City of Carson City
Agenda Report

Date Submitted: 8/7/09

Agenda Date Requested: 8/20/09
Time Requested: 15 Minutes

To: Mayor and Supervisors

From: Fire Department

Subject Title: Presentation of and Action to approve the adoption of the Carson City Community Wildfire Protection Plan.

Staff Summary: The Fire Department is recommending the adoption of the Community Wildfire Protection Plan (CWPP) as developed by a contractor hired to complete the work. The CWPP is a document that delineates the wildland fuel reduction work necessary in each of the identified wildfire prone communities in Carson City. The plan has been reviewed by all stake holders in the wildfire protection community.

Type of Action Requested: (check one)

(___) Resolution
(X) Formal Action/Motion
(___) Ordinance
(___) Other (Specify)

Does This Action Require A Business Impact Statement: (___) Yes (X) No

Recommended Board Action: I move to approve the adoption of the Carson City Community Wildfire Protection Plan.

Explanation for Recommended Board Action: The adoption of this agreement will allow for Carson City to use the comprehensive plan to apply for grants, work cooperatively with homeowners, developers, and code enforcement officials to improve each community's survivability during a wildland fire.

Applicable Statute, Code, Policy, Rule or Regulation: N/A

Fiscal Impact: No direct fiscal impact as a result of the adoption of this plan

Explanation of Impact:

Funding Source:

Alternatives:

Supporting Material: Community Wildfire Protection Plan

Prepared By: R. Stacey Giomi, Fire Chief

Reviewed By: _____ Date: 8/11/09
(Fire Chief)

_____ Date: 8/11/09
(City Manager)

_____ Date: 8-11-09
(District Attorney)

_____ Date: 8-11-09
(Finance Director)

Board Action Taken:

Motion:_____ 1)_____ Aye/Nay
2)_____

_____
(Vote Recorded By)

CARSON CITY

Community Wildfire Protection Plan

July 2009

Prepared For:

CARSON CITY FIRE DEPARTMENT
777 S. Stewart Street
Carson City, NV 89701

Prepared By:

RESOURCE CONCEPTS, INC.
340 N. Minnesota Street
Carson City, NV 89703

CARSON CITY

Community Wildfire Protection Plan

July 2009

PREPARED FOR:

CARSON CITY FIRE DEPARTMENT
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Carson City, NV 89701

PREPARED BY:

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Funded Through
Community Assistance Grant

From the
Bureau of Land Management

EXECUTIVE SUMMARY

The Carson City Community Wildfire Protection Plan (CWPP) is a follow-up to the Community Risk Hazard Assessment/Community Wildfire Protection Plan prepared for Carson City in 2004-2005. Thirteen neighborhoods in the Carson City Consolidated Municipality (Carson City) have been delineated to provide more detailed analyses of community wildfire hazards and to update recommendations for reducing fuel hazards on pubic and private property and in the surrounding wildland-urban interface. Inventory and analyses methodology from the 2005 assessment were repeated in 2008 to allow for comparisons over time.

This CWPP is a collaborative effort between Carson City Fire Department, Nevada Division of Forestry, US Forest Service, Bureau of Land Management, and Carson City residents and incorporates recent planning efforts including the Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy. The Nevada Fire Safe Council has provided fundamental services to Carson City neighborhoods and facilitated homeowner participation in this effort.

Substantial progress has been made since 2005 when the first Community Wildfire Protection Plan was completed. Fire agencies and homeowners assisted by the Nevada Fire Safe Council have made significant contributions in improving community safety. Fuel breaks have been built, private water storage for wildfire suppression has been developed, burned areas have been revegetated, and defensible space has been established and maintained. The Carson City Board of Supervisors has updated fire code standards with regard to structure construction, road construction, and water supply systems and community risk hazard ratings for newer developments reflect the improved conditions for wildfire safety.

A summary of the assessment results for the neighborhoods in this update is provided in Table 1. The area surrounding Carson City has an active wildfire history and the ignition risk is high everywhere. Fuel hazard conditions on the west side of Carson City range from moderate to high in the vicinity of the 2004 Waterfall Fire. The potential for these areas to rapidly spread fire into adjacent neighborhoods is ever increasing. Fuel hazards on the north and east side of Carson City also range from moderate to high. The Community Risk Hazard rating was high for the more remote and for the older neighborhoods including Lakeview, Edmonds/Prison Hill, Pinion Hills, Mexican Dam, Carson Colony/Voltaire Canyon, and North Carson. Updated building ordinances and fire-wise planning have improved community safety in newer subdivisions.

Of greatest concern is the Clear Creek neighborhood. The physical conditions and topographic constraints that characterize the Clear Creek wildland-urban interface emphasize the need for extensive and ongoing fuel reduction and fuels management. The recent US Forest Service plan for fuel reduction north and west of the Clear Creek neighborhood is an important shift in forest management objectives to prioritize actions that define fire resiliency and forest health. Homeowners and landowners in Clear Creek, including the Washoe Tribe, have initiated a number of thinning and defensible space projects. Yet, much remains to be done in a coordinated effort to address forest health and community safety objectives, reduce the potential for catastrophic crown fires, and safeguard our natural resources and the residences who live among them.

Some innovative programs implemented in Carson City neighborhoods to reduce fuels include prescribed grazing for control of cheatgrass and other fire fuels and the community dumpster program to provide homeowners an efficient means of biomass disposal. University of Nevada Cooperative Extension has been in the forefront of public education with the *Living with Fire* program. It is important to continue these efforts to maintain awareness and participation.

Table 1. Results of the community risk/hazard assessment for Carson City.

Neighborhood	Ignition Risk	Fuel Hazard	Community Risk/Hazard Rating
Ash Canyon-Western Nevada College	High	Moderate	Moderate
C-Hill	High	Moderate	Moderate
Carson Colony-Voltaire Canyon	High	Moderate	High
Clear Creek	High	Extreme	Extreme
Edmonds-Prison Hill	High	Moderate-High	High
Kings Canyon-Lower	High	Moderate	Low
Kings Canyon-Upper	High	Moderate	High
Lakeview	High	Moderate-High	High
Mexican Dam	High	Moderate-High	High
North Carson	High	Moderate	High
Pinion Hills	High	Moderate	High
Stewart-South Carson	High	Moderate	Moderate
Timberline	High	Moderate-High	Moderate

Homeowners throughout all of the Carson City neighborhoods must be ever diligent and cognizant of defensible space around their homes and structures. Fuels management on undeveloped parcels within neighborhood boundaries sometimes poses a greater risk to residents than wildland fuels in the interface. Enforcement of ordinances that require property owners to maintain fire safe vegetative conditions should be used when necessary. The ongoing need for maintenance of fuel reduction and defensible space treatments must remain a priority for both private landowners and land management agencies.

Ultimately, it is each homeowner's responsibility to establish and maintain the physical characteristics of a fire-safe interface property. Public and non-profit agencies such as the Carson City Fire Department, the Nevada Fire Safe Council, and NDF offer resources to assist individuals and neighborhoods in achieving the objectives of fuels reduction treatments such as those recommended within this report. Using a strategy of offering defensible space assessments to aid homeowners in improving defensible space, the Carson City Fire Department would remind homeowners – and the owners of undeveloped wildland parcels – that the safety of their individual property is directly related to property owners taking the initiative within their neighborhoods for ongoing fuel reduction and vegetation management.

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[July 23, 2009]

1.0 INTRODUCTION

1.1 PURPOSE AND NEED

The Healthy Forest Restoration Act of 2003 was initiated to give communities the incentive to address local wildfire issues and threats such as fuel hazard conditions and mitigation actions and to identify fuel reduction treatment responsibilities and priorities. The first Community Wildfire Protection Plan (CWPP) for the Carson City Municipality was completed in 2004-2005 as part of a statewide effort and was approved by the Carson City Board of Supervisors, the Carson City Fire Department, and the Nevada State Forester (RCI 2005). The 2004 Assessment evaluated four separate communities in the Carson City Municipality that were listed in the 2001 federal register as "communities-at-risk." These included two tribal communities (Carson Indian Colony and Stewart Community), the Clear Creek community, and the remainder of Carson City as a whole.

Carson City Fire Department (CCFD) identified the need to update the 2005 CWPP and conduct a more detailed analysis of wildfire risks and hazards in the wildland urban interface around Carson City. Funding for the project was provided from a Community Assistance Grant through the Bureau of Land Management. Resource Concepts, Inc (RCI) was retained to conduct a follow-up risk/hazard assessment and update the Carson City Municipality CWPP.

The objectives for the update were to

1. Conduct a structure and fire-safe condition assessment for The Carson City Municipality using methods consistent with the previous statewide assessment project (RCI 2005).

2. Evaluate the fuel hazard condition within a boundary of 0.5 miles around the Carson City Municipality including both public and private land, consistent with the 2004 assessment.

3. Divide the interface area into distinct geographic neighborhoods for analyses and provide recommendations to reduce community wildfire hazards specific to each neighborhood.

4. Prioritize recommended treatments and actions for implementation.

5. Integrate the recommendations from the 2008-2009 update with the existing multi-jurisdictional fuel reduction and wildfire prevention strategy for the Carson Range and with existing plans developed in conjunction with the Nevada Fire Safe Council.

6. Identify fuel reduction projects the can be done in partnership with State and Federal agencies and projects that are suitable for implementation through the Nevada Fire Safe Council or other private funding.

1.2 PROJECT TEAM

RCI specialists in the fields of wildland fire fighting, fuels management, forestry, range management, renewable natural resources, and geographic information systems (GIS) were used to compile and interpret the information for this assessment. RCI worked cooperatively with fire agencies that are responsible for structure protection and wildland fire suppression in the Carson City Consolidated Municipality to gain an understanding of the current wildfire risks and hazards, and to update the current status of completed and proposed fuel reduction projects. The Carson City Fire Department provided technical and regulatory advice, wildfire apparatus data, and facilitated integration of anecdotal information. Agency Fire Management Officers and Fuels Specialists contributed current information on fuels treatments and agency fuel reduction plans. Local chapters of the Nevada Fire Safe Council provided updated records on defensible space and neighborhood programs.

2.0 METHODOLOGY

2.1 NEIGHBORHOOD BOUNDARY DELINEATION

The wildland-urban interface is the place where homes and wildland meet. This project focused on identifying hazards and risks in the wildland-urban interface areas throughout thirteen neighborhoods in Carson City. Neighborhood boundaries for this assessment were delineated to include all outlying residential areas around the perimeter of Carson City and to conform with boundaries for Nevada Fire Safe Council local chapters where they exist. In some cases neighborhood boundaries were expanded to include additional outlying residences.

To allow for comparisons between the current conditions and the conditions observed during the 2004 assessment, the fuel hazard assessment area within the wildland-urban interface (WUI) that was used for this analysis was consistent with the 2004 risk/hazard assessment, defined as a distance of 0.5 miles from the neighborhood boundary. The following neighborhoods that were evaluated in the 2008 assessment are shown on Figure 2-1 at the end of this chapter.

- Ash Canyon – Western Nevada College
- C-Hill
- Carson Colony – Voltaire Canyon
- Clear Creek
- Edmonds – Prison Hill
- Kings Canyon – Lower
- Kings Canyon – Upper
- Lakeview
- Mexican Dam
- North Carson
- Pinion Hills
- Stewart – South Carson
- Timberline

2.2 PROJECT INTEGRATION

Land ownership in the interface area around Carson City includes National Forest land administered by the US Forest Service, public land administered by the Bureau of Land Management, open space land owned and managed by Carson City, tribal land held in trust by the Bureau of Indian Affairs, land owned by the Washoe Tribe of Nevada and California, land owned by the University of Nevada Board of Regents, and private land. Carson City Fire Department, local and federal fire agencies, and local chapters of the Nevada Fire Safe Council have been actively treating hazardous fuels in the Carson Range and around Carson City for some time. Representatives from each of these programs were contacted and interviewed to incorporate the most current information on projects that have been completed since the 2004 assessment and to compile information on future fuel reduction plans. Fire agency and other personnel who contributed information to this report are listed in Appendix A.

Local input from the community was provided by chapters of the Nevada Fire Safe Council. There are six formally organized chapters in Carson City: Clear Creek, Kings Canyon, Lakeview, Mexican Dam/Prison Hills, North Carson, and Timberline. Information was exchanged between the RCI Project Team and the chapter representatives regarding completed projects, planned projects, and treatment priorities.

A specific mandate for the west side of Carson City is included in the White Pine County Conservation, Recreation, and Development Act of 2006 (Public Law 109-432 [H.R.6111) that required development and implementation of cost-effective, multi-jurisdictional hazardous fuels reduction plans for the Carson Range. This recent multi-jurisdictional fuels reduction planning effort was completed by 15 cooperating agencies[1] in January 2008 to reduce the probability of another catastrophic fire in the Carson Range. The *Carson Range Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy* provides the foundation for fuel treatments for all participating agencies for the next ten years. Carson City neighborhoods and WUI areas used in this assessment that are part of the multi-jurisdictional plan include Lakeview, Ash Canyon, Upper and Lower Kings Canyon, C-Hill, Carson Colony-Voltaire Canyon, and Clear Creek. General treatment areas from the multi-jurisdictional plan that overlap the CWPP project area are included in this plan and are shown in Appendix F. The majority of these treatments are planned to be initiated within the next five years. Some of the Clear Creek treatments are planned to be implemented in the five to ten year timeframe. Specific treatment plans will be developed for each project area and jurisdiction but may include tree and shrub thinning to reduce ladder and crown fuels, pruning, prescribed burning, mastication and chipping, and controlled grazing. The treatments map showing proposed treatments within Carson City and descriptions of fuel reduction treatments used in the wildland-urban interface are included in Appendix B.

2.3 FUEL HAZARD ASSESSMENT

The RCI Fire Specialist and Fuels Specialist visited each of the thirteen Carson City neighborhoods and assessed the existing fuel conditions within that portion of the wildland-urban interface within approximately 0.5 miles of each neighborhood boundary. The Fuel Hazard assessments were conducted between November 13, 2008 and January 12, 2009 using the same approach used during the initial 2004 evaluation for consistency.

The Fuel Hazard Assessment is an expression of the potential for hazardous fire behavior in the wildland-urban interface. It is a combined rating that incorporates fuel type and ignition risk. Fuel type incorporates the kind of vegetation present, and the spatial arrangement of the vegetation in terms of height, layers, density, and continuity. Slope and aspect also have significant influences on fuel hazard and fire behavior. The ignition risk rating is based on interpretation of the historical record of ignition patterns and fire polygons provided by the National Interagency Fire Center (NIFC), BLM, and US Forest Service (USFS) databases and interviews with Carson City Fire Department and agency Fire Management Officers. The fire and ignition history around Carson City is shown in Figure 2-2 at the end of this chapter. The Fuel Hazard rating for each neighborhood in this Plan was based upon available data and the judgment of the RCI Fire Specialist based on professional experience with wildland fire ignitions and fire behavior in the Carson City area.

[1] Nevada Division of Forestry (NDF), Nevada Division of State Lands, Nevada Division of State Parks, Nevada Fire Safe Council, Washoe Tribe of Nevada and California, Carson City Division of Open Space, Washoe County, Douglas County, Carson City Fire Department, Sierra Fire Protection District, Reno Fire Department, Truckee Meadows Fire Protection District, Whittell Forest University of Nevada, and USDA Forest Service (USFS) Humboldt-Toiyabe National Forest, Carson Ranger District.

2.4 NEIGHBORHOOD RISK/HAZARD ASSESSMENT

The procedure for the Neighborhood Risk/Hazard Assessments was developed by Nevada's Wildland Fire Agencies, Board of Directors (2001, revised 2002) and was used during the 2004 initial assessment and plan[2]. This method assigns hazard ratings ranging between low and extreme based on a composite score that incorporates consideration for factors that affect the potential for hazardous fire behavior in the wildland-urban interface. The scores and associated hazard ratings are shown in Table 2-1.

Table 2-1. Hazard rating point system utilized in the 2008 Carson City community wildfire protection plan.

Hazard Category	Score
Low Hazard	<41
Moderate Hazard	41-60
High Hazard	61-75
Extreme Hazard	76+

To arrive at a score for each neighborhood, five primary factors affecting potential wildfire hazard were assessed: community design, construction materials, 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 neighborhood is provided below. The details of the scoring system are broken down in Appendix C. Individual neighborhood score sheets presenting the point values assigned for each element in the hazard assessment score are provided at the end of each neighborhood assessment.

2.4.1 Community Design

Aspects of community design account for 26 percent of the total assessment score. Many aspects of community design can be modified to improve fire safety. Factors considered include:

- **Interface Condition.** Community safety is affected by the density and distribution of structures with respect to the surrounding wildland environment. Four condition classes are used to categorize the wildland-urban interface: Classic Interface, Intermix, Occluded, and Rural. Definitions for each Condition Class are included in the glossary of wildfire terms in Appendix D.
- **Access.** Design aspects of roadways influence the hazard rating assigned to a neighborhood. A road gradient of greater than five percent can increase response times for heavy vehicles carrying water. Roads less than twenty feet in width often impede two-way movement of vehicles for resident evacuation and access for fire suppression equipment. 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 neighborhood can lower a hazard rating. Visible, fire-resistant, street and address identification and adequate driveway widths also reduce the overall neighborhood hazard rating.

[2] *Draft Community Wildland Fire Assessment For Existing and Planned Wildland Residential Interface Developments in Nevada*

- **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, 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 also 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 neighborhood without a backup energy source. Many communities rely on electric pumps to provide water to residents and firefighters for structure protection and fire suppression.

2.4.2 Construction Materials

Building construction materials account 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 fire-resistant materials, there are steps that can be taken to address specific elements that strongly affect structure ignition potential in the interface area. Factors considered in the assessment include:

- **Building Materials.** The composition of building materials determines the length of time a structure could 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 higher temperatures and heat durations when defensible space conditions are adequate.
- **Architectural Features**. Unenclosed or unscreened balconies, decks, porches, eaves, or attic vents provide 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 neighborhood.

2.4.3 Defensible Space

Defensible space accounts for sixteen percent of the total assessment score. Density and type of fuel around a home determines the potential for fire exposure and damage to the home. A greater volume of trees, shrubs, dry weeds, 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 most easily manipulate in order to improve the chances that a home or other property avoids damage or complete loss from a wildfire.

2.4.4 Suppression Capabilities

Suppression capabilities account for sixteen percent of the total assessment score. Knowledge of the capabilities or limitations of the fire suppression resources in a neighborhood can help municipality officials and 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 neighborhood, having the appropriate firefighting personnel available to respond quickly is critical to saving structures and lives. Whether there is a local paid fire department, volunteer department, or no local fire department affects

how long it takes for firefighters to respond to a reported wildland fire or to a threatened neighborhood.

- **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 neighborhood. 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 fire 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 neighborhood.

2.4.5 Physical Conditions

Physical conditions account for 26 percent of the total assessment score. Physical conditions include slope, aspect, topography, typical local weather patterns, fuel type, and fuels density. With the exception of changes to the fuel composition, the physical conditions in and around a neighborhood cannot be altered to make the neighborhood more fire safe. Therefore, an understanding of how these physical conditions influence fire behavior is essential to planning effective preparedness activities such as fuel 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 longer flame lengths than on flat areas. Fire will burn downslope; however, it usually burns downhill at a slower rate and with shorter flame lengths than in upslope burns. East aspect slopes may experience afternoon downslope winds that may rapidly increase downhill burn rates. West and south facing aspects are subject to more intense solar exposure, which preheats vegetation and lowers the moisture content of fuels. Canyons, ravines, and saddles are topographic 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 in the event of a wildfire.
- **Fuel Type and Density**. Vegetation type, fuel moisture values, and fuel density around a neighborhood 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. Dry weather conditions, particularly successive years of drought, in combination with steep slopes or high winds can create situations in which the worst-case fire severity scenario can occur.

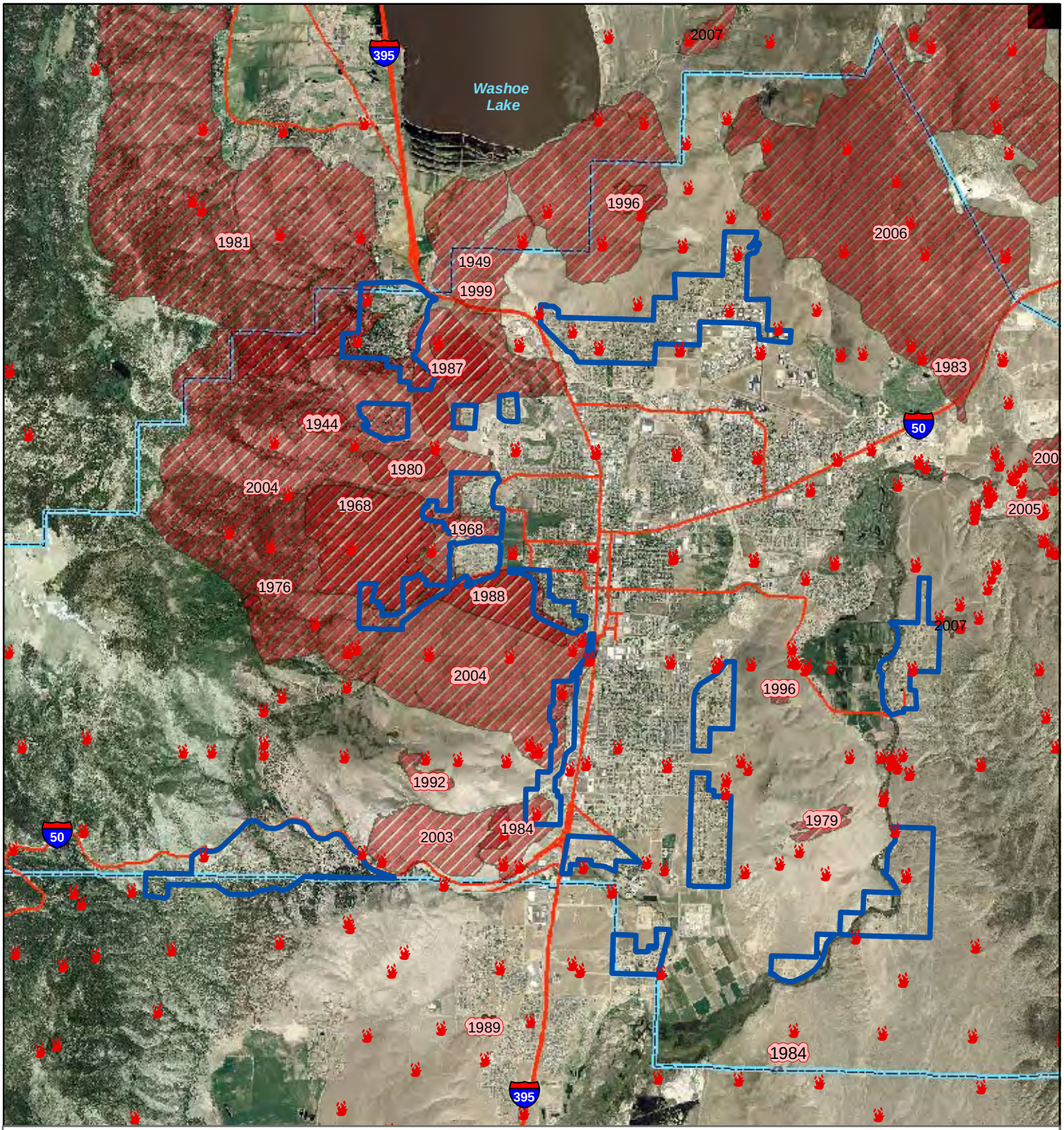

Figure 2-2: Carson City Coordinated Municipality Fire History 1944-2007 and Ignition History 1980-2008.

Neighborhood Boundary

Municipal Boundary

Fire History

Federal Ignition History Record

N

0 0.5 1 2

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006
Ignition data: Federal Fire History Reports: 1980-2008 DOI (BIA,BLM,NPS), USFWS, and USFS

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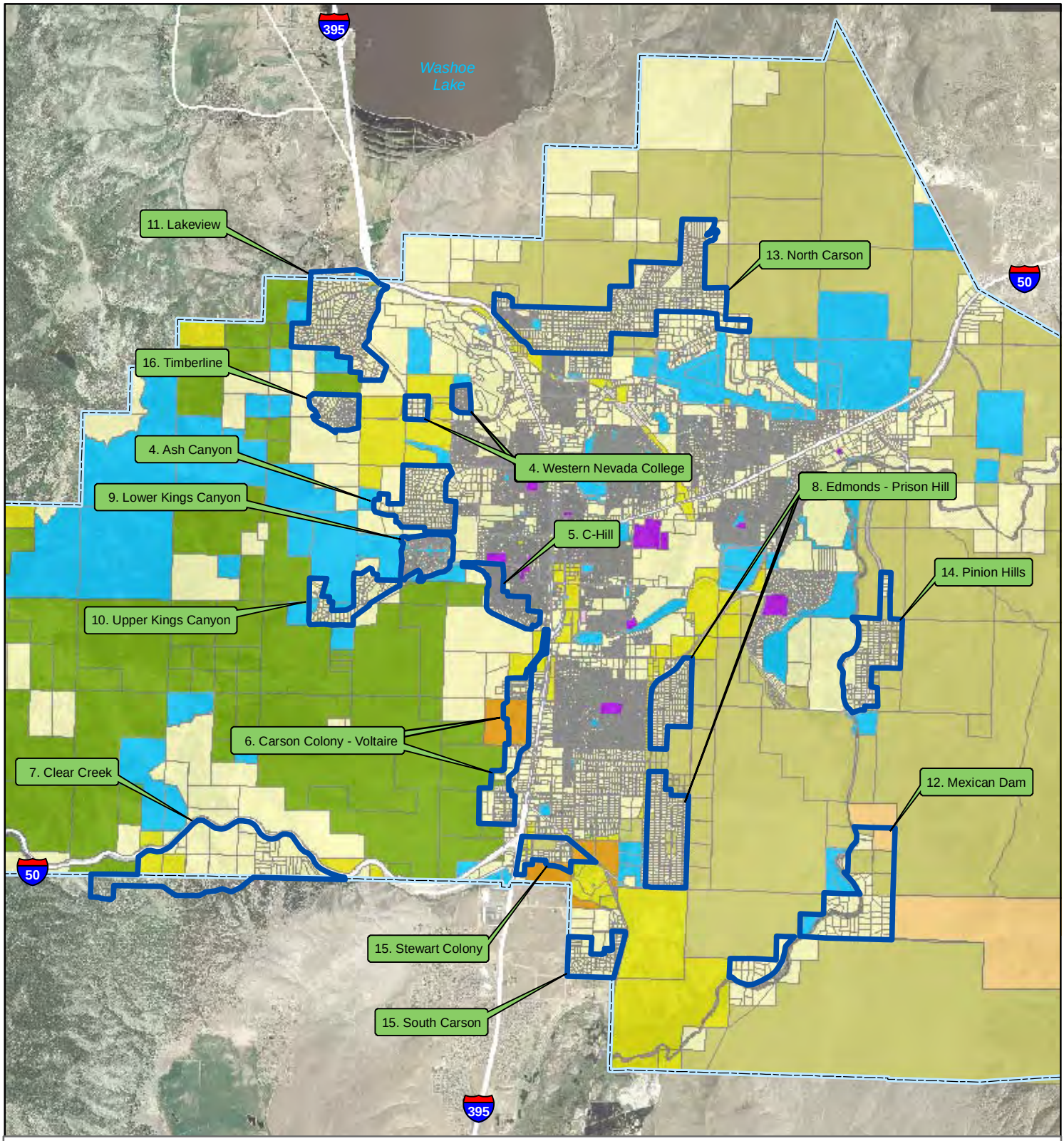

Figure 2-1. Carson City Community Wildfire Protection Plan Neighborhood Boundaries and Land Ownership.

