EXECUTIVE SUMMARY

The purpose of this Wildfire Hazard Assessment and Mitigation Plan (WHAMP) is to present the survey findings and assessment concerning the risk of wildfires to the community of Spring Valley/Double Springs, Nevada. This document will assist the appropriate fire management and public safety officials in providing better fire prevention services for the residents of the community. To facilitate its use, this document has been tab-indexed to allow for quick location of information, especially in the event the community becomes threatened by a wildfire. In addition to sections containing the purpose, need, and methodology for the WHAMP, the document contains three sections that systematically outline the nature of the wildfire risks to the community as well as the specific mitigation needed to address these potential risks. These three sections include the Community Description, Community Hazards, and Mitigation. The nature of each section is as follows:

- Community Description presents the hard data representing the nature and character of the Spring Valley/Double Springs community. This section includes information on land ownership and use, geographic setting, transportation systems, and climate. This information is necessary to adequately perform a risk assessment specific to the community. Information that may affect fire behavior and suppression efforts has been included to give fire officials and planners an overall view of the community to be assessed prior to dedicating resources in the event of a wild land fire.

- Community Hazards presents and discusses critical information that was used to identify specific risks and hazards to the Spring Valley/Double Springs community. This information includes a history of fire within the community and surrounding area, vegetation hazards, community exposure, community risks, and wildfire emergency response. All information collected on specific structures was used to rank them individually within the community. This information was then used to calculate the ranking of the community as a whole. The structure and community ranking was based upon a risk assessment performed through use of National Fire Protection Agency (NFPA) Standard Form 299 (Appendix A).

- The section entitled Mitigation provides recommendations to address specific risks that exist for the Spring Valley/Double Springs community. It also discusses the benefits of implementing the recommendations.

This document will provide assistance to managers and fire officials in budgeting time and resources for risk management in ways that are goal oriented and tangibly defensible. Priority for project funding and implementation can be determined from the amount of risk that can be reduced by the implementation of various projects. Risk reduction can be evaluated from the discussions in the text and information in the tables regarding Relative Risk Values (RRVs) based on current conditions compared to changes in conditions resulting from mitigation projects. Benefits from any one particular mitigation project can be compared to those of other projects to determine the order in which implementation should occur. Information regarding

cost and time of implementation can be justified or substantiated based on the projected reductions in RRVs estimated by the model, as discussed later in this document. This information will assist project managers and officials in identifying, proposing, and funding mitigation projects for this community.

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Wildfire Hazard Assessment and Mitigation Plan

for

Spring Valley/Double Springs, Nevada

Purpose and Need

As communities grow and as new communities are developed urban areas encroach upon wildland environments creating a situation where flammable wildland fuels are in close proximity to houses and community structures (Figure 1). The geographic area where this occurs is called a wildland-urban interface (WUI). Expansion of the WUI increases the potential for conflicts between community and their wilderness surroundings, especially in terms of the potential for damaging wildfires.

Figure 1. The Wildland Urban Interface

Because of increased agriculture, urbanization, and general public concerns over the last 100 years federal and state fire officials have maintained a strict policy to actively suppress all fires that occur in wildland areas within the arid western United States. Prior to the fire suppression policy, fires were allowed to burn naturally. The change in fire management policy has caused a change in the structure of existing fire-prone ecosystems, primarily due to a change in the native vegetation composition. Another result of the policy change was the encroachment and expansion of non-native plant species. As a result of the changes in the wildland ecosystem, when wildland fires do occur they may burn larger and hotter than those in the past and possess an increased risk to human welfare and ecological integrity.

Wildfires are an integral component of most forest and rangeland ecosystems. It is one of nature's ways of recycling and returning nutrients to the environment. Although fire may not be ecologically harmful, it becomes undesirable and even dangerous in areas of increased human population along the WUI. Over the last two decades, the western United States has seen a

dramatic increase in the intensity and number of wildfires each year. To reduce the risk of these fires in the WUI, the President of the United States directed the Secretaries of the Departments of Agriculture and Interior to increase federal investments in projects to reduce the risk of wildfire in the WUI.

Seasonal wildfires represent a potential threat to both new and established older community along the WUI. During the wildfire season, the availability of fire fighting personnel is often diminished depending on: the occurrence of other fires in the region, the size of those fires, the size of the community at risk, and the number of structures needing protection. Even for an individual fire, there are not always enough firefighters to quickly suppress fires before structures are threatened or damaged by fire. While firefighters are defending one structure, the perimeter of the fire may rage on elsewhere, threatening many more structures and consuming many acres of vegetation. For these reasons, residents of community along the WUI cannot solely depend on firefighters to save their property. To lessen or possibly even to eliminate damages to property by wildfires, residents can help protect their property and community by taking defensive steps to assist firefighters both before and during the fire season. The concerns and mitigation plans addressed by this document include the potential for wildfires and the threat they pose to the Spring Valley/Double Springs community.

In recognition of the existing potential for harm or damage to residents and their homes along the WUI, the Nevada Fire Safe Council has funded this WHAMP. SWCA, Inc. Environmental Consultants (SWCA) was contracted to conduct the assessment and prepare the WHAMP. This document is intended to aid the Spring Valley/Double Springs community in the continuing work to improve the safety of life and property of community residents. Specific information contained in the WHAMP will allow the Spring Valley/Double Springs community and its partners to perform the following tasks:

- Improve firefighter and public safety,
- Establish mitigation priorities and develop mitigation strategies,
- Develop a tactical fire response and evacuation plan,
- Strategically locate and plan fuel reduction projects,
- Recommendations for alternative treatment methods,
- Develop cost/benefit analyses to validate expenditures and document funding needs.

Methodology

In the development of this hazard assessment and the subsequent mitigation recommendations for the Spring Valley/Double Springs community, SWCA used a methodology that incorporated data collection and analysis. Data collection included fuel and structure surveys, as well as interviews with community, local, state, and federal officials. This data was compiled into a database representing the community infrastructure. Analysis of the data was accomplished through use of a mathematical model developed to evaluate the Relative Risk Values (RRVs) for community at risk. The information within the database and the analysis of this information was compiled to develop the following community hazard assessment and mitigation recommendations to address identified fire hazards.

Data Collection

Data collection was accomplished in four steps:

- The locations of all the roads within and surrounding the Spring Valley/Double Springs community were mapped.
- Each building in the community was assessed and assigned a fire hazard rating.
- The location of each building was mapped.
- All water sources within the community were located and mapped.

SWCA began data collection through Global Positioning Systems (GPS) mapping of all paved roads within the community and surrounding areas. This information was entered into the community infrastructure database. To accomplish the assessment of individual structures for fire hazard potential, SWCA survey teams utilized the National Fire Protection Agency (NFPA) Standard Form 299 (Appendix A). The NFPA Standard Form 299 consists of a series of questions designed to determine potential fire risks and hazards to individual structures. For the purposes of this study, hazards are defined as the vegetative components, including type, arrangement, volume, condition, and location, that surrounds a community and could increase its potential for damage caused by wildfire. Risks are defined as the non-vegetative components within a community that could increase its potential for damage from wildfire. Risks could include such things as building materials, defensible space, availability of water, access, etc. SWCA personnel used this form to assess each currently occupied residential home and business under five categories representing potential risks and hazards: construction of the building, fire protection, access, utilities, and vegetation. Responses in these categories were then tallied to calculate the RRV (discussed more fully in the following section) for each structure.

During the assessment of individual structures, SWCA survey teams located and mapped the location of each structure. These locations were then added to the community infrastructure database.

The final step in the data collection process involved identifying and mapping the locations of all water sources in the community. GPS technology was used to gather this data, which was then entered into the community infrastructure database.

Data Analysis

For the data analysis used for this assessment, SWCA utilized a mathematical model developed to evaluate fire risks and hazards, as defined in the preceding paragraph, for community at risk. The model uses information collected on assessment forms (NFPA Standard Form 299) by SWCA survey crews for each currently occupied residential home and business within the community. The data from these forms was entered a computer database representing the community infrastructure. The database was then evaluated statistically to produce a unique quantifiable Relative Risk Value, or RRV, for each home and an average RRV for the community as a whole.

Each RRV was calculated as follows, where *i* is the risk or hazard identified from the NFPA Standard Form 299, *j* is the individual structure within the community, RRV_j is the RRV calculated for the j^{th} home, C_{ij} is the response variable for the risk or hazard (*i*) listed on the NFPA Standard Form 299 for each structure (*j*), RRV_p is the average RRV calculated for the community (*p*), and *n* is the total number of structures within the community:

$$RRV_j = \sum_i C_{ij}$$

$$RRV_p = \frac{\sum_{j=1}^{n} RRV_j}{n_i}$$

As stated previously, SWCA personnel collected data on potential fire risks and hazards by using the NFPA Standard Form 299 for each currently occupied residential home and business. Responses on each form were then tallied and used to calculate the RRV for individual structures. Based on its RRV, each structure was then placed into four risk categories (Low Hazard, Medium Hazard, High Hazard, or Extreme Hazard). The range of values for these four categories can be found at the bottom of the NFPA Standard Form 299 (Appendix A). These individual structure RRVs were then compared to identify the RRV for the community as a whole. Specific RRVs for each structure, as well as the mean, maximum, and minimum values for the community as a whole are listed in Appendix D.

Individual structures, or groups of structures, identified with high RRVs were further evaluated based on possible causes for the high RRV. Once these causes were identified, mitigation recommendations (discussed in "Mitigation") were developed to address and reduce identified

risks and hazards. To quantify the viability of these mitigation recommendations, the model was used to recalculate the RRV for each home to reflect the possible changes resulting from implementation of the recommendations. Comparisons were then made between the initial baseline RRV and recalculated RRV for each home to evaluate the effectiveness of specific proposed mitigation measures.

Community Description

Geographic Setting

The community of Spring Valley/Double Springs lies southeast of the Minden/Gardnerville area in Douglas County, Nevada (Figure 2). The community is located along Highway 395 and is northwest of Topaz Lake at an elevation of 4,600 to 6,400 feet.

Transportation Systems

The Spring Valley/Double Springs community is easily accessed from Highway 395. Within the community there are several improved roads that link parts of the community together and allow access to Highway 395. Figure 3 shows the roads and infrastructure of the community (Note: Figure 3 also shows the structures of the community; those structures that appear very close together are usually houses and their outbuilding or detached garages). Some roads in the area do not allow adequate access to and from the community. Cavelti Road does not allow adequate access to homes in the community because of the width of the road and the lack of surfacing along sections of the road. Pine Valley Road was recently improved (resurfaced and the slope reduced) and now allows a second access point to the community for emergency vehicles from Highway 395.

Climate

Generally, the Spring Valley/Double Springs vicinity has an arid climate and experiences warm summer months (June through August) with temperatures ranging from 80° to 95°. Winter months (December through February) are moderate with temperatures ranging from 30° to 45°. See Figure 4 for 14-year average temperatures.

The precipitation of the area ranges from 1.5 inches per month in the winter to below a quarter of an inch per month in the summer months. Figure 5 shows the average monthly precipitation over a 14-year period.

The prevailing winds of the area are from west to east, and are generally of higher velocity in the afternoon. The weather data for the area comes from the Western Regional Climate Center, Topaz Lake Station. This weather station is the geographically closest station to the community.

