
6. Address Signs	<u>3</u> /5	D1. Lot Sizes <u>31</u> <1ac <u>8</u> >1ac <10ac <u>0</u> >10ac	
7. Utilities	<u>1</u> /5	D2. Defensible Space <u>5</u> not adequat <u>34</u> adequate <u>87%</u> adequate	
C. Construction Materials			
1. Roofs	<u>1</u> /10		
2. Siding	<u>1</u> /5		
3. Unenclosed Structures	<u>1</u> /5		
D. Defensible Space			
1. Lot Size	<u>5</u> /5		
2. Defensible Space	<u>1</u> /15		
F. Fire Behavior			
1. Fuels	<u>1</u> /5		
2. Fire Behavior	<u>3</u> /10		
3. Slope	<u>1</u> /10		
4. Aspect	<u>1</u> /10		
E. Suppression Capabilities			
1. Water Source	<u>10</u> /10		
2. Department	<u>1</u> /10		
Score <u>37</u> /128			



Legend

- Community Boundary
- School
- Hospital
- Lake Mead NRA
- Fire Ignition
- Fire Station
- Highways and State Routes

Figure 24-1. Henderson
Fire History, Suppression Resources,
and Critical Features



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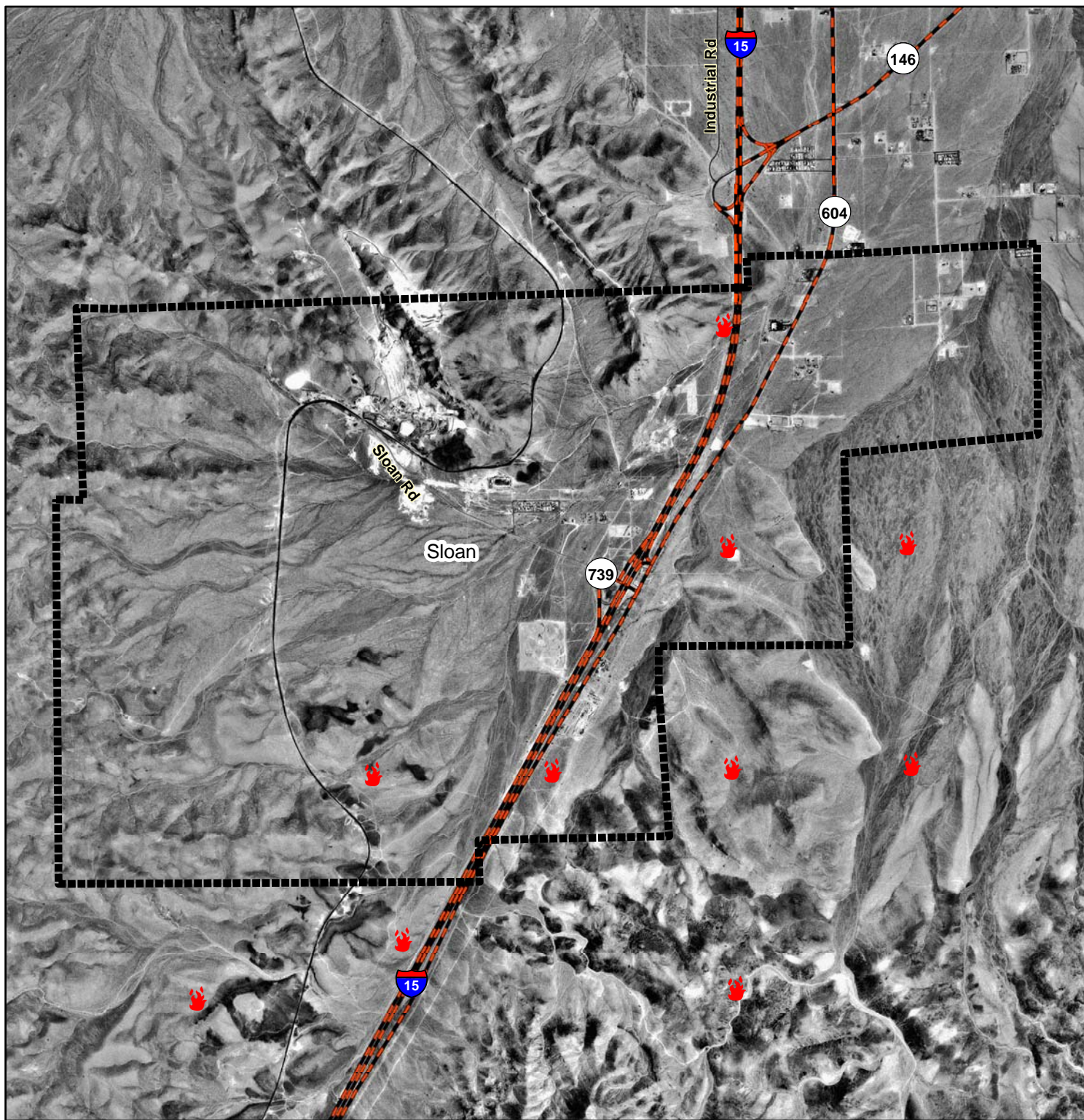