- Bureau of Land Management
- Bureau of Indian Affairs Allotments
- Carson City Schools
- City Lands
- Private
- State of Nevada
- U.S. Forest Service
- U.S. Government
- Washoe Tribe
- Neighborhood Boundary
- Municipal Boundary

N

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Miles

Carson City CWPP, July 2009.
Base map: NAIP Aerial 2006
Ownership: FLB Dataset 2009

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3.0 CARSON CITY FIRE HISTORY & FIRE RESOURCES

3.1 WILDFIRE HISTORY

Significant wildland fires have occurred in and around Carson City over the last 24 years. Table 3-1 summarizes the fire histories and fire ignitions by year recorded for public lands in the Carson City Consolidated Municipality. Figure 2-2 illustrates the fire history in the vicinity of Carson City. Several smaller wildland fires have occurred on private lands within the municipality that are not recorded in the fire database.

Five significant wildland fires have occurred on the east side of Carson City from 2004 to 2007. There were no significant fires in 2008.

Table 3-1. Summary of available fire history data 1980-2007.

Year	Number of Fire Ignitions	Total Fire Acreage	Year	Number of Fire Ignitions	Total Fire Acreage
1980	7	161	1994	1	35
1981	2	356	1995	2	<1
1982	2	3	1996	8	225
1983	8	2,670	1997	3	5
1984	8	600	1998	1	40
1985	10	7	1999	14	1,027
1986	8	81	2000	13	101
1987	10	485	2001	8	55
1988	14	1,798	2002	6	9
1989	2	1	2003	6	691
1990	8	N/A	2004	9	8,799
1991	9	4	2005	16	18
1992	3	1	2006	**6**	5,994
1993	3	1	2007	015	0
			TOTAL	**202**	**23,167**

Source: National Interagency Fire Center, Boise, Idaho, Bureau of Land Management, and US Forest Service NA – either no acreage was reported in the databases, or the acreage was too small to be recorded in the database.

Ignition risks for wildfires fall into two categories - lightning and human caused. Human caused ignitions can come from a variety of sources: fires started along highways and roads from burning material thrown out of vehicle windows or ignited during auto accidents, off-road vehicles, arcing power lines, agricultural fires, ditch burning, debris burning in piles or burn barrels, unextinguished matches and campfires, target shooting, and fireworks. Fire ignition data between 1980 and 2003 indicate that 47 percent of the ignitions recorded around Carson City were due to natural causes and 53 percent were human caused.

3.2 WILDFIRE PROTECTION RESOURCES

The Carson City Fire Department (CCFD) is responsible for fire protection on private and municipal lands within the Municipality. The Nevada Division of Forestry Sierra Forest Fire Protection District is responsible for wildfire suppression. The CCFD is a 63-member career department that works closely with the ten-member Warren Engine Company No. 1 Volunteer Fire Department.

The Sierra Forest Fire Protection District was established according to NRS 473 to provide wildfire suppression services and procure federal aid for wildfire suppression within the District boundary. The District includes the Sierra Front portions of the Municipality. The Sierra Forest Fire Protection District has one fire station in Carson City that is staffed with up to ten seasonal NDF personnel from May through October. Three NDF career personnel staff the Sierra Forest Fire Protection District in offices in Carson City and Washoe County year round and are available to respond to wildfires. NDF has five 24-person hand crews based at the Stewart Conservation Camp in south Carson. These crews are available for both wildland fire suppression and for fuels management projects.

The BLM District Office is the primary agency responsible for wildland fire suppression on BLM administered lands within the Municipality (41,000-acres) and has an agreement with the Bureau of Indian Affairs (BIA) to provide suppression on BIA lands (480) acres in the Municipality.

The USFS Carson Ranger District is the primary agency responsible for wildland fire suppression on the 10,000-acres of USFS lands within the Municipality. The Sierra Front Interagency Dispatch Center in Minden, Nevada dispatches BLM, NDF, and USFS suppression resources through a computer-aided dispatch system.

Wildfire suppression resources are also available for wildfire suppression on private land throughout Carson City through mutual aid agreements with the BLM Carson City Field Office, USFS Carson Ranger District, East Fork Fire and Paramedic District, Reno Fire Department, Central Lyon County Fire Protection District, Bureau of Indian Affairs, Sierra Fire District Washoe County, Nevada Fire Chiefs Statewide Mutual Aid Agreement, and the Lake Tahoe Regional Fire Chief's Association. Carson City Fire Department is also a member of the Sierra Front Wildfire Cooperators.

Tables 3-2 and 3-3 summarize the types of wildfire suppression resources, cooperating partners, and equipment available for first alarm and initial attack of wildland-urban interface fires in the Carson City Consolidated Municipality.

The availability of the listed resources varies depending on time of year and whether fire agency resources have been previously dispatched to other incidents. A subgeographical ALP is currently in place between State (NDF) and Federal agencies (BLM, USFS) along the Sierra Front that allows dispatch centers to request resources directly from partner agencies for initial attack, up to 24 hours.

Table 3-2. Carson City Fire Department wildfire resources and equipment available for response to a wildland-urban interface fire.

Type of Equipment	Amount of Equipment	Cooperating Partner (Resource Location)
Wildland Engines	4	Carson City Fire Department
Water Tender	2	
Chief Officers	2	
Rescue Ambulance	3	

Source: Personal Communication with Stacey Giomi Carson City Fire Department Fire Chief

Table 3-3. Carson City Consolidated Municipality wildfire resources, cooperating partners, and equipment that will be dispatched for first response to a wildland-urban interface fire on a high hazard day.

Type of Equipment	Amount of Equipment	Cooperating Partner (Resource Location)
Type III Engine	5	Sierra Front Interagency Dispatch, Minden – Closest available resources from the following agencies: Sierra Forest Fire Protection District (NDF) BLM USFS
Battalion Chief/Duty Officer	2	
Water Tender	1	
Dozer	1	
Hand Crew	1	
Single Engine Air Tanker (SEAT)	2	
Air Attack	1	
Helicopter	1	

Source: Personal Communication with Mike Klug, Nevada Division of Forestry Fire FMO, Ken Smihula, BLM Carson City Field Office Fire Management Officer, Stan Heinrich, BIA FMO Superintendent and Mike Wilde, FMO Carson Ranger District USFS.

3.3 WATER SOURCES AND INFRASTRUCTURE

Water available for fire suppression resources for Carson City includes private water systems shown in Table 3-4 and the following municipal sources:

- Community wells;
- 500 gpm hydrants within 500 feet of structures for about 70 percent of residences;
- Helicopter dip spots in the Carson River and golf course ponds;
- 14 water storage tanks:
  - (1) 4 million gallons
  - (4) 3 million gallons
  - (1) 2.6 million gallons
  - (1) 2 million gallons
  - (1) 400,000 gallons
  - (2) 300,000 gallons
  - (4) 250,000 gallons

The municipal water system is pressurized by gravity, except in two areas where pressure is generated by pumps. None of the pressure pumps or wells has emergency back-up generators. Carson City has two portable generators for use during power outages. The existing infrastructure for the water delivery system meets the 2006 International Fire Code.

Hydrants are not available for three homes in Ash Canyon or in the Pinion Hills, Mexican Dam, Stewart-South Carson, Clear Creek, and Kings Canyon neighborhoods.

Table 3-4. Carson City Fire Department – private water supply systems.

Address	Neighborhood	Source	Connection/Hydrant	Equipment	Coordinates
4648 Old Clear Creek Rd.	Clear Creek	30,000 gallon in-ground pool, gravity-fed FDC[a]	6" FDC by driveway	6" hard supply hose on site	39° 06.994^{N} 119° 49.221^{W}
6275 Robert Hill Rd.	Clear Creek	30,000 gallon in-ground pool, gravity-fed FDC	6" FDC 180' from house	No equipment on site	39° 06.713^{N} 119° 49.745^{W}
4980 Old Clear Creek Rd. Side of the road	Clear Creek	10,000 gallon underground tank	6"/4"/2' FDC& 4" fill connection	No equipment on site	39° 06.910^{N} 119° 49.307^{W}
4670 Clear Creek Rd.	Clear Creek	30,000 gallon in-ground pool	6" FDC	Pending. Homeowner expects FD test in May 2009	39° 06.962^{N} 119° 49.143^{W}
4081 Kings Canyon Rd.	Upper Kings Canyon	30,000 gallon creek-fed pond	Hydrant 40' from house	6" hard supply hose on site	39° 09.278^{N} 119° 48.675^{W}
4137 Kings Canyon Rd.	Upper Kings Canyon	30,000 gallon creek-fed pond	Hydrant 60' from house	No equipment on site	39° 09.269^{N} 119° 48.718^{W}
1769 Pinion Hills Rd.	Pinion Hills	10,000 gallon underground tank	2.5" FDC for fill and draft	4" hard supply hose on site	39° 09.097^{N} 119° 42.163^{W}
6600 Sierra Vista Ln. & Arroya Vista	Mexican Dam	10,000 gallon underground tank	6"/4"/2" FDC& 4" fill connection	5" hard supply hose on site	39° 06.422^{N} 119° 42.285^{W}
4344 Combs Canyon Rd.	Lakeview	12,000 gallon in-ground pool	2.5" FDC for drafting purposes on side of pool wall	No equipment on site	39° 11.90^{N} 119° 48.237^{W}
Homeowner pools may also be used as dip sites when permission is obtained.					

[a] FDC = Fire Department Connection

3.4 DETECTION AND COMMUNICATION

Fires are reported in the municipality through 911 calls and direct calls to the Carson City Sheriff's Office. Fires are communicated to Carson City Fire Department fire response personnel through Carson City Sheriff's Office emergency dispatch, radios, pagers, and telephones. Carson City uses a computer-aided dispatch system and if the fire is determined to be multi-jurisdictional, dispatch is transferred to the Sierra Front Interagency Dispatch Center in Minden, Nevada to create a uniform command. Carson City assumes communication and dispatch responsibilities for all fires within the municipality or involving Carson City Fire Department Equipment. The Sierra Forest Fire Protection District (NDF), Bureau of Land Management, and US Forest Service fire personnel and equipment are dispatched through the Sierra Front Interagency Dispatch Center in Minden, Nevada.

The Carson City Sheriff's Office, Carson City Fire Department, and Sierra Forest Fire Protection District have access to the state mutual aid frequencies. The radio system is compatible with neighboring agencies. The radio coverage does not include the areas around Spooner Lake, Clear Creek, and Pinion Hills.

3.5 FIRE PROTECTION PERSONNEL QUALIFICATIONS

The Carson City Fire Department (CCFD) firefighters have been trained to National Fire Protection Association Firefighter II standards. Entry-level wildland firefighter training is scheduled annually with BLM or USFS instructors. A Red Card certification and the NWGC Firefighter I and II qualifications are used for all management level positions with the CCFD. The Red Card certification is part of a fire qualifications management system used by many state and all federal wildland fire management agencies that indicates an individual's qualifications to fight wildland fires.

NDF Sierra Forest Fire Protection District personnel are trained to State Fire Marshal Firefighter I and II standards and have completed the National Wildfire Coordinating Group Wildland Firefighter Qualifications (310-1). A Red Card certification is required for all seasonal and career personnel.

3.6 WORK LOAD

The Carson City Fire Department reported that they responded to 50 wildland fires within the municipality in 2008. The Nevada Division of Forestry estimated that on average they respond to approximately six wildfires each year within the municipality (Klug 2008).

3.7 FINANCIAL SUPPORT

Funding for the Carson City Fire Department is provided primarily from the Carson City General Fund. The Fire Department also pursues grant funding when available for fuel reduction projects around the community. Funding for the Sierra Forest Fire Protection District is provided through ad valorem property tax and CTX sales tax revenue.

3.8 COMMUNITY PREPAREDNESS

The Carson City Municipality has an active Local Emergency Planning Committee and has adopted an emergency plan, a disaster plan, and an emergency evacuation plan. The emergency plan is updated annually. The Carson City Federal Emergency Management Agency plan covers wildland fires, earthquakes, and floods. The Sierra Front Interagency Dispatch Center has a pre-attack plan that is updated annually prior to the start of each fire season and primarily covers dispatch run cards for initial attack.

A pre-attack plan was developed for Carson City in the 1980's that provided travel maps, topographic maps, facility locations for incident command posts, water supply locations, basic fuel maps, and aerial photos. The pre-attack plan was designed to be used by incident management teams after initial attack and was originally intended to be stored at the Sierra Front Interagency Dispatch Center. NDF has one copy of the 1986 Carson Zone Pre-Attack Plan and recommends it as a useful reference that needs to be updated and incorporated into a GIS database (Klug, 2009).

New development plans for the Municipality are reviewed by the Carson City Fire Department. The Municipality has also adopted an ordinance for homes in the wildland-urban interface that addresses access, water supply, construction materials, defensible space, spark arrestors, placement and storage of propane tanks, and storage of firewood and other combustible material. Carson City Fire Department is also available upon request to provide homeowners an evaluation of home defensible space.

Within the Sierra Forest Fire Protection District, NDF firefighters conduct defensible space inspection of homes, and NDF Foresters review subdivision plans. The municipal areas beyond Division Street, Curry Street, Edmonds Street, Snyder Avenue, and Arrowhead Drive were designated as a 'Fire Hazard Area' in 1986 in accordance with (NRS 477.030/472.040(d). Each of the thirteen Carson City neighborhoods evaluated in this report is included within the Fire Hazard Area, which requires fire resistant roofing on all homes.

Both the Carson City Street Department and the Nevada Department of Transportation perform right-of-way clearance on public streets in the Municipality. The Carson City Fire Department also conducts fire safety activities during the annual Fire Prevention Week and conducts noxious weed abatement.

4.0 ASH CANYON – WESTERN NEVADA COLLEGE

FUEL HAZARD: MODERATE – HIGH COMMUNITY RISK: MODERATE

The Ash Canyon interface assessment area includes residences in the Wellington Crescent Subdivision, Cogorno Drive, the Joost Ranch, and the Kingston Park subdivision. The west flank of Silver Oak Subdivision between Winnie Lane and College Parkway connects the Ash Canyon neighborhoods to the Western Nevada College (WNC) assessment area to the north. The WNC assessment area includes residences along Harvard, Radcliffe, and Dartmouth Streets and residences further west along Combs Canyon Road, including the Murphy Drive and Vanpatten Avenue neighborhoods.

4.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Ash Canyon neighborhood is characterized by classic interface conditions, with the exception of a few residences that are intermixed with wildland fuels at the end of Ash Canyon Road. A 200' wide fuelbreak from Foothill Road (off of Winnie Lane) follows the north and west edge of Wellington Crescent to its terminus at Ash Canyon Road. This fuelbreak was established in 2002.

In 2004 widespread expanses of fuels in this area were consumed in the Waterfall Fire. Drill seeding with fire-resistant species occurred during rehabilitation efforts in the fall of 2004, changing the fuel type and structure throughout most of the interface. Since that time, annual prescribed grazing by sheep and targeted herding has been used to control cheatgrass and reduce the height and density of fine, dry grassy fuels.

The vegetative fuel density within the Ash Canyon neighborhood assessment area varies between light and medium, with fuel loads estimated at 0.5 to 4.0 tons per acre. Dominant vegetation consists of rabbitbrush and big sagebrush with a minor component of bitterbrush. This area is classified as a **moderate fuel hazard**.

The interface between the private residential properties at Silver Oak and the wildland fuels to the west is characterized by an expanse of non-flammable cover, including a stormwater basin, baseball diamond, and parking lot coverage.

The WNC residential assessment area is characterized as a classic interface condition. Shrubs including big sagebrush, bitterbrush and rabbitbrush that range from four to six feet in height dominate the WUI. In recently disturbed areas, such as those areas around the constructed stormwater basins, or previously burned areas, annual plants including cheatgrass, Russian thistle and mustard form a ground fuel layer. The total fuel load ranges from 2.0 to 4.0 tons per acre and is considered a **high fuel hazard**.

The terrain west of the wildland-urban interface is generally between 8 and 20 percent slopes, with some areas (the Joost Ranch, Martin Drive) adjacent to fairly steep terrain (>30 percent slopes). The area has several west/east directional canyons (Ash Canyon, Vicee Canyon, Combs Canyon). The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region (Klug 2009, Washoe Tribe 2009). There is a history of lightning strikes and repeated wildfires to the north and west of the assessment areas.

The fuel hazard condition ratings are shown in Figure 4-1 at the end of this chapter. Photographs in Figure 4-2 show the representative fuel types in the wildland-urban interface. Table 4-1 summarizes the history of fuels reduction treatments within the Ash Canyon and WNC Assessment Area.

Table 4-1. Fuels treatment history for the Ash Canyon – WNC neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Shrub Thinning and Seeding	10	2008	Carson City Board of Regents State of Nevada
Grazing	594	2008	Carson City State of Nevada Board of Regents Private
Grazing	315	2007	Carson City State of Nevada Private
Hand Treatment	66	2004	Private
Mechanical	11	2004	Carson City
Mechanical	34	2002	Carson City Board of Regents State of Nevada Private

4.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Ash Canyon – Western Nevada College neighborhood in the **Moderate Hazard** category (45 points). A summary of the values that affect the hazard rating is included in Table 4-2 at the end of this chapter. The primary wildfire hazard conditions in the Ash Canyon – Western Nevada College neighborhood were related to construction materials, lot size and the potential for severe fire behavior due to topography and fuel loading.

4.2.1 Community Design

Throughout most of the Ash Canyon – Western Nevada College neighborhood there is a clear line of demarcation between wildland fuels and structures in the neighborhood. Fuels do not continue into the development area. Most homes are situated on lots less than one acre in size, and there are typically three or more structures per acre. Thus structures are spaced relatively close together.

- **Interface Condition:** classic wildland-urban interface condition.
- **Access:** College Parkway, North Ormsby Boulevard, and Winnie Lane are the primary access roads to the Ash Canyon – Western Nevada College neighborhood. The roads are greater than 24 feet wide and have less than a five percent slope, providing adequate access for fire suppression equipment.
- **Signage:** All street signs and 96 percent of residential addresses in the survey area were adequately visible from the street. Clear and visible residential addresses are

important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.

- **Utilities:** low risk of ignition.

4.2.2 Construction Materials

Nearly all the homes (96 percent) within the Ash Canyon – WNC survey area were built with fire resistant composite roofing materials; however, thirty-five percent of the homes were built with combustible siding and several (14 percent) had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

4.2.3 Defensible Space

Of the seventy-four homes evaluated, most (91 percent) have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

4.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department and the Sierra Forest Fire Protection District are responsible for wildfire and structure fire protection within the Ash Canyon – Western Nevada College neighborhood. The US Forest Service also provides fire protection for the national forest lands in the vicinity of the Ash Canyon – WNC neighborhood.

Water Sources and Infrastructure

Water availability for fire suppression in the Ash Canyon – Western Nevada College neighborhood is provided by 500 gpm hydrants within 500 feet of structures.

4.3 RECOMMENDATIONS

Ash Canyon

Recommended and planned treatments for the Ash Canyon-WNC neighborhood are shown on Figure 4-1 and described in Table 4-3.

Table 4-3. Fuels treatments recommended or planned within the vicinity of the Ash Canyon – WNC neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Shrub Thinning and Seeding	57	Carson City Board of Regents State of Nevada Private
Drill Seeding	5	Private
Grazing	910	Carson City Board of Regents State of Nevada Private

Additional recommendations based on the 2008 assessment are described below.

Ash Canyon

The existing fuelbreak from Foothill Road to Ash Canyon Road has a five-year maintenance cycle. The annual grazing treatment is expected to maintain a low fuel hazard condition in the area west of Wellington Crescent. The following actions should be taken in addition to the fuelbreak maintenance cycle and the grazing plan:

- Reduce the shrub density and fuel loads on the wedge-shaped parcel between the bike path and the trailhead at Foothill Road & stormwater pond. (1.3 acres).
- Thin the shrub component with hand crews or by mechanical means at the interface south of Ash Canyon Road. Thin shrubs an additional 180 feet beyond the fuelbreak by removing approximately 75 percent of the shrub cover in this zone (determined visually in the field). Leave the remaining shrubs (approximately 25 percent) in a clustered mosaic pattern, with a preference for retaining healthy specimens of bitterbrush, Mormon tea, and desert peach. (Approximately 9 acres).
- If cheatgrass control is necessary in the treated areas, apply a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension (or as approved by the jurisdiction involved).
- If needed, reseed the fuelbreak in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix for the Carson City interface is included in Appendix E. Develop site-specific seed mixes in collaboration with the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive, use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension to control rabbitbrush reestablishment, or as approved by the jurisdiction involved.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.

Western Nevada College

- Monitor the buildup of tumbleweeds and other flammable debris in the following areas and maintain them free of all flammable debris accumulations:
  - Along the west side of the wooden fence line at Silver Oak between the College parking area and the stormwater basin at Foothill Road;
  - Along the wooden fence lines behind Harvard, Radcliffe, and Dartmouth Streets; and
  - In the rock-lined infiltration ditch to the west of Harvard.
- Monitor the 200-foot wide fuelbreak established in 2004 and maintain as necessary.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).

Table 4.2 Results of the wildfire risk/hazard rating in the Ash Canyon – Western Nevada College neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	1	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	3	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

74 Total Houses **11 Residential Streets**

B5. Street Signs

0 not visible | 11 visible | 100% visible

B6. Address Signs

3 not visible | 71 visible | 96% visible

C1. Roofs

3 combust | 71 not combust | 96% not combust

C2. Siding

26 combust | 48 not combust | 65% not combust

C3. Unenclosed Structures on Lot

10 not enclosed | 64 enclosed | 14% not enclosed

D1. Lot Sizes

69 <1ac | 5 >1ac <10ac | 0 >10ac

D2. Defensible Space

7 not adequat | 67 adequate | 91% adequate

Community Hazard Score: **45** /128

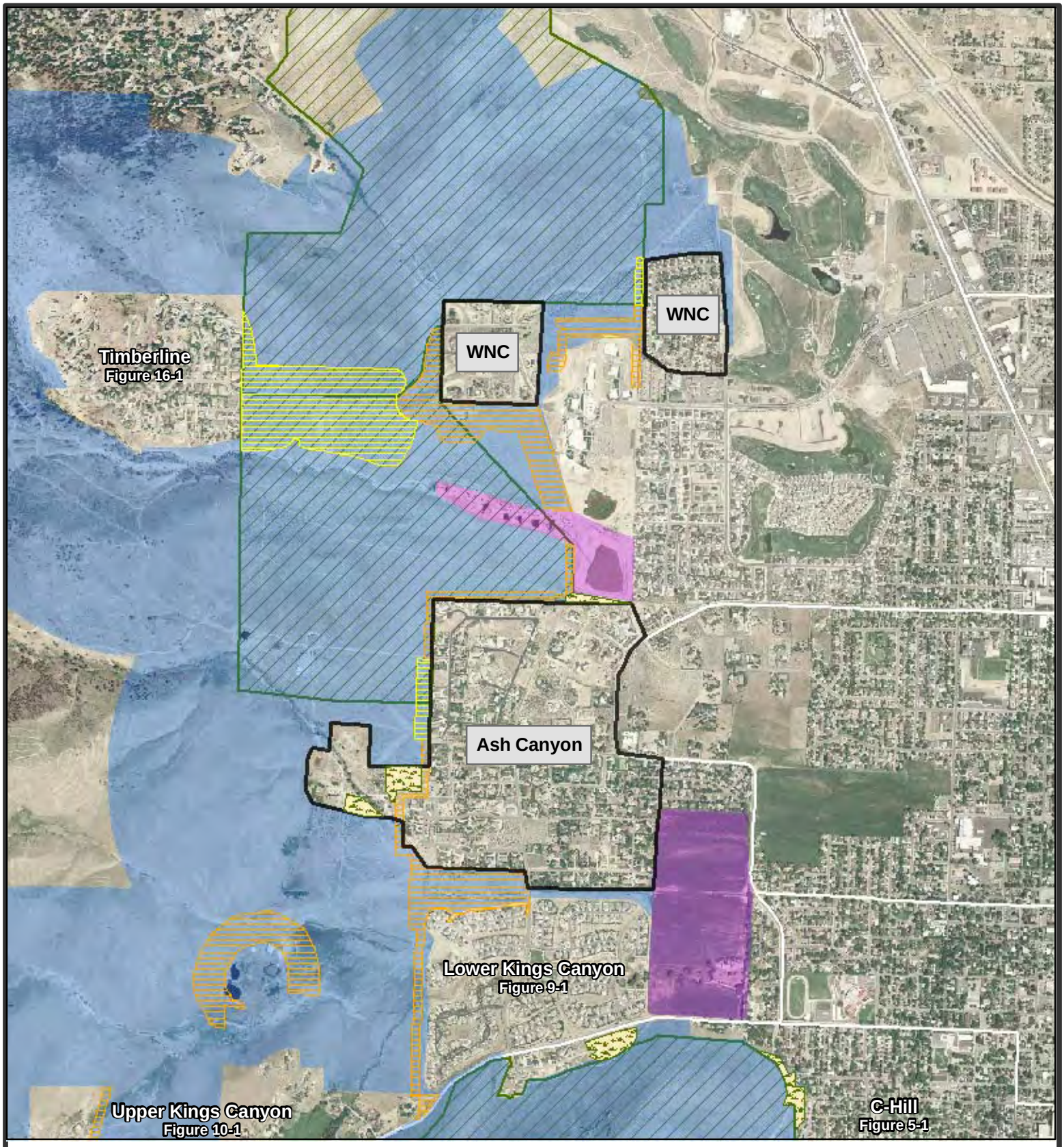

Figure 4-1. Ash Canyon - WNC fuel hazard conditions and recommendations for fuel hazard reduction

Recommended Treatments

- Drill Seed
- Thin Shrubs & Seed
- Thin Shrubs
- Grazing Treatment

Fuel Hazard Class

- Low
- Moderate
- Neighborhood Boundary

N

0 0.25 0.5

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 4-2. Representative fuel types in the wildland-urban interface around the Ash Canyon-Western Nevada College neighborhood.