Figure 2. General Vicinity Map

Figure 3. Roads and Infrastructure

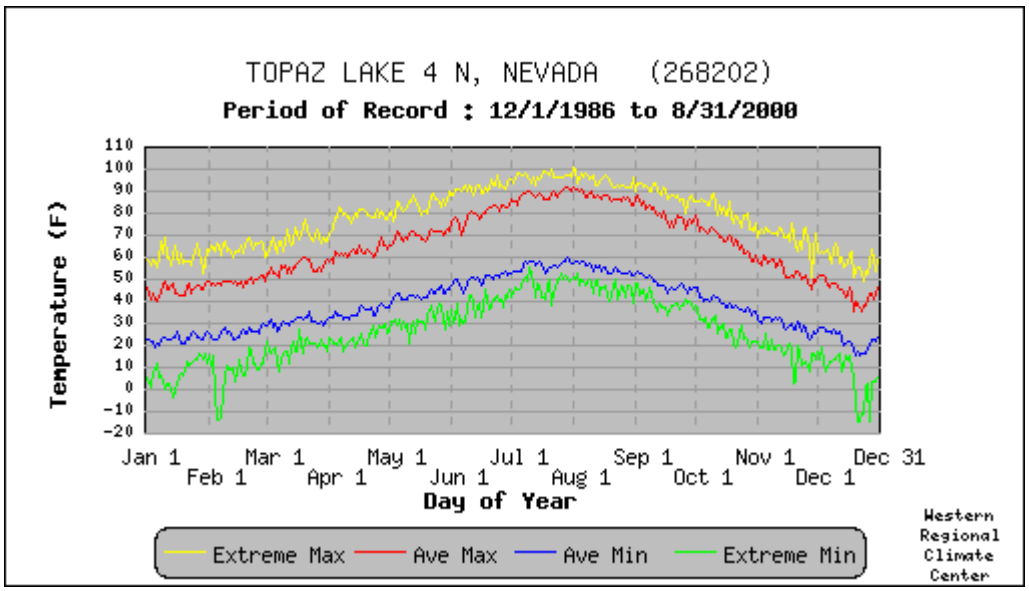

Figure 4. Climate for Spring Valley/Double Springs, Nevada

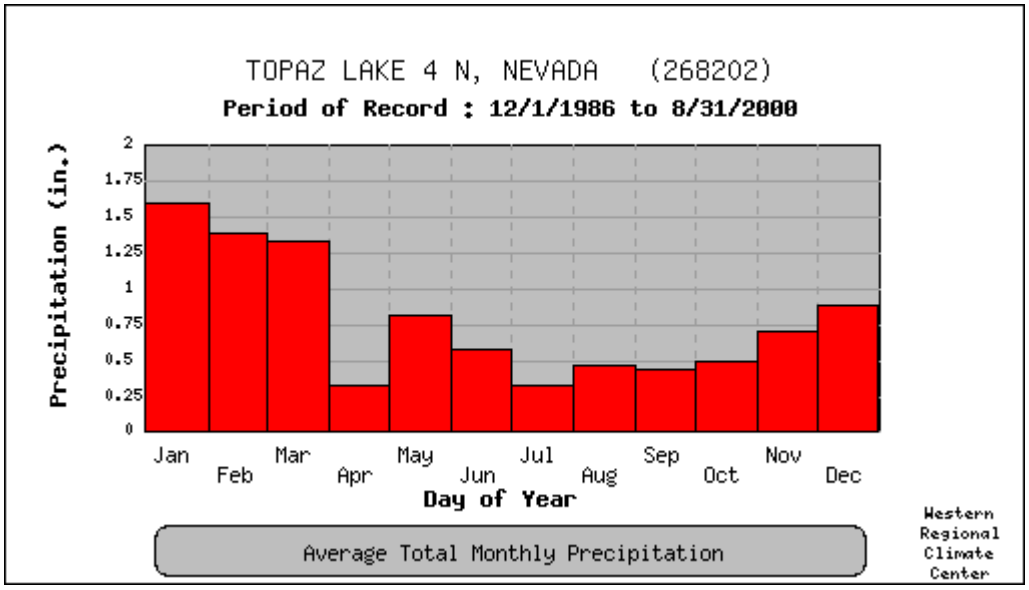

Figure 5. Precipitation for Spring Valley/Double Springs, Nevada

Community Hazards and Risks

Fire History

There is a record of fires in the area dating back several decades. In the higher elevations of the east slope of the Sierras, wildfires historically have been caused primarily by lightning strikes. Many fires started by lightning strikes remain small and can be controlled during their initial burning period. Based on information on past wild land fires in the area, the fire history rating is high. From 1999 through 2002 there were nine large wild land fire incidents (fires that burned over 300 acres or fires with an incident management team assigned) in the vicinity of the Spring Valley/Double Springs community. The locations of these fires are shown in Figure 6. Appendix B contains the causes, acres burned, and other specific information on the fires in the area from 1999 through 2002 from the Western Great Basin Coordination Center Website. Table 1 shows the years, acres burned, and name of the fires in the vicinity of the community.

Table 1. Fire History

Year	Area Burned (in Acres)	Name
1999	247	West Fire
2000	554	China Fire
2000	-	Golden Complex
2001	500	Siegel Fire
2002	861	Buckeye Fire
2002	22,750	Cannon Fire
2002	448	China Springs Fire
2002	9,866	Gate Complex Fire
2002	600	Silver Two Fire

Data compiled from the Western Great Basin Coordination Website: www.nv.blm.gov/wgbcc/past%20season%20info.htm

Vegetation Hazards

The Double Springs/Spring Valley community has three vegetation types: Pinyon/Juniper Woodland, Sagebrush/Bitterbrush Community, and Meadow Community. These vegetation types were used as indicators to determine the NFFL Fuel Model[1] relative fire hazards, within the community. Figure 7 illustrates the vegetation types within the community.

The area is suffering from drought stress and beetle infestation. The Spring Valley homeowners are conducting a fuels reduction project through the Nevada Fire Safe Council. This project consists of mechanical removal of vegetation, then removing the resulting debris from the community. To date, there are no other fuel reduction projects planned in the Double Springs community. The Double Springs area has a heavy fuel load on the federal lands

[1] Northern Forest Fire Laboratory fuel model used in calculating fire behavior; 13 models in 4 fuel groups: grass, timber/litter, brush, and slash.

Figure 6. 1999-2002 Regional Fires

surrounding the community. The fire behavior estimates and the defensible space recommendations for the following vegetative community types are based upon information contained in the *Living With Fire* publication. The Nevada Cooperative Extension and the Sierra Front Wildfire Cooperators publish this document.

Type 1 - Pinyon/Juniper Woodland: This vegetative community is a heavy brush woodland common to the eastern slopes of the Sierra Nevada range and consists mainly of singleleaf pinyon (*Pinus monophylla* Torr. & Frem.), and Utah juniper (*Juniperus osteosperma* (Torr.) Little). The vegetation of this community can be very dense and stands from five feet to over fifteen feet tall. Depending on fuel moisture content and wind speed, this vegetation type has a wide range of fire intensity behavior and rate of spread depending on wind speed and amount of understory fuels. High down slope winds and extremely low humidity are common in the area around the community and could, therefore, increase the rate of spread considerably. With a wind speed of 20 miles per hour, on flat terrain, with the typical moisture content of living and dead vegetation for the summer months, and assuming typical August weather for the area, the flame length can be expected to be 16 feet tall and the fire would travel at 3 miles per hour. If any of the above assumptions were to change (for example a steeper slope or higher wind speed) the flames could be taller flame lengths longer and the fire would move at a higher rates of spread faster speed.

Defensible space for structures in this vegetation type with a slope of less than 20 percent should be about 30 feet. If the structure is located on a slope of 20 percent to 40 percent, defensible space should be about 100 feet. Additionally, there should be 10 to 15 feet of crown space between the trees within 100 to 150 feet of the structure. This amount of crown space should prevent a crown fire from spreading rapidly to nearby trees, and can slow a fire in the surface vegetation. A crown fire is a fire that moves rapidly from the top of one tree to the top of the next. If trees are too close together, it is easy for a fire to quickly spread among the crowns of the trees.

Type 2 – Sagebrush/Bitterbrush Community: This vegetative community is composed mainly of sagebrush (*Artemisia spp*.), rabbit brush (*Chrysothamnus spp*.), bitterbrush (*Purshia tridentate*), and annual grasses consisting of cheatgrass *(Bromus tectorum),* Indian ricegrass (*Oryzopsis hymenoides*), needlegrasses (*Stipa spp*.), and Sandburg bluegrass (*Poa sandbergii*). This vegetative community ranges in height from one to over three feet. The Sagebrush/Bitterbrush Community has a medium fire hazard rating. This fuel model can exhibit some of the faster rates of spread of any fuel type. High down slope winds and low humidity could drastically increase the rate of spread. With a wind speed of 20 miles per hour, on flat terrain, with the typical moisture content of living and dead vegetation for the summer months, and assuming typical August weather for the area, the flame length can be expected to be 55 feet tall and the fire would travel at 8.5 miles per hour. If any of the above assumptions were to change (for example a steeper slope or higher wind speed) the flames could be taller and the fire would move at a faster speed.

Defensible space for structures in this vegetation type with a slope of less than 20 percent should be about 100 feet. If the structure is located on a slope of 20 percent to 40 percent, defensible space should be about 200 feet.

Type 3 – Meadow Community: This vegetative community is composed mainly of cheatgrass, Indian ricegrass, needle grasses, and Sandburg bluegrass, and, in one or two areas, willows *(Salix spp)*. This area appears to have been used for grazing in the past and may still be used for this purpose. A portion of this area appears to have moist soils (as evidenced by the willow growth) and fire danger in these moist areas is expected to be low. This vegetative community generally ranges in height from one to two feet, but the willows can be taller than five feet. This vegetative type can exhibit a fast rate of spread. High winds, drought conditions and low humidity could drastically increase the rate of spread. Information on this exact community was not available. The closest model would be the cheat grass community model. With a wind speed of 20 miles per hour, on flat terrain, with the typical moisture content of living and dead vegetation for the summer months, and assuming typical August weather for the area, the flame length can be expected to be 8 feet tall and the fire would travel at 4.5 miles per hour. If any of the above assumptions were to change (for example a steeper slope or higher wind speed) the flames could be taller and the fire would move at a faster speed.

Defensible space for structures in this vegetation type with a slope of less than 20 percent should be about 30 feet. If the structure is located on a slope of 20 percent to 40 percent, defensible space should be about 100 feet.

Table 2 shows the fire behavior estimates of the vegetative communities if the area.

Table 2. Local Fire Behavior Estimates

	Rate of Spread	Flame Length	Spread Rate Acres/ Hour
Cheatgrass (NFFL Model 1)	4 ½ mph.	8 ft	3,000 acres
Big Sagebrush /Bitterbrush (NFFL Model 6)	8 ½ mph	55 ft	5,900 acres
Pinyon-Juniper Woodlands (NFFL Model 8 lo wind; 4 hi wind & closed canopy)	3 mph	16 ft	830 acres

* Fire behavior estimates were prepared by John Swanson, USDA Forest Service for Sierra Front Wildfire Cooperators

Figure 7. Vegetation

Community Exposure/Risk

Community exposure is defined as the susceptibility of buildings in a community in terms of their resistance to ignition should a wildfire occur. Community exposure was assessed for the Spring Valley/Double Springs community by evaluating how individual buildings were constructed and how each was resistant to ignition from a wildfire. This evaluation was based on NFPA's Standard Form 299 (Appendix A) and the Firewise Standards for Home Wildfire Survivability (Appendix E). Information from Form 299 was used to assign a hazard rating for each structure. Using the same vegetation conditions and wildfire characteristics, SWCA evaluated three main variables to assess and rate the survivability of each dwelling or structure from a potential wildfire. These variables included the exterior building material of each individual structure, roofing material, and the defensible space surrounding the structure. This information was then evaluated to rate each structure's relative hazard within the community as a whole.

Exterior Building Materials

There are 75 structures within the Spring Valley/Double Springs community. Wood siding was used for the exterior of 62 of the homes (83 percent) during the initial construction and is rated as a combustible Class C material (burns through in less than 20 minutes). Twenty-two homes (29 percent) have decks rated as combustible. The types of exterior building materials used within the community are shown on Figure 8.

Roofing Materials

The majority of the homes in the Spring Valley/Double Springs community have Class B roofing. Most attic spaces between the roof and ceilings are vented under the eaves with standard unscreened louver vents. (Appendix F). Five homes within the community have nonrated roofs. These homes would benefit from a reduction of their RRVs if a minimum of Class B roofing materials were used. The roof types of the houses within the community are shown on Figure 9.

Defensible Space

Defensible space refers to the area surrounding a house in which the vegetation has been modified to reduce the threat of a potential wildfire. This open space allows both firefighters and the residents to more effectively defend the structure from fire damage. Within 50 feet of the structure there should be an intense fuel reduction. Gradually, farther from the structure, the fuel reduction is less intense. The Spring Valley/Double Springs community was assessed as having less than adequate defensible space. Forty structures in the community (53 percent) were observed as having less the 30 feet of defensible space (Table 3). 34 homes in the community (45

percent) were observed as having less then 70 feet of defensible space (Figure 10). RRVs for all homes in the community are shown in Figure 11 and listed in Appendix D.

Table 3. Defensible Space of the Structures in the Community

Defensible Space Surrounding Structures (in feet)	Number of Structures	Percentage of the Community
More than 100	1	Less than 1
71-100	0	0
30-70	34	46
Less than 30	40	53
Total	75	100

Figure 8. Exterior Building Materials

Figure 9. Roofing Materials

Figure 10. Defensible Space

Figure 11. Relative Risk Values

Wildfire Emergency Response

The main year-round fire fighting resource is the East Fork Fire and Paramedics District. The East Fork Fire and Paramedics District staff consists of one District Chief, three Deputy Chiefs, two Training Captains, one Fire Inspector, three shift Captains, six Company Officers, fifteen Paramedic/Firefighters, and nine Emergency Medical Technician-II/Firefighters who work with over 250 volunteer fire and medical personnel. The East Fork Fire and Paramedics District supports 11 volunteer fire departments working out of 13 volunteer or combination volunteer/paid firefighter stations to provide structural firefighting, emergency medical services, wildland firefighting, and operations based hazardous materials response. Three manned, paid Fire Stations typically respond to the community. These are Station 7, Station14, and Station 12. Stations 7 and 12 have 2 firefighter/paramedics and one officer on duty at all times. Station 14 has a captain and four firefighter/paramedics on duty at all times.