Figure 34-1. Sloan
Fire History



Legend

Community Boundary

Fire Ignition

Highways and State Routes



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35.0 CONCLUSIONS

The RCI Project Team developed the recommendations for Clark County communities based on site-specific conditions observed during the wildfire risk and hazard assessments and information provided by local fire departments and agencies. General and specific recommendations provide a starting point so that each community described in this report can take a proactive approach to implement projects to reduce the risks of loss of life, property, and natural resources from a wildland fire.

Large wildfires have not been a common occurrence in Clark County but the history of ignitions has been extensive. A rapid response to wildland fire calls has been successful despite the fact that most County and City firefighters are not equipped or trained to fight wildland fire. Mutual aid assistance from the Nevada Division of Forestry, the US Forest Service, the Bureau of Land Management, the US Park Service, and the US Air Force has greatly contributed to wildland firefighting success in Clark County. Providing proper wildland fire training and equipment is the most prevalent recommendation for Clark County in this report. Training and equipping all firefighters, both career and volunteer, for fighting wildfires increases their effectiveness and, more importantly, their safety when responding to a wildland fire call.

Eighteen of the thirty communities assessed in Clark County have a low fire hazard rating. The wildland-urban interface around most of these communities is characterized by a low fuel hazard condition typical of the Mojave Desert where shrubs are sparse and ground fuels are not abundant except in wet years. These conditions also contribute to low ignition risks. High fuel hazards in these communities are associated with tall and dense tamarisk and mesquite in riparian areas along the Colorado, Muddy, and Virgin Rivers.

Six of the seven high and extreme hazard communities are located in the Spring Mountains. Extreme fuel hazards, high visitor numbers, and constricted access to the communities create extremely dangerous conditions for the evacuation of residents and tourists and for the ingress of firefighters to these areas. These communities are in urgent need of improved defensible space and extensive fuel reduction treatments to minimize the potential for loss of life and property during a catastrophic wildfire.

There is no way to completely eliminate the threat that wildfires present to communities in the wildland -urban interface. However, the recommendations in this report are intended to increase public responsibility and encourage concerned community members to be proactive in reducing the risk of wildfire ignitions near their communities. Creating and maintaining defensible space on private property and increasing public awareness of the risks and potential for damage or loss of lives and property associated with living in a fire prone environment is best accomplished at the local level.

The recommendations presented for each community in this report should be considered a starting point for addressing community wildfire safety. Long-term community safety from wildfire requires a permanent commitment to the enforcement of fire safe ordinances at the local level and dedicated attention to fuels management. Regular monitoring of fuel conditions and periodic updates to this report should include new recommendations for maintenance or implementation of additional treatments as development continues to encroach at the wildland-urban interface.

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APPENDICES

Appendix A

Glossary of Terms Used in Wildfire Management
Scientific Plan Names

Appendix A Glossary of Terms used in Wildfire Management

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.

ALS Rescue: A life support rescue vehicle (ambulance) staffed by a minimum of one paramedic and one EMT (*compare to:* BLS Rescue).

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.

BLS Rescue: A life support rescue vehicle (ambulance) staffed by a minimum of one EMT and one first responder (*compare to:* ALS Rescue).