Ash Canyon-WNC 1. UTM 4339778N 258326E. View to South.

Ash Canyon-WNC 2. UTM 4340409 N258257E. View to East.

5.0 C-HILL

FUEL HAZARD: MODERATE COMMUNITY RISK: MODERATE

The C-Hill neighborhood includes residences along the urban-wildland interface at the base of C-Hill. The neighborhood begins to the southwest of King Street and Ormsby Boulevard and wraps south and east around the base of C-Hill along Terrace and Crain Streets, ending near the Lake Glen Apartments and Stewart Street.

5.1 INTERFACE CONDITIONS AND FUEL HAZARD

The C-Hill neighborhood is characterized by a classic interface condition. The vegetative fuel density in the C-Hill wildland-urban interface is light, with an estimated fuel load of 0.5 to 1.0 tons per acre and a **moderate fuel hazard rating**. The 2004 Waterfall fire reduced nearly all the vegetative fuel around the neighborhood at that time. Post-fire reseeding has been generally successful, as the ground fuels now consist primarily of the fire-resistant perennial species seeded during rehabilitation efforts in the fall of 2004. Cheatgrass occurrence is moderate and can range from moderate to heavy depending on winter and spring precipitation. The shrub community is dominated by rabbitbrush, which readily resprouts following fire, Mormon tea, and occasional young bitterbrush seedlings. Shrubs will eventually reoccupy and dominate the hillside canopy and necessitate retreatment for maintenance.

The topography of the C-Hill interface is composed of slopes consistently greater than 30 percent on north and east-facing slopes. Along with vegetative composition and structure, topography influences the potential fire hazard in the wildland-urban interface and is the only factor that cannot easily be changed. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region. There is a history of lightning strikes and recurrent fires to the west and south of the C-Hill neighborhood. Fuel hazard conditions around the C-Hill neighborhood are shown in Figure 5-1. Photographs of the typical fuel conditions are shown in Figure 5-2.

A 15-feet wide fire access road traverses the C-Hill wildland-urban interface between 40 and 175 feet from homeowner property lines along Terrace Street. Though the access road follows the property lines on Crain Street, residences are approximately 350 feet downslope from the firebreak road. A 10 to 15-feet wide fuelbreak has been established along the homeowners back property lines from King Street at Canyon Park Court (west of Ormsby) to Terrace Drive at the Mormon Church. The fuelbreak was well maintained in the fall of 2008. Table 5-1 summarizes the history of fuels reduction treatments within the vicinity of the C-Hill neighborhood.

Table 5-1. Fuels treatment history in the wildland-urban interface around the C-Hill neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak (maintenance)	1	2008	Carson City USFS Private
Grazing	1,330	2006-2008	Carson City USFS Private
Fuelbreak 3,950' x 150'	13	2004	Carson City USFS Private
Fuelbreak 2,355' x 150'	5	2003	Carson City Private

5.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the C-Hill neighborhood in the **Moderate Hazard** category (59 points). A summary of the values that affect the hazard rating is included in Table 5-2 at the end of this chapter. The primary wildfire hazard conditions in the C-Hill neighborhood were related to construction materials, defensible space, and the potential for severe fire behavior due to topography.

5.2.1 Neighborhood Design

Throughout most of C-Hill neighborhood, there is a clear line of demarcation between wildland fuels and structures in the neighborhood. Most homes surveyed in the C-Hill neighborhood are situated on lots less than one acre in size, and there are typically three or more structures per acre. As such, most structures are spaced relatively close together.

- **Interface Condition:** classic wildland-urban interface condition.
- **Access:** Fifth Street, Thompson Street, and Terrace Street are the primary access roads to the C-Hill neighborhood. These roads are greater than 24 feet wide which allows for accessibility of fire suppression equipment, but have greater than a five percent slope which may increase response times for heavy vehicles carrying water.
- **Signage:** All street signs were visible within C-Hill survey area; however, twenty percent of residential address signs were not visible. Clear and visible residential addresses are important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

5.2.2 Construction Materials

Many homes within the C-Hill survey area were not built with fire resistant composite roofing materials (26 percent) or non-combustible siding (46 percent). Over half of the residences (52 percent) had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

5.2.3 Defensible Space

Of the forty-six homes evaluated, nearly half (41 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

5.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department and the NDF Sierra Forest Fire Protection District are responsible for wildfire and structure fire protection on state and private lands within the C-Hill neighborhood. The US Forest Service also provides fire protection for the national forest lands west of the C-Hill neighborhood. Ownership and administration of a portion of this land will transfer from USFS to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the C-Hill neighborhood is provided by 500 gpm hydrants within 500 feet of structures.

5.3 RECOMMENDATIONS

Recommended and planned treatments for the C-Hill neighborhood are shown on Figure 5-1 and described in Table 5-3.

Table 5-3. Fuels treatments recommended or planned within the vicinity of the C-Hill neighborhood.

Treatment Type	Treatment Area (acres)	Ownership
Fuelbreak 3,560' x 100' Hand-treatment	8	Carson City USFS Private
Grazing	1,330	Carson City USFS Private

Additional recommendations based upon the 2008 risk assessment are provided to reduce wildfire risks in the wildland-urban interface around the C-Hill neighborhood:

- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Thin shrubs in the area between the homeowners' 15-feet wide fuelbreak behind Terrace Street and the fire access road to the west.
- If cheatgrass control is necessary, treat the area with a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.

- If needed, reseed the fuelbreak in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix and seeding specifications for the Carson City interface area is included in Appendix E. Develop site-specific seed mixes in collaboration with the jurisdiction involved.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).

Table 5.2 Results of the wildfire risk/hazard rating in the C-Hill neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	5	/10
2. Siding	5	/5
3. Unenclosed Structures	5	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	1	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	1	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

46 Total Houses **10 Residential Streets**

B5. Street Signs

0 not visible | 10 visible | 100% visible

B6. Address Signs

9 not visible | 37 visible | 80% visible

C1. Roofs

12 combust | 34 not combust | 74% not combust

C2. Siding

21 combust | 25 not combust | 54% not combust

C3. Unenclosed Structures on Lot

24 not enclosed | 22 enclosed | 52% not enclosed

D1. Lot Sizes

46 <1ac | 0 >1ac <10ac | 0 >10ac

D2. Defensible Space

19 not adequat | 27 adequate | 59% adequate

Community Hazard Score: **59** /128

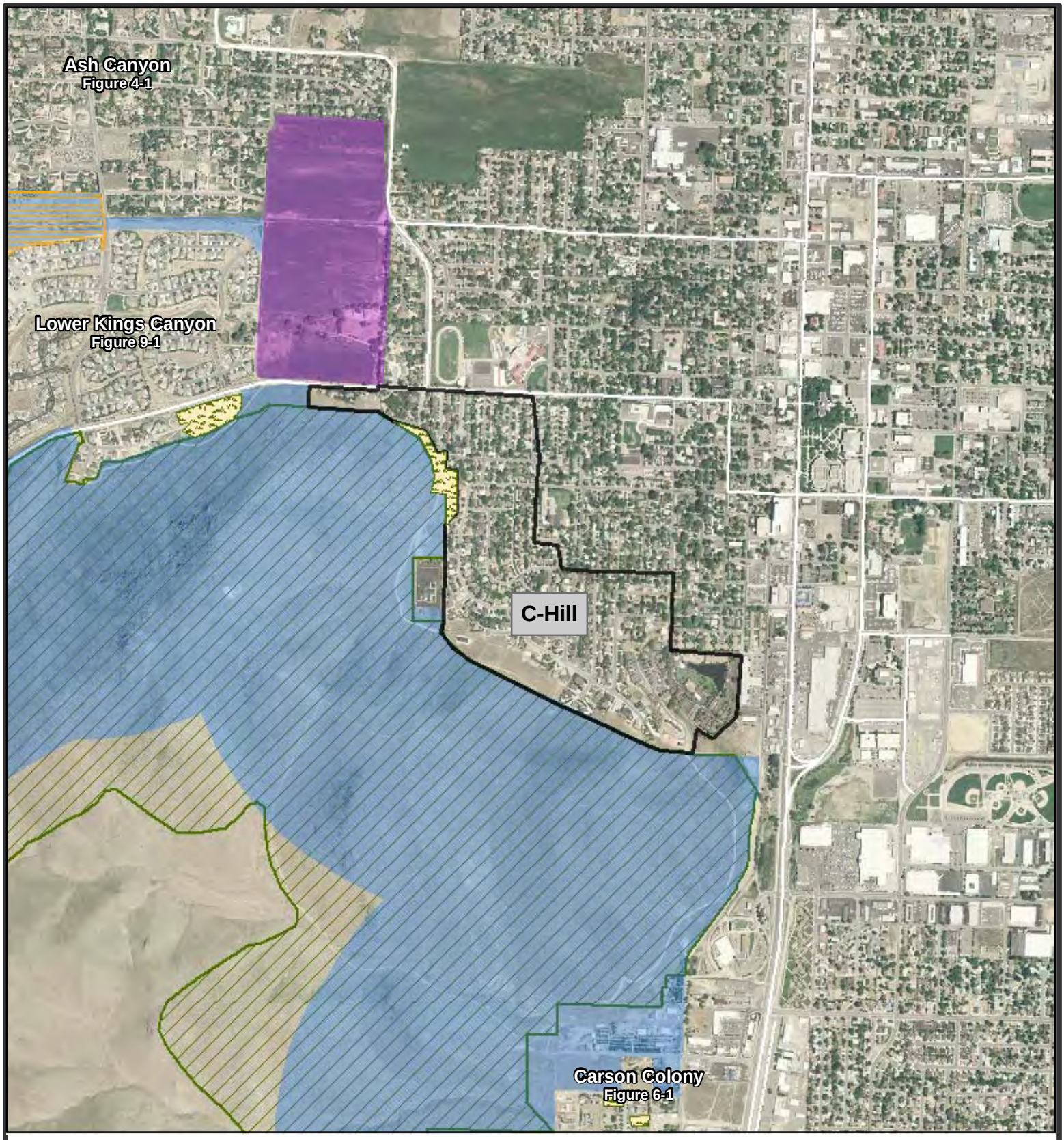

Figure 5-1. C-Hill fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

- Thin Shrubs
- Thin Shrubs & Seed
- Grazing Treatment

Fuel Hazard Class

- Low
- Moderate
- Neighborhood Boundary

N

0 0.25 0.5

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 5-2. Representative fuel types in the wildland-urban interface around the C-Hill neighborhood.

C-Hill 1. UTM 4338497N 259760E. View to South.

C-Hill 2. UTM 4338537N 259730E. View to West.

6.0 CARSON COLONY – VOLTAIRE CANYON

FUEL HAZARD: MODERATE COMMUNITY RISK: HIGH

The Carson Colony-Voltaire Canyon neighborhood is located to the west of Curry Street, bounded on the north by the Humboldt Toiyabe Carson Ranger District Office and extending south to the Highway 50/Highway 395 Junction.

6.1 INTERFACE CONDITIONS AND FUEL HAZARD

The wildland-urban interface around the Carson Colony-Voltaire Canyon neighborhood has an intermix interface condition. Light fuel densities are present along the Carson Indian Colony wildland-urban interface to the west of the neighborhood. The 2003 Voltaire 2 Fire and the 2004 Waterfall Fire both greatly reduced density and fuel loads. Post-fire rehabilitation efforts appear to have been successful in this area as evidenced by the reestablishment of perennial grasses, dominated by pubescent wheatgrass and Siberian wheatgrass. Occasional Mormon tea and rabbitbrush shrubs, one to two feet in height are widely scattered throughout. Fuel loading is estimated at 0.5 to 0.75 tons per acre and is classified as a **low fuel hazard**.

Fuel density increases on undeveloped lots in the interior of the neighborhood. The moderate fuel density areas are dominated by big sagebrush and rabbitbrush ranging from three to five feet in height with cheatgrass as dominant fine fuel layer. Fuel loading was estimated at 2.0 to 4.0 tons per acre and is classified as a **high fuel hazard**.

The portion of the neighborhood to the south of Voltaire Canyon has a moderate vegetation density dominated by rabbitbrush and sagebrush four to five feet tall with interspersed bitterbrush. The fuel load was estimated at 2.0 to 4.0 tons per acre and a **moderate fuel hazard**.

The terrain along the Carson Colony-Voltaire Canyon interface varies between 20 and 40 percent slopes, with predominantly east-facing aspects. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface and are the most common factor contributing to structure loss in a WUI for this region. There is a history of lightning strikes and repeated fires south, west, and north of the Carson Colony-Voltaire Canyon assessment area.

Fuel hazard conditions in the wildland-urban interface around the Carson Colony-Voltaire Canyon neighborhood and photographs of representative fuel types are shown in Figure 6.1 and Figure 6.2, respectively, at the end of this chapter.

Table 6-1 summarizes the history of fuels reduction treatments in the vicinity of the Carson Indian Colony-Voltaire Canyon neighborhood.

Table 6-1. Fuels treatment history for the Carson Colony-Voltaire Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 8,050 x 150' **Fuelbreak** 1,930 x 100'	31	2007	Washoe Tribe USFS Private
Grazing	1,330	2006-2008	State of Nevada USFS
Hand Treatment 44 lots	44	2004	Private Carson City

6.2 NEIGHBORHOOD RISK/HAZARD RATING

Thirty-one residences were evaluated within the Carson Colony-Voltaire Canyon neighborhood that resulted in classifying the community in the **High Hazard** category (61 points). A summary of the values that affect the hazard rating is included in Table 6-2 at the end of this chapter. The primary wildfire risk conditions in the Carson Colony-Voltaire neighborhood were accessibility and construction materials.

6.2.1 Community Design

Throughout most of the Carson Colony-Voltaire Canyon neighborhood, there was no clear line of demarcation between structures and wildland fuels. All of the lots assessed were on parcels of one acre or less and typically had more than three structures per acre. As such, most structures are spaced close together.

- **Interface Condition:** intermix interface condition.
- **Access:** Curry Street is the major transportation route to and from the Carson Colony, though Boyle Street can be used to exit the neighborhood to the North. Curry Street is paved and is at least 24 feet in width. Only one dead-end road in the neighborhood limits the ability for fire suppression equipment to maneuver or turn around. Access to the Voltaire Canyon neighborhood is also via Curry Street. Streets in this neighborhood are steeper than five percent, and the majority of the roads in the interface dead-end at private drives. Access to the homes at the top of Voltaire Canyon is a two mile graded dirt road.
- **Signage:** Street signs were visible on 91 percent of the streets; however, many (35 percent) of the residential addresses were not visible on the homes surveyed. Clear and visible residential addresses are important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities.** All utilities were noted to be above ground, and power lines were properly maintained to minimize the potential for sparking power lines that could start fires in nearby vegetation during windstorms.

6.2.2 Construction Materials

The majority of homes surveyed (84 percent) were constructed using fire resistant composite roofing materials; however, most of the homes (74 percent) in the survey area were built with combustible siding. Nearly half (45 percent) of the homes assessed had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

6.2.3 Defensible Space

Of the thirty-one homes evaluated, many (29 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

6.2.4 Suppression Capabilities

Wildfire Protection Resources

No formal agreement exists with the Washoe Tribe for structure protection on the Carson Colony tribal land. The Carson City Fire Department has been voluntarily responding to provide these resources. The Bureau of Land Management has a formal agreement with the Bureau of Indian Affairs (BIA) to provide wildfire suppression resources to the 480 acres of Washoe Tribe land in the municipality. The US Forest Service is also responsible for wildfire protection for national forest lands adjacent to the Carson Colony and Voltaire neighborhoods. Ownership and administration of portions of this land will transfer from the USFS to Carson City and to the Washoe Tribe in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD and the BIA/BLM.

Water Sources and Infrastructure

Water availability for fire suppression in the Carson Colony-Voltaire Canyon includes 500 gpm hydrants within 500 feet of structures.

6.3 RECOMMENDATIONS

Recommended and planned treatments for Carson Colony-Voltaire Canyon neighborhood are shown on Figure 6-1 and described in Table 6-3.

Table 6-3. Fuels treatments recommended or planned in the vicinity of the Carson Colony-Voltaire Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Shrub Thinning and Seeding	13	USFS Private
Hand Treatment 11 parcels and along Voltaire Canyon Road	109	Washoe Tribe USFS Private

Additional recommendations based upon the 2008 assessment are described below.

- Conduct annual defensible space evaluations with residents of the Carson Indian Colony on 20 to 30 parcels on Tribal Land.
- Encourage residents in the Voltaire vicinity to maintain existing defensible space.
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Expand shrub reduction areas in the vicinity of Voltaire Street at Voltaire Canyon Road and other undeveloped parcels in this neighborhood. (Approximately 16 acres).
- Leave remaining shrubs in a clustered mosaic pattern, with a preference for retaining healthy specimen plants of bitterbrush, Mormon tea, and desert peach.
- If cheatgrass control is necessary, treat the area with a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- If needed, reseed treated areas in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix and specifications for the Carson City interface area is included in Appendix E. Develop site-specific seed mixes in collaboration with the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- Establish a formal agreement between Carson City Fire Department and the Washoe Tribe for fire protection on tribal land.

Table 6.2 Results of the wildfire risk/hazard rating in the Carson Colony - Voltaire neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	5	/10
2. Siding	5	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	1	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	3	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

31 Total Houses **11 Residential Streets**

B5. Street Signs

1 not visible | 10 visible | 91% visible

B6. Address Signs

11 not visible | 20 visible | 65% visible

C1. Roofs

5 combust | 26 not combust | 84% not combust

C2. Siding

23 combust | 8 not combust | 26% not combust

C3. Unenclosed Structures on Lot

14 not enclosed | 17 enclosed | 45% not enclosed

D1. Lot Sizes

31 <1ac | 0 >1ac <10ac | 0 >10ac

D2. Defensible Space

12 not adequat | 19 adequate | 61% adequate

Community Hazard Score: **61** /128

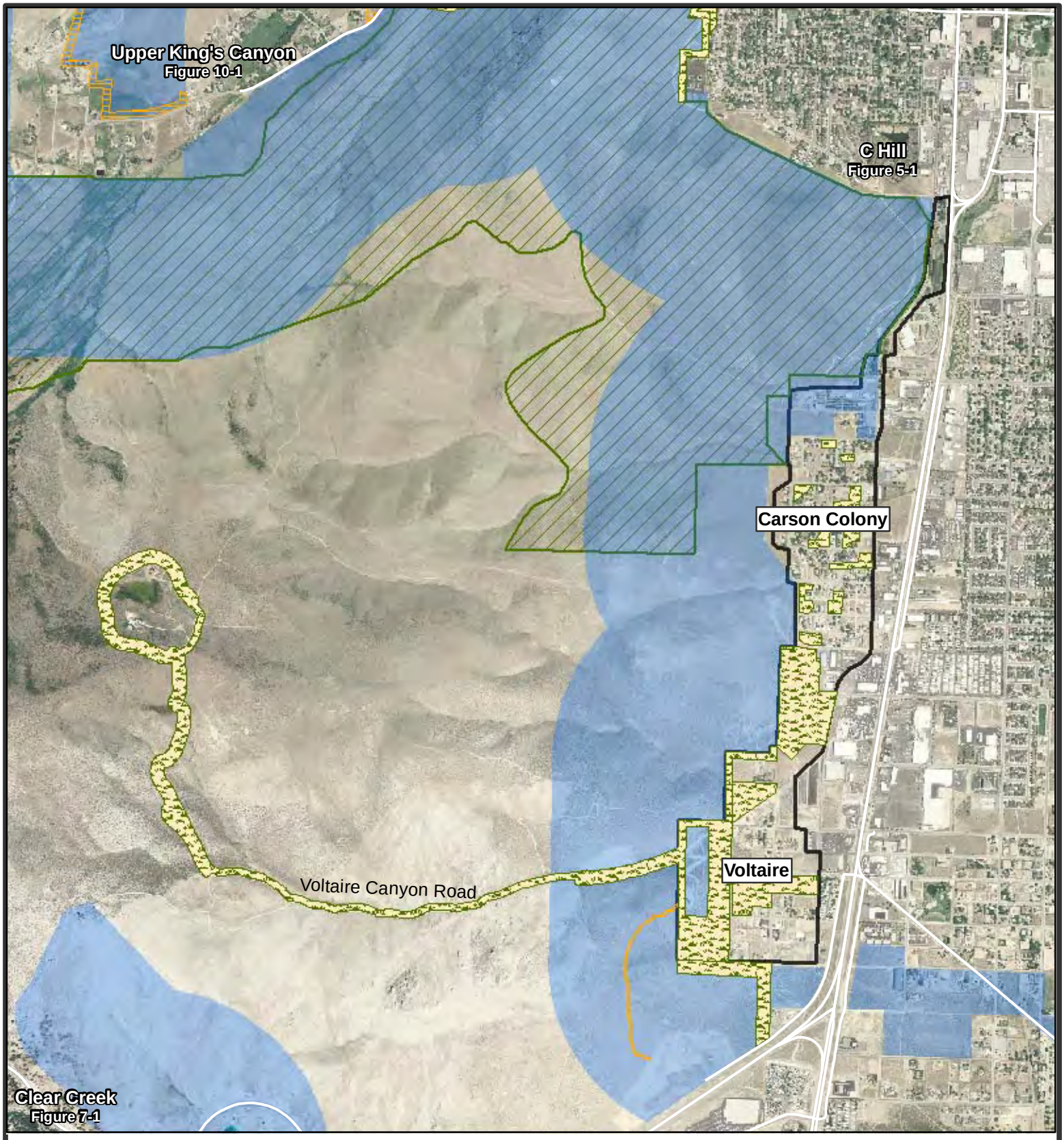

Figure 6-1. Carson Colony-Voltaire Canyon fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

- Thin Shrubs
- Thin Shrubs & Seed
- Grazing Treatment

Fuel Hazard Class

- Moderate
- Neighborhood Boundary

N

0 0.25 0.5

Miles

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Carson City, Nevada 89703
(775) 883-1600

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

Figure 6-2. Representative fuel types in the wildland-urban interface around the Carson Colony – Voltaire Canyon neighborhood.

Carson Colony 1. UTM 4335505N 260249E. View to North.

Voltaire Canyon 1. UTM 4334816N 260088E. View to West.

7.0 CLEAR CREEK

FUEL HAZARD: EXTREME COMMUNITY RISK: EXTREME

The Clear Creek neighborhood is situated in an east-west canyon in the foothills of southwestern Carson City east of the US Highway 395/Highway 50 junction. The assessment area occupies a one-mile wide band (at its widest) between Highway 50 and the Douglas County line. The eastern limit of the neighborhood is near the canyon narrows, the west boundary is about three-quarters of a mile west of where Old Highway 50 departs from the former site of the Clear Creek Youth Camp. The assessment area includes clusters of developed parcels, scattered individual residences, steep canyon terrain, meadows, and extensive undeveloped timbered acres on steep slopes.

7.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Clear Creek neighborhood is characterized by an intermixed interface condition. Fuel density within the Clear Creek assessment area is heavy. Fuel loading was estimated at 3.5 to 10.0 tons per acre and is classified as an **extreme fuel hazard**. In the higher elevations, vegetation consists of a Jeffrey pine overstory with a big sagebrush and manzanita understory ranging from one to five feet tall. At lower elevations, the conifer overstory is more open and manzanita is replaced by bitterbrush in the understory.

A sagebrush/bitterbrush shrub community dominates the lowest elevations in the southeast portion of the wildland-urban interface. Fuel density is medium and shrub heights range from six to ten feet tall. Fuel loads are estimated at 4.0 to 6.0 tons per acre, and contribute to **extreme fuel hazard conditions**.

Clear Creek is situated in an east-west directional canyon with most of the homes located on the south-facing canyon slope, surrounded on three sides by mountains. Slopes vary from five percent to greater than forty percent. Prevailing winds are from the west-southwest, and can be channeled down Clear Creek Canyon at excessively high speeds that can contribute to extreme fire behavior. Strong afternoon downslope winds occur during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region. Wildfire history in this area includes the 2003 Highway 50 Fire that was contained at the east end of the assessment area, just across the highway.