As well as firefighting crews from the stations in the towns of Minden and Gardnerville, the Topaz Ranch Estates Volunteer Fire Department (VFD) and Topaz Lake VFD would respond to a fire call in the Double Springs/Spring Valley area. These two VFDs are the first responders to the area. Assistance from the Minden/Gardnerville area would be supplemental. The equipment of the Topaz Ranch Estates VFD consists of: a structure engine, a 3,000-gallon tender, a brush truck, a squad, a utility and an Intermediate Life Support ambulance. The volunteer crew consists of seventeen active and three auxiliary members. The Topaz Ranch Estates VFD covers an area from Leviathan Mine Road on Highway 395 to the California state line and from the junction of Highway 208 and Highway 395 to the Lyon County border. This VFD also runs mutual aid calls with Mono County and Smith Valley Fire. The Topaz Lake VFD would also respond to a fire with in the community. The equipment consists of a Type 1 engine with a 750-gallon capacity, an 1800-gallon water tender, a Type 3 wildland engine with a 750-gallon capacity, a utility/rescue truck and a rescue boat. On a first alarm fire in the community the response would come from the Topaz Lake VFD, the Topaz Ranch Estates VFD, Station 10 and a rescue unit from Station 7. If the initial resources are not adequate, a second alarm goes out and Station 7 will send an engine and Stations 1 and 2 from the Gardnerville would also respond.

The Bureau of Land Management (BLM), and Forest Service (FS) respond to all fires in this area as well. Typically the BLM and the FS only supply equipment and firefighters during the fire season, which is May 15th – October 15th. The BLM and FS respond to structure fires in the area because such fires have the potential to become wildland fires. Additionally the community is near tribal lands. The BLM has a memorandum of understanding with the Bureau of Indian Affairs (BIA) to fight all fires on Tribal lands.

During the fire season there is a paid BLM crew in the Fish Springs Volunteer Fire Station as well as the East fork VFD that utilizes the station. The BLM crew consists of three crewmembers with a Type 3 engine. A Type 3 engine has a minimum capacity of 500 gallons, 1400 feet of hose and is four wheel drive. During the same time period the Gardnerville Ranchos station has a FS crew that consists of a captain and 2 crew members an a Type 3 engine. Additionally, there is a BLM Type 3 engine and a FS Type 3 engine near Topaz Lake. The above federal resources vary from year to year.

Sierra Front Wildfire Cooperators assists in fire education and coordinating fire response along the eastern side of the Sierras – from Washoe County to south of Bridgeport. Sierra Front Wildfire Cooperators has no resources or response responsibilities within the community. Rather it is made up of federal, state, and local fire agencies including the East Fork Fire and Paramedics District, BLM, FS, Nevada Division of Forestry (NDF) and the Truckee Meadows Fire Department. The Sierra Front Dispatch center is a dispatch center for the entire area – they lend support to whichever entity in the area needs it. Sierra Front Dispatch dispatches all federal or state fire aviation resources in the area from Minden. The air resources consist of: a Type 2 helicopter owned by NDF, a private 800 gallon capacity single engine air tanker contracted by the BLM for the fire season, and an Air Attack plane. The Air Attack plane has no direct fire fighting capabilities, but is used to report on the fire and coordinate the attack by the other air resources. The Forest Service in Bridgeport, California maintains a Type 3 helicopter year round that can be utilized during a fire. Air response for the area is variable. Depending on fire activity in the surrounding areas the air resources may or may not be available for use within the community.

The air and ground response resources for the Spring Valley/Double Springs community are outlined in tables 4 and 5 and in figures 12 and 13.

Table 4. Ground Response Resources

Entity	Resources Availability		Distance to Travel
East Fork Fire and Paramedics District	See text	Year round	17 miles
Topaz Ranch Estates VFD	1 Structure Engine 1 3000 gallon Water Tender 750 gallon Type 3 Engine 1 Ambulance 1 Squad Truck	Year round	8 miles
Topaz Lake VFD	750 gallon Type 1 Engine 1800 gallon Water Tender 750 gallon capacity Type 3 Wildland Engine Utility/Rescue Truck Rescue boat	Year round	6 miles
BLM – Fish Springs Station	Type 3 Engine	May 15th – October 15th	17 miles
FS – Gardnerville Ranchos	Type 3 Engine	May 15th – October 15th	13 miles
BLM – Topaz Lake	Type 6 Engine Type 3 Engine	May 15th – October 15th	6 miles
FS – Topaz Lake	Type 4 Engine Type 3 Engine	May 15th – October 15th	6 miles
FS – Bridgeport	Type 6 Engine	Year round	75 miles
FS – Mono Lake	Type 3 Engine	Year round	68 miles

Table 5. Air Response Resources

Entity	Resources	Availability	Flight Time
FS – Bridgeport	Type 3 Helicopter	Year round	15-20 minutes
NDF – Minden	Type 2 Helicopter	Year round	5-10 minutes
BLM – Minden	800 gallon Single Engine Air Tanker Air Attack Plane	May 15th – October 15th	5-10 minutes

*These resources are those that are immediately available. Other resources such as Hotshot crews or additional air support can be utilized in the event of a catastrophic fire

Recently two 50,000-gallon water tanks were installed in and near the community. The tank in the community is located south of the junction of Highway 395 and Leviathan Mine Road. The other tank is on Highway 395 across from Penrod Lane approximately 2 miles away. These tanks are not connected to a well and must be filled via water tankers. Currently, the East Fork Fire and Paramedics District is responsible for filling the water tanks. Douglas County codes now require all new subdivisions dedicate a parcel of land and a well for water tanks. The community is on wells rather than a municipal water system; therefore fire hydrant installation is not an option.

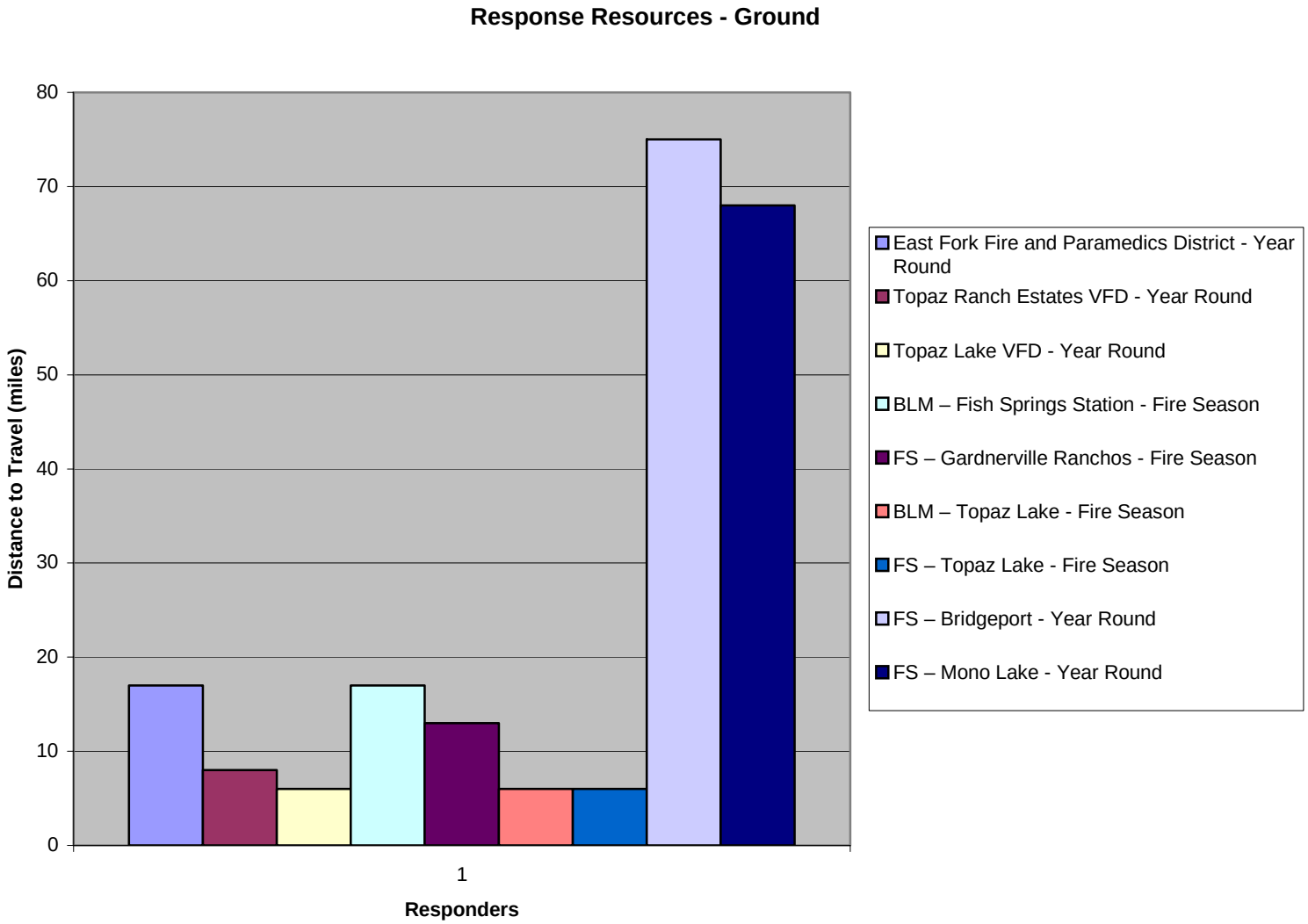

Figure 12. Ground Response

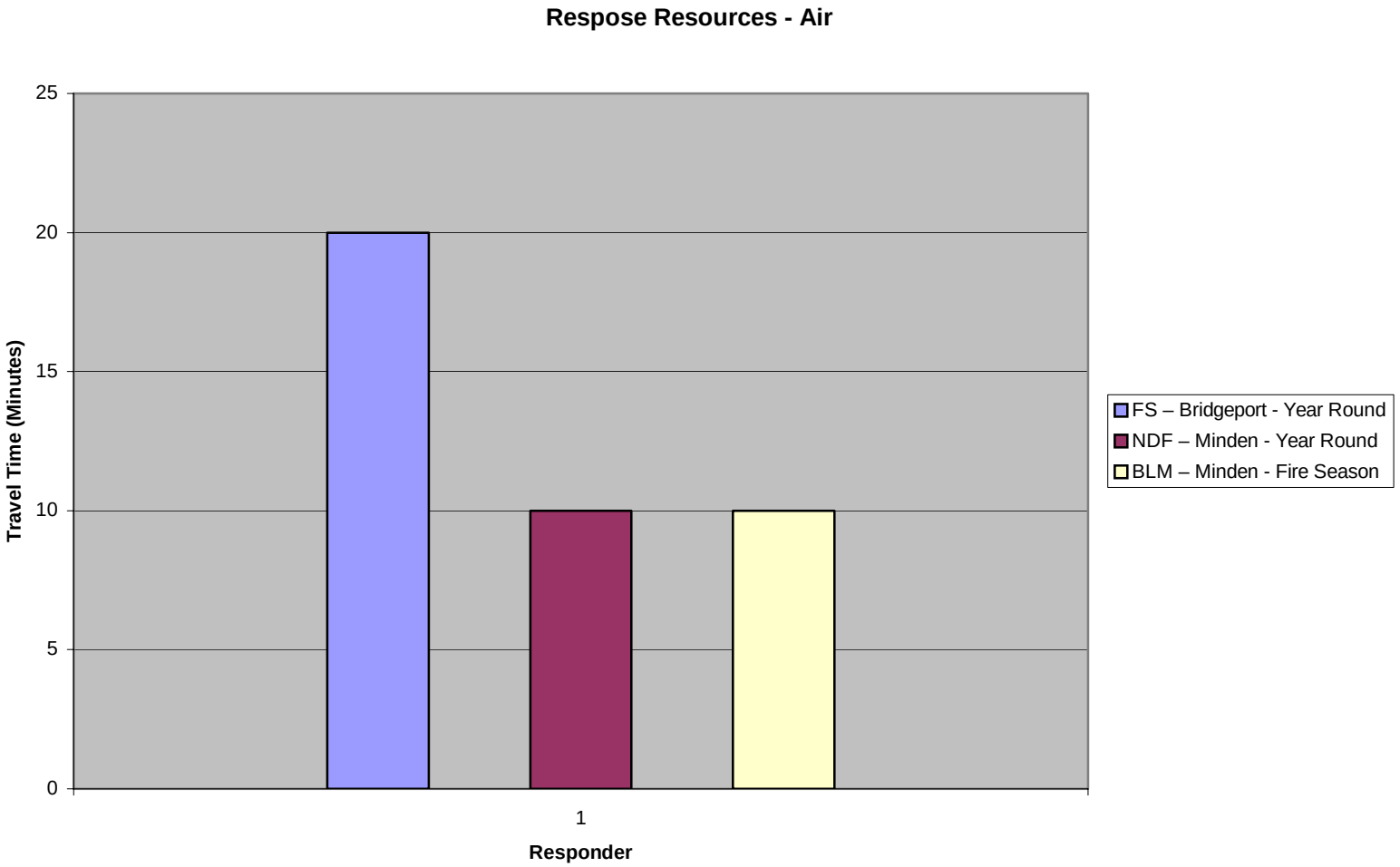

Figure 13. Air Response

Mitigation

The following mitigation recommendations address specific risks that were identified during the fire hazard assessment of the Spring Valley/Double Springs community:

- Recommendation 1: Community Education Regarding Wildfire Issues
- Recommendation 2: Improvement of Defensible Space around Individual Structures
- Recommendation 3: Construction of Shaded Fuel Breaks around the Community
- Recommendation 4: Road Improvement
- Recommendation 5: Improvement of Street Signs and House Numbers
- Recommendation 6: Roofing Improvements
- Recommendation 7: Combined Recommended Mitigations
- Recommendation 8: Information Kiosks Containing Community Information
- Recommendation 9: Barrier Foam for Individual Structures
- Recommendation 10: Shaded Fuel Treatments for all Parcels Within the Community

To assess the validity of these recommendations, RRVs were recalculated for both individual structures and the community based on implementation of these recommendations. This could not be done for recommendations 1, 8, and 9. These recommendations do not directly affect the RRVs, however they will assist in making the community safer in the event of a wildfire. The recalculated RRVs can be found in Appendix D. Figure 14 shows locations for specific recommended projects. Changes in the RRVs resulting from each mitigation recommendation are listed in Table 6 and diagrammed in Figure 15. Figure 15 also compares the relative changes in RRVs that occur from the implementation of mitigation projects in the community.