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 fuel break 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.

Engine, Type 1 and Type 2: Fire engine designed and equipped primarily for structure protection in paved urban and sub-urban settings.

Engine, Type 3 and Type 4: Also known as a “brush engine”, designed and equipped for off-road and wildland fire conditions.

Engine, Type 5, 6, 7: Generally also known as “quick attack” or patrol engines, often pickup trucks outfitted with small pumps and some water storage, usually used to arrive quickly to size up the fire and direct other resources. See table below for engine type specifications.

Fire Engine Types

	Structural Equipment		Wildland Fire Equipment				
Minimum Capabilities (Component)	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
Pump Capacity	1,000 GPM	500 GPM	120 GPM	70 GPM	50 GPM	50 GPM	50 GPM
Tank Capacity	400 Gallon	400 Gallon	500 Gallon	750 Gallon	500 Gallon	200 Gallon	125 Gallon
Hose, 2.5 inch	1,200 Feet	1,000 Feet					
Hose, 1.5 inch	400 Feet	500 Feet	1,000 Feet	300 Feet	300 Feet	300 Feet	200 Feet
Hose, 1 inch	200 Feet	300 Feet	800 Feet	300 Feet	300 Feet	300 Feet	200 Feet
Personnel	4	3	3	2	2	2	2

Adapted from: www.fema.gov/preparedness/resources/firehaz/engine_fire_pumper.htm

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:

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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.

SCIENTIFIC PLANT NAMES

Dominant Vegetation of the Wildland-Urban Interface, Clark County

Common Name	Scientific Name*
Trees	
Mesquite	<i>Prosopis juliflora</i>
Ponderosa pine	<i>Pinus ponderosa</i>
Single-leaf pinyon pine	<i>Pinus monophylla</i>
Utah juniper	<i>Juniperus osteosperma</i>
White fir	<i>Abies concolor</i>
Willow	<i>Salix</i> sp.
Shrubs	
Whitethorn acacia	<i>Acacia constricta</i>
Blackbrush	<i>Coleogyne ramosissima</i>
Cliff rose	<i>Purshia mexicana</i>
Creosote bush	<i>Larrea tridentata</i>
Fourwinged saltbush	<i>Atriplex canescens</i>
Gambel's oak	<i>Quercus gambelii</i>
Greasewood	<i>Sarcobatus vermiculatus</i>
Joshua tree	<i>Yucca brevifolia</i>
Manzanita	<i>Arctostaphylos</i> sp.
Mojave yucca	<i>Yucca schidigera</i>
Morman tea	<i>Ephedra nevadensis</i>
Mountain mahogany	<i>Cercocarpus</i> sp.
Prickly pear	<i>Opuntia basilaris</i>
Rabbitbrush	<i>Chrysothamnus</i> sp.
Tamarisk	<i>Tamarix ramosissima</i>
White bursage	<i>Ambrosia dumosa</i>
Yucca	<i>Yucca</i> spp.
Grasses / Forbs	
Red brome	<i>Bromus rubens</i>
Saltgrass	<i>Distichlis spicata</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

Community Wildfire Assessment Rating System

Appendix B – Community Wildfire Assessment Rating System

Community Design	Score
1. Ingress/Egress	
Two or more primary roads	1
One Road	3
One-way road in, one way out	5
2. Width of Primary Road	
>24 feet	1
>20 feet and <24 feet	3
<20 feet	5
3. Accessibility	
Road grade 5% or less	1
Road grade more than 5%	3
4. Secondary Road Terminus	
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
5. Street Signs	
Present 90-100%	1
Present 75-89%	3
Present <75%	5
6. Address Signage	
Present 90-100%	1
Present 75-89%	3
Present <75%	5

Existing Building Materials	Score
1. Roofing Materials	
Non-combustible covering 90-100%	1
Non-combustible covering 70-89%	5
Non-combustible <70%	10
2. Siding Materials	
Non-combustible siding >75%	1
Non-combustible siding <75%	5
3. Unenclosed Features	
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
1. Average Lot Size	
10 acres or larger	1
1 to 10 acres	3
<1 acre	5
2. Defensible Space	
70% or more adequate	1
30-70% adequate	7
<30% adequate	15

