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 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.

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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 plan². 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.

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

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

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.

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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

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- 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 midslope, 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.

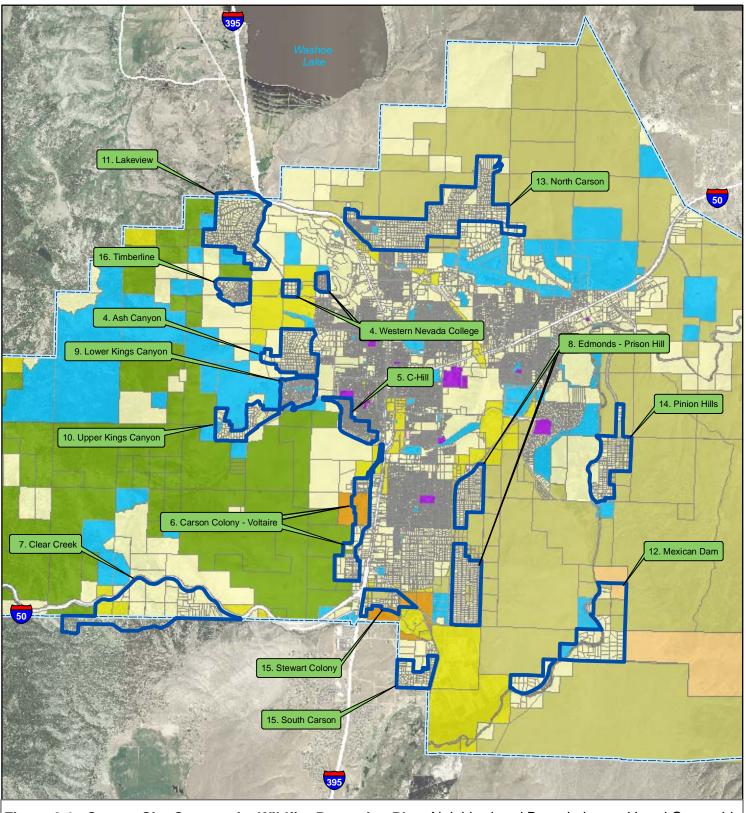
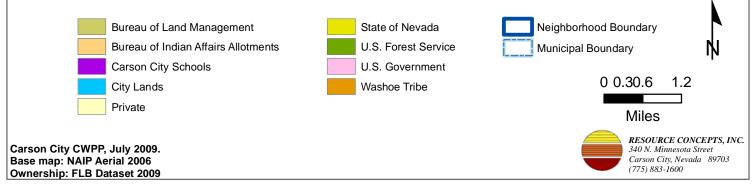
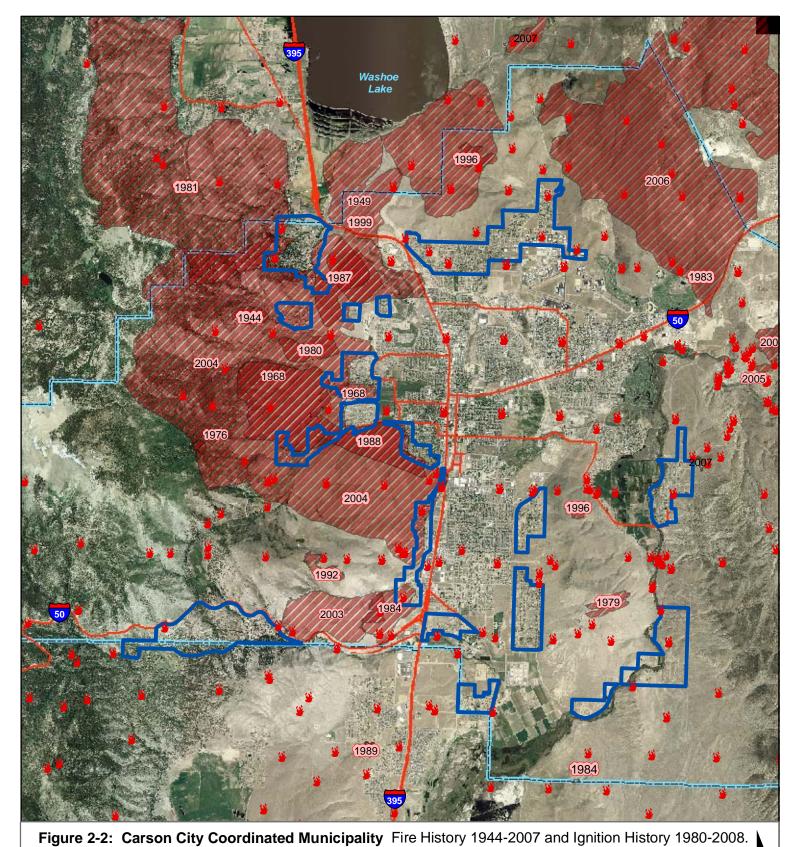


Figure 2-1. Carson City Community Wildfire Protection Plan Neighborhood Boundaries and Land Ownership





Neighborhood Boundary Fire History Municipal Boundary Federal Ignition History Record 2 0.5 Miles RESOURCE CONCEPTS, INC. Carson City CWPP Final Draft, July 2009. Base map: NAIP Aerial, 2006 340 N. Minnesota Street Carson City, Nevada 89703 (775) 883-1600

Ignition data: Federal Fire History Reports: 1980-2008 DOI (BIA,BLM,NPS), USFWS, and USFS