Table 6. Relative Risk Value Comparisons

	Current	Defensible Space	Fuel Break	Roofing	Signage	Road Improvements	All Mitigation
Average Rating	89	52	86	88	88	89	68
Maximum Rating	137	114	122	117	137	135	113
Minimum Rating	62	48	62	62	57	62	23
Percent Change	*****	***19***	***4***	***2***	***2***	***less than 1***	***28***

Figure 15 illustrates the key parameters used to evaluate mitigation effectiveness for the community. A Box and Whisker Plot is used to illustrate the distribution of the data for RRVs in the community and to compare the change in the distribution of data as each mitigation is implemented. The average value represents the middle value in the dataset. Half the dataset is the above the average value and half the dataset is below. The upper quartile is the value at which three-quarters of the dataset is below, and the lower quartile is the value at which one-quarter of the dataset is below. Thus, the values which lie between the maximum and upper

quartile, the upper quartile and average, the average and lower quartile, and the lower quartile and minimum each represent 25 percent of the dataset. This allows a manager to evaluate the distribution data to determine the effectiveness of a mitigation. Each whisker indicates a separate statistical parameter; the upper whisker indicates the maximum risk value that occurs in the community while the lower whisker indicates the minimum risk value that occurs in the community. By analyzing each Box and Whisker Plot individually one can determine the average, maximum, and minimum RRVs for the homes that were assessed as well as the distribution of the data within the community.

If a manager wishes to determine which homes will benefit most from a given mitigation project, the results shown in Figure 15 may help shed light on the solution. The effectiveness of each mitigation recommendation can be evaluated by comparing the Box and Whisker Plot for the proposed mitigation to the Box and Whisker Plot representing the current existing condition. Numerical values for each home used to create the graph in Figure 15 are listed in Appendix D.

Figure 14. Proposed Mitigation

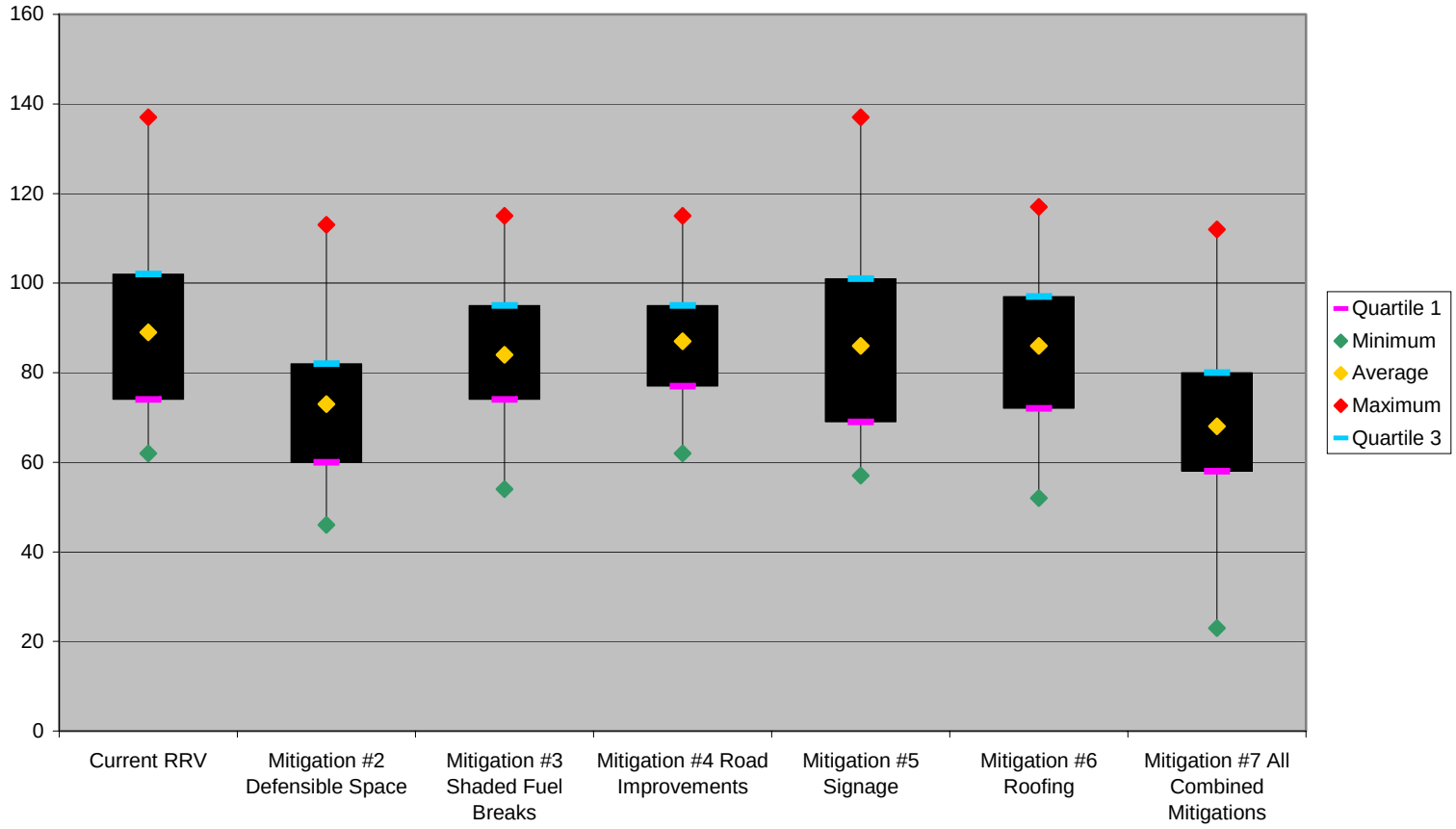

Figure 15. Mitigation Effectiveness

Recommendation 1: Community Education Regarding Wildfire Issues

It is recommended that the neighborhood promote community education projects to increase awareness about wildfire issues. Community education projects should focus on topics that increase the survivability of individual homes within the community in the event of a wildfire. Community newsletters, publications, meetings, and workshops can be used to encourage residents to take a proactive approach to creating a wildfire survivable home. Information gathered for the preparation of this assessment can be shared with the homeowners to indicate how their property was ranked and to identify specific actions that can be taken to reduce RRVs. Concepts for achieving a wildfire survivable home such as defensible space and more fire resistant yards are specified in the Firewise Standards for Home Wildfire Survivability (Appendix E) and in the *"Living With Fire"* document available from the University of Nevada Cooperative Extension. Estimated cost for community education is approximately $5000.

Recommendation 2: Improvement of Defensible Space around Individual Structures

It is recommended that the defensible space around individual structures in the Spring Valley/Double Springs community be increased according to recommendations set forth in such publications as *"Living with Fire"*. As a whole, inadequate defensible space around individual structures in Spring Valley/Double Springs was identified as a significant risk to the community. Ninety-nine percent of the homes (73 homes) in the community have less then 70 feet of defensible space (Figure 10). Increasing the amount of defensible space around individual structures within the community would reduce the RRV for the community as a whole.

Potential Results of Implementation

The implementation of this recommendation will lower the average community RRV from 89 to 73, a decrease of 19 percent. Increasing the amount of defensible space around the individual structures in the community will be a benefit to all of the structures in the community, and will significantly decrease the RRV for most of the homes which were rated as having the highest ratings. The increase of defensible space will have a beneficial effect on the 73 homes with less than 70 feet of defensible space. Note: In order for this recommendation to be most effective it needs to be implemented by the entire community. Defensible space treatment carried out by one homeowner and not performed by the adjacent homeowners is not as effective as a defensible space treatment conducted by all homeowners throughout the community.

Cost and Time of Implementation

Individual homeowners could take on the task of creating defensible space around individual homes. However this task could in all probability be accomplished more rapidly, cheaper and with less individual effort if the community were to join together and implement a community wide defensible space project. Implementation of this mitigation is estimated at approximately $300-400 per acre depending on fuels. Depending on the level of community involvement in the project, it is estimated that it may take approximately two years to fully implement this recommendation. This mitigation would require maintenance every 3-5 years. This maintenance should be minimal due to the rate of growth of the vegetation of the area. Note: Cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include. but are not limited to:

- Type of crew – inmate crew or contracted labor
- Amount of materials removed
- Method of biomass disposal – chipping, burning, hauling to landfill, etc.
- Method of removal

Recommendation 3: Construction of Shaded Fuel Breaks around the Spring Valley/Double Springs Community

The area surrounding the Spring Valley/Double Springs community consists of vegetative types identified as having a moderate to high fire hazard rating (see "Vegetation Hazards" in "Community Hazards and Risks). Reduction of vegetation around the perimeter of three portions of the community housing would greatly reduce the RRV for many of the homes on the perimeter of the community.

An effective shaded fuel break is created when the fuel load is reduced by "limbing up" trees, the possibility of some selected tree removal and thinning or removing understory vegetation from a section of land for the specific purpose of creating defensible space fire protection. "Limbing up" of a tree consists of removing the bottom branches of a tree several feet up from the ground. A shaded fuel break creates a park like setting that slows the spread of a wildfire mainly due to lack of vegetative fuel. Shaded fuel breaks are frequently re-vegetated with fire-resistant understory plant materials, but this is often not necessary. It should be noted and taken into consideration when choosing recommendations that shaded fuel breaks often require upkeep and maintenance. The objective for the construction of a fuel break is to slow the advance of a wildfire and increase the effectiveness of fire fighting efforts, and confine fires to a limited and manageable area. Locations of specific shaded fuel break projects can be seen on Figure 14.

- *Recommended Project 1: 300-foot-wide Shaded Fuel Break around Homes on Leviathan Mine Road.* It is recommended that a 300-foot-wide shaded fuel break be constructed and maintained on the north side of the homes on Leviathan Mine Road. This fuel break would run approximately 1,500 feet in length on the north edge of the community.

- *Recommended Project 2: 300-foot-wide Shaded Fuel Break around Homes on the South edge of the Community.* It is recommended that a 300-foot-wide shaded fuel break be constructed and maintained around the perimeter of the homes on the southern edge of the community. This fuel break would run approximately 4,500 feet in length starting and ending at Cavelti Road and ending at Highway 395.

- *Recommended Project 3: Shaded Fuel Break around Homes on the West Edge of the Community.* It is recommended that a 300-foot-wide fuel break be constructed and maintained around the perimeter of the homes on the western edge of the community. This fuel break would run approximately 5,200 feet in length around the homes on the west edge of the community.

- *Recommended Project 4: Shaded Fuel Break along Highway 395 between Pine Valley Road and Spring Valley Road.* It is recommended that an approximately 300-foot-wide

shaded fuel break be constructed and maintained along Highway 395 between Pine Valley Road and Spring Valley Road.

Potential Results of Implementation
The implementation of this recommendation will lower the average community RRV from 89 to 86, a decrease of 4 percent. The implementation of this recommendation would reduce the rating for structures with the highest RRVs. The construction of shaded fuel breaks will have a beneficial effect on all of the homes on the perimeter of the community.

Cost and Time of Implementation
SWCA estimates that this recommendation may be implemented for a cost of approximately $300-400 per acre for a 200 ft. fuel break, depending on fuels. This recommendation can be implemented in a relatively short period of time, possibly as short as several weeks, depending on the contractor. Note: As with the defensible space recommendation, these cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include but are not limited to:

- Type of crew – inmate crew or contracted labor
- Amount of materials removed
- Method of biomass disposal – chipping, burning, hauling to landfill, etc.
- Method of removal

Recommendation 4: Road Improvement
Acceptable road access and condition within the community are important to how fire response vehicles are able to access structures in the event of a fire. Several factors may limit the accessibility to an area by emergency responders including poor road conditions, unpaved/unsurfaced roads, and insufficient road width.