Fire Protection	Score
1. Water Source	
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
2. Fire Department Protection Within 5 Miles	
Career Department	1
Combination Career/Volunteer	3
Volunteer with Seasonal Staffing	5
All Volunteer Department	7
No Organized Department	10

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

Fire Behavior (<i>continued</i>)	Score
<p>Situation #3 – 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>Situation #2 – 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>Situation #1 – 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

Photographs of Representative Fuel Types in
Clark County Communities



Photo 1. Wood frame homes under construction create numerous unenclosed areas where firebrands can enter and ignite. Soil disturbances associated with construction can produce excessive red brome growth in years with above normal precipitation, thus increasing the fuel hazard (Las Vegas area).



Photo 2. The Mojave Mixed Scrub Community includes four-wing saltbush, creosote bush, bursage, and shadscale. Plants in the photo are about four feet in height; fuel loading is moderate. (Sandy Valley area).



Photo 3. Typical Mojave Mixed Scrub community in coarse, shallow soils includes creosote bush and bursage with fuel loadings of less than one ton per acre. These areas were considered a low fuel hazard (North Las Vegas area).



Photo 4. Riverine areas include mesquite, tamarisk, and sometimes willow and palm. Shrubs include fourwing saltbush and creosote bush. Understory can include salt grass, Russian thistle, prickly pear, and annual grasses. Fuel loading ranges between three and eight tons per acre and was considered a high fuel hazard. (Moapa, Muddy River area).



Photo 5. Dense undergrowth of mountain mahogany, Gambel's oak, and white fir in the Spring Mountains area create ladder fuels that reach into the ponderosa pine overstory. This fuel loading and arrangement present extremely hazardous conditions for the propagation of a catastrophic wildfire (Kyle Canyon area).



Photo 6. Pinyon-juniper fuel types typically occur between the lower range of the ponderosa pine forest and the upper limit of the Mojave desert shrub community. Shrub vegetation is composed of ephedra, cliffrose, and sagebrush; annual and perennial grasses also occur. Fuel loading in dense stands can exceed ten tons per acre (Mt. Springs area).

Resource Concepts, Inc.

Appendix D

List of Persons Contacted

Appendix D – List of Persons Contacted

CONTACT NAME	DATE CONTACTED	POSITION	TELEPHONE
Steve McClintock	March, April 2004 October 12, 2004	Fire Rural Coordinator, CCFD	(702) 455-7311
Dean Molberg	March 30, 2004	Chief, Boulder City FD	(702) 293-9228
Dave Bibee	March 20, 2004	NDF	(702) 875-5483
Steve Bittingham	March 20, 2004 July 22, 2004	NDF	(702) 875-5483
Derek Hughes	March 23, 2004	Chief, Mesquite FD	(702) 346-5244
Kurt Leavitt	March 30, 2004 March 14, 2005	Rural Fire Coordinator, CCFD	(702) 455-7311
Ken Moultray	March, 2004	Vol. Chief, Blue Diamond VFD	(702) 875-4280
Chief Gammon	March 24, 2004	Chief, Las Vegas Fire Department	(702) 383-2888
Chief Tarbett	March 24, 2004	Chief, North Las Vegas Fire Department	(702) 633-1102
Mark Blankensop	March 2004	US Forest Service	(702) 494-7528
Bill Karim	March 2004	CCFD	(702) 455-7311
Jim Cavalieri	March 30, 2004	City of Henderson	(702) 267-2222
Duffy Grismanauskas	March 16, 2004 October 5, 2004	Representative, Mt. Charleston Fire Safe Chapter	Private
Clint Gould	October 6, 2004	Engine Capitan, USFS Kyle Station	(702) 872-0100
John Jones	October 8, 2004	Regional Forester, NDF Southern Region	(702) 486-5123
Kevin Oliver	October 12, 2004	Fire Management Officer, BLM Las Vegas	(702) 515.5000

Appendix E

Homeowner Guidelines

Defensible Space Guidelines
Homeowner's Annual Checklist
Fuelbreaks and Fuel Reduction Treatments
Seed Mix and Planting Recommendations

DEFENSIBLE SPACE GUIDELINES

A FACT SHEET FOR CLARK 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 Dependent upon Slope

Recommended Defensible
Space Distance

Flat to Gently Sloping
0 to 20%

Moderately Steep
21% to 40%

Very Steep
>40%

Vegetation Type

Grass

Wildland grasses (such as cheatgrass), weeds, and widely scattered shrubs with grass understory.