Fuel hazard conditions in the Clear Creek neighborhood and photographs of representative fuel types are shown in Figures 7-1 and 7-2, respectively.

Table 7-1 summarizes the history of fuels reduction treatments within the Clear Creek Assessment Area.

Table 7-1. Fuels treatment history for the Clear Creek neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak Maintenance	15	2008 2006 2004	Washoe Tribe
Fuelbreak	58	2007-2008	USFS
Fuelbreak	4	2007	Private
Fuelbreak	156	2005	Private
Fuelbreak	15	2002	Washoe Tribe
Cheatgrass Abatement	80	2006	Private
Seeding	30	2005	Private
Hand Treatment	112	2004	Private
Shaded Fuelbreak	20	2004	Private
Thinning – Fuel Reduction	30	2002	Washoe Tribe

7.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying Clear Creek in the **Extreme Hazard** category (89 points). A summary of the values that affect the hazard rating is included in Table 7-2 at the end of this chapter. The primary wildfire hazard conditions in the Clear Creek neighborhood were related to community design, including limited road access and steep grades, and the potential for severe fire behavior due to topography and fuel loading.

7.2.1 Community Design

Throughout most of Clear Creek there is no clear line of demarcation between wildland fuels and buildings in the neighborhood. Most homes are situated on lots between one and ten acres in size. These scattered structures are widely spaced and interspersed with wildland fuels.

- **Interface Condition**: intermix wildland-urban interface condition.
- **Access:** Clear Creek has one paved road in and out of the neighborhood. This road is listed as State Route 705 for the first mile west of U.S. Highway 395 and as Old Clear Creek Road further west. Old Clear Creek Road is between 20 and 24 feet wide and allows adequate room for fire suppression equipment to maneuver. The road gradient on primary and secondary roads is steeper than five percent. Steep roads and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire. There is an unpaved emergency access road between Clear Creek and Highway 395 located approximately three miles west of the junction with Highway 50. A new exit from Highway 395 approximately 4.5 miles west of the junction with Highway 50 has been built to connect with Old Clear Creek Road. However, the opening of this exit has been indefinitely postponed.
- **Signage:** Visibility of street signs and addresses was inadequate throughout the Clear Creek neighborhood survey area. Nearly one-third of home addresses and sixty percent of street signs were not visible. Clear and visible residential addresses

are important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.

- **Utilities:** Underground electrical and aboveground propane tanks were the primary utilities serving the Clear Creek neighborhood. The underground electrical service reduces any potential ignition risk from utilities. Vegetation clearance around propane tanks was generally in need of improvement.

7.2.2 Construction Materials

All the homes within the neighborhood survey area were built with fire resistant composite roofing materials; however, thirty percent of the homes were built with combustible siding and most (74 percent) had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

7.2.3 Defensible Space

Of the twenty-seven homes evaluated, most (63 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

7.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department and the NDF Sierra Forest Fire Protection District provide wildland and structure fire protection to the Clear Creek Neighborhood. The US Forest Service also provides fire protection for the national forest lands surrounding the Clear Creek neighborhood. BLM/BIA provide fire protection for tribal lands.

Water Sources and Infrastructure

Water availability for fire suppression in Clear Creek neighborhood includes a limited drafting source from Clear Creek, one pond, and two residences with water storage facilities. Fire suppression water tenders can refill at a source near the intersection of U.S. Highway 395 and Old Clear Creek Road in the event of a wildfire (ten to twenty minute round trip) (Dynamac, 2003 from 2004 Report). In 2006, the Fire Safe Council assisted in the installation of a 10,000-gallon dry hydrant in Clear Creek.

7.3 RECOMMENDATIONS

The *extreme* community hazard rating for the Clear Creek neighborhood warrants priority attention to this area for fuel hazard reduction. In the summer of 2009, the US Forest Service will begin the field layout and tree marking for fuels reduction on 12,190 acres on Forest Service lands to the north and west of the Clear Creek neighborhood.[3] Work expected to commence on USFS lands during the 2010 field season is shown in Appendix F.

[3] Project components are described in the 2008 "Environmental Assessment for Clear Creek Fuels Reduction and Ecosystem Enhancement Project" (available online at www.fs.fed.us/r4/htnf/**project**s/carson/**ClearCreek**EA.pdf).

The Washoe Tribe is using Southern Nevada Public Land Management Act (SNPLMA) funding to perform hazardous fuels reduction activities between 2009 and 2011. During the summer of 2009 the Washoe Tribe will perform stand examinations on approximately 386 acres of tribal lands, with fuels reduction activities occurring during 2010 and 2011. Figures in Appendix F show areas and type of treatment for the Washoe Tribe lands.

The recommendations included here should be implemented as a complement to past and planned homeowner and Fire Safe Council Chapter activities. On a larger scale they are designed to complement the treatments on forest lands.

- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Develop a vegetation management plan for non-Forest Service lands in T14N, R19E, Sections 3, 4, 5 and 6 and in T15N, R19E Sections 28, 33 and 34 with the objective of reducing ground fuels, ladder fuels, and stand density to lessen the potential for torching and crown fires in the remaining stand. Specific treatments should be designed to restore appropriate stand density, structure and species composition by thinning prescriptions that remove more than just small trees. Table 7-4 provides the extent of the treatment area by county and land status.

Table 7-4. Timber treatments recommended or planned in the Clear Creek wildland-urban interface.

Treatment Type	County	Treatment Area (approximate acres)	Ownership
Timber Thinning	Carson City	733	Private (15%) Carson City
	Douglas County	1160	Private Washoe Tribe (14%)

- Continue the riparian vegetation treatment along Clear Creek from the narrows to 1.8 miles upstream to connect to previous riparian treatment areas. (A description of riparian area treatment is given in Appendix B.) This treatment crosses into Douglas County. Table 7-3 provides the extent of the treatment area by county and land status.

Table 7-3. Riparian area treatment recommended or planned in the Clear Creek neighborhood.

Treatment Type	County	Treatment Area (approximate acres)	Ownership
Riparian Area Treatment	Carson City	15	Private
	Douglas County	16	Private Washoe Tribe (33%)

- Create a shaded fuelbreak 200 feet wide along the south side of Clear Creek from the narrows to approximately one mile upstream to the Section 34/35 line (as recommended in the 2005 Risk/Hazard Assessment). Remove ladder fuels, prune remaining trees to a height three times any remaining understory shrub, or six feet or to a maximum height equal to 1/3 of the total tree canopy. Tree spacing should be such that torching and crown fire potential in the remaining stand has been significantly reduced. Proper crown spacing for trees on slopes greater than 30 percent will be determined during the development of a comprehensive prescription.

Table 7.2 Results of the wildfire risk/hazard rating in the Clear Creek neighborhood.

A. Urban Interface Condition ***2***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	5	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	7	/15

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	5	/10
2. Department	1	/10

TALLIES

27 Total Houses **5 Residential Streets**

B5. Street Signs

3 not visible | 2 visible | 40% visible

B6. Address Signs

8 not visible | 19 visible | 70% visible

C1. Roofs

0 combust | 27 not combust | 100% not combust

C2. Siding

8 combust | 19 not combust | 70% not combust

C3. Unenclosed Structures on Lot

20 not enclosed | 7 enclosed | 74% not enclosed

D1. Lot Sizes

0 <1ac | 26 >1ac <10ac | 1 >10ac

D2. Defensible Space

17 not adequat | 10 adequate | 37% adequate

Community Hazard Score: **89** /128

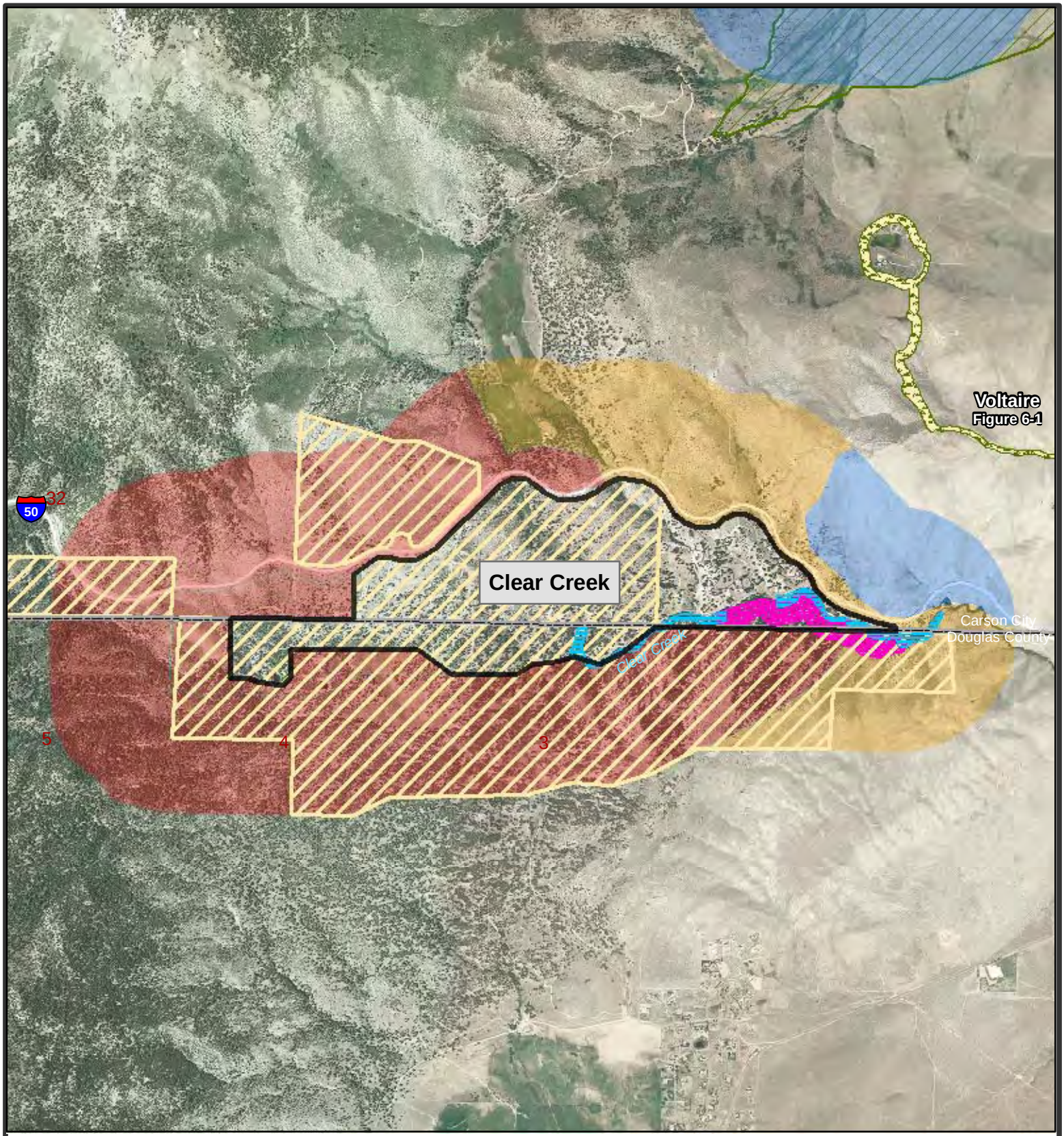

Figure 7-1. Clear Creek fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments
- Establish fuelbreak
- Riparian treatment
- Timber veg mgmt area
- Thin Shrubs
- Thin Shrubs & Seed
- Grazing Treatment

Fuel Hazard Class
- Moderate
- High
- Extreme
- Neighborhood Boundary

N

0 0.4 0.8

Miles

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Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

Figure 7-2. Representative fuel types in the wildland-urban interface around the Clear Creek neighborhood.

Clear Creek 1. UTM 4333888N 256149E. View to North

Clear Creek 2. Clear Creek 1. UTM 4333048N 253238E. View to West

8.0 EDMONDS – PRISON HILL

FUEL HAZARD: MODERATE-HIGH COMMUNITY RISK: HIGH

The Edmonds–Prison Hill neighborhood is located to the east of South Edmonds Drive between Fairview Drive and Snyder Avenue. The wildland-urban interface occurs primarily along Gentry Way, at the base of the Prison Hill Range, which rises 500 to 900 feet to the east above the neighborhood.

8.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Edmonds–Prison Hill neighborhood is characterized by a classic interface condition with intermixed fuel conditions in some interior parts of the neighborhood. Medium density vegetative fuels around the neighborhood consist primarily of rabbitbrush, big sagebrush, bitterbrush, desert peach, and Mormon tea. Typical shrub heights range from two to three feet, with bitterbrush often reaching five feet in height. Fuel loads are estimated at 2.0 to 4.0 tons per acre and are classified as a **moderate fuel hazard**.

Slopes of 8 to 20 percent behind the east private property lines rapidly increase to slopes greater than 40 percent reaching the ridgeline of the Prison Hill Range. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds in the late afternoons commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region.

Vegetation, fuels, and topography contribute to the potential fire hazard around wildland-urban interface neighborhoods. Fuel hazard conditions for the Edmonds-Prison Hill wildland-urban interface are shown in Figure 8-2 and photographs of general fuel conditions are shown in Figure 8-3 at the end of this chapter.

Table 8-1 summarizes the history of fuels reduction treatments within the Edmonds–Prison Hill Assessment Area.

Table 8-1. Fuels treatment history in the vicinity of the Edmonds–Prison Hill neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 11,250' x 100' (3 segments)	26	2008	BLM[4]
Fuelbreak 11,250' x 100' (3 segments)	26	2002	BLM

8.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Edmonds–Prison Hill neighborhood in the **High Hazard** category (63 points). A summary of the values that affect the hazard rating is

[4] Land scheduled for transfer to Carson City in 2009 or 2010.

included in Table 8-2 at the end of this chapter. The primary wildfire hazard conditions in the Edmonds–Prison Hill neighborhood were related to community design, construction materials, lack of defensible space, and the potential for severe fire behavior due to topography and fuel loading.

8.2.1 Community Design

Throughout most of Edmonds–Prison Hill neighborhood there is a clear line of demarcation between wildland fuels and structures in the neighborhood. However due to the large number of contiguous undeveloped parcels in the neighborhood, it has some characteristics of an intermix interface condition. In the Edmonds–Prison Hill neighborhood, most homes are situated on lots less than one acre in size.

- **Interface Condition**: classic wildland-urban interface condition.
- **Access**: South Edmonds Drive is the primary access road to the Edmonds–Prison Hill neighborhood. Secondary access roads include Bennett Avenue, Clearview Drive, Sinbad Street, and Damon Road. These roads are greater than 24 feet wide which allows for accessibility of fire suppression equipment. The road gradient is steeper than five percent. Steep roads and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire.
- **Signage**: Street signs were not visible on several (17 percent) of the streets in the survey area. Fifteen percent of the residential addresses were not visible on the homes surveyed. Clear and visible residential addresses are important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities**: low risk of ignition.

8.2.2 Construction Materials

Most of the homes surveyed within the neighborhood (92 percent) were built with fire resistant composite roofing materials; however, nearly half of the homes (45 percent) were built with combustible siding. Twenty-seven percent of the homes surveyed had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

8.2.3 Defensible Space

Of the 75 homes evaluated, nearly half did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

8.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department is responsible for wildfire and structure fire protection within the Edmonds–Prison Hill neighborhood. The Bureau of Land Management also provides wildland fire protection for the publicly administered lands surrounding the Edmonds–Prison Hill neighborhood. Ownership and administration of much of this land will transfer from the BLM to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the Edmonds–Prison Hill neighborhood includes 500 gpm hydrants within 500 feet of structures.

8.3 RECOMMENDATIONS

The fuelbreak established along the east interface was observed to be well maintained with minor shrub encroachment and moderate cheatgrass and annual weeds. The intermix condition in the interior of the neighborhood, with islands of developed parcels surrounded by untreated wildland fuels, presents a greater wildfire risk than the fuels in the interface.

- Monitor fuelbreaks annually for shrub encroachment and cheatgrass conditions.
- Consider prescribed annual grazing as a fuelbreak maintenance option to control cheatgrass and other fine fuels. Maintain low shrub canopy cover by mechanical means or hand crews as necessary.
- Conduct an assessment of fuel hazard conditions on undeveloped lots within the neighborhood boundaries and notify inattentive property owners of Ordinances that require fuel hazard reduction.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.

Table 8.2 Results of the wildfire risk/hazard rating in the Edmonds-Prison Hill neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	7	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

75 Total Houses **6 Residential Streets**

B5. Street Signs

1	not visible	5	visible	83%	visible

B6. Address Signs

11	not visible	64	visible	85%	visible

C1. Roofs

6	combust	69	not combust	92%	not combust

C2. Siding

34	combust	41	not combust	55%	not combust

C3. Unenclosed Structures on Lot

20	not enclosed	55	enclosed	27%	not enclosed

D1. Lot Sizes

70	<1ac	5	>1ac <10ac	0	>10ac

D2. Defensible Space

35	not adequat	40	adequate	53%	adequate

Community Hazard Score: **63** /128

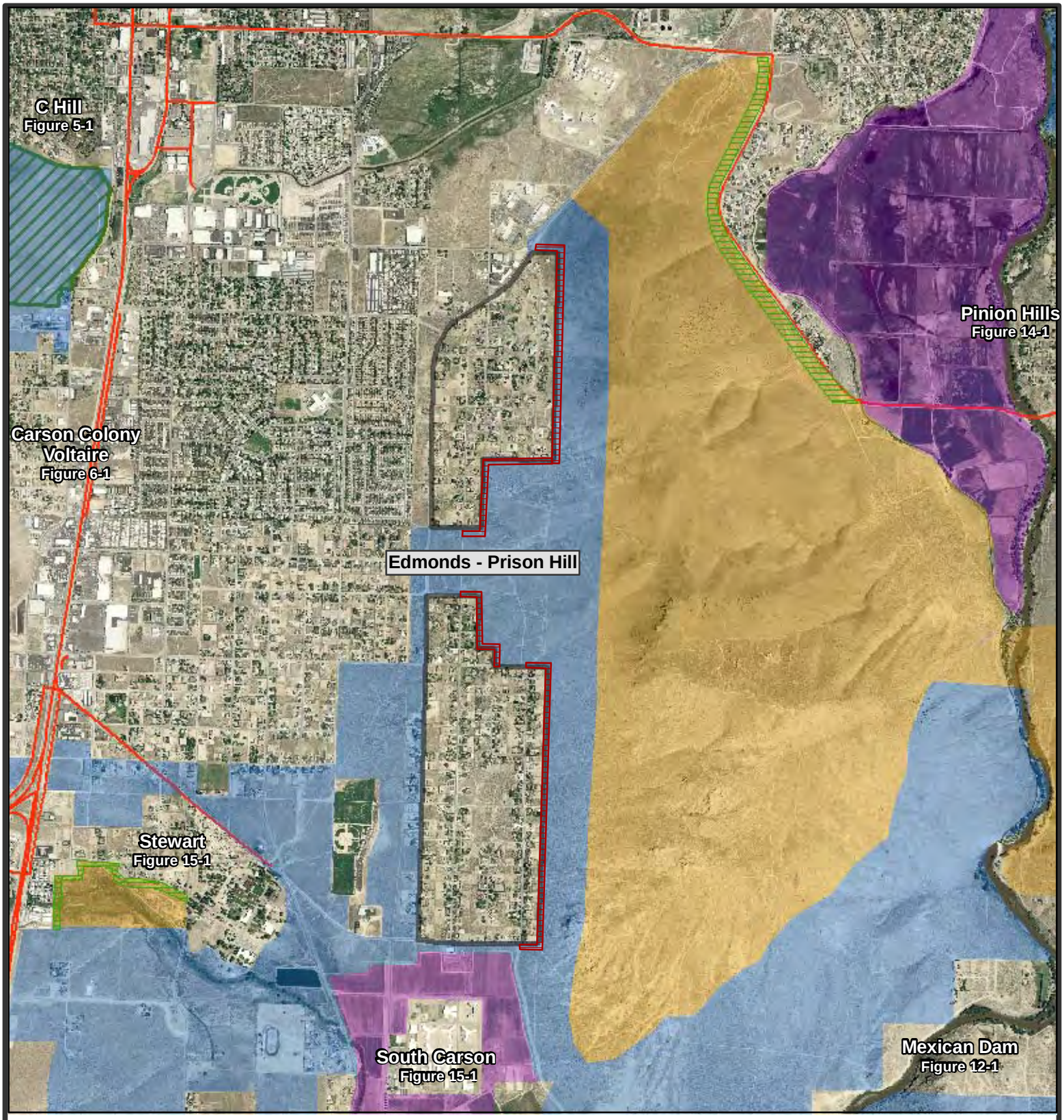

Figure 8-1. Edmonds - Prison Hill fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments
- Establish fuelbreak
- Maintain Fuelbreak
- Grazing Treatment

Fuel Hazard Class
- Low
- Moderate
- High
- Neighborhood Boundary

N

0 0.3 0.6
Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 8-2. Representative fuel types in the wildland-urban interface around the Edmonds – Prison Hill neighborhood.

Edmonds-Prison Hill 1. UTM 4335795N 263388E. View to North-Northeast

Edmonds Prison Hill 2. UTM 4334617N 263352E. View to South

9.0 KINGS CANYON – LOWER

FUEL HAZARD: MODERATE COMMUNITY RISK: LOW

The Lower Kings Canyon neighborhood contains the Kings Canyon Highlands and Kings Canyon Meadows subdivisions to the west of Longview Way: Coventry Drive, Waterford Place, and Chelsea Place. To the south side of Kings Canyon Road, Kingsview Way, Canterbury Lane, and Carlisle Court are included in the assessment area.

9.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Lower Kings Canyon neighborhood is characterized as a classic interface condition. To the north of Kings Canyon Road, the Highlands and Meadows neighborhoods are bounded on the west by an asphalt path and a rock swale, which provides 100 to 125 feet of separation between wildland fuels and the wooden fencing of the residential parcels. Wildland fuels to the west are composed of sagebrush and rabbitbrush that transition into irrigated pastureland to the north portion of the neighborhood. Fuel density for this area is light to medium, estimated at 0.5 to 2.0 tons per acre. The Lower Kings Canyon neighborhood has a **moderate fuels hazard**.

To the south of Kings Canyon Road, the homes along Kingsview, Canterbury and Carlisle are built against the steep north-facing slopes of C-Hill. A 25-foot wide fire access road runs parallel to the back property lines of the residences at a distance of 20 to 40 feet. The strip between the fire access road and the wooden fences of the private property is generally unaltered wildland fuels composed primarily of sagebrush with some rabbitbrush, two to four feet tall. Unaltered fuels throughout the neighborhood south of King Street are of similar size and composition, medium density, 2.0 to 4.0 tons per acre, and are in the **moderate fuel hazard** class.

The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region.

Table 9-1 summarizes the history of fuels reduction treatments within the Lower Kings Canyon Assessment Area.

Table 9-1. Fuels Treatment History for the Lower Kings Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership)
Grazing	1,327	2006-2008	Carson City Private USFS
Fuelbreak 1,450' x 150'	8	2003	Carson City Board of Regents State of Nevada Private
Fuelbreak 2,700' x 150'	9	2002	Carson City Utilities

9.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Lower Kings Canyon neighborhood in the **Low Hazard** category (37 points). A summary of the values that affect the hazard rating is included in Table 9-2 at the end of this chapter. The primary wildfire hazard conditions in the Lower Kings Canyon neighborhood were related to site accessibility and the potential for severe fire behavior due to topography and fuel loading.

9.2.1 Community Design

Throughout most of the Lower Kings Canyon neighborhood there is a clear line of demarcation between wildland fuels and buildings in the neighborhood. All homes are situated on lots less than one acre in size, and there are typically three or more structures per acre. As such, most structures are spaced close together.

- **Interface Condition:** classic wildland-urban interface condition.
- **Access:** Kings Canyon Road and Longview are the primary access roads to the Lower Kings Canyon neighborhood. These roads range in width between 20 to 24 feet and allow adequate room for fire suppression equipment to maneuver. The road gradient on primary roads is less than five percent.
- **Signage:** All street signs and home addresses were clearly visible within the survey area. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire**.**
- **Utilities:** low risk of ignition.

9.2.2 Construction Materials

All the homes within the neighborhood survey area were built with fire resistant composite roofing materials and non-combustible siding. Five percent of the homes had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty places where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

9.2.3 Defensible Space

All forty-two homes evaluated had landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

9.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department, the USFS, and the NDF Sierra Forest Fire Protection District provide wildland and structure fire protection to the Kings Canyon – Lower neighborhood. The US Forest Service also provides fire protection for the national forest lands near the Lower Kings Canyon neighborhood. Ownership and administration of a portion of this land will transfer from USFS to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water available for fire suppression in the Lower Kings Canyon neighborhood includes 500 gpm hydrants within 500 feet of structures.

9.3 RECOMMENDATION

Recommended and planned treatments for Lower Kings Canyon neighborhood are shown on Figure 9-1 and are described in Table 9-3.

Table 9-3. Fuels treatments recommended or planned for the Lower Kings Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Shrub Thinning and Seeding 2,700' x 100' Fuelbreak	16	Carson City Utilities
Hand Treatment 3,350' x 100' Fuelbreak	9	Carson City USFS

Additional recommendations from the 2008 risk/hazard assessment are provided for the portion of the Lower Kings Canyon neighborhood north of Kings Canyon Road (the Highland and Meadows neighborhoods):

- Ensure that the rock-lined swales and fence lines are kept free of accumulations of tumbleweeds, cheatgrass and other flammable materials.
- Interface shrub densities are the highest at the southwest corner of the neighborhood, where the paved path turns to the east to parallel Kings Canyon Road. Hand thin rabbitbrush as necessary to provide a horizontal spacing between shrubs that is two times the height of the remaining shrubs.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.

