Community Fire Risk, Hazard Reduction, and Project Implementation Plan

For the

Galena Forest Estates Unit 1 Community
Washoe County, Nevada

Prepared For:

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INTRODUCTION

Following a record-breaking wildfire season, The National Fire Plan was written in the year 2000 to identify and address high hazard conditions for wildfires in the urban interface. Working with Congress, the Secretaries of Agriculture and Interior jointly developed the National Fire Plan, which received substantial new appropriations in fiscal year 2001 to address fuel reduction treatment planning and implementation. This project was administered by the Nevada Fire Safe Council and funded through a National Fire Plan Grant from the USDA Forest Service and the Nevada Commission on Economic Development.

Resource Concepts, Inc. (RCI) was retained to identify existing conditions and hazards in the Galena Forest Estates Unit 1 Community (hereafter referred to as 'Galena Unit 1') that increase the risk for loss of life and/or property in the event of a wildfire. In this report, risks are prioritized and recommended mitigation plans are described to reduce or manage risks in the inevitable event of a wildfire in the community.

Location and Adjacent Ownership

Galena Unit 1 is located along the eastern slope of the Sierra Front approximately 17 miles south of Reno, Nevada, as shown in Figure 1. The community is accessed via the Mount Rose Highway (State Route 431) and consists of 227 lots ranging in size from approximately 0.5 to 2.3 acres. Approximately 40 lots in the subdivision are vacant. A total of six community open space parcels ranging in size from 1 to 13 acres are owned and managed by the Galena Forest Estates Homeowners' Association. One parcel along Galena Creek is owned by Washoe County Parks. The general locations of roads, parcels, and structures are shown in Figure 2.

The Humboldt-Toiyabe National Forest and the Montreux Golf Club border the Galena Unit 1 Community to the north. The Nevada Department of Transportation Mount Rose Highway right-of-way, Humboldt-Toiyabe National Forest, and Washoe County Parks property lie west of the community. Private subdivision parcels and community open space owned by various Homeowners' Associations border the remainder of Galena Unit 1, as shown in Figure 3.

Environmental Setting

The Galena Unit 1 Community is situated in a second growth Jeffrey pine forest, approximately 125 to 135 years of age, typical of the eastern slope of the Sierra Nevada Mountains. Ecologists refer to this area as a "fire environment." Fire is an integral ecological component of this forest ecosystem. Regeneration, nutrient cycles, and species diversity in a Jeffery pine forest typically depend upon fire for proper function and condition.

Shrub communities are also common to the Sierra region in forest openings, riparian areas, and as understory in young to middle-aged tree stands. The most common shrub species in the Galena Unit 1 project area include mountain mahogany (*Cercocarpus ledifolius)* bitterbrush (*Purshia tridentata)*, greenleaf manzanita (*Arctostaphylos viridis)*, mountain big sagebrush (*Artemisia tridentata vaseyana)*, rabbitbrush (*Chrysothamnus* sp.), and snowbrush (*Ceanothus velutinus).* The riparian area along the Galena Creek streamzone is dominated by quaking aspen (*Populus tremuloides*), wildrose (*Rosa woodsii*), willow (*Salix* sp.), alder (*Alnus tenuifolia*), and some of the upland shrubs.

Figure 1. Galena Forest Estates, Unit 1 General Project Location.

Figure 2. Galena Forest Estates, Unit 1 General Locations of Roads, Parcels and Structures.

Figure 3. Galena Forest Estates, Unit 1 and Adjacent Land Ownership.

Previous Fire Hazard Reduction Projects

Development of Galena Unit 1 and surrounding subdivision projects in the "classic wildland/urban interface" brought concern for community safety to the forefront of the Nevada Division of Forestry (NDF), fire agencies, county planners, and homeowners. Fuel reduction projects that have been completed to comply with development conditions within the vicinity of Galena Unit 1 (and the approximate dates) are shown in Figure 4 and include:

1977-1982 - *Galena Forest Estates Phase 1* - The developer was required to thin the entire subdivision. Some lots were sold prior to thinning and did not receive treatment. Thinning was completed by NDF Conservation Camp Crews to remove ladder fuels and smaller trees.

1988 - *Whispering Pines* - A brush hog was used to remove understory shrubs. Trees were thinned on 45 acres of the 47-acre subdivision.

1990 - *Washoe County Park - Galena* - Smaller trees were thinned and ladder fuels were removed in the day-use areas and around the NDF residence.

1994 - *Guerra Development* (Abies Court south of Galena Forest Estates) - The developer was required to reduce fuels prior to sales by removing mountain mahogany and conducting some pre-commercial and commercial tree thinning.

1994 - 1996 - *St. James Village* - The developer was required to thin each lot and remove 50 percent of the brush understory on each lot prior to street paving. Brush was treated with a brush hog and demasticator.