Shrubs

Includes shrub dominant areas (such as sagebrush, bitterbrush, manzanita) and pinyon-juniper.

Trees

Includes forest areas of the Sierras. If substantial grass or shrub understory is present, use those values shown above.

30 feet	100 feet	100 feet
100 feet	200 feet	200 feet
30 feet	100 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

A FACT SHEET FOR CLARK 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.

FUEL REDUCTION TREATMENTS: **SHADED FUELBREAKS**

A FACT SHEET FOR CLARK COUNTY HOMEOWNERS



Untreated understory fuels in the Mt. Charleston area include white fir, Gambel's oak, and mountain mahogany.

DEFINITIONS:

A **fuel reduction treatment** is a strategically located block of land on which a cover of dense, heavy, or flammable vegetation has been drastically changed to one of reduced flammability or lower fuel volume. Fuel reduction treatments may include mowing grasses, thinning shrubs, pruning or removing trees, and replacing highly flammable vegetation with more fire resistant species.

Shaded fuelbreaks are created by thinning or removing grasses, shrubs, and other surface fuels, and then increasing the distance between the ground and the overstory live tree crowns by removing ladder fuels such as juvenile trees and low tree limbs. Canopy openings are created in the overstory by thinning the remaining mature trees. This type of fuelbreak spans a wide range of understory and overstory prescriptions. Methods of

implementation and maintenance can be mechanical or manual and sometimes include the use of prescribed fires.

GENERAL RULES FOR SHADED FUELBREAKS:

- ❖ Broadcast seed fuelbreak areas prior to fuel removal to enhance soil stabilization, promote the establishment of fire-resistant vegetation, and prevent noxious weed invasions. Consult with your local extension agent to create a pre-suppression seed mixture appropriate for the local climate and soil conditions.
- ❖ Thin ponderosa pine and white fir trees to a minimum spacing of twenty and forty feet between tree boles (equivalent of 80 to 100 sq. ft. basal area) of mature trees. Optimal spacing for reducing fuel loads in the pinyon-juniper vegetation type is a distance between tree crowns equal to twice the height of the trees.



An effective shaded fuelbreak will not have ladder fuels connecting the understory layer with the coniferous overstory.

FUEL REDUCTION TREATMENTS: ***SHADED FUELBREAKS*** *(continued)*

- ❖ Consult with a forester from the Nevada Division of Forestry for assistance regarding technical forestry questions, permitting and carrying out thinning operations on your site.
- ❖ Areas of dense brush will require a thinning so that remaining shrubs have a spacing (canopy to canopy) equal to twice their height. Further reduce the fuel volume by reducing shrubs to a height of eighteen inches or less.
- ❖ For mature large conifers such as ponderosa pine and white fir, prune all branches from six to fifteen feet above the ground, but not more than one-third of the total tree height. For smaller conifers such as pinyon and juniper trees, limb all branches a minimum of four feet from the ground, not to exceed one-third of the total tree height.
- ❖ Prune and remove dead and diseased tree branches and keep the area within fifteen feet of remaining trees free of smaller trees, shrubs, duff, and other ladder fuels.
- ❖ Where trees are removed, cut stumps as close to the ground as possible and leave no stump higher than four inches.



Clear all brush within fifteen feet of tree canopies.

When applying thinning, pruning, and fuel reduction treatments it is essential that all plant biomass (tree branches, shrub trimmings, pine needle litter) be immediately removed to a safe disposal area. This material dries rapidly and can contribute to the fire hazard problem if allowed to remain on the premises.