Recommendations for the portion of the Lower Kings Canyon neighborhood south of Kings Canyon Road (Carlisle, Kingsview, Canterbury streets) are as follows:

- Remove all live shrubs and accumulated flammable material from the rock-lined drainage structure that parallels the back lots of the homes along Carlisle Court.
- Ensure that the brush hand thinning scheduled for 2009 in this neighborhood is completed.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Continue implementing the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.

Table 9.2 Results of the wildfire risk/hazard rating in the Lower Kings Canyon neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	1	/5
3. Unenclosed Structures	1	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	3	/10
3. Slope	10	/10
4. Aspect	1	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

42 Total Houses **4 Residential Streets**

B5. Street Signs

0 not visible | 4 visible | 100% visible

B6. Address Signs

0 not visible | 42 visible | 100% visible

C1. Roofs

0 combust | 42 not combust | 100% not combust

C2. Siding

0 combust | 42 not combust | 100% not combust

C3. Unenclosed Structures on Lot

2 not enclosed | 40 enclosed | 5% not enclosed

D1. Lot Sizes

42 <1ac | 0 >1ac <10ac | 0 >10ac

D2. Defensible Space

0 not adequat | 42 adequate | 100% adequate

Community Hazard Score: **37** /128

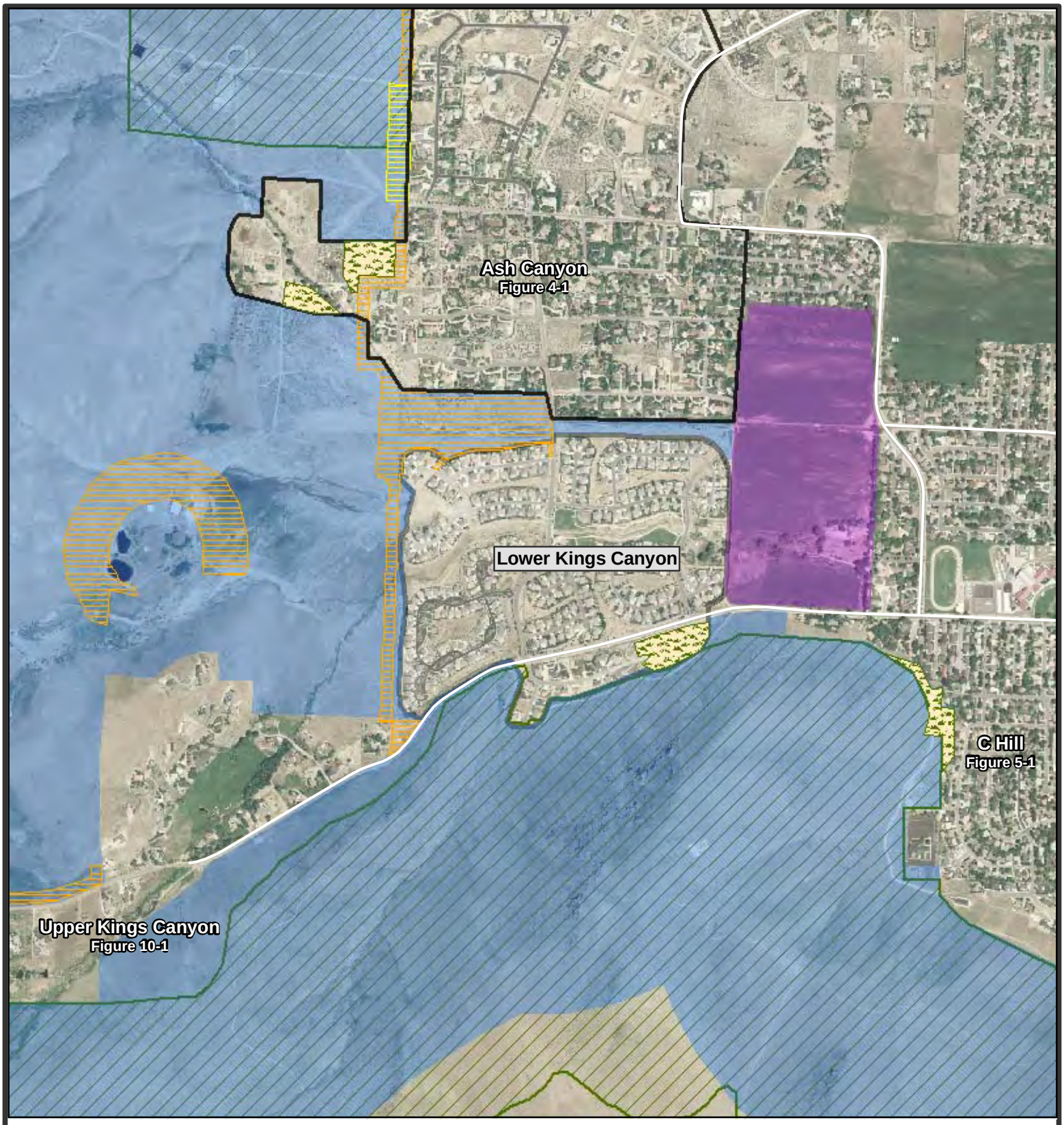

Figure 9-1. Lower Kings Canyon fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

- Thin Shrubs
- Thin Shrubs & Seed
- Drill Seed
- Grazing Treatment

Fuel Hazard Class

- Low
- Moderate
- Neighborhood Boundary

N

0 0.2 0.4

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 9-2. Representative fuel types in the wildland-urban interface around the Lower Kings Canyon neighborhood.

Lower Kings Canyon 1. UTM 4338535N 259123E. View to West

Lower Kings Canyon 2. UTM 4339147N 258731E. View to West

10.0 KINGS CANYON – UPPER

FUEL HAZARD: MODERATE COMMUNITY RISK: HIGH

The Kings Canyon Upper neighborhood includes the homes along Custer Circle, Canyon Drive, Dagget Drive, Knoll Drive, and the residences scattered along the lateral drives on upper Kings Canyon Road. The eastern boundary of the assessment area is the municipal water treatment plant access road.

10.1 INTERFACE CONDITIONS AND FUEL HAZARD

The fuels in the Upper Kings Canyon neighborhood are characterized as an intermix interface condition. Vegetative fuel density in the Upper Kings Canyon wildland-urban interface is medium, with an estimated fuel load of 0.5 to 1.0 tons per acre with occasional Jeffrey pine that survived the 2004 Waterfall Fire. Ground fuels are composed of seeded reclamation species including pubescent wheatgrass and Siberian wheatgrass and invasive cheatgrass. The shrub community in unburned areas is composed of sagebrush and bitterbrush, with willow along Kings Canyon Creek, its tributaries, and other wet areas. The Upper Kings Canyon neighborhood has a **moderate fuel hazard rating.** Fuel hazard mapping in the vicinity of the Upper Kings Canyon neighborhood and photographs of typical fuel conditions are shown in Figures 10.1 and 10.2, respectively at the end of this chapter.

The southwest to northeast topography of the Upper Kings Canyon assessment area is conducive to wind currents that can contribute to extreme fire behavior. Residences at highest risk are in the canyon bottom on irregular, hilly terrain with slopes between 8 and 20 percent, homes against the base of the Carson Range, and homes between Kings Canyon Road and Kings Canyon Creek adjacent to slopes greater than 30 percent in steepness. Fire history for this area includes recurrent fires in the C-Hill area to the south and the recent Waterfall Fire that originated in the canyon directly above the residential area.

The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface and are the most common factor contributing to structure loss in a WUI for this region.

Table 10-1 summarizes the history of fuels reduction treatments within the Upper Kings Canyon Assessment Area.

Table 10-1. Fuels treatment history for the Upper Kings Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Grazing	1,330	2006-2008	Carson City Utilities USFS
Fuelbreak 10,000’ x 150’	35	2003	Carson City Utilities
Hand Treatment 2,260’ x 150’ Fuelbreak	8	2003	Private USFS

10.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying Upper Kings Canyon neighborhood in the **High Hazard** category (65 points). A summary of the values that affect the hazard rating is included in Table 10-2 at the end of this chapter. The primary wildfire hazard conditions in the Kings Canyon upper neighborhood were related to community design, lack of defensible space, and the potential for severe fire behavior due to topography.

10.2.1 Community Design

Within the Upper Kings Canyon neighborhood, structures are scattered throughout wildland areas. Most homes are situated on lots between one and ten acres in size.

- **Interface Condition**: intermix wildland-urban interface condition.
- **Access**: The Kings Canyon upper neighborhood is accessed by Kings Canyon Road, the only paved road in and out of the neighborhood. Kings Canyon Road is between 20 and 24 feet wide and allows adequate room for fire suppression equipment to maneuver. The road gradient is steeper than five percent. Steep roads and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire.
- **Signage:** A quarter of the street signs were not visible within the survey area, and twenty-three percent of home address signs were not visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

10.2.2 Construction Materials

Most of the homes surveyed (94 percent) within the neighborhood were built with fire resistant composite roofing materials; however, twenty percent of the homes were constructed with combustible siding. Nearly half of the homes had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

10.2.3 Defensible Space

Of the 35 homes evaluated, 37 percent did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

10.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department and the NDF Sierra Forest Fire Protection District provide wildland and structure fire protection for the state and private lands in and around the Upper Kings Canyon neighborhood. The US Forest Service also provides fire protection for the national forest lands surrounding the Upper Kings Canyon neighborhood. Ownership and administration of much of this land will transfer from USFS to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in Upper Kings Canyon neighborhood is approximately 20 minutes away roundtrip.

10.3 RECOMMENDATIONS

Recommended and planned treatments for Kings Canyon upper neighborhood are shown on Figure 10-1 and described in Table 10-3.

Table 10-3. Fuels treatments recommended or planned for the Upper Kings Canyon neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Shrub Thinning and Seeding 2,775' x 425' Fuelbreak 3,655' x 100' Fuelbreak	36	Carson City Utilities
Grazing	1,330	Carson City Utilities USFS

The impacts of the 2004 Waterfall Fire in this area would indicate that most homeowners in this neighborhood are aware of fire effects and the importance of maintaining defensible space. However, extended extra effort should be extended to provide education to new residents regarding homeowner responsibilities and protecting themselves in the wildland-urban interface.

- Encourage participation in the neighborhood Fire Safe Council Chapter.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Conduct annual defensible space inspections and hazardous fuels evaluations on private and public lands.
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Maintain weed-free conditions along the south boundary for a minimum of 50 feet and remove shrubs within 25 feet of fence.

Table 10.2 Results of the wildfire risk/hazard rating in the Upper Kings Canyon neighborhood.

A. Urban Interface Condition ***2***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	1	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	3	/10

E. Suppression Capabilities

1. Water Source	5	/10
2. Department	1	/10

TALLIES

35 Total Houses **4 Residential Streets**

B5. Street Signs

1 not visible | 3 visible | 75% visible

B6. Address Signs

8 not visible | 27 visible | 77% visible

C1. Roofs

2 combust | 33 not combust | 94% not combust

C2. Siding

7 combust | 28 not combust | 80% not combust

C3. Unenclosed Structures on Lot

15 not enclosed | 20 enclosed | 43% not enclosed

D1. Lot Sizes

5 <1ac | 30 >1ac <10ac | 0 >10ac

D2. Defensible Space

13 not adequat | 22 adequate | 63% adequate

Community Hazard Score: **65** /128

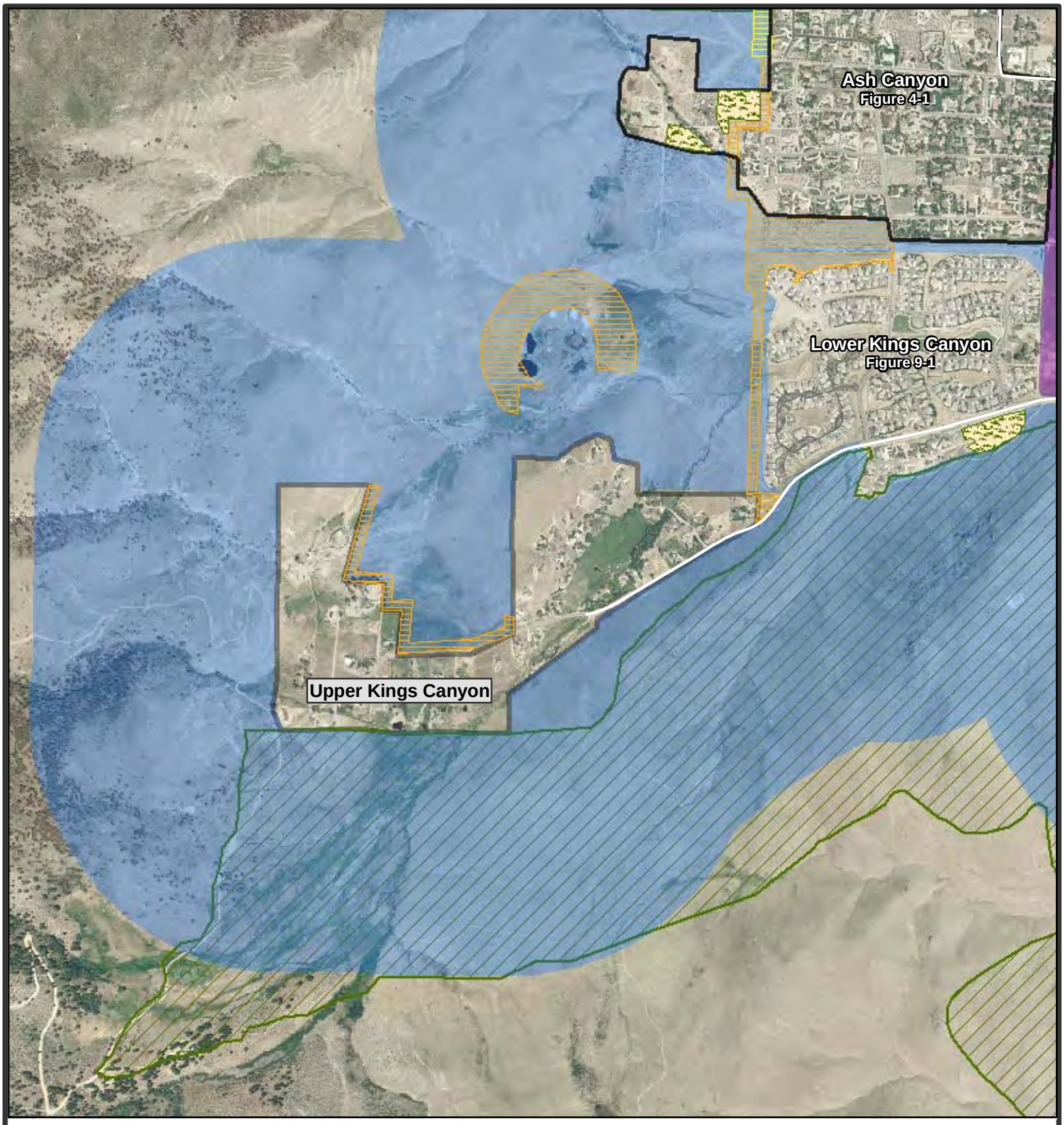

Figure 10-1. Upper Kings Canyon fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

- Thin Shrubs
- Drill Seed
- Thin Shrubs & Seed
- Grazing Treatment

Fuel Hazard Class

- Low
- Moderate
- Neighborhood Boundary

N

0 0.25 0.5

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 10-2. Representative fuel types in the wildland-urban interface around the Upper Kings Canyon neighborhood.

Upper Kings Canyon 1. UTM 4337608N 256695E. View to North

Upper Kings Canyon 2. UTM 4337935N 257568E. View to West-Northwest.

11.0 LAKEVIEW

FUEL HAZARD: MODERATE – HIGH COMMUNITY RISK: HIGH

The Lakeview neighborhood is located in northwest Carson City and is accessed from the south by Combs Canyon Road and from the north by Old Highway 395 onto Hobart Road. The interface properties assessed include residences on County Line Road, Numaga Pass, Wagon Wheel Road, Levi Gulch, Lakeview Road, Weise Road, and Vista Ariana.

11.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Lakeview neighborhood is characterized as an intermix wildland urban interface condition. No clear boundary distinguishes private property from the surrounding wildland fuels, which continue into and in between residential structures. Four vegetation communities occur around the wildland-urban interface: big sagebrush/bitterbrush/rabbitbrush association; rabbitbrush; manzanita with standing dead pine; and Jeffrey pine.

The mixed sagebrush/bitterbrush/rabbitbrush community is most common in the northeast and east portions of the interface, continuing south to Combs Canyon. This vegetation type has a medium vegetative fuel density and shrub heights range from four to six feet in height. Fuel loads are estimated at 2.0 to 4.0 tons per acre, and the vegetation is classified as a **high fuel hazard.**

A dense stand of rabbitbrush established following the 1981 Little Valley Fire along the northwestern portion of the Lakeview neighborhood. Shrub heights range from three to five feet, and the fuel load was estimated at 2.5 tons per acre, with loading up to 10 tons per acre where live timber fuels are present. This vegetation type is classified as a **high fuel hazard**.

A large portion on the west side of the Lakeview neighborhood was burned in the 1981 Little Valley Fire and re-burned in the 2004 Waterfall Fire. The vegetative fuel density is light in this area and is dominated by perennial grasses seeded after the fire and re-sprouting manzanita shrubs 12 to 18 inches tall. A low occurrence of cheatgrass and Russian thistle is present. While scattered pine trees that survived the fire and from reforestation efforts forecast increasing fuel loads in the future, the current moderate fuel load ranges from 0.25 to 0.75 tons per acre.

The fuel hazard in the interface along the southwest quarter of the Lakeview neighborhood is moderate. However, the vegetative fuel hazard within the neighborhood boundary is high. An overstory of Jeffrey pine shades a shrub layer dominated by manzanita, big sagebrush, bitterbrush, and rabbitbrush. Shrub heights range from eighteen inches to four feet. Ground fuels consist of cheatgrass and a thick duff layer of pine needles. Fuel density is heavy. The fuel load between residential structures varies from four to twelve tons per acre and is classified as a **high fuel hazard**.

The topography of the south and west portions of the Lakeview neighborhood interface is steep (greater than 30 percent slopes) and dissected with wind-funneling canyons. The Lakeview neighborhood interface is less steep to the east and to the north. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region. The history of

recurrent fires and lightning strikes to the west of the neighborhood are evidence of a high wildfire ignition risk around the Lakeview neighborhood.

Fuel hazard conditions and representative photographs of fuel hazard conditions are shown in Figures 11.1 and 11.2, respectively, at the end of this chapter.

Table 11-1 summarizes the history of fuels reduction treatments within the Lakeview Assessment Area.

Table 11-1. Fuels treatment history for the Lakeview neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 14,610' x 150'	50	2007	Carson City USFS Private
Grazing	594	2008	Carson City State of Nevada Board of Regents Private
Grazing	315	2007	Carson City State of Nevada Private
Hand treatment	320	2004	Private

11.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying Lakeview neighborhood in the **High Hazard** category (63 points). A summary of the values that affect the hazard rating is included in Table 11-2 at the end of this chapter. The primary wildfire hazard conditions in the Lakeview neighborhood were related to community design, construction materials, and the potential for severe fire behavior due to topography and fuel loading.

11.2.1 Community Design

Structures are scattered throughout wildland areas in the Lakeview neighborhood and there is no clear line of demarcation between wildland and residential areas. Most homes are situated on lots between one and 10 acres in size. These scattered structures are widely spaced and interspersed with wildland fuels.

- **Interface Condition:** intermix wildland-urban interface condition.
- **Access:** Combs Canyon Road and Old US 395 South are the primary access roads to the Lakeview neighborhood. These roads range between 20 to 24 feet in width and allow adequate room for fire suppression equipment to maneuver. The road gradient on primary and secondary roads is greater than five percent. Steep roads can increase response times for heavy vehicles carrying water.
- **Signage:** All street signs within the Lakeview neighborhood survey area were clearly visible. Nineteen percent of the residential address signs were not visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire**.**
- **Utilities:** moderate ignition risk from propane tanks.

11.2.2 Construction Materials

All of the homes within the neighborhood survey area were built with fire resistant composite roofing materials; however, sixty-six percent of the homes were constructed with combustible siding. Nearly half of the homes had unenclosed or unscreened balconies, decks, porches, eaves, or attic vents that create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

11.2.3 Defensible Space

Of the sixty-four homes evaluated, twenty-five percent did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

11.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department and the NDF Sierra Forest Fire Protection District provide wildland and structure fire protection to the Lakeview neighborhood. The US Forest Service also provides fire protection for the national forest lands surrounding the Lakeview neighborhood. Ownership and administration of much of this land will transfer from USFS to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the Lakeview neighborhood includes 500 gpm hydrants within 1,000 feet of structures

11.3 RECOMMENDATIONS

Recommended and planned treatments for Lakeview neighborhood are shown on Figure 11-1 and are described in Table 11-3.

Table 11-3. Fuels treatment activities recommended or planned for the Lakeview neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Hand Treatment 10,455' x 100' Fuelbreak	24	State of Nevada Board of Regents Carson City Parks
Grazing	594	Carson City State of Nevada Board of Regents Private

Additional recommendations based upon the 2008 risk/hazard assessment include:

- Remove 85 percent of the shrub component on the 9.6-acre Carson City Utilities Parcel (APN 007-211-02) in northeast Lakeview. Leave the remaining 15 percent shrub cover in a mosaic pattern with a preference for retaining healthy specimens of bitterbrush, and desert peach.
- Establish 1,200 feet of fuelbreak 100 to 150 feet wide on private property adjacent to the north side of the Carson City Utilities Parcel.
- If cheatgrass control is necessary, use a pre-emergent herbicide in treatment areas according to the recommendations from the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- If needed, reseed treated areas in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix and specifications for the Carson City interface area is included in Appendix E. Develop site-specific seed mixes in collaboration with the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- Conduct defensible space evaluations on private parcels as necessary to identify and prioritize parcels requiring defensible space improvement.
- **I**n the southwest quarter of Lakeview, develop a plan to:
  - Hand-treat to reduce shrubs and other ladder fuels
  - Remove conifer limbs to a height three times that of remaining understory vegetation but not more than one-third the height of the tree.
  - Remove tree branches that come in contact with the exterior walls, eaves, or roof of a structure as well as any branches that overhang the home.
  - Reduce conifer canopy closure by selective thinning. On flat to gently sloping ground, the ideal distance between tree canopies is ten feet. The separation distance will be greater on steeper slopes.
- At north end of Wagon Wheel, salvage plastic tree tubes from pine plantings.
  - Replanting Jeffrey Pine in this area is a long-term strategy for rabbitbrush and manzanita control. If a pine replanting effort is to be coordinated, planting should occur in the late fall just before the ground freezes. This will permit the plantings to take full advantage of snowpack moisture in the springtime.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.

Table 11.2 Results of the wildfire risk/hazard rating in the Lakeview neighborhood.

A. Urban Interface Condition ***2***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	5	/5
2. Fire Behavior	10	/10
3. Slope	10	/10
4. Aspect	3	/10

E. Suppression Capabilities

1. Water Source	2	/10
2. Department	1	/10

TALLIES

64 Total Houses **11 Residential Streets**

B5. Street Signs

0 not visible | 11 visible | 100% visible

B6. Address Signs

12 not visible | 52 visible | 81% visible

C1. Roofs

0 combust | 64 not combust | 100% not combust

C2. Siding

42 combust | 22 not combust | 34% not combust

C3. Unenclosed Structures on Lot

28 not enclosed | 36 enclosed | 44% not enclosed

D1. Lot Sizes

12 <1ac | 52 >1ac <10ac | 0 >10ac

D2. Defensible Space

16 not adequat | 48 adequate | 75% adequate

Community Hazard Score: **63** /128

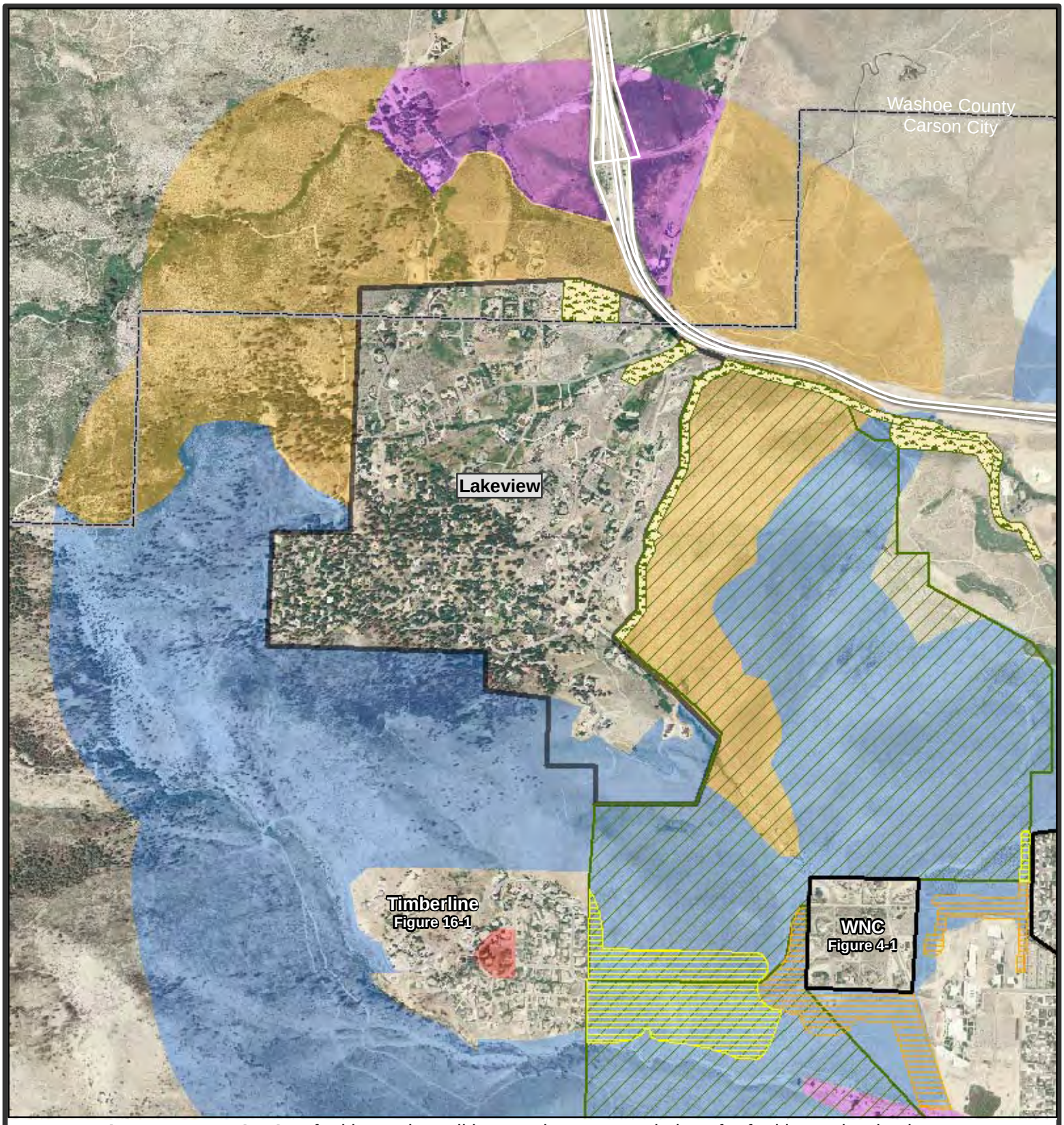

Figure 11-1. Lakeview fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments
- Thin Shrubs
- Thin Shrubs & Seed
- Drill Seed
- Grazing Treatment

Fuel Hazard Class
- Low
- Moderate
- High
- Extreme
- Neighborhood Boundary

N

0 0.25 0.5
Miles

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Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

Figure 11-2. Representative fuel types in the wildland-urban interface around the Lakeview neighborhood.