- *Recommended Road Improvement Project: Road Improvements on Several Roads within the Spring Valley/Double Springs Community.* It is recommended that the roads within the community be improved to allow access to emergency personnel. The condition of several of these roads is currently unsafe for fire response vehicles to travel on. It is recommended that the roads be surfaced with an aggregate or paved and widened to 24 feet. In particular, Cavelti Road requires improvement to allow access of emergency vehicles. Figure 14 shows the road recommended for improvement in this mitigation.

Potential Results of Implementation
The implementation of this recommendation may lower the average community RRV by less than 1 percent. Although the decrease in risk according to this assessment is low, a large portion of the community would benefit from the implementation of this recommendation by enabling access to homes that would otherwise not be accessible to emergency vehicles.

Cost and Time of Implementation
Construction costs may vary depending on the nature and size of the road improvements. It may be necessary to evaluate the road use and size necessary to support the needs of the community. SWCA estimates that the necessary road improvements may range in cost from $30,000 to

$100,000 per mile. SWCA estimates that implementation of this project may be accomplished in approximately one year.

Recommendation 5: Improvement of Street Signs and House Numbers

In the event of a fire, it is crucial that emergency services be able to locate streets and individual structures in a timely manner. Clearly visible and easy to read signs and house numbers will reduce the response times of emergency personnel responding to a fire. Figure 14 shows which houses have house numbers that are clearly visible.

- *Recommended Improvement of Street Signs and House Number Project: Install Clearly Visible Street Signs and House Numbers Within the Spring Valley/Double Springs Community.* It is recommended that all streets within the community be clearly identified with street signs containing reflective lettering at least four inches in height. These street signs should be positioned so that they can be clearly visible to emergency personnel. Additionally, it is recommended that all structures be clearly identified with the appropriate house numbers.

Potential Results of Implementation

Overall, the implementation of this recommendation may lower the average community RRV from 89 to 88, a decrease of 2 percent. All of the homes in the community may benefit from the improvement of street signs and house numbers.

Cost and Time of Implementation

The cost of implementing this project may be as low as approximately $20 to $50 per house. SWCA estimates that implementation of this project may be accomplished in one month.

Recommendation 6: Roofing Improvements

For a structure, the roof is the most common structural fuel bed for ignition by flying firebrands. Therefore, the type of building materials used in the construction of the roof is of great importance to the structure. Class B roofing includes roof coverings that are effective against moderate fire test exposures. These coverings are not readily flammable, do not carry or communicate fire, afford a moderate degree of fire protection to the roof deck, do not slip from position, and possess no flying brand hazard; however, may require repairs to maintain their fire retardant properties over time. Figure 9 shows the roof classes of all the structures in the community.

- *Recommended Roofing Improvements:* It is recommended homes within the Spring Valley/Double Springs community with roofing Class C or non-rated roofs install roofs rated B or better.

Potential Results of Implementation

The implementation of this recommendation may lower the average community RRV from 89 to 88, a decrease of 2 percent. The implementation of this recommendation would have a

beneficial effect on several homes within the community. Although a limited number of homes would be affected by the implementation of this recommendation, the decrease in risk for those homes would be significant.

Cost and Time of Implementation
Construction costs may vary depending on the type of roof and size of the home and could take several weeks to complete each house.

Recommendation 7: Combined Recommended Mitigations
Implementation of mitigation recommendations 2 through 6 would provide the greatest benefit to the Spring Valley/Double Springs community. Note: *Recommendation 1: Community Education Regarding Wildfire Issues* is not included on the combined recommended mitigations list as it would have no quantifiable effect on the community, however this recommendation should not be dismissed simply because a number cannot be attached to it. Community education for the individual homeowner may help save lives and property in the future and as it is easily implemented, it should not be overlooked. Figure 16 shows the relative risk values of all the structures within the community with all combined recommended mitigations in place.

Recommended Combined Mitigation Projects: The Implementation of Mitigation Projects 2 through 6 in the Spring Valley/Double Springs Community

- Recommendation 2: Improvement of Defensible Space around Individual Structures
- Recommendation 3: Construction of Shaded Fuel Breaks around the Spring Valley/Double Springs Community
- Recommendation 4: Road Improvement
- Recommendation 5: Improvement of Street Signs and House Numbers
- Recommendation 6: Roofing Improvements
- Recommendation 10: Shaded Fuel Reduction Project

Potential Results of Implementation
The implementation of all of the above recommendations may lower the average community RRV from 89 to 68, a decrease of 28 percent. The implementation of all of the recommendations may reduce the RRV*s* for structures assigned maximum, average, and minimum ratings. The implementation of all of the recommendations may have a beneficial effect on all of the homes in the community.

Cost and Time of Implementation
As discussed in the previous recommendation sections, the Spring Valley/Double Springs community may implement all recommendations for a relatively low cost. SWCA estimates that the implementation of all of the above mentioned mitigation recommendation could take approximately two years to complete.

Figure 16. Relative Risk Values with Incorporation of all Mitigation Measures

Note: As with recommendation 1, the recommendations 8 and 9 and their results are not quantifiable, nonetheless these recommendations have merit, are fairly easy to implement, and, in the event of a wildfire, could save lives or property.

Recommendation 8: Information Kiosks Containing Community Information

SWCA recommends that at the main entrances to the community there be informational kiosks. These kiosks would be made of a lockable, immovable, weather proof, and fire resistant container. The professional and volunteer emergency personnel would have keys to allow access to the information contained inside the kiosks. The information contained inside the kiosks could consist of a variety of things such as:

- Propane tank locations
- Updated maps of the community
- Landing sites for helicopters
- Water sources
- Home locations
- People requiring help in the event of an evacuation
- Utility types and locations
- Types and numbers of animals/livestock in the community

The above are simply a portion of what could be included in the kiosks. The community could decide upon the information contained in the kiosks and it should be organized in an easily accessible and understood format. All emergency personnel should be briefed on the locations and contents of the kiosks when they are given their keys. Cost for this mitigation will vary depending on the type and number of kiosks purchased, the information to be included and the number of people that will need access to the kiosks. One possible location for the informational kiosk could be behind the fence of the water tank at the junction of Highway 395 and Leviathan Mine Road.

Recommendation 9: Barrier Foam for Individual Structures

Note: SWCA Inc. does not endorse or recommend one particular type of product or vouch for the product's ability to withstand fire. The products and websites mentioned in this document are for reference; in no way is this an endorsement of any product or website. A community committee or individual homeowner should decide which foam/gel is best for their uses if this mitigation is chosen.

There are several gel or foam products on the market that can protect a structure from an encroaching wildfire. The firefighters or the occupants easily spray these products on the structure and then evacuate the area. One such product is Barricade Fire Blocking Gel, more information about this product can be found at: http://www.barricadegel.com/. This gel will provide a layer of protection that can be sprayed on by a garden hose. It will adhere to surfaces such as walls, overhangs, wood shake roofs, metal or fiberglass surfaces and glass. Eight 1¼-gallon containers will cover approximately 4000 square feet. This particular product costs between $500 to $640 for eight gallons and applicators. An Internet search revealed several other similar products that may or may not work better or cost less. Research into each particular

product should be conducted by the individual homeowner or community to determine which product meets their particular needs and standards.

Recommendation 10: Shaded Fuel Reduction for all Parcels Within the Community

The parcels within the Spring Valley/Double Springs community are generally several acres in size. This means that even if a homeowner were to create defensible space as recommended in Mitigation 2, much of the rest of the parcel would contain high levels of understory vegetation, which could help the spread of a wildfire. Additionally, firebrands can travel ¼ to ½ mile or more from a wildfire starting spot fires. If a major wildfire were to occur near the community, the firebrands may be able to travel over the shaded fuel breaks and into the community. If the amount of fuel is not reduced throughout the community, when these firebrands land a major fire could start within the community. Therefore, it is recommended that a shaded fuel reduction project take place on all parcels within the community.

This shaded fuel reduction project would be conducted in the same manner as the shaded fuel break projects, but not as much vegetation would be removed for this project. The costs and time involved in this recommendation would be similar to the shaded fuel break projects. It should be noted and taken into consideration that this recommendation will require upkeep and maintenance.

Potential Results of Implementation

As with the shaded fuel break recommendation, the implementation of this recommendation will lower the average community RRV from 89 to 86, a decrease of 4 percent. The implementation of this recommendation would reduce the rating for structures with the highest RRVs. The shaded fuel reduction will have a beneficial effect on all of the homes within the community.

Cost and Time of Implementation

SWCA estimates that this recommendation may be implemented for a cost of approximately $300-400 per acre, depending on fuels. This recommendation can be implemented in a relatively short period of time, possibly as short as several weeks, depending on the contractor. Note: As with the defensible space recommendation, these cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include but are not limited to:

- Type of crew – inmate crew or contracted labor
- Amount of materials removed
- Method of biomass disposal – chipping, burning, hauling to landfill, etc.
- Method of removal

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www.nv.blm.gov/wgbcc/past%20season%20info.htm

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Appendix A

Wildland Fire Risk and Hazard Severity Assessment Form

Wildland Fire Risk and Hazard Severity Assessment Form

Element	Points
A: Means of Access	
1. Ingress and egress	
a. Two or more roads in/out	0
b. One road in/out	7
2. Road width	
a. ≥ 24 feet wide	0
b. ≥ 20 and < 24 feet	2
c. < 20 feet wide	4
3. All season road condition	
a. Surfaced road, grade < 5%	0
b. Surfaced road, grade > 5%	2
c. Non-surfaced road, grade < 5%	2
d. Non-surfaced road, grade > 5%	5
4. Fire Service Access	
a. ≤ 300 feet, with turnaround	0
b. > 300 feet, with turnaround	2
c. < 300 feet, with no turnaround	4
d. ≥ 300 feet, with no turnaround	5
5. Street signs	
a. Present (4 inches in size and reflective)	0
b. Not present	5
B: Vegetation (Fuel Models)	
1. Characteristics of predominate vegetation within 300 feet	
a. Light (e.g., grasses, forbs, sawgrass and tundra)	5
b. Medium (e.g., light brush and small trees)	10
c. Heavy (e.g., dense brush, timber, and hardwoods)	20
d. Slash (e.g., timber harvesting residue)	25
2. Defensible space	
a. > 100 feet of vegetation treatment from the structure(s)	1
b. 71 –100 feet of vegetation treatment from the structure(s)	3
c. 30 –70 feet of vegetation treatment from the structure(s)	10
d. < 30 feet of vegetation treatment from the structure(s)	25
C: Topography within 300 feet of structure(s)	
1. Slope < 9%	1
2. Slope 10% to 20%	4
3. Slope 21% to 30%	7
4. Slope 31% to 40%	8
5. Slope > 41%	10
D: Additional Rating Factors (rate all that apply)	
1. Topographical features that adversely affect wildland fire behavior	0-5
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, arson)	0-5
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds	0-5

E: Roofing assembly	
1. Class A roof	0
2. Class B roof	3
3. Class C roof	15
4. Non-rated	25
F: Building Construction	
1. Siding	
a. Noncombustible/fire resistive siding, eaves	0
b. Combustible siding, eaves	5
2. Deck	
a. Noncombustible/fire resistive deck	0
b. Combustible Deck	5
3. Building setback relative to slopes of 30% or more	
a. ≥ 30 feet to slope	1
b. < 30 feet to slope	5
c. Not Applicable	0
G: Available Fire Protection	
1. Water Source Availability	
a. Pressurized water source availability	
500 gpm hydrants ≤ 1000 feet apart	0
250 gpm hydrants ≤ 1000 feet apart	1
b. Non-pressurized water source availability	
≥ 250 gpm continuous for 2 hours	3
< 250 gpm continuous for 2 hours	5
c. Water unavailable	10
2. Organized Response Resources	
a. Station ≤ 5 miles from structure	1
b. Station > 5 miles from structure	3
3. Fixed Fire Protection	
a. NFPA 13, 13R, 13D sprinkler system	0
b. None	5
H: Placement of Gas and Electric Utilities	
1. Both utilities underground	0
2. One underground, one above ground	3
3. Both utilities above ground	5
I: Totals for Home or Subdivision (Total for all above points)	

Hazard Assessment	Total Points
1. Low Hazard:	**< 40**
2. Moderate Hazard:	**40 – 69**
3. High Hazard:	**70 – 112**
4. Extreme Hazard:	**> 112**