SEED MIX AND APPLICATION SPECIFICATIONS FOR DISTURBED AREAS, CLARK COUNTY

Mojave Desert low elevation seedmix

Common Name	Scientific Name	Drill Seeding Rate PLS pounds/acre	Broadcast Seeding Rate PLS pounds/acre
Blue grama	<i>Bouteloua gracilis</i>	1.0	2.0
Buffalo grass	<i>Buchloe dactyloides</i>	1.0	2.0
Desert needlegrass	<i>Achnatherum speciosum</i>	1.0	2.0
Galleta	<i>Pleuraphis jamesii</i>	1.0	2.0
'Paloma' Indian ricegrass	<i>Achnatherum humeoides</i>	1.0	2.0
'Immigrant' Kochia	<i>Kochia prostrata</i>	2.0*	
TOTAL PLS POUNDS PER ACRE		7.0	12.0

Spring Mountains High elevation seedmix

Common Name	Scientific Name	Drill Seeding Rate (PLS pounds/acre)	Broadcast Seeding Rate (PLS pounds/acre)
'Sodar' Streambank wheatgrass	<i>Elymus lanceolatus ssp. psammophilus</i>	1.5	3.0
'P-27' Siberian wheatgrass	<i>Agropyron fragile spp. sibericum</i>	1.5	3.0
'Luna' Pubescent wheatgrass		2.0	4.0
Sandberg bluegrass	<i>Poa sandbergii</i>	0.5	1.0
'Immigrant' Forage Kochia	<i>Kochia prostrata</i>	2.0	
TOTAL PLS POUNDS PER ACRE		7.5	13.0

***Kochia prostrata* should always be broadcast seeded on the soil surface.

This seed mixture is for treating all disturbed areas and areas cleared for fuel reduction purposes. Seeding application rates are specified on a "pure live seed" (PLS) basis. All seeds should be thoroughly mixed and seeded together at the same time. Drill seeding is recommended where feasible. Drill rows should be spaced at 12 inches apart and seed should be planted at a depth of 1/4 to 1/2 inch. Broadcast seeding 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 an ATV. Following the broadcast seed application, seeded areas should be lightly raked to assure seed placement at an average depth of 1/4 to 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 ATV in areas that are less rocky.

PONDEROSA PINE TREE THINNING GUIDE

Thin ponderosa pine trees to reduce the stocking level to 80 to 100 square feet of basal area per acre. Basal area of a tree is defined as the cross-sectional area at breast height (4.5 feet above the ground) and is expressed in square feet. The following is a chart of tree sizes and the spacing needed between trees of the same size.

Thinning Guide
Basal Area (sq. ft.) / Acre

TREE DIAMETER AT 4.5 FEET HIGH (inches)	BASAL AREA			
	60 sq ft Dia. X 2	80 sq ft Dia. X 1.7	100 sq ft Dia. X 1.5	
10	20	17	15	Tree Spacing (ft.)
	110	147	183	# Trees/Acre
12	24	21	18	Tree Spacing (ft.)
	76	101	127	# Trees/Acre
14	27	24	22	Tree Spacing (ft.)
	56	74	93	# Trees/Acre
16	32	28	25	Tree Spacing (ft.)
	42	57	71	# Trees/Acre
18	36	31	28	Tree Spacing (ft.)
	33	45	56	# Trees/Acre
20	40	34	31	Tree Spacing (ft.)
	27	36	45	# Trees/Acre
22	44	38	34	Tree Spacing (ft.)
	22	30	37	# Trees/Acre
24	48	41	37	Tree Spacing (ft.)
	19	25	31	# Trees/Acre
26	52	45	40	Tree Spacing (ft.)
	19	25	31	# Trees/Acre
28	56	48	43	Tree Spacing (ft.)
	14	18	23	# Trees/Acre
30	60	52	46	Tree Spacing (ft.)
	12	16	20	# Trees/Acre