Lakeview 1. UTM 4342982N 256807E. View to West

Lakeview 2. UTM 4343261N 257832E. View to East

12.0 MEXICAN DAM

FUEL HAZARD: MODERATE – HIGH COMMUNITY RISK: HIGH

The Mexican Dam neighborhood is located in the remote southeast portion of Carson City, south of Silver Saddle Ranch and east of the Northern Nevada Correctional Center. The neighborhood includes residences on both sides of the Carson River, those accessed via Snyder Avenue/Golden Eagle Lane and those accessed by Mexican Dam Road/Sierra Vista Lane. The Mexican Dam neighborhood boundary for this report excludes those houses accessed by Vicky Lane from the south, as fire protection for those homes is provided by Douglas County under a mutual aid agreement with the Carson City Fire Department.

12.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Mexican Dam neighborhood is characterized as an intermix wildland urban interface condition. Wildland fuels continue throughout the neighborhood, with no clear boundary between the wildland vegetation and residential structures.

Vegetative fuel density within the southern portion of the Mexican Dam neighborhood is medium, and the shrub-dominant overstory consists of bitterbrush, rabbitbrush, desert peach and Mormon tea. Shrub heights range from two to six feet. The understory is comprised primarily of Indian ricegrass. Fuel loads range from 2.0 to 4.0 tons per acre and is classified as a **moderate fuel hazard**.

Vegetative fuel density in the southeast interface is heavy and consists of bitterbrush, big sagebrush, Mormon tea and rabbitbrush, with pinion pine trees at higher elevations on the surrounding slopes. Cheatgrass is present in disturbed areas. Fuels generally ranged between two and four feet in height with fuel loading estimated at 4.0 to 6.0 tons per acre. The **fuel hazard is high**.

The terrain surrounding the northwest portion of the Mexican Dam neighborhood is fairly steep, ranging from 8 to 30 percent slopes. The terrain is relatively flat within the Carson River floodplain in the southwest portion of the neighborhood. The predominant wind direction is from the south-southwest in the late afternoon, with occasional strong upslope and cross-slope winds in the late afternoons during the summer months due to thunderstorms. There is very minor fire history in this area.

Fuel hazard conditions and photographs of representative fuel types in the Mexican Dam wildland-urban interface are shown in Figures 12.1 and 12.2, respectively, at the end of this chapter.

Table 12-1 summarizes the history of fuels reduction treatments within the Mexican Dam Assessment Area.

Table 12-1. Fuels treatment history for the Mexican Dam neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 16,540' x 200' and mosaic patches	43	2005	BLM
Hand Treatment 14 parcels	85	2005	Private

12.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Mexican Dam neighborhood in the **High Hazard** category (64 points). A summary of the values that affect the hazard rating is included in Table 12-2 at the end of this chapter. The primary wildfire hazard conditions in the Mexican Dam neighborhood were related to community design and the potential for severe fire behavior due to topography and fuel loading.

12.2.1 Community Design

Within the Mexican Dam neighborhood structures are scattered throughout wildland areas, and there is no clear line of demarcation between wildland and residential areas. Most homes are situated on lots between one and ten acres in size, and a few are on lots greater than ten acres.

- **Interface Condition:** intermix wildland-urban interface condition.
- **Access:** The Mexican Dam neighborhood is accessed by one paved road in and out of the neighborhood. The road is called Mexican Dam Road to the north of the neighborhood, and changes to Sierra Vista Lane within the neighborhood. The road is between 20 and 24 feet wide and allows adequate room for fire suppression equipment to maneuver. The road gradient is steeper than five percent. Steep roads, several dead end roads greater than 200 feet in length, and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire.
- **Signage:** All street signs and ninety percent of the residential address signs in the Mexican Dam survey area were clearly visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

12.2.2 Construction Materials

All the homes within the neighborhood were built with fire resistant composite roofing materials; however, eighteen percent of the homes were constructed with combustible siding. Nearly half of the homes had unenclosed structures such as a porch, balcony, or deck that create drafty places where sparks and embers can be trapped, smolder, ignite, and readily spread fire to the house.

12.2.3 Defensible Space

Of the forty-nine homes evaluated, many (24 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

12.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department provides wildland and structure fire protection in the Mexican Dam neighborhood. However, the neighborhood is beyond the recommended maximum distance of five miles from a fire station. BLM provides fire protection for the public lands surrounding the neighborhood. Ownership and administration of much of this land will transfer from BLM to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in Mexican Dam neighborhood is approximately 20 minutes away roundtrip. There is a 10,000-gallon underground tank located at 6600 Sierra Vista Lane and Arroyo Vista.

12.3 RECOMMENDATIONS

Of all the neighborhoods included in this assessment, the Mexican Dam neighborhood is the most remote and the most complicated to access. These features make preventive measures very important for this neighborhood.

- Conduct annual defensible space evaluations on each residence in the neighborhood and conduct hazardous fuels assessments on surrounding public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Monitor brush and cheatgrass conditions on areas masticated in 2005 and maintain as necessary. The 5-year maintenance schedule calls for maintenance activities in 2010. Pre-emergent and broadleaf herbicide application may be necessary to slow the encroachment of cheatgrass, rabbitbrush, and other highly flammable undesirable species.
- Establish an additional 30 acres of fuelbreak (6,981' X 200') to complete protection on the south and east portions of this neighborhood.

Table 12.2 Results of the wildfire risk/hazard rating in the Mexican Dam neighborhood.

A. Urban Interface Condition ***2***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	1	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	4	/10
4. Aspect	7	/10

E. Suppression Capabilities

1. Water Source	5	/10
2. Department	10	/10

TALLIES

49 Total Houses **5 Residential Streets**

B5. Street Signs

0 not visible | 5 visible | 100% visible

B6. Address Signs

5 not visible | 44 visible | 90% visible

C1. Roofs

0 combust | 49 not combust | 100% not combust

C2. Siding

9 combust | 40 not combust | 82% not combust

C3. Unenclosed Structures on Lot

20 not enclosed | 29 enclosed | 41% not enclosed

D1. Lot Sizes

0 <1ac | 46 >1ac <10ac | 3 >10ac

D2. Defensible Space

12 not adequat | 37 adequate | 76% adequate

Community Hazard Score: **64** /128

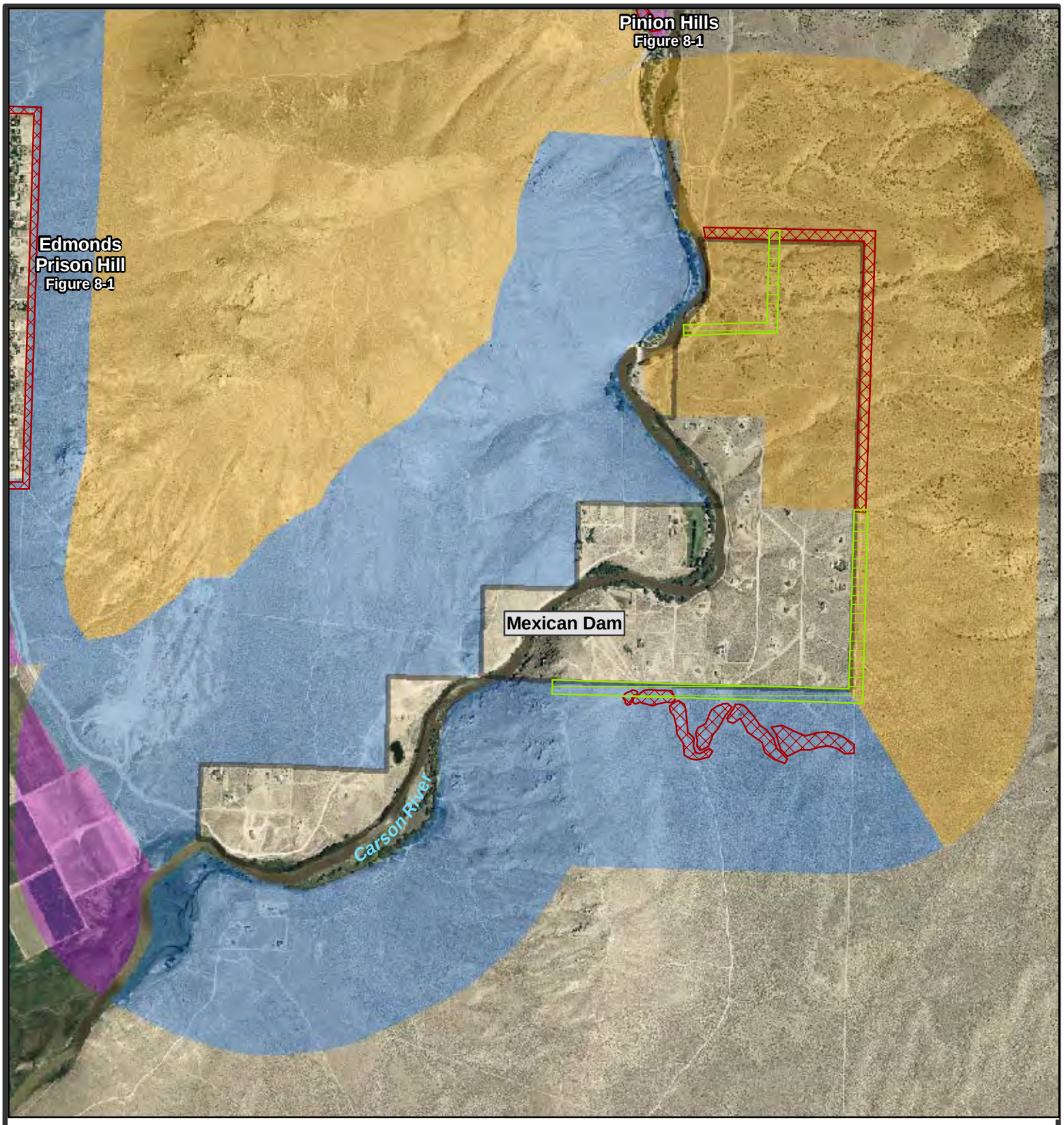

Figure 12-1. Mexican Dam fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatment

- Establish Fuelbreak
- Maintain Fuelbreak

Fuel Hazard Class

- Low
- Moderate
- High
- Neighborhood Boundary

N

0 0.25 0.5

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 12-2. Representative fuel types in the wildland-urban interface around the Mexican Dam neighborhood.

Mexican Dam 1. UTM 4332391N 266495E. View to East-Southeast

Mexican Dam 2. UTM 4332254N 266123E. View to North

13.0 NORTH CARSON

FUEL HAZARD: MODERATE COMMUNITY RISK: HIGH

The North Carson neighborhood includes the residential area north of the 395 bypass and east of Imus Road. The North Carson neighborhood also includes the industrial area east of Goni Road and north of Arrowhead Road. Major cross streets include Bonanza, Conestoga, Boeing, and Ruby.

13.1 INTERFACE CONDITIONS AND FUEL HAZARD

The North Carson neighborhood is characterized as a classic wildland urban interface. Wildland vegetation abuts residential properties with a clear line of separation along back property lines and the native wildland vegetation.

Fuel density is medium and uniform throughout the wildland-urban interface, with inclusions of wildland fuels occurring within the adjacent developed residential parcels. Dominant vegetation consists of big sagebrush, bitterbrush, Mormon tea, and rabbitbrush with an understory consisting of cheatgrass and annual mustard. Shrub heights range between two and six feet. The fuel load is estimated at 2.0 to 4.0 tons per acre and is considered a **moderate fuel hazard.**

The terrain along the north and east sides of the North Carson neighborhood is fairly steep, with slopes in excess of 30 percent in close proximity to private property. Several north/south directional canyons intersect the hillsides. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope winds in the afternoon commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region. There is a history of lightning strikes and repeated fires to the north and east of the North Carson neighborhood.

Fuel hazard conditions around the North Carson neighborhood and photographs of representative fuel types are shown in Figures 13-1 and 13-2 at the end of this chapter.

Table 13-1 summarizes the history of fuels reduction treatments within the vicinity of the North Carson assessment area.

Table 13-1. Fuels treatment history in the vicinity of the North Carson neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 63,550 x 100’	58	2006	BLM Private

13.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the North Carson neighborhood in the **High Hazard** category (64 points). A summary of the values that affect the hazard rating is included in Table 13-2 at the end of this chapter. The primary wildfire hazard conditions in the North Carson neighborhood were primarily related to lack of defensible space and the potential for severe fire behavior due to topography and fuel loading.

13.2.1 Community Design

Within the North Carson neighborhood, there is a clear line of demarcation between the structures and wildland fuels along the roads. Most homes (58 percent) are situated on lots less than one acre in size, and forty-one percent of the homes are located on lots between one and ten acres in size.

- **Interface Condition**: classic wildland-urban interface condition.
- **Access**: The North Carson neighborhood is accessed by several primary roads including Goni, Bonanza, Arrowhead and Emerson. These roads range in width between 20 to 24 feet and allow adequate room for fire suppression equipment to maneuver. The road gradient on primary and secondary roads is greater than five percent. Steep roads can increase response times for heavy vehicles carrying water.
- **Signage:** Twenty percent of street signs within the North Carson neighborhood were not visible. Nine percent of the residential address signs in the survey area were not visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

13.2.2 Construction Materials

Nearly all of the homes within the neighborhood survey area were built with fire resistant composite roofing materials; however, many of the homes (35 percent) were constructed with combustible siding. Nine percent of the homes had unenclosed structures such as a porch, balcony, or deck that create drafty places where sparks and embers can be trapped, smolder, ignite, and readily spread fire to the home.

13.2.3 Defensible Space

Of the ninety-eight homes evaluated, nearly half (41 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

13.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department provides wildland and structure fire protection to the North Carson neighborhood. The Bureau of Land Management also provides wildfire protection for the publicly administered lands surrounding the North Carson neighborhood. Ownership and administration of much of this land will transfer from BLM to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the North Carson neighborhood includes 500 gpm hydrants within 500 feet of structures.

13.3 RECOMMENDATIONS

The fuelbreak extending from the borrow pit at the end of Imus Road to the neighborhoods east of Goni Lane was established along the BLM/Private property line in 2006. Field reconnaissance in November 2008 revealed a rapid reestablishment of rabbitbrush within the fuelbreak.

- Remove 85 percent of the shrub component encroaching into the fuelbreak (100 to 150 feet north of the property line). Leave the remaining 15 percent of shrub cover in a clustered mosaic pattern.
- Treat areas with a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive, use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or as approved by the jurisdiction involved.
- If needed, reseed treated areas in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix and specifications for the Carson City interface area is included in Appendix E. Develop site-specific seed mixes in collaboration with the jurisdiction involved.
- Establish or maintain 25 to 50 feet of brush clearance around water tanks and pipeline utilities.
- Reinforce defensible space guidelines with homeowners, with special emphasis on replacing ornamental junipers with more fire-resistant landscape species.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.

Table 13.2 Results of the wildfire risk/hazard rating in the North Carson neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	1	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	10	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

98 Total Houses **15 Residential Streets**

B5. Street Signs

3 not visible | 12 visible | 80% visible

B6. Address Signs

9 not visible | 89 visible | 91% visible

C1. Roofs

6 combust | 92 not combust | 94% not combust

C2. Siding

34 combust | 64 not combust | 65% not combust

C3. Unenclosed Structures on Lot

9 not enclosed | 89 enclosed | 9% not enclosed

D1. Lot Sizes

57 <1ac | 40 >1ac <10ac | 1 >10ac

D2. Defensible Space

40 not adequat | 58 adequate | 59% adequate

Community Hazard Score: **64** /128

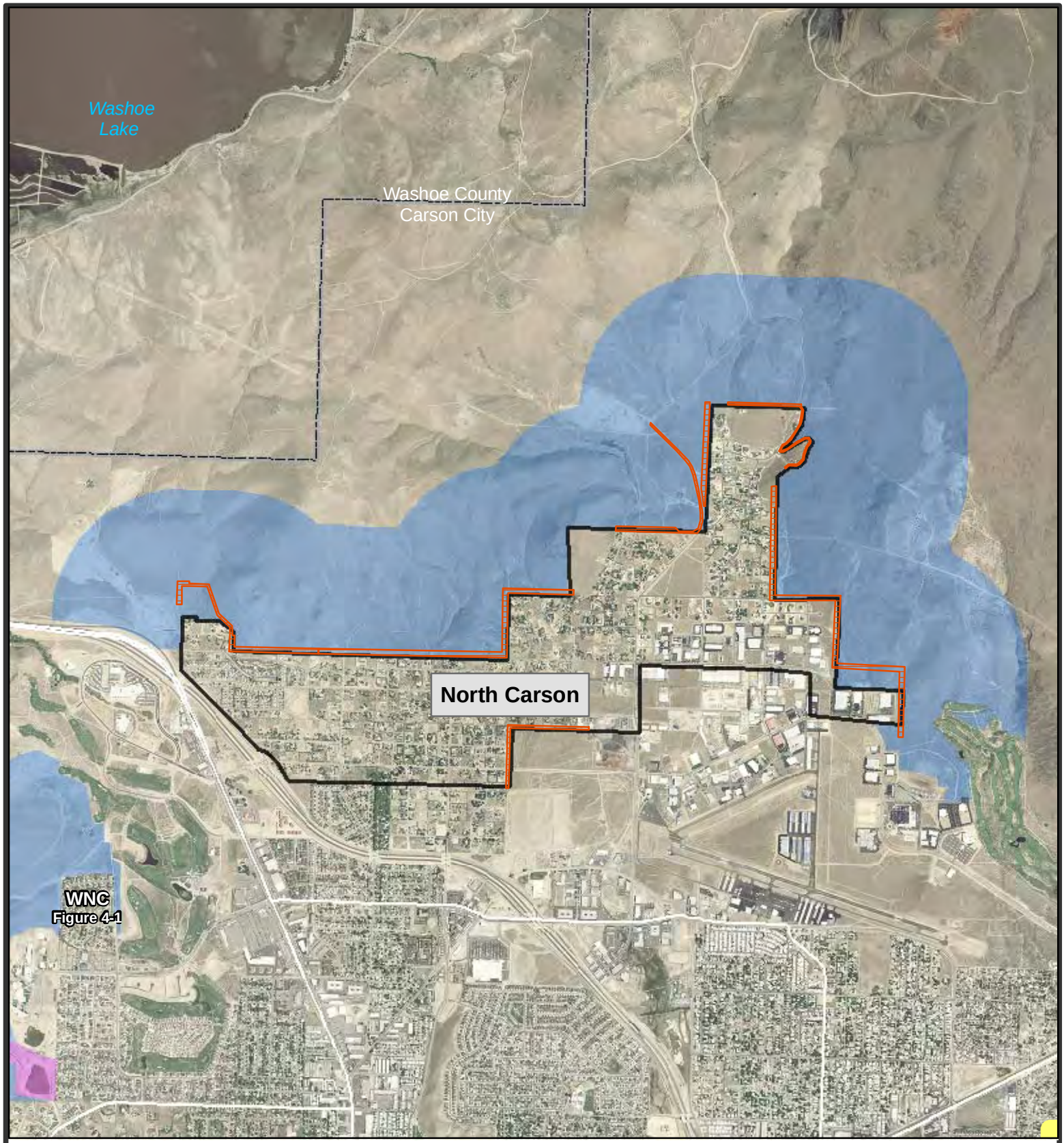

Figure 13-1. North Carson fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

Maintain Fuelbreak

Fuel Hazard Class

Low

Moderate

Neighborhood Boundary

N

0 0.4 0.8

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 13-2. Representative fuel types in the wildland-urban interface around the North Carson neighborhood.

North Carson 1. UTM 4343135N 260531E. View to East

North Carson 2. UTM 4343163N 260863E. View to West

14.0 PINION HILLS

FUEL HAZARD: MODERATE COMMUNITY RISK: HIGH

The Pinion Hills neighborhood is located east of Carson City. The neighborhood is bounded on the west by the Carson River and on the east by the Pine Nut Mountains. The northern boundary includes the residences on Deer Run Road that are located a mile north of Sedge Drive and extends south to Lee's Bridge.

14.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Pinion Hills neighborhood is characterized as an intermix wildland urban interface condition. Wildland fuels continue throughout the neighborhood with no clear boundary between the wildland vegetation and residential structures.

Vegetative fuel density was heavy throughout the Pinion Hills neighborhood and wildland-urban interface. Pinion and juniper trees spaced up to twenty feet apart grow within a shrub layer of big sagebrush, bitterbrush, rabbitbrush, and Mormon tea. Tree density is higher near drainages, which can channel air currents and act as chimneys during a wildfire. Ground fuels are dominated by cheatgrass and other annuals. Fuel loads range from 2.0 to 6.0 tons per acre, depending upon tree density. This area is classified as a **high fuel hazard**.

The terrain along the east side of the Pinion Hills neighborhood is very irregular, with slopes from 8 to 20 percent near Deer Run Road to over 30 percent along the base of the Pine Nut Range. The predominant wind direction is from the south-southwest, with strong afternoon upslope and cross slope winds during the summer months. No history or large fires is recorded west of Brunswick Canyon near this neighborhood.

Fuel hazard conditions and representative photographs of fuel types around the Pinion Hills neighborhood are included in Figures 14-1 and 14-2 at the end of this chapter.

Table 14-1 summarizes the history of fuels reduction treatments within the Pinion Hills Assessment Area.

Table 14-1. Fuels treatment history for the Pinion Hills neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 15,100' x 150'	52	2005	BLM

14.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Pinion Hills neighborhood in the **High Hazard** category (63 points). A summary of the values that affect the hazard rating is included in Table 14-2 at the end of this chapter. The primary wildfire hazard conditions in the Pinion Hills neighborhood were related to community design, including limited access and multiple dead end roads, construction materials, and the potential for severe fire behavior due to topography and fuel loading.

14.2.1 Community Design

Within the Pinion Hills neighborhood there is no clear line of demarcation between the structures and wildland fuels along the roads. Most homes in the survey area (60 percent) are located on lots between one and ten acres in size, and forty percent are located on lots less than one acre in size.

- **Interface Condition:** intermix wildland-urban interface condition.
- **Access:** The Pinion Hills neighborhood is accessed by one primary road in and out of the neighborhood. The road entering the neighborhood from the south, Carson River Road, changes to Pinion Hills Road within the neighborhood. The neighborhood can be accessed from the north by South Deer Run Road. These roads are greater than 24 feet wide which allows access for fire suppression equipment. However, many roads lead to dead ends that limit the ability for fire suppression equipment to maneuver or turn around. The road gradient on primary and secondary roads is greater than five percent. Steep roads and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire.
- **Signage:** Half of the street signs within the Pinion Hills survey area were not visible. Twenty-three percent of the residential address signs were not visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

14.2.2 Construction Materials

Nearly all of the homes surveyed within the neighborhood (93 percent) were built with fire resistant composite roofing materials; however, fifty percent of the homes were constructed with combustible siding. Forty-seven percent of the homes had unenclosed structures such as a porch, balcony, or deck that create drafty places where sparks and embers can be trapped, smolder, and ignite, readily spreading fire to the home.

14.2.3 Defensible Space

Of the thirty homes evaluated, eight homes (27 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

14.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department provides wildland and structure fire protection to the Pinion Hills neighborhood. The Bureau of Land Management provides wildfire protection for the publicly administered lands surrounding the Pinion Hills neighborhood. Ownership and administration of much of this land will transfer from BLM to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the Pinion Hills neighborhood is approximately 20 minutes away roundtrip. Within the community there is a 10,000-gallon underground tank located at 1769 Pinion Hills Road.