-Taken and adapted from the NFPA 299

Appendix B

Western Great Basin Large Fires 1999-2002

Large Fires

Large fires

Appendix C

Fuels Work in the Spring Valley/Double Springs Community

Property Address	Owner	Date of Fuels Work	# of crew members	# of Crew hours	Request for Additional fuels work
2980 Candy Ln.	David & Judy Thomas	3/11/03 3/12/03 4/03/03	8 7 6	5 10 5	Yes
830 Cavelti Rd.	Harold & David Rosso	3/13/03	7	10	Yes
859 Spring Valley Rd.	Phil & Doreen Liles	3/14/03 3/17/03	6 8	5 5	Yes
931 Cavelti Rd.	Gary & Linda Schatt	3/18/03 4/30/03	8 7	10 10	Yes
862 Spring Valley Rd.	Shawn Mc Laughlin	3/19/03	8	10	Yes
3011 Pine Valley Rd.	George & Lynn Rice	3/20/03 3/24/03	8 8	5 5	Yes
2972 Candy Ln.	Gary Cullen	3/25/03	8	10	No
930 Karnes	Larry & Dee Haines	3/26/03	9	10	No
2915 Jackrabbit Tr.	Robert Johnson	3/27/03 3/31/03	8 6	5 5	Yes
2939 Devenpeck	Bob Price	3/31/03 4/03/03	7 8	5 5	Yes
2962 Candy Ln..	Dan Ward	4/01/03 4/24/03	8 6	10 10	Yes
2449 Leviathan Mine Rd.	Terry & Susan Hunt	4/01/03	8	10	Yes
2945 Pine Valley Rd.	Tom Bryant	4/02/03	7	10	Yes
2915 Pine Valley Rd.	Frank Cross	4/02/03	8	10	No
3138 Bodie Rd.	Ron & Audry Scott	4/15/03 4/18/03	10 10	5 3.5* (short 1.5 hrs.)	Yes
980 Cavelti Rd.	Sue Salmon & Gayle Graham	4/16/03	10	10	Yes
832 Big Valley Rd.	Tom & Deb Robinson	4/17/03	10	10	No
891 Spring Valley Rd.	Les & Kelly McCroskey	4/22/03 4/25/03	6 6	5 5	Yes
2988 Pine Valley Rd.	Jay & Pat Gallagher	4/23/03	6	10	Yes
29? Pine Valley Rd.	Jon & Jody Whaley	4/28/03	6 7	5 5	Yes
2923 Pine	Laura Pabon	4/29/03	7	10	Yes

Appendix D

Mitigation Summary

mitigation summary

Mitigation summary

Mitigation summary

Appendix E

Firewise Standards for Home Wildfire Survivability

Firewise Standards for Home Wildfire Survivability[D1]

Rural Fire Prevention Checklist: A Factsheet on Rural Fire Safety and Prevention

Self-reliance is the rule for fire safety for many people. If you live in an area where the local fire department is more than a few minutes away because of travel time or distance, or if you are outside the limits of the nearest town, be sure you know how to be self-reliant in a fire emergency.

The National Fire Protection Agency (NFPA), and Firewise encourages you to use this fire safety checklist to help you protect yourself, you home and its surroundings from fire. Remember, fire safety is your personal responsibility.

Make Structures Fire-Resistant

- Use fire-resistant and protective roofing and materials like stone, bricks and metal to protect your home. Avoid using wood materials that offer the least fire protection.
- Keep roofs and eaves clear of debris.
- Coverall exterior vents, attics and eaves with metal mesh screens no larger than 6 millimeters.
- Install multipane windows, tempered safety glass or fireproof shutters to protect large windows from radiant heat.
- Use fire-resistant draperies for added window protection.
- Keep tools for fire protection nearby: 100-foot garden hose, shovel, rake, ladder and buckets.
- Make sure water sources, such as hydrants and ponds, are accessible to the fire department.

Let Your Landscape Defend Your Property

- Trim grass on a regular basis up to 100 feet surrounding your home.
- Create defensible space by thinning trees and brush with 30 feet around your home.
- Beyond 30 feet, remove deadwood, debris and low tree branches.
- Landscape your property with fire resistant plants and vegetation to prevent fire from spreading quickly.
- Stack firewood at least 30 feet away from your home and other structures.
- Store flammable materials, liquids and solvents in metal containers outside the home, at least 30 feet away from structures and wooden fences.

[D1] Based on information found in Community Awareness: Wildfire by Douglas County, Nevada.

Follow Local Burning Laws

- Do not burn trash or other debris without proper knowledge of local burning laws, techniques and the safest times for day and year to burn.
- Before burning debris in a wooded area, make sure you notify local authorities and obtain a burning permit.
- Use an approved incinerator with a safety lid or covering with holes no larger then ¾ inches.
- Create at least a 10-foot clearing around the incinerator before burning debris.

Fire-safe Landscaping Can Save Your Home: Rural Fire Safety and Prevention

Wildland fires destroy hundreds of homes and acres of land every year across the country. Fire-safe landscaping is an effective tool that creates an area of defensible space between your home and flammable vegetation that protects against devastating fires.

The United States Fire Administration (USFA) encourages you to keep fire safety at the forefront by learning how to landscape and maintain your property to minimize possible fire damage and slow fires if they start.

Defensible Space Works

- Remove all dead plants, trees and shrubs from the site.
- Reduce excess leaves, plant parts and low-hanging branches.
- Replace dense flammable plants with fire-resistant plants.

The choice of plants, spacing and maintenance are crucial elements in any defensible space-landscaping plan.

Tips for a Fire-safe Landscape

- Create a defensible space perimeter by thinning trees and brush within 30 feet around you home.
- Beyond 30 feet, remove dead wood, debris and low tree branches.
- Eliminate small trees and plants growing under trees. They allow ground fires to jump into tree crowns.
- Space trees 30 feet apart and prune to a height of 8 to 10 feet.
- Place shrubs at least 20 feet from any structures and prune regularly.
- Plant the most drought-tolerant vegetation within three feet of you home and adjacent to structures to prevent ignition.
- Provide at least a 10 to 15 foot separation between islands of shrubs and plant groups to effectively break-up continuity of vegetation.
- Landscape your property with fire-resistant plants and vegetation to prevent fire from spreading quickly.

Choose Fire Resistant Materials

- Check you local nursery or county extension service for advice on fire resistant plants that are suited for you environment.
- Create fire-safe zones with stone walls, patios, swimming pools, decks and roadways.
- Use rock, mulch, flowerbeds and gardens as ground cover for bare spaces and as effective firebreaks.
- There are no "fire-proof" plants. Select high moisture plants that grow close to the ground and have a low sap or resin content.
- Choose plant species that resist ignition such as rockrose, iceplant and aloe.
- Fire-resistant shrubs include hedging roses, bush honeysuckles, currant, cotoneaster, sumac, and shrub apples.
- Plant hardwood, maple, poplar and cherry trees that are less flammable than pine, fire and other conifers.

Maintain Your Home and Surrounding Property

- Maintain a well-pruned and watered landscape to serve as a green belt and protection against fire.
- Keep plants green during the dry season and use supplemental irrigation, if necessary.
- Trim grass on a regular basis up to 100 feet surrounding your home.
- Stack firewood at least 30 feet from your home.
- Store flammable materials, liquids and solvents in metal containers outside the home at least 30 feet away from structures and wooden fences.
- No matter where you live, always install smoke alarms on every level of you home. Test them monthly and change the batteries at least once a year. Consider installing the new long-live smoke alarms.

Fire Safety Beyond the City Limits: Rural Fire Safety and Prevention

A move from an urban center to a suburb or rural area requires you to rethink fire safety. First, you must be aware of special fire hazards near wooded areas. Second, geographic location may create longer response times for fire and rescue services.

If you live in the rural-urban interface, the point where homes meet combustible vegetation, you must increase you role to protect lives and property in your community beyond the city limits. The United States Fire Administration (USFA) encourages you to practice the following fire safety steps in rural areas.

Fire Facts about Rural Living

- Once a fire starts outdoors in a rural area, it is often hard to control. Wildland firefighters are trained to protect natural resources, not homes and buildings.

- Many homes are located far from fire stations. The result is longer emergency response times. Within a matter of minutes and entire home may be destroyed by fire.
- Limited water supply in rural areas can make fire suppression difficult.
- Homes may be secluded and surrounded by woods, dense brush and combustible vegetation that fuel fires.

Tips For Making Your Property Fire Resistant

- Keep lawns trimmed, leaves raked, and the roof and rain-gutters free from debris such as dead limbs and leaves.
- Stack firewood at least 30 feet away from you home.
- Store flammable materials, liquids and solvents in metal containers outside the home at least 30 feet away from structures and wooden fences.
- Create defensible space by thinning trees and brush within 30 feet around your home.
- Landscape you property with fire resistant plants and vegetation to prevent fire from spreading quickly.
- Post home address signs that are clearly visible from the road.
- Provide emergency vehicle access with properly constructed driveways and roadways, at least 12 feet wide with adequate turnaround space.
- Make sure water sources, such as hydrants and ponds, are accessible to the fire department.
- Burning yard waste is a fire hazard. Check with your local fire agency on a non-emergency number for fire permit requirements and restricted burning times.

Protect Your Home

- Use fire resistant, protective roofing and materials like stone, brick and metal to protect you home. Avoid using wood materials that offer the least fire protection.
- Cover all exterior vents, attics and eaves with metal mesh screens no larger than 6 millimeters.
- Install multipane windows, tempered safety glass or fireproof shutters to protect large windows from radiant heat.
- Use fire-resistant draperies for added window protection.
- Have chimneys, wood stoves and all home heating systems inspected and cleaned annually by a certified specialist.

Prepare Your Family

- Know how to contact fire emergency services in your area.
- Plan ahead. Make sure you and you family are prepared for a fire emergency.

Develop and practice escape and evacuation plans with your family. Install smoke alarms on every level of your home. Test them monthly and change the batteries at least once a year. Consider installing the new long-life smoke alarms.

Appendix F

Roofing Type Classification

Roofing Type Classification

For a structure, the roof is the most common structural fuel bed for ignition by flying firebrands. Therefore, the type of building materials used in the construction of the roof is of great importance to the structure. Roofing materials are categorized into four separate categories. The four classifications are Class A, Class B, Class C, and Non-rated. These categories refer to the ability of the material to protect and retard against fire. The specific definition of each roofing classification is dependent upon the roofing material, roofing support construction and sheathing. Definitions for three of the classes of roof coverings that include criteria for resistance to ignition have been prepared by Underwriters Laboratories Inc. (UL). The test standard for roof coverings is NFPA 256, *Standard Methods of Fire Tests of Roof Coverings* (also known as ASTM E108). The three classes are:

- **Class A:** Roof coverings that are effective against severe fire test exposures. These coverings are not readily flammable, do not carry or communicate fire, afford a fairly high degree of fire protection to the roof deck, do not slip from position, and possess no flying brand hazard.

- **Class B:** Roof coverings that are effective against moderate fire test exposures. These coverings are not readily flammable, do not carry or communicate fire, afford a moderate degree of fire protection to the roof deck, do not slip from position, and possess no flying brand hazard; however, they may require repairs to maintain their fire retardant properties.

- **Class C:** Roof coverings that are effective against light fire test exposures. These coverings are not readily flammable, do not carry or communicate fire, afford at least a slight degree of fire protection to the roof deck, do not slip from position, and possess no flying brand hazard; however, they may require repairs to maintain their fire retardant properties.

The Class A rating is considered the best material for providing resistive characteristics and protecting the structure from flying firebrands. The Class C rating is considered an acceptable roofing material for structures; however, it affords less protection against the spread of fire. The Non-rated roof classification is used for roofing materials that are below the standards set for roofing materials. This can come from the material that was once installed on the roof as a Class A, B, or C, but has since fallen below building code standards. A Non-rated roof can also be a roof that allows the build up of organic mater on the roof and has little to no protection from fire after one has started.

For this survey, because of the time constraints and the total number of structures that needed evaluating a close inspection of every structures roof and the underlayment was not possible. Each house was evaluated for the visible roofing material seen from a close distance. Some assumptions had to be made about the overall integrity of the roof and the roofing material used. Assumptions were made for underlying roof bedding and standard construction methods. There is no way of determining how many layers of shingles or prior roofing materials that may exist on a particular structure. Roof classification was determined as a “Worst Case” scenario.

Conservative estimates or roof classifications were used to err on the side of caution. This table indicates how roof classifications were used for the WHAMP project. Examples of roof materials in the table are materials observed in the field while performing evaluations.

Roof Classification	Roofing Examples Used for this Project
Class A	Ceramic Tile Concrete Concrete Tile Metal/Tin/Copper
Class B	Heavy Asphalt Shingle
Class C	Light Asphalt Shingle Old/Worn Heavy Asphalt Shingle Hot Coal Tar
Non-rated	Wood Shingle Damaged Roof Non-covered roof bedding Trailer/Mobile home roof

Appendix G

Mitigation Worksheets

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 1. Community Education Regarding Wildfire Issues

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Currently there is no program to educate homeowners regarding the danger to the community from wildfires. Some homeowners may have taken it upon themselves to learn about wildfire and the danger that it can pose to a community, but others may be completely ignorant of the danger. Additionally, the information that homeowners do have may not be specific to their area.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is a Tier 1 mitigation measure. It is essential that the community be educated about the danger that wildfire represents to individual homes and the community as a whole, and what they can do to reduce the danger.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

There is no specific location for this mitigation.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.*

It is recommended that the neighborhood promote community education projects to increase awareness about wildfire issues. Community education projects should focus on topics that increase the survivability of individual homes within the community in the event of a wildfire. Community newsletters, publications, meetings, and workshops can be used to encourage residents to take a proactive approach to creating a

wildfire survivable home. It is recommended that the community appoint/elect an educational committee. This committee could then apply for grants to fund the educational programs.