1. Remove the trees with forked tops. Forked topped trees can become a hazard, as part of the top could fail and damage buildings, cars, and people.
2. Remove trees with basal scars that are showing signs of wood boring insects and ants in the bole of the tree.
3. Remove trees with dead or broken tops. These trees will attract bark beetles.
4. Remove trees that are infested with dwarf mistletoe. If a tree only has dwarf mistletoe in the lower branches, then prune the branches off. Dwarf mistletoe is a parasitic plant that spreads by seed and will eventually kill the tree.
5. Remove the smaller trees that are not in a dominant position in the canopy and are being crowded by the taller trees. Remove enough trees to allow for ten to fifteen (10-15) feet of space between crowns. Ponderosa pine need direct sunlight to survive. Trees in a shaded condition will slowly die from lack of sunlight, but until they die, they will continue to use moisture and nutrients the larger trees could use. This stress for moisture in an overstocked condition will predispose all the trees to attacks from bark beetles, especially during years of drought.
6. Treat the stumps with borax powder (decahydrate borax) to prevent harmful root rot fungi (*Fomes annosus*) from becoming established.
7. Thinning debris (limbs, tops and tree trunks) should be promptly removed from the site. Ips beetles will breed in wood larger than three (3) inches in diameter if the wood and slash remain on the site longer than four weeks. If the homeowner wants to keep the wood to burn in a fireplace, then the wood should be cut to the proper length and split to help dry it out. Do not stack the wood between trees, next to buildings or under decks. Dispose of the limbs and tops by burning or chipping and hauling the chips away.

Appendix F

Community Guidelines

Appendix F – Community Guidelines

FIRESAFE 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 routine 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 firesafe community development and are not intended to supercede existing fire codes. Check with your county building department for actual county building codes.

SAMPLE BURN PERMIT

(Issued in accordance with the provisions of NRS chapter 473.090)

Name: _____
Address: _____
Land Owner: _____
Location of Authorized Burning: _____
Type of Burning Authorized: _____

PERMITTEE UPON ACCEPTANCE OF THIS PERMIT AGREES TO THE FOLLOWING CONDITIONS:

1. The permittee shall notify Fire Dispatch at _____, each and every day of their proposed burn. Dispatch will advise whether it is a Burn Day or a No Burn Day.
2. Burn hours: 9:00 a.m. to 3:00 p.m. with all flames and hot ashes totally extinguished by 3:30 p.m. **No exceptions!** Violation of burn hours results in a \$_____ fine.
3. Do not conduct burning during windy conditions. Cease burning should wind conditions at burn site exceed 15 mph. If in doubt, don't burn!
4. Smoke shall not discharge material which has an offensive odor or which may be injurious or detrimental to health and safety of others.
5. Do not burn garbage (waste food products, dead animals, fish or fowl), oil, rubber, plastic, tar paper or asphalt products, including hay-baling twine.
6. Burn in open area, at least 30 feet from structure or combustible surface.
7. Burning of excessive amounts of combustibles is prohibited. Limit stacks to piles of three feet high and five feet in diameter. Piles must be a proper distance from each other. Burn one at a time to maintain control of the burn. Cut, pile, and burn weeds as described above. Burning standing grass and weeds is prohibited.
8. Use of burn barrels is prohibited at any time - \$_____ fine for violation.
9. A break to mineral earth of not less than ten feet shall be maintained around all fires.
10. A garden hose attached to a pressurized water supply shall be immediately available and functional for emergency use. In addition, have available a shovel and rake, hoe or Pulaski.
11. A copy of this burn permit must be in the responsible person's possession at the burn site. Failure to call Dispatch the day of your burn or failure to have burn regulations at the burn site or failure to properly extinguish your fire is a citable offense. First citation is \$_____. The expenses of fighting fires that result from a violation of this code shall be a charge against the person whose violation of this code caused the fire. Damages caused by such fires shall constitute a debt of such person and are collectible by the chief in the same manner as in the case of an obligation under a contract, expressed or implied.

Period of this permit: From _____, 20____, to _____, 20____, inclusive.

TO EXTEND THE TIME PERIOD A NEW PERMIT MUST BE OBTAINED

I understand and agree to comply with the provisions of this permit:

Permittee Signature

Permit issued by: _____ Date: _____

Title: _____

Area was inspected by: _____ On: _____

Persons participating in open burning activities do so at their own risk and may be held responsible for the costs of suppressing escaped or uncontrolled fires.

These regulations issued in compliance with the Nevada Department of Environmental Protection and the Sierra Front Wildfire Cooperators. Reference: 1997 Uniform Fire Code, Appendix II-A, Section 24, Section 105.1, and Section 1102.3

Resource Concepts, Inc.