14.3 RECOMMENDATIONS

- Conduct an assessment of fuel hazard conditions on all lots within the neighborhood boundaries and notify inattentive property owners of Ordinances that require fuel hazard reduction.
- Thin pinyon-juniper stands within and to the south and east of the Pinion Hills neighborhood. Outside of the defensible space zone, gradually diminish the intensity of tree and brush thinning within 0.5 miles of the neighborhood boundary.
- Monitor brush and invasive grass species encroachment on existing and future fuel reduction treatment areas and maintain as necessary. If needed, treat the area with a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension or the jurisdiction involved.
- If needed, reseed treated areas in the fall of the year (October-November) with a fire-resistant seed mixture. An example of a recommended seed mixture and specifications for the Carson City interface area is included in Appendix E. Create a site-specific seed mix in collaboration with the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or the jurisdiction involved.
- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix B.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition.* (U of NV Cooperative Extension).
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.
- Continue implementing the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option

Table 14.2 Results of the wildfire risk/hazard rating in the Pinion Hills neighborhood.

A. Urban Interface Condition ***2***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	5	/5
2. Fire Behavior	7	/10
3. Slope	4	/10
4. Aspect	7	/10

E. Suppression Capabilities

1. Water Source	5	/10
2. Department	1	/10

TALLIES

30 Total Houses **6 Residential Streets**

B5. Street Signs

3	not visible	3	visible	50%	visible

B6. Address Signs

7	not visible	23	visible	77%	visible

C1. Roofs

2	combust	28	not combust	93%	not combust

C2. Siding

15	combust	15	not combust	50%	not combust

C3. Unenclosed Structures on Lot

14	not enclosed	16	enclosed	47%	not enclosed

D1. Lot Sizes

12	<1ac	18	>1ac <10ac	0	>10ac

D2. Defensible Space

8	not adequat	22	adequate	73%	adequate

Community Hazard Score: **63** /128

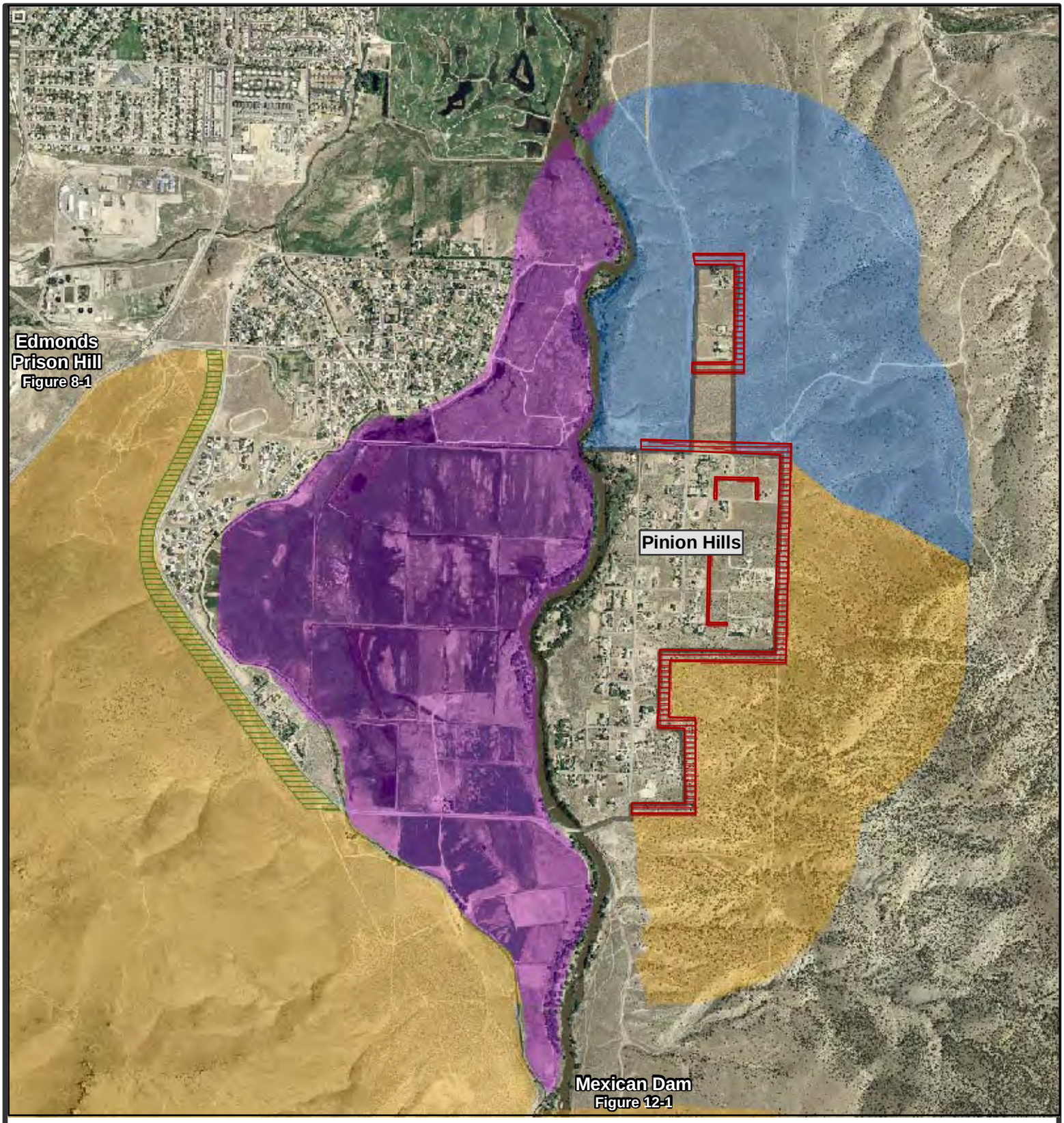

Figure 14-1. Pinion Hills fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments
- Establish fuelbreak
- Maintain fuelbreak

Fuel Hazard Class
- Low
- Moderate
- High
- Neighborhood Boundary

N

0 0.25 0.5
Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 14-2. Representative fuel types in the wildland-urban interface around the Pinion Hills neighborhood.

Pinion Hills 1. UTM 4337700N 267073E. View to West

Pinion Hills 2. UTM 4336178N 266418E. View to East

15.0 STEWART – SOUTH CARSON

FUEL HAZARD: MODERATE COMMUNITY RISK: MODERATE

The Stewart – South Carson neighborhood is located in south Carson City, to the east of Highway 395 at the Carson City/Douglas County line, along Delahedeh and Gibson Roads. Clear Creek passes near this portion of the neighborhood. The assessment area is bounded on the north by Bennett and Snyder Avenue and to the south by the Carson City/Douglas County line at Rabe Way and Center Drive. Schultz Drive and an irrigation ditch define the southeast neighborhood boundary.

15.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Stewart – South Carson neighborhood has characteristics of both classic and intermix wildland urban interface conditions. Stewart is primarily characterized by an intermix condition, with wildland fuels continuing throughout the neighborhood and no clear boundary between the wildland vegetation and residential structures. The South Carson area has certain characteristics of a classic wildland urban interface, where wildland vegetation abuts residential properties with a clear line of separation between back property lines and the adjacent native wildland vegetation.

The vegetative fuel density in the Stewart – South Carson wildland-urban interface is heavy. Fuels around the neighborhood consist primarily of big sagebrush and bitterbrush. Typical shrub heights range between three to eight feet, with the taller shrubs found within the Clear Creek floodplain. Fuel loads on the south side of the Clear Creek riparian zone are estimated at 2.0 to 6.0 tons per acre, and are classified as a **high fuel hazard**.

The Stewart neighborhood is on predominantly flat terrain. Hills to the south and west of the neighborhood range from 8 to 30 percent. Winds are predominantly from the south-southwest in the late afternoon.

The terrain along the east side of the South Carson neighborhood is steep (20 to 40 percent slopes). The predominant wind direction is from the south-southwest in the late afternoon, with occasional upslope and cross-slope winds in late afternoons in summer.

Fuel hazard conditions and photographs of representative fuel types around the Stewart-South Carson neighborhood are shown in Figures 15-1 and 15-2 at the end of this chapter.

An existing fuelbreak located along the south side of the neighborhood at Delahedeh Street is approximately 30 feet wide, running the length of the block, and was established in 2004-2005.

Table 15-1 summarizes the history of fuels reduction treatments within the Stewart – South Carson Assessment Area.

Table 15-1. Fuels treatment history for the Stewart–South Carson neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Fuelbreak 825’ x 30’	1	2004-2005	Washoe Tribe

15.2 NEIGHBORHOOD RISK/HAZARD RATING

Thirty-four residences were evaluated during the neighborhood hazard assessment, which resulted in classifying the Stewart – South Carson neighborhood in the **Moderate Hazard** category (41 points). A summary of the values that affect the hazard rating is included in Table 15-1. The primary wildfire hazard conditions in the Stewart – South Carson were lot sizes and potential for severe fire behavior due to high fuel loads around some structures in the interface and on undeveloped lots in the interior of the neighborhood.

15.2.1 Community Design

The Stewart – South Carson neighborhood contains structures that are scattered throughout the wildland, with no clear boundary between the wildland vegetation and residential areas in many places. The majority of the lots assessed in the Stewart area were on parcels of one acre or less. Parcel sizes were generally larger in the South Carson neighborhood and typically had more than three structures per acre.

- **Interface Condition**: intermix wildland-urban interface condition.
- **Access**: Clear Creek Avenue, Snyder Drive, and Topsy Lane are the primary access roads to the Stewart-South Carson neighborhood. These roads are greater than 24 feet wide and have less than a five percent slope, which provides adequate access for fire suppression equipment. No dead-end roads limit the ability for fire suppression equipment to maneuver or turn around.
- **Signage:** Residential addresses in the survey area were visible on most of the homes assessed (94 percent). Twelve percent of the street signs were not visible. Clear and visible residential addresses are important to assist firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** All of the utilities were above ground. Power line right-of-ways were properly maintained, which minimizes the possibility of power lines sparking during windstorms and starting fires in nearby vegetation.

15.2.2 Construction Materials

The majority of homes surveyed (91 percent) were constructed using fire resistant composite roofing materials. However, nearly a quarter of the homes in the interface were built with combustible siding. Many of the homes (18 percent) had unenclosed structures such as a porch, balcony, or deck that create drafty places where sparks and embers can be trapped, smolder, ignite, and readily spread fire to the home.

15.2.3 Defensible Space

Of the thirty-four homes evaluated, many (15 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

15.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department provides wildland and structure fire protection to the Stewart–South Carson neighborhood. The BLM Carson City Field Office also has wildland fire suppression responsibility for Washoe Tribe lands in Stewart.

Water Sources and Infrastructure

Water for fire suppression in the Stewart area is provided by 500 gpm hydrants within 500 feet of structures. Water for fire suppression in the South Carson neighborhood is from sources 20 minutes away roundtrip.

15.3 RECOMMENDATIONS

- Establish a Fire Safe Chapter in this neighborhood and encourage neighborhood participation.
- Continue the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition* (U of NV Cooperative Extension).
- Establish a fuelbreak approximately 4,000 feet by 125 feet (11 acres) beginning at the county line near the Clear Creek Mobile Home Park and the Stewart Cemetery, running to Clear Creek Avenue and behind Delahedeh, along the previously established fuelbreak. Thin shrubs to a minimum horizontal distance of twice the remaining shrub height or by creating a clustered mosaic pattern.
- Conduct annual assessments of fuel hazard conditions on all lots in the South Carson neighborhood and notify inattentive property owners of ordinances that require fuel hazard reduction. Brush mastication is recommended on approximately 48 acres throughout the neighborhood.
- If cheatgrass control is required, treat existing fuel reduction treatment areas with a pre-emergent herbicide according to the recommendations from the University of Nevada Cooperative Extension or the jurisdiction involved.
- If needed, reseed treated areas in the fall of the year (October-November) with a fire-resistant seed mixture. A sample seed mix and specifications for the Carson City interface area is included in Appendix E. Create a site-specific seed mix in collaboration with the jurisdiction involved.
- If resprouting rabbitbrush becomes excessive use an appropriate herbicide application as recommended by the University of Nevada Cooperative Extension or the jurisdiction involved to control rabbitbrush reestablishment.
- Establish a formal agreement between Carson City Fire Department and the Washoe Tribe for fire protection on tribal land in the Stewart neighborhood.

Table 15.2 Results of the wildfire risk/hazard rating in the Stewart-South Carson neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	1	/5
3. Unenclosed Structures	1	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	5	/5
2. Fire Behavior	7	/10
3. Slope	4	/10
4. Aspect	1	/10

E. Suppression Capabilities

1. Water Source	5	/10
2. Department	1	/10

TALLIES

34 Total Houses **8 Residential Streets**

B5. Street Signs

1 not visible | 7 visible | 88% visible

B6. Address Signs

2 not visible | 32 visible | 94% visible

C1. Roofs

3 combust | 31 not combust | 91% not combust

C2. Siding

8 combust | 26 not combust | 76% not combust

C3. Unenclosed Structures on Lot

6 not enclosed | 28 enclosed | 18% not enclosed

D1. Lot Sizes

21 <1ac | 13 >1ac <10ac | 0 >10ac

D2. Defensible Space

5 not adequat | 29 adequate | 85% adequate

Community Hazard Score: **41** /128

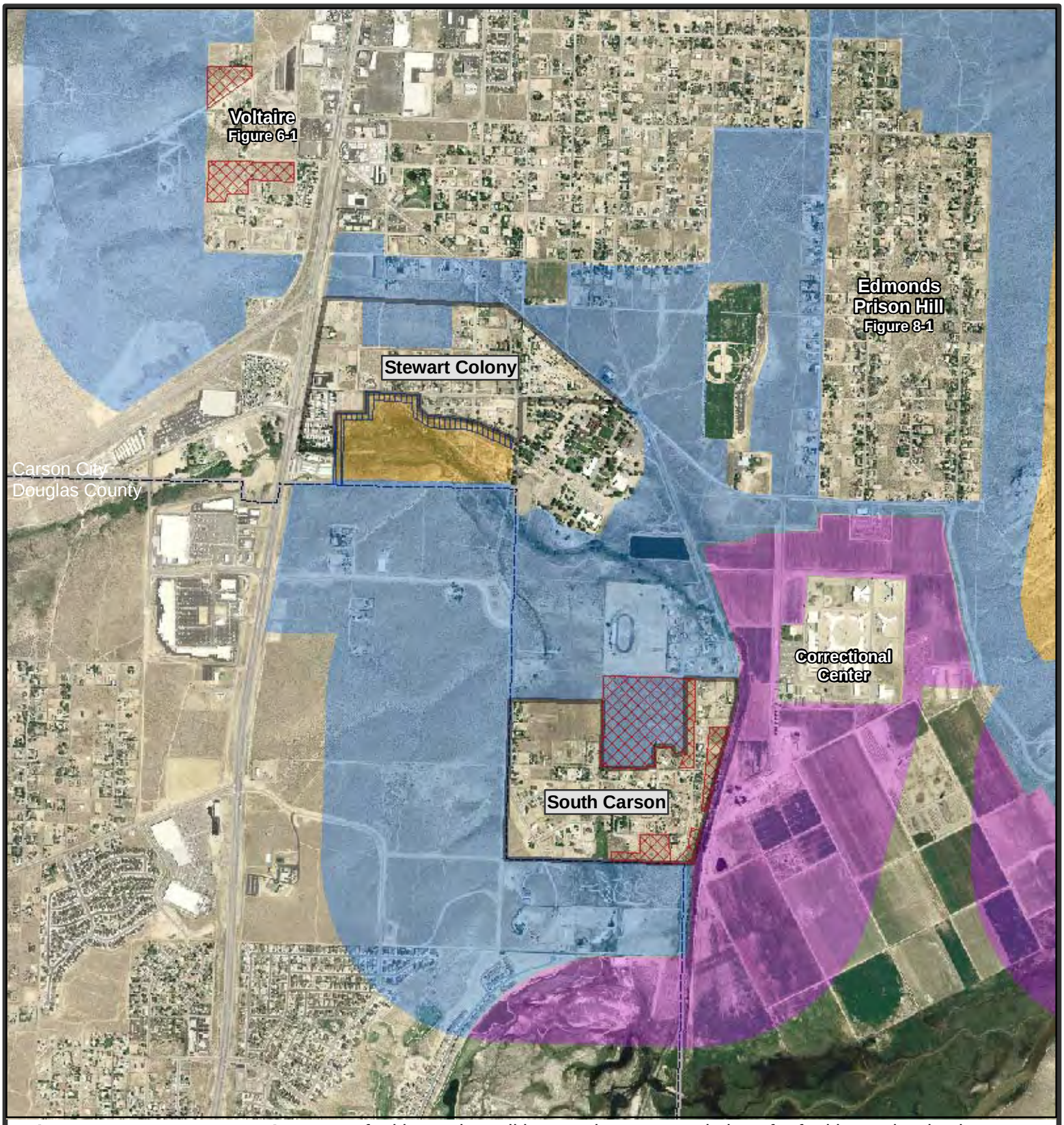

Figure 15-1. Stewart-South Carson fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments
- Establish fuelbreak
- Shrub Thinning

Fuel Hazard Class
- Low
- Moderate
- High
- Neighborhood Boundary

N

0 0.25 0.5
Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 15-2. Representative fuel types in the wildland-urban interface around the Stewart-South Carson neighborhood.

Stewart-South Carson 1. UTM4333367N 260854E. View to East

Stewart-South Carson 2. UTM 4333360N 261075E. View to West

16.0 TIMBERLINE

FUEL HAZARD: MODERATE – HIGH COMMUNITY RISK: MODERATE

The Timberline neighborhood includes the residential area located in the foothills west of Carson City and accessed by Timberline Road. The neighborhood includes the homes located on Westwood, Denmar, Woodridge, Lotus, Prospect and Upland roads.

16.1 INTERFACE CONDITIONS AND FUEL HAZARD

The Timberline neighborhood is characterized as an intermix wildland urban interface condition. Wildland fuels continue throughout the neighborhood with no clear boundary between the wildland vegetation and residential structures.

Vegetative fuel density is light to medium within the Timberline wildland-urban interface. Widely spaced Jeffrey pine and a scattered shrub layer consisting of Mormon tea, rabbitbrush and manzanita dominate the light fuel load found in the areas that were burned during the 2004 Waterfall fire. Understory fuels consist predominantly of pubescent wheatgrass, 12 to 18 inches tall. The fuel load ranges from 0.5 to 1.0 ton per acre and is classified as a **moderate fuel hazard.**

Fuel density within the unburned portions of the interface was classified as medium and consists of bitterbrush, big sagebrush, and rabbitbrush ranging from two to eight feet in height. Fuel load ranges from 2.0 to 4.0 tons per acre and is classified as a **high fuel hazard**.

In the center of the neighborhood, in the vicinity of Lotus Drive, a number of large Jeffrey pine trees grow under very dense, closed-canopy conditions. This area represents an **extreme fuel hazard**.

The terrain to the north, west, and south of the Timberline neighborhood is very steep (over 30 percent slopes) with several west\east directional canyons, including Vicee Canyon. Timberline is bounded to the west by reclaimed grass covered slopes up to 20 percent. The predominant wind direction is from the south-southwest, with strong afternoon downslope winds during the summer months and on the approach of cold fronts. Downslope afternoon winds along the Eastern Sierra Front commonly spread wildfire into the wildland-urban interface, and are the most common factor contributing to structure loss in a WUI for this region. There is a history of lightning strikes west of the Timberline neighborhood, and a strong history of recurring wildfires.

Fuel hazard mapping and photographs of representative fuel conditions around the Timberline neighborhood are shown in Figures 16-1 and 16-2 at the end of this chapter.

Table 16-1 summarizes the history of fuels reduction treatments within the Timberline Assessment Area.

Table 16-1. Fuels treatment history for the Timberline neighborhood.

Treatment Type	Treatment Area (approximate acres)	Treatment Year	Ownership
Grazing Treatment	594	2008	Carson City State of Nevada Board of Regents Private
Grazing Treatment	315	2007	Carson City State of Nevada Private
Hand Treatment 26 lots	33	2004	Private
Fuelbreak 1,980' x 100'	5	2004	State of Nevada
Fuelbreak 1,830' x 100'	4	2003	State of Nevada
Fuelbreak Roadside treatment areas	2	2001	State of Nevada

16.2 NEIGHBORHOOD RISK/HAZARD RATING

The risk/hazard assessment resulted in classifying the Timberline neighborhood in the **Moderate Hazard** category (57 points). A summary of the values that affect the hazard rating is included in Table 16-2 at the end of this chapter. The primary wildfire hazard conditions in the Timberline neighborhood were related to community design, including limited access roads and steep grades, construction materials, and the potential for severe fire behavior due to topography and fuel loading.

16.2.1 Community Design

Within the Timberline neighborhood, structures are scattered throughout wildland areas, and there is no clear line of demarcation between wildland vegetation and residential structures. Of the forty-eight homes assessed, most homes (69 percent) are situated on lots less than one acre in size, and fifteen homes (31 percent) are located on lots between one and ten acres in size.

- **Interface Condition**: intermix wildland-urban interface condition.
- **Access**: Timberline Road is the only paved road in and out of the Timberline neighborhood. The road is greater than 24 feet wide and allows adequate room for fire suppression equipment to maneuver. The road gradient is steeper than five percent. Steep roads and limited access to the neighborhood could limit fire suppression and evacuation activities during a wildland fire.
- **Signage**: All street signs within the Timberline survey area were clearly visible. Twenty-one percent of residential address signs were not visible. Clear and visible residential addresses are important to aid firefighting personnel in locating homes during low visibility conditions that may occur during wildland fire.
- **Utilities:** low risk of ignition.

16.2.2 Construction Materials

All the homes within the survey area were built with fire resistant composite roofing materials; however, half of the homes were constructed with combustible siding. Sixty-three percent of the homes had unenclosed structures such as a porch, balcony, or deck that create drafty places where sparks and embers can be trapped, smolder, ignite, and readily spread fire to the home.

16.2.3 Defensible Space

Of the forty-eight homes evaluated, several (29 percent) did not have landscaping that would meet the minimum defensible space requirement to help protect the home and minimize the potential for damage or loss during a wildfire.

16.2.4 Suppression Capabilities

Wildfire Protection Resources

The Carson City Fire Department provides structure fire protection to the Timberline neighborhood and the NDF Sierra Forest Fire Protection District provides wildland fire suppression. The U.S. Forest Service also provides fire protection for the national forest lands surrounding the Timberline neighborhood. Ownership and administration of much of this land will transfer from USFS to Carson City in 2009 or 2010. Fire protection for those lands will become the responsibility of the CCFD.

Water Sources and Infrastructure

Water availability for fire suppression in the Timberline neighborhood includes 500 gpm hydrants within 500 feet of structures.

16.3 RECOMMENDATIONS

Recommended and planned treatments for Timberline neighborhood are shown on Figure 16-1 and described in Table 16-3.

Table 16-3. Fuels treatment activities planned or recommended for the Timberline neighborhood.

Treatment Type	Treatment Area (approximate acres)	Ownership
Drill Seeding	59	Private
Grazing	910	Carson City Board of Regents State of Nevada Private

Additional recommendations for the Timberline neighborhood based on the 2008 risk/hazard assessment are as follows:

- Investigate options for establishing an emergency exit route from the community via the existing unpaved road that exits the neighborhood toward the west at the top of Timberline Drive, crosses Vicee Canyon to the south and continues to the south of Vicee Wash, west of Western Nevada College.
- For residences with large Jeffrey pine trees within 20 feet of structures, remove tree branches that come in contact with the home's exterior walls, eaves, or roof, as well as any branches that overhang the home.

- In the vicinity of Lotus Circle, reduce tree canopy closure by selective thinning. On flat to gently sloping ground, the ideal distance between tree canopies is ten feet. The separation distance will be greater on steeper slopes.
- North of the corner of Timberline and Prospect, salvage plastic tree tubes from pine plantings. If a pine replanting effort is to be coordinated, planting should occur late in the fall just before the ground freezes. This will permit the plantings to take full advantage of snow pack moisture in the springtime.
- Conduct annual defensible space and hazardous fuels evaluations on private and public lands.
- Distribute copes of *Living With Fire: A Guide for the Homeowner, Eastern Sierra Front Edition.* (U of NV Cooperative Extension).
- Continue implementing the defensible space dumpster program to provide homeowners with an easily accessible biomass removal option.
- Encourage homeowners to follow the UNR Cooperative Extension's recommendations for fire safe landscaping.

Table 16.2 Results of the wildfire risk/hazard rating in the Timberline neighborhood.