1999 - *Scotch Pine* - The developer was required to thin fuels on the lots in the primary area of development (home sites).

2001-2002 - *Calamont* - In 2001, the golf course fairways were clear-cut and approximately 100 acres were commercially thinned. In 2002, the remaining 150 acres of forestland were commercially thinned. Approximately 86,000 board feet of saw logs were shipped to the Sierra Pacific Industries (SPI) sawmill in Quincy, California, and 3,200 tons of biomass were chipped and shipped to the SPI wood-fired power plant in Loyalton, California.

2002-2003 - *St. James Village* - In 2002, 100 acres were commercially thinned for fuel hazard reduction. Approximately 318,000 board feet of saw logs were sent to the SPI sawmill in Quincy, California; 4,200 tons of biomass were chipped and shipped to the SPI wood-fired power plant in Loyalton. 700 cords of firewood were shipped to a wood yard in Chilcoot, California. In 2003, a brush demasticator was used to remove 50 percent of the brush on 65 acres of Homeowners' Association green belt property.

Some of these fuel reduction treatments are now 10 or more years old and should be reevaluated for follow-up treatment (thinning) to maintain a healthy forest and continue the effectiveness of fuel load reduction. Fuel reduction treatments take a significant, ongoing effort and commitment to modify the fuel structure and maintain that modified environment to accomplish wildfire hazard reduction.

Figure 4. Galena Forest Estates, Unit 1 Location and Approximate Dates of Risk/Hazard Mitigation Work Previously Completed.

METHODOLOGY

The RCI Project Team included highly experienced experts in the fields of natural resource ecology, fire suppression, forest health, geographic information systems (GIS), and public education. Each of the project tasks was completed with collaboration of the RCI Team Specialists.

Base Map Data Collection

The Washoe County GIS program was the primary data provider for the aerial photographs, parcel information, and the county road centerlines. Both 1-foot and 10-foot aerial orthophotos from 2002 were used. The parcel database was purchased for the sub-region where the project area is located. The roads database and the 10-foot orthophotos are available through free downloads from the GIS program website.

The elevation data used for creating slope and aspect maps were the 10-meter Digital Elevation Models (DEMs) from the US Geological Survey (USGS). ESRI's Spatial Analyst extension was used to calculate the slope and aspects of the area. Digital Raster Graphs (DRGs) of the project area were also obtained from the USGS and used to delineate Galena Creek and for illustrating the general location of the project area.

The DEMs and the DRGs were provided in the Universal Transverse Mercator (UTM) projection and NAD 1927, Zone 11 datum in meters. The Washoe County data was provided in the State Plane projection with the NAD 1983, Nevada West datum in US Survey Feet. Washoe County also uses a local adjustment factor for their survey data. The differences in projections required a transformation be performed on the County data to correct it to true State Plane. A geographic conversion was then used to change the data from State Plane to UTM. These processes allowed for the County data to be overlain on the USGS data. These maps were used to identify parcels with south and west facing aspects and steeper slopes.

Community Meetings

RCI specialists conducted three community meetings with the Galena Homeowners to provide information on why the project is necessary, the goals of the project, the outcome of the risk assessment, and to solicit input from the homeowners regarding specific concerns and opportunities.

Risk Assessment

The revised procedures given in the *Draft Community Wildland Fire Assessment: For Existing Wildland Residential Interface Developments in Nevada* (Nevada's Wildland Fire Agencies 2001; revised 2002) were used to assess the overall risk from wildfire to the Galena Unit 1 Community. This system assigns community risk values (moderate through extreme) based on a ranking system that considers factors that affect potential fire behavior, community access, availability of fire suppression resources, and structure survivability.

Site specific data for the Galena Unit I Community was collected during field visits in April 2003. The average conditions recorded within the community were used as the basis for the risk assessment ranking.

Interviews with Fire Personnel

Local fire department and Fire Safe Council personnel were interviewed by members of the RCI Team to obtain information on emergency response time, equipment availability, evacuation plans and pre-attack plans. Rich Riolo, NDF Fire Prevention Captain; Mike Brown, NDF Battalion Chief; and Kelly Martin, USFS Fire Management Officer were also asked to provide local knowledge on existing hazards and risks.

Prioritization

The RCI Team met several times to analyze community risks, treatment alternatives, and treatment benefits. Treatment recommendations to reduce existing risks were formulated based upon professional experience, the quantitative risk assessment, and information developed in conjunction with the National Fire Plan and FIREWISE[1] resources.

[1] All information supplied by FIREWISE is approved by the National Wildfire Coordinating Group, a consortium of wildland fire agencies that includes the USDA-Forest Service, the Department of Interior, the