To begin the educational program, information gathered for the preparation of this assessment can be shared with the homeowners to indicate how their property was ranked and to identify specific actions that can be taken to reduce RRVs. Additional information for subsequent meetings could come from the Firewise Standards for Home Wildfire Survivability (Appendix E of the WHAMP document) and in the *"Living With Fire"* document available from the University of Nevada Cooperative Extension. After this type of information has been covered in the educational programs, the committee may decide to bring in various fire experts to speak and educate the community in the latest techniques and products for creating a wildfire survivable home.

No bid procurement process is necessary. However there will be grant-writing activities needed to procure the money to start and continue the community education process. It is recommended that the community form a committee of volunteers to begin the grant writing and education process. If the community desires, the committee can be appointed yearly. This way the burden does not fall to one or two specific people year after year. Because the community belongs to the Nevada Fire Safe Council, the council can apply for and manage the grants on the community's behalf

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The results of this mitigation are not quantifiable, nonetheless this recommendation has merit, is fairly easy to implement, and, in the event of a wildfire, could save lives and/or property.

Identification of Protected Species or Other Critical Resources: *Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.*

Not applicable for this mitigation.

Post-project Rehabilitation: Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Not applicable for this mitigation.

Estimated Timeline:

Desirable time of year to complete: on going, throughout the year

Estimated time required to complete project: Ongoing and continuing mitigation project.

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Estimated cost for community education is approximately $5000 per year. Community education is an on-going process rather than a one-time event. It is anticipated that community outreach would occur several times per year with special emphasis during the pre-fire season. The funds would be used to cover the, arranging the meetings, bringing in experts to educate the community, cost of copies, or materials and activities the educational committee decides would be appropriate.

Project Maintenance Requirements:

There would be a long-term commitment by the community education committee in the form of time and effort to set up and run the community meetings. SWCA recommends one-year terms for appointed/volunteer committee members. The individuals of the community should to realize that the educational requirements of the community will change over time and this education program should not be a one-time meeting/effort. The wildfire hazard will not disappear after one year of meetings. This hazard will always be present; education and homeowner effort will help the community and individual homes survive in the event of a wildfire only if these efforts perpetually continue.

Other Considerations:

Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.

This recommendation will require a long term commitment from several people willing to donate their time to set up the meetings and bring in experts to speak/educate the community, or research topics themselves and present them to the community.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 2. Improvement of Defensible Space around Individual Structures

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Risk is defined as those factors that have caused wildland fires to be ignited (i.e., human activity, lightning) in the area; while a hazard relates to those fire environment factors of fuels, weather, and topography that contribute to fire behavior. As the fire history and the community assessment demonstrates, the community has both risks and hazards.

It is recommended that the defensible space around individual structures in the Spring Valley/Double Springs community be increased according to recommendations set forth in such publications as *"Living with Fire"*. As a whole, inadequate defensible space around individual structures in Spring Valley/Double Springs was identified as a significant risk to the community. Ninety-nine percent of the homes (73 homes) in the community have less then 70 feet of defensible space. Increasing the amount of defensible space around individual structures within the community would reduce the risk for the community as a whole.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This mitigation is ranked as a first tier mitigation – it should be accomplished as soon as possible.

Those structures where dense, closed canopy pinyon-juniper woodland occurs in close proximity (within about 200 feet) should be done as soon as possible. Those structures located next to mature (over 2 feet) sagebrush-bitterbrush fields where a running surface fire in high winds could produce flames that may impinge on yard fuels or structures (including outbuildings) should be done next.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

Figure 10 shows the defensible space around each structure within the community.

Recommended Mitigation Measures and Scope of Work:

Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.

Defensible Space - Shrub (NFFL Fuel Model 6 before treatment)
Width: a minimum of 66 feet from nearest structure. Combustible woody vegetation (live standing 6" diameter and less) shall be severed to less than 6" stump height. Leave shrub groups of 2 to 4 plants with stems growing within a 6-foot diameter circle at ground level that are the same species. Clump spacing shall be a minimum of 10 feet. Trees shall be pruned up 4 feet and left on site; grasses, weeds, forbs left over the 60 foot portion of space. Estimated volume of debris produced: 4 tons/acre (90% is 3" diameter or less). Disposal would consist of chip and scatter woody materials to a depth not to exceed 6" or remove woody debris

Residual Structure: NFFL Fuel Model 1 (grass is primary carrier of fire for fire behavior predictions)
Grasses, shrubs, weeds, and forbs shall be cleared with hand tools to mineral soil within 6 feet of the structure. The grass will grow back in a season, so these areas must be maintained annually, prior to fire season. The estimated volume of debris produced: 3+ tons/acre Disposal: removal to nearest landfill.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The implementation of this recommendation will lower the average community RRV from 89 to 73, a decrease of 19%. Increasing the amount of defensible space around the individual structures in the community will be a benefit to all of the structures in the community, and will significantly decrease the risk for most of the homes which were rated as having the highest ratings. The increase of defensible space will have a beneficial effect on the 73 homes with less than 70 feet of defensible space.

Note: In order for this recommendation to be most effective it needs to be implemented by the entire community. Defensible space treatment carried out by one homeowner and not performed by the adjacent homeowners is not as effective as a defensible space treatment conducted by all homeowners throughout the community.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Post –Project Rehabilitation will be minimal. Removal of understory vegetation could create the opportunity for the growth of cheatgrass and invasive weed species. However, grasses would only be removed completely within six feet of the structure; with proper maintenance cheatgrass and other invasive species would not be able to gain a foothold.

Estimated Timeline:

Desirable time of year to complete: Late fall or winter – frozen ground will minimize the disturbance to the ground.

Estimated time required to complete project: 2-3 acres per day with a 10-person crew

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include but are not limited to: Type of crew – inmate crew or contracted labor; Amount of materials removed; Method of biomass disposal – chipping, burning, hauling to landfill, etc.

It is estimated that this recommendation may be implemented for a cost of approximately $300-400 per acre

Project Maintenance Requirements:

After the initial defensible space is cleared the homeowner will need to continue to remove any vegetation annually, before fire season.

Other Considerations:

Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.

The community or individual homeowners should contact the appropriate officials within the county to determine if any permits are needed.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 3. Construction of Shaded Fuel Breaks around the Spring Valley/ Double Springs Community

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Currently the structures on the north, west and south borders of the community are surrounded by dense pinyon-juniper forest. The area surrounding the Spring Valley/Double Springs community consists of vegetative types identified as having a moderate to high fire hazard rating. Reduction of vegetation around the perimeter of three portions of the community housing would greatly reduce the risk for many of the homes on the perimeter of the community. Most fuel breaks are located where indirect attack tactics would be employed, such as along ridges, or roads along valley bottoms, and upper south and west slopes. Fuel breaks around developed areas have been recognized as an effective strategy.

An effective shaded fuel break is created when the fuel load is reduced by "limbing up" trees, the possibility of some selected tree removal and thinning or removing understory vegetation from a section of land for the specific purpose of creating defensible space fire protection. "Limbing up" of a tree consists of removing the bottom branches of a tree several feet up from the ground. A shaded fuel break creates a park like setting that slows the spread of a wildfire mainly due to lack of vegetative fuel. Shaded fuel breaks are frequently re-vegetated with fire-resistant understory plant materials, but this is often not necessary. It should be noted and taken into consideration when choosing recommendations that shaded fuel breaks often require upkeep and maintenance. The objective for the construction of a fuel break is to slow the advance of a wildfire and increase the effectiveness of fire fighting efforts, and confine fires to a limited and manageable area

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This recommendation is a first tier recommendation – it should be accomplished as soon as possible.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

Figure 14 shows where the shaded fuel breaks should be located.

Recommended Mitigation Measures and Scope of Work:

Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.

Recommended Project 1: 300-foot-wide Shaded Fuel Break around Homes on Leviathan Mine Road.

It is recommended that a 300-foot-wide shaded fuel break be constructed and maintained on the north side of the homes on Leviathan Mine Road. This fuel break would run approximately 1,500 feet in length on the north edge of the community.

Recommended Project 2: 300-foot-wide Shaded Fuel Break around Homes on the South edge of the Community.

It is recommended that a 300-foot-wide shaded fuel break be constructed and maintained around the perimeter of the homes on the southern edge of the community. This fuel break would run approximately 4,500 feet in length starting and ending at Cavelti Road and ending at Highway 395.

Recommended Project 3: Shaded Fuel Break around Homes on the West Edge of the Community.

It is recommended that a 300-foot-wide fuel break be constructed and maintained around the perimeter of the homes on the western edge of the community. This fuel break would run approximately 5,200 feet in length around the homes on the west edge of the community.

Recommended Project 4: Shaded Fuel Break along Highway 395 between Pine Valley Road and Spring Valley Road.

It is recommended that an approximately 300-foot-wide shaded fuel break be constructed and maintained along Highway 395 between Pine Valley Road and Spring Valley Road.

The shaded fuel breaks would be accomplished in the following manner:

Cutting/thinning trees/shrubs - All trees (live and insect-killed standing 12" diameter and less) not selected as leave trees shall be cut as close to ground level as possible.

Slash trees - Trees >12" diameter shall be left. Leave a minimum of 3 snags per acre for habitat. Leave trees shall be marked singly and in groups of 2 to 3 in a random arrangement; understory shrubs shall be removed to prevent torching. Leave trees shall not be damaged while cutting vegetation, or buried with slash. Clump spacing shall be a minimum of 25 feet. Shrubs over 3 feet in height shall be thinned to a 10-foot minimum spacing and slashed.

Bucking - Felled trees shall be limbed and bucked to 4-foot. Lengths.

Trimming/pruning - Leave trees shall be pruned up 4 ft. and left on site; grasses, weeds, forbs left over the 60-ft portion of space.

Debris disposal would consist of: chipping all woody material, shredding, hauling to landfill, or piling and covering with 6-mil plastic for later burning. Non-woody debris shall be hauled to a landfill.

Defensible space shall be a 6-foot minimum fire line to mineral soil next to structures only where the fuel break is next to structures.

Estimated Volumes of Debris Produced: tree volume: estimated at 30 tons/acre; shrub volume: estimated at. 2 tons/acre.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The implementation of this recommendation will lower the average community RRV from 89 to 86, a decrease of 4%. The implementation of this recommendation would reduce the rating for structures with the highest RRVs. The construction of shaded fuel breaks will have a beneficial effect on all of the homes on the perimeter of the community.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Post–project rehabilitation would be minimal. Removal of understory vegetation could create the opportunity for the growth of cheatgrass and invasive weed species. However much of the native grass would be left in the shaded fuel break, except where the break was immediately adjacent to a structure. If needed, once the area had been treated, the contractor could reseed the areas with native grasses or fire resistant vegetation. With proper maintenance, the areas should remain relatively free of invasive species.

Estimated Timeline:

Desirable time of year to complete: Any time but fire season.

Estimated time required to complete project: ½ to 1 acre per day, depending on stand density.

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include but are not limited to: type of crew (inmate crew or contracted labor); amount of materials removed; method of biomass disposal – chipping, burning, hauling to landfill, etc.; and method of removal.

This recommendation may be implemented for a estimated cost of approximately $300-400 per acre

Project Maintenance Requirements:

After the initial defensible space is cleared the community will need to continue to remove any vegetation annually, before fire season.

Other Considerations:

*Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*The community should contact the appropriate officials within the county to determine if any permits are needed. As well, if the shaded fuel break projects occur on private, public or American Indian-owned land, permission from the landowner and all appropriate permits should be obtained before beginning work.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 4. Road Improvement

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Acceptable road access and condition within the community are important to how fire response vehicles are able to access structures in the event of a fire. Several factors may limit the accessibility to an area by emergency responders including poor road conditions, unpaved/unsurfaced roads, and insufficient road width. Most of the roads within the community are accessible to the emergency response vehicles. However, Cavelti Road is not wide enough to accommodate emergency response vehicles. This north/south trending road in the western part of the community serves as primary access to many of homes. Should a fire to break out in this area, this road could limit firefighter access.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is Tier 2 mitigation.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

Figure 14 shows the location of the proposed mitigation.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.*

SWCA recommends the improvement of the entire length of Cavelti Road. The community needs to decide what type of road improvement it desires. The choices range from simple grading and widening to asphalt. An evaluation of the community needs and should be conducted to determine the road size and surface type. Once a decision is reached, the community could, obtain the grant money if necessary, release a Request for Quotation, choose a contractor, and commence work. Construction costs may vary depending on the nature and size of the road improvements.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The implementation of this recommendation may lower the average community RRV by less than 1%. Although the decrease in risk according to this assessment is low, a large portion of the community would benefit from the implementation of this recommendation by enabling access to homes that would otherwise not be accessible to emergency vehicles.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Not applicable for this mitigation.