A. Urban Interface Condition ***1***

B. Community Design

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

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	5	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	3	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	1	/10

TALLIES

48 Total Houses **6 Residential Streets**

B5. Street Signs

0 not visible | 6 visible | 100% visible

B6. Address Signs

10 not visible | 38 visible | 79% visible

C1. Roofs

0 combust | 48 not combust | 100% not combust

C2. Siding

24 combust | 24 not combust | 50% not combust

C3. Unenclosed Structures on Lot

30 not enclosed | 18 enclosed | 63% not enclosed

D1. Lot Sizes

33 <1ac | 15 >1ac <10ac | 0 >10ac

D2. Defensible Space

14 not adequat | 34 adequate | 71% adequate

Community Hazard Score: **57** /128

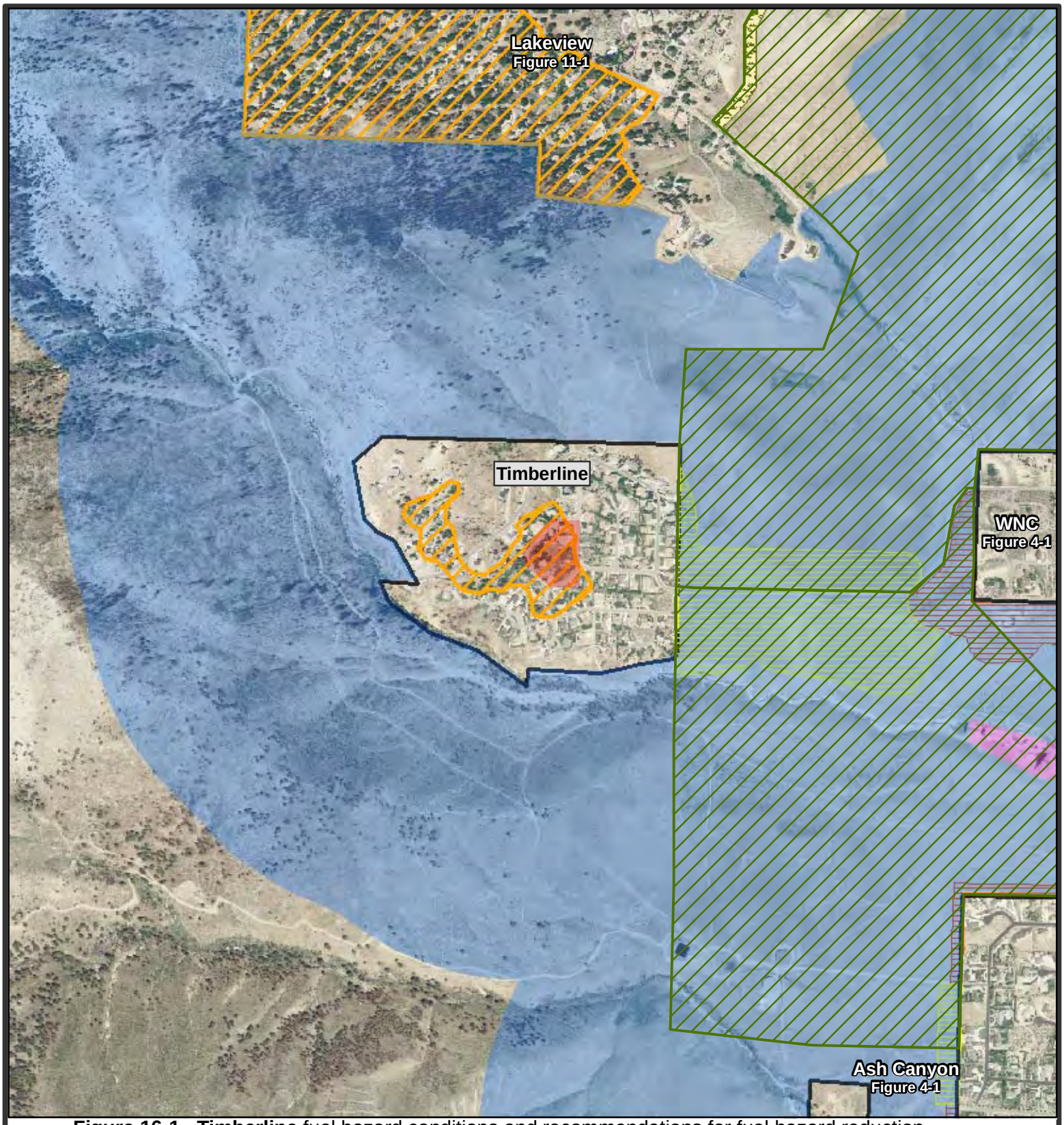

Figure 16-1. Timberline fuel hazard conditions and recommendations for fuel hazard reduction.

Recommended Treatments

- Thin Shrubs
- Thin Shrubs & Seed
- Drill Seed
- Pruning/ Selective Thinning
- Grazing Treatment

Fuel Hazard Class

- Low
- Moderate
- Extreme
- Neighborhood Boundary

N

0 0.1 0.2

Miles

Carson City CWPP Final Draft, July 2009.
Base map: NAIP Aerial, 2006

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Figure 16-2. Representative fuel types in the wildland-urban interface around the Timberline neighborhood.

Timberline 1. UTM 4341466N 257189E. View to East

Timberline 2. UTM 4341311N 257030E. View to South

17.0 REFERENCES

Anderson, H. E. 1982. Aids to determining fuel models for estimating fire behavior. A publication for the national wildfire coordinating group. NFES 1574. Gen. Tech. Rpt. INT-122.

Arno and Fiedler 2005. Mimicking nature's fire: Restoring fire-prone forests in the West. Island Press.

Communities Committee of the Seventh American Forest Congress, National Association of Counties, National Association of State Foresters, Society of American Foresters, Western Governor's Association. 2004. Preparing a Community Wildfire Protection Plan. A handbook for wildland-urban interface Communities.

Communities Committee of the Seventh American Forest Congress, National Association of Counties, National Association of State Foresters, Society of American Foresters, Western Governor's Association. 2008. Community Guide to Preparing and Implementing a Community Wildfire Protection Plan.

Davison, Jason, Ed Smith, and Linda Wilson. 2006. Livestock grazing guidelines for controlling noxious weeds in the western United States, UNR Cooperative Extension Publication EB-06-05.

Edgar, Steve, Bureau of Land Management. April, 2009. Personal communication: written comments on Draft 2009 Carson City CWPP update.

Johnson, Jennifer, Washoe Tribe of Nevada and California. March 14, 2009. Personal communication: written comments on Draft 2009 Carson City CWPP update.

Klug, Michael, Nevada Division of Forestry. April 15, 2009. Personal communication: written comments on Draft 2009 Carson City CWPP update.

Nabors, Beth, USDA Forest Service. May 8, 2009. Personal communication: comments on Draft 2009 Carson City CWPP update.

Resource Concepts, Inc. 2005. Nevada Community Wildfire Risk/Hazard Assessment Project. Carson City.

Roide, Tim, Bureau of Land Management. April, 2009. Personal communication: written comments on Draft 2009 Carson City CWPP update.

University of Nevada Cooperative Extension. 2005. Living With Fire Guide to Homeowners: Eastern Sierra Front Edition.

USDA Forest Service. 2004. Waterfall Fire Burned Area Emergency Response (BAER) Plan. US Forest Service, Humboldt-Toiyabe National Forest, Carson Ranger District, Carson City, Nevada.

USDA Forest Service. 2008. Carson Range Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy.

USDA Forest Service. 2008. Environmental Assessment Clear Creek Fuels Reduction and Ecosystem Enhancement Project. Humboldt-Toiyabe National Forest, Carson Ranger District, Carson City and Douglas Counties, Nevada..

APPENDICES

Appendix A

List of Preparers / Personal Communications

Appendix A
List of Preparers / Personal Communications

List of Preparers

Sheila Anderson	RCI Project Manager
Josh Lynn	RCI Project Team
Jody Matranga	RCI Project Team
John McLain	RCI Project Principal
Jim Reinhardt	RCI Project Team
JoAnne Robben	RCI Project Team

Agency Contacts

Ann Bollinger	Carson City Open Space Division
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Matt Forrest	Carson City Public Works
Stacey Giomi	Carson City Fire Department
Stan Heinrich	Bureau of Indian Affairs
Steve Howell	US Forest Service Carson Ranger District
Mike Klug	Nevada Division of Forestry Western Region
Pat Murphy	Nevada Fire Safe Council
Beth Nabors	US Forest Service Carson Ranger District
Tim Roide	Bureau of Land Management Carson City District
Ken Smihula	Bureau of Land Management Carson City District
Mike Wilde	US Forest Service Carson Ranger District

Appendix B

Fuel Reduction Treatments Used In The
Wildland Urban Interface Around Carson City

Appendix B

Fuel Reduction Treatments Used In The
Wildland Urban Interface Around Carson City

Riparian Treatments

Areas indicated as "Riparian Treatment" contain willow vegetation with dense herbaceous understory. The woody vegetation is characterized by a dense tangle of dead branches, dying willows, and accumulations of tumbleweeds and other flammable materials. In dry conditions, drainages can serve as a wick and rapidly carry fire past control lines.

Treatment for these areas includes aggressive pruning of the dense riparian woody vegetation to break the fuel continuity. This pruning will also encourage more abundant green riparian vegetation growth, which will be a better defense against wildfire. Native surrounding vegetation should be thinned for a distance of 100-150 feet upslope of the riparian area.

Grazing Treatments

The need to proactively prevent the invasion of large unbroken stands of cheatgrass is urgent. Sheep grazing treatments are being implemented annually to directly address the threat of cheatgrass invasion on the areas burned by the Waterfall Fire. Targeted grazing during a window of opportunity in the spring when cheatgrass is beginning to green-up but seeded and native fire-resistant species are still dormant will reduce cheatgrass seed production and give desired grass species better conditions in which to establish.

Dumpster Programs

A partnership between the Nevada Fire Safe Council and the Carson City Fire Department provides the use of a dumpster and trailer for residents to use for disposal of fuels reduction residues collected on private property. For the past four years the BLM District Office has provided funding to the CCCFD through the Community Assistance Grant. In one year, five Fire Safe Chapters (Timberline, Kings Canyon, Lakeview, North Carson, and Mexican Dam/Pinion Hills) filled 164 trailer loads and 61 dumpster loads for a total of 160 tons of biomass removed from residential defensible space zones.

In another partnership, the Nevada Division of Forestry and the USFS had specialized roll off bins fitted to a Freightliner truck and used them to collect woody residues from large-scale fuels reduction projects in the region. Slash and green waste was delivered to a biomass-fueled combined heat and power plant at the Northern Nevada Correctional Center. This infrastructure helps to divert biomass from burn piles in the field into a biomass delivery system for energy generation.

Six Steps to Creating an Effective Defensible Space. (UNCE 2005)

1. Define the size of an effective defensible space for individual residences. The recommended size will vary depending on surrounding vegetation and slope, according to the following guidelines:

Guidelines for determining an effective defensible space distance on residential lots.

	Flat to Gently Sloping 0-20%	Moderately Steep (21-40%)	Very Steep (+40%)
Grass	30 feet	100 feet	100 feet
Shrubs and Woodland	100 feet	200 feet	200 feet
Trees	100 feet	100 feet	200 feet

2. Remove dead vegetation
3. Create a separation between live trees of shrubs to break the horizontal continuity of fuels. For shrubs and small trees, create a spacing equal to twice the height of the remaining shrubs. This spacing will be greater on steeper slopes. For trees, leave a distance of at least ten feet between live canopies.
4. For trees in the defensible space zone with shrubs in the understory, ensure that there is adequate space between the understory vegetation and the tree branches above to prevent flames from reaching the canopy. A rule of thumb is to leave a space between tree branches and shrubs that is equal to three times the height of the understory shrubs by pruning tree branches and shrub tips.
5. Create a lean, clean and green area extending at least 30 feet from the house.
6. Maintain defensible space.

Appendix C

Neighborhood Risk/Hazard Assessment Rating Score System

Appendix C

Neighborhood Risk/Hazard Assessment Rating Score 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 80-90%	5
Non-combustible covering 70-80%	8
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 *(continued)*	Score
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.	3
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.	7
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.	10

Appendix D

Glossary of Terms

Appendix D
Glossary of Terms

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

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

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

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

Aspect: Direction toward which a slope faces.

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

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

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

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

Contain a Fire: A 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.

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 time lag 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 Danger: Described as low, moderate, high, or extreme based on various weather indices.

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 Regime: The capacity of a species to maintain or regain normal function and development following a fire.

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: A 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 possible 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/Extreme Fire Danger: 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. May include "red flag" warnings.

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.

Lake Tahoe Regional Fire Chief's Association: A regional mutual aid agreement between signatories and the Lake Tahoe Regional Fire Chief's Association provides for the activation of pre-assigned task forces and strike teams with multiple suppression apparatus to participating fire departments and fire protection districts under a "good neighbor" policy of free assistance for a predetermined period of time. This agreement is directed by an operating plan and mobilization guides updated annually by each participating force. These guides set forth the commitments made in local agreements, the regional plan, and assistance for hire predicated on closest resource and the dispatch level of the request: Initial attack (nearest on-duty crews respond), immediate need (crews respond within 30 minutes), or planned need beyond initial attack. While state agencies are members of the Lake Tahoe Regional Chief's Association, the mutual aid agreements does not include state or federal resources.

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.

Sierra Front Wildfire Cooperators: Membership in the Sierra Front Wildfire Cooperators is composed of more than 25 federal, state and local entities. Fire suppression agencies, state and local law enforcement agencies and special organizations such as the Natural Resources Conservation Service, and the U.S. Weather Service comprise the membership of the Sierra Front Wildfire Cooperators. By pooling their resources, these agencies take a more efficient approach to the common goal of fire protection and a quicker response to wildland fires and other emergencies. The Sierra Front area of responsibility extends north from Reno to Susanville, California and south to Bridgeport, California, including the Tahoe Basin and east to Fallon, Nevada.

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

Survivable: Defensible space conditions where no flame contact or prolonged heat exposure leading to home ignition is expected.

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.

Appendix E

Fire-resistant Seed Mixture & Seeding Specification
Recommendation for Carson City

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Fire-resistant Seed Mixture & Seeding Specification
Recommendation for Carson City

Seedbed preparation is essential to seeding success. Seedbeds must be loosened and friable. If necessary, disk to a depth of six inches not more than 2 days prior to seeding.

The following seed mix is formulated for application with a drill seeder. For hand broadcast applications, increase seed quantities by 30 percent and incorporate the seed using a rake or harrow. A length of chain link fence, dragged behind an ATV, makes an effective harrow for larger areas.

Low Elevation Drill Seed Mix

Scientific Name	Common Name	Rate PLS Pounds/acre	Percent of Mix
Agropyron desertorum	'Hycrest' crested wheatgrass	4.50	34
Agropyron sibericum	Siberian wheatgrass	4.50	34
Poa secunda sandbergii	Sandberg bluegrass	0.25	12
Eriogonum umbellatum	Sulfur flower	0.25	2
Kochia prostrata	Prostrate summer cypress	0.10	2
Linum lewisii	Blue flax	0.30	4
Medicago sativa	Ladak alfalfa	0.80	9
Penstemon palmeri	Palmer penstemon	0.10	3
	TOTAL	**10.8**	**PLS pounds per acre**

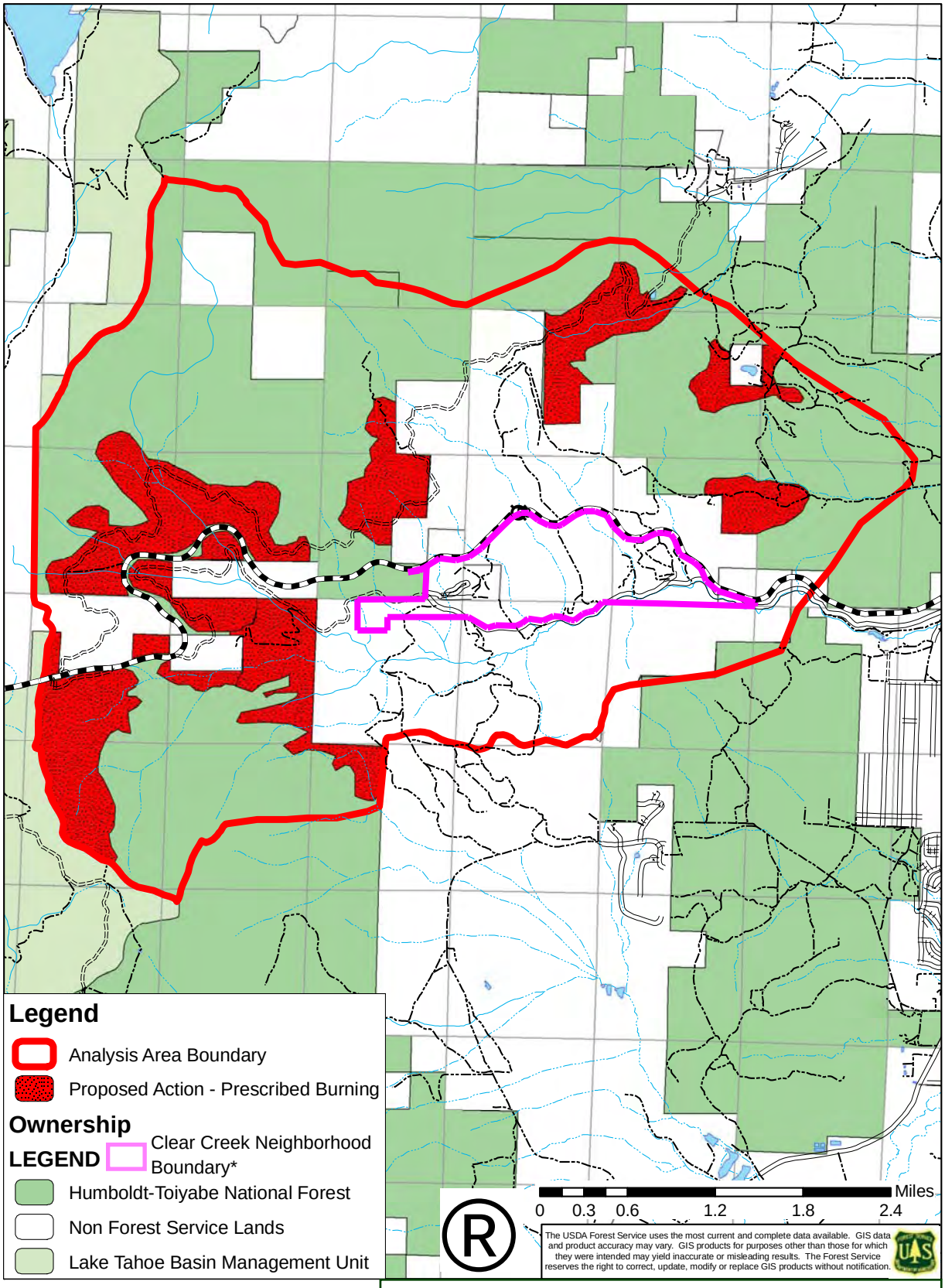
PLS = Pure Live Seed

Appendix F

Excerpts From Agency Regional Plans Within the Carson City Vicinity

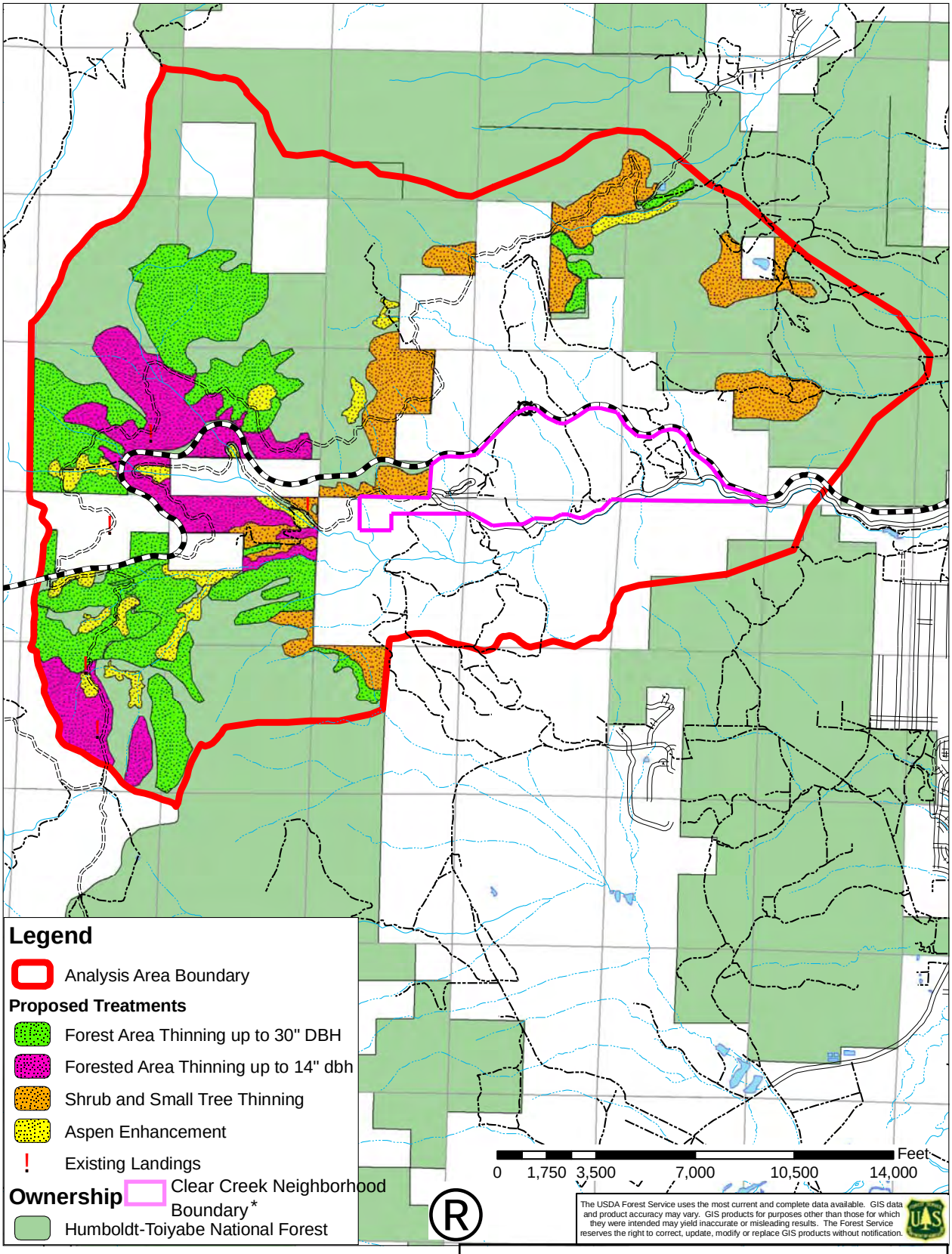
- USFS Figure "2-1 Proposed Action -- prescribed burning"
- USFS Figure "2-2 Proposed Action -- tree and shrub thinning and aspen enhancement"
- Washoe Tribe Figure "Upper Clear Creek Parcel Previous Fuels Reduction Project"
- Washoe Tribe Figure "Upper Clear Creek Parcel Proposed Treatments"

Figure 2-1. Proposed action – prescribed burning.



*This figure was modified by RCI on 4/2/2009 for inclusion in the 2009 Carson City CWPP Update.

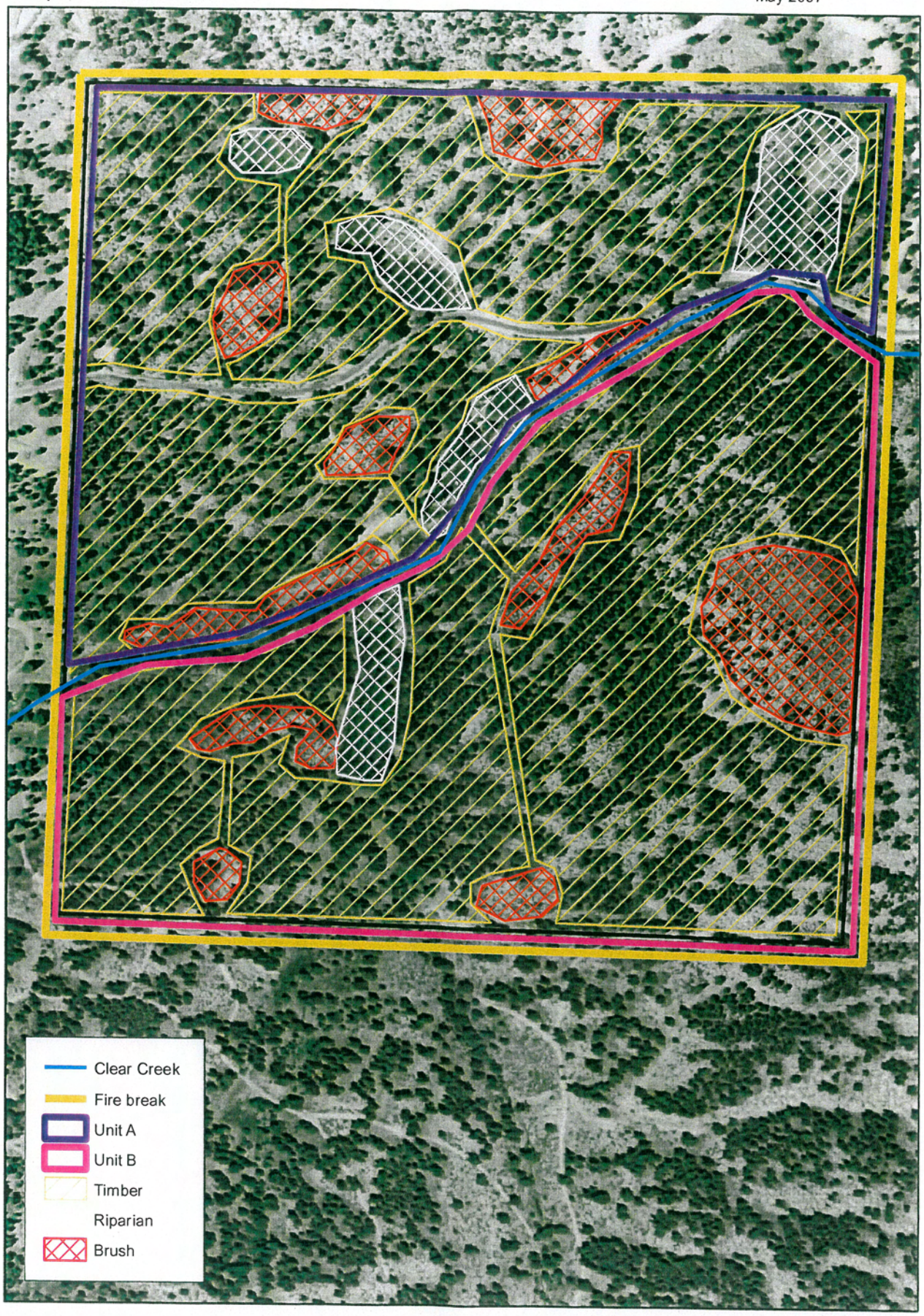
Figure 2-2. Proposed action – tree and shrub thinning and aspen enhancement



* This figure was modified by RCI on 4/2/2009 for inclusion in the 2009 Carson City CWPP Update.

Washoe Tribe
Upper Clear Creek Parcel
Proposed Treatments

Washoe Tribe of NV and CA
Environmental Protection Department
GIS: J. Johnson
May 2007



Washoe Tribe
Upper Clear Creek Parcel
Previous Fuels Reduction Project

Washoe Tribe of NV and CA
Environmental Protection Department
GIS: J. Johnson
May 2007