Estimated Timeline:

Desirable time of year to complete: late spring, summer, or early fall

Estimated time required to complete project: Implementation of this project may be accomplished in approximately one year.

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

The necessary road improvements may range in cost from $30,000 to $100,000 per mile. These costs depend on which type of road improvement that the community chooses. If an asphalt road is chosen it will obviously cost more than a road that is simply graded and surfaced with gravel.

Project Maintenance Requirements:

Maintenance requirements would consist of those typically needed to maintain similar road surfaces.

Other Considerations: *Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*

To complete this project it would be necessary to contact the County and obtain all the necessary permits. Whichever contractor the community chooses should be familiar with the permits needed to complete the work, and this same contractor should be able to obtain the permits on behalf of the community.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 5. Improvement of Street Signs and House Numbers

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

In the event of a fire, it is crucial that emergency services be able to locate streets and individual structures in a timely manner. Clearly visible and easy to read signs and house numbers will reduce the response times of emergency personnel responding to a fire. Many of the houses in the community did not have clearly visible addresses. If the emergency personnel are not intimately familiar with the community, the response time in any emergency event could be slowed with a resulting cost in human life and property.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is Tier 2 mitigation. Measures in this tier are typically completed after those in Tier 1. A 2% decrease in risk could be rated at Tier 3, but this measure was ranked higher because of the relatively low costs.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

Figure 14 shows the houses that are clearly addressed.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.*

It is recommended that all streets within the community be clearly identified with street signs containing reflective lettering at least four inches in height. These street signs should be positioned so that they can be clearly visible to emergency personnel. Additionally, it is recommended that all structures be clearly identified with the appropriate house numbers. The attached figure shows those houses need to be more clearly addressed

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

Overall, the implementation of this recommendation may lower the average community RRV from 89 to 88, a decrease of 2%. All of the homes in the community may benefit from the improvement of street signs and house numbers.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Not applicable for this mitigation.

Estimated Timeline:

Desirable time of year to complete: anytime

Estimated time required to complete project: Implementation of this project could be accomplished in one month.

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

The cost of implementing this project was estimated to be approximately $20 to $50 per house.

Project Maintenance Requirements:

Not applicable for this mitigation.

Other Considerations: Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.

No other considerations.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 6. Roofing Improvements

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

For a structure, the roof is the most common structural fuel bed for ignition by flying firebrands. Therefore, the type of building materials used in the construction of the roof is of great importance to the structure. Class B roofing includes roof coverings that are effective against moderate fire test exposures. These coverings are not readily flammable, do not carry or communicate fire, afford a moderate degree of fire protection to the roof deck, do not slip from position, and possess no flying brand hazard; however, may require repairs to maintain their fire retardant properties over time. Some of the homes in the community do not have class B or better roofs. In the event of a wildfire these houses would be at risk for ignition from firebrands.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is Tier 3 mitigation. Individual structures would benefit, but this would not reduce risk on a community-wide basis.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

Figure 9 shows the roof types of the houses within the community.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.*

It is recommended homes within the Spring Valley/Double Springs community with roofing Class C or non-rated roofs install roofs rated B or better. The attached figure shows the houses within the community that need to have class B or better roofs installed. A limited number of homes would be affected by this recommendation; therefore the community will need to decide if this mitigation is going to be a community sponsored mitigation an individual homeowner mitigation. If the community decides that the individual homeowners should carry out this mitigation, those homeowners that are affected should try

to get bids as a group from various contractors. Often the contractor will charge less for roofing a group of homes rather than individual homes.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The implementation of this recommendation may lower the average community RRV from 89 to 88, a decrease of 2%. The implementation of this recommendation would have a beneficial effect on several homes within the community. Although a limited number of homes would be affected by the implementation of this recommendation, the decrease in risk for those homes would be significant.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Not applicable for this mitigation.

Estimated Timeline:

Desirable time of year to complete: late spring, summer, or early fall

Estimated time required to complete project: several weeks to complete each house

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Construction costs may vary depending on the type of roof and size of the home.

Project Maintenance Requirements:

The project maintenance requirements for this mitigation will vary upon the size and type of the roof.

Other Considerations: *Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*

The County should be contacted to determine whether a building permit will be required.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 8. Information Kiosks Containing Community Information

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Often in the event of a fire or other emergency the emergency response personnel are not familiar with the community where the event is taking place. This lack of information can lead to loss of life or property. If the community were to place informational kiosks at the entrances to the community the emergency response personnel would have access to information that could help prevent loss of life or property.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is Tier 3 mitigation. Measures in this tier are generally implemented after higher tiers and as funding is available.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

The kiosks would be placed at the junction of Highway 395 and Spring Valley Road and at the junction of Highway 395 and Pine Valley Road.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.*

SWCA recommends that at the main entrances to the community there be informational kiosks. These kiosks would be made of a lockable, immovable, weather proof, and fire resistant container. The professional and volunteer emergency personnel would have keys to allow access to the information contained inside the kiosks.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

This recommendation is not quantifiable, nonetheless this recommendation has merit, is fairly easy to implement and, in the event of a wildfire, and could save lives or property.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

The information contained within the kiosks would need to be periodically updated.

Estimated Timeline:

Desirable time of year to complete: Anytime

Estimated time required to complete project: SWCA estimates one to two months to complete

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Cost would depend on the type of containers chosen for the kiosks and the amount and type of information contained within the kiosks

Project Maintenance Requirements:

The information contained within the kiosks would need to be periodically updated

Other Considerations: *Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*
The community should form a kiosk committee to decide what type of container to use, exact locations and the information that the kiosks should contain.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 9. Barrier Foam for Individual Structures

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

Often during a wildfire, there are not enough firefighting resources to protect every home in the communities in the path of the fire. If the residents or the volunteer fire departments had a protective product that they could spray on the house when leaving the area, the house would have a better chance of surviving the wildfire than a house that had not been sprayed with the fire resistant/protective product.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This is Tier 1 mitigation.

Location: Describe or attach a map with sufficient detail to allow accurate ground location.

All homes in the community.

Recommended Mitigation Measures and Scope of Work: *Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes.*

Note: SWCA Inc. does not endorse or recommend one particular type of product or vouch for the product's ability to withstand fire. The products and websites mentioned in this document are for reference; in no way is this an endorsement of any product or website. A community committee or individual homeowner should decide which foam/gel is best for their uses if this mitigation is chosen.

There are several gel or foam products on the market that can protect a structure from an encroaching wildfire. The firefighters or the occupants easily spray these products on the structure and then evacuate the area. One such product is Barricade Fire Blocking Gel, more information about this product can be found at: http://www.barricadegel.com/. This gel will provide a layer of protection that can be sprayed on by a garden hose. It will adhere to surfaces such as walls, overhangs, wood shake roofs, metal or fiberglass surfaces and glass. An Internet search revealed several other similar products that may or may not work better or cost less. Research into each particular product should be conducted by the individual homeowner or community to determine which product meets their particular needs and standards.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

This mitigation will not reduce fire threat to a community; it will only increase the survivability of the homes in the event of a wildfire.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation:

Present scope of work in sufficient detail to facilitate procurement of bids and quotes.

Not applicable for this mitigation.

Estimated Timeline:

Desirable time of year to complete: Not applicable for this mitigation.

Estimated time required to complete project: Varies with availability of funding and whether or not this is a community or individual homeowner effort

Estimated Cost:

Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.

Cost of this mitigation depends on the individual square footage of the homes, on whether or not this project is going to be undertaken by the entire community or the individual homeowners and the brand of product chosen. The following cost is based upon choosing one particular type of product. SWCA in no way endorses this product or vouches for the product's ability to withstand fire. Cost: Eight 1¼-gallon containers of Barricade Fire Blocking Gel will cover approximately 4000 square feet. This particular product ranges between $500 to $640 for eight gallons and applicators.

Project Maintenance Requirements:

Not applicable for this mitigation.

Other Considerations: *Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*

Not applicable for this mitigation.

Risk/Hazard Identification and Mitigation Project Worksheet
(Complete one worksheet for each mitigation project proposed)

Name of Community: Spring Valley/Double Springs Date: September 8, 2003

Project Title: Mitigation 10. Shaded Fuel Reduction for all Parcels Within the Community

Description of Risk/Hazard: *Describe in detail the risk or hazard that poses a threat to the community.*

The parcels within the Spring Valley/Double Springs community are generally several acres in size. This means that even if a homeowner were to create defensible space as recommended in Mitigation 2, much of the rest of the parcel would contain high levels of understory vegetation, which could help the spread of a wildfire. Additionally, firebrands can travel ¼ to ½ mile or more from a wildfire starting spot fires. If a major wildfire were to occur near the community, the firebrands may be able to travel over the shaded fuel breaks and into the community. If the amount of fuel is not reduced throughout the community, when these firebrands land a major fire could start within the community. Therefore, it is recommended that a shaded fuel reduction project take place on all parcels within the community.

This shaded fuel reduction project would be conducted in the same manner as the shaded fuel break projects, but not as much vegetation would be removed for this project. The costs and time involved in this recommendation would be similar to the shaded fuel break projects. It should be noted and taken into consideration that this recommendation will require upkeep and maintenance.

Priority Ranking: *What is the priority ranking of this risk/hazard in relation to all others identified?*

This recommendation is a first tier recommendation – it should be accomplished as soon as possible.

Location: *Describe or attach a map with sufficient detail to allow accurate ground location.*

The shaded fuel reduction would take place throughout the community

Recommended Mitigation Measures and Scope of Work:

Present prescription and work specifications in sufficient detail to facilitate procurement of bids and quotes. For hazardous fuel removal projects include estimated volumes (tons/acre) of fuel removed and disposal plan.

The shaded fuel reduction would be accomplished in the following manner:

Cutting/thinning trees/shrubs - All trees (live and insect-killed standing 12" diameter and less) not selected as leave trees shall be cut as close to ground level as possible.

Slash trees - Trees >12" diameter shall be left. Leave a minimum of 3 snags per acre for habitat. Leave trees shall be marked singly and in groups of 2 to 3 in a random arrangement; understory shrubs shall be removed to prevent torching. Leave trees shall not be damaged while cutting vegetation, or buried with slash. Clump spacing shall be a minimum of 25 feet. Shrubs over 3 feet in height shall be thinned to a 10-foot minimum spacing and slashed.

Bucking - Felled trees shall be limbed and bucked to 4-foot. Lengths.

Trimming/pruning - Leave trees shall be pruned up 4 ft. and left on site; grasses, weeds, forbs left over the 60-ft portion of space.

Debris disposal would consist of: chipping all woody material, shredding, hauling to landfill, or piling and covering with 6-mil plastic for later burning. Non-woody debris shall be hauled to a landfill.

Defensible space shall be a 6-foot minimum fire line to mineral soil next to structures only where the fuel break is next to structures.

Estimated Volumes of Debris Produced: tree volume: estimated at 30 tons/acre; shrub volume: estimated at. 2 tons/acre.

Evaluation of the Extent to Which Completion of This Project Will Reduce the Fire Threat:

The implementation of this recommendation will lower the average community RRV from 89 to 86, a decrease of 4%. The implementation of this recommendation would reduce the rating for structures with the highest RRVs. The shaded fuel reduction will have a beneficial effect on all of the homes within the community.

Identification of Protected Species or Other Critical Resources:

Describe any measures that must be taken to protect critical wildlife habitat, historic or culturally sensitive sites, artifacts or other resources, and plant and animal species protected by statute.

Not applicable for this mitigation.

Post-project Rehabilitation: *Present scope of work in sufficient detail to facilitate procurement of bids and quotes.*

Post–project rehabilitation would be minimal. Removal of understory vegetation could create the opportunity for the growth of cheatgrass and invasive weed species. However much of the native grass would be left in the shaded fuel break, except where the break was immediately adjacent to a structure. If needed, once the area had been treated, the contractor could reseed the areas with native grasses or fire resistant vegetation. With proper maintenance, the areas should remain relatively free of invasive species.

Estimated Timeline:

Desirable time of year to complete: Any time but fire season.

Estimated time required to complete project: ½ to 1 acre per day, depending on stand density.

Estimated Cost: *Present an estimate of the total cost of project completion and the basis for the estimate presented. If the project can be subdivided into phases or various components present an estimated cost for each.*

Cost estimates are based on a variety of factors. These factors account for the wide variation in the per acre cost to implement this recommendation. Factors contributing to cost include but are not limited to: type of crew (inmate crew or contracted labor); amount of materials removed; method of biomass disposal – chipping, burning, hauling to landfill, etc.; and method of removal.

This recommendation may be implemented for a estimated cost of approximately $300-400 per acre

Project Maintenance Requirements:

After the initial fuel reduction, the community will need to continue to remove any vegetation annually, before fire season.

Other Considerations: *Describe any other considerations that must be taken into account to successfully complete this project such as permits, clearances, approvals, etc.*

The community should contact the appropriate officials within the county to determine if any permits are needed. As most of this work would be done within the community, on privately owned land and with the permission of the landowner, it is not expected that any permits will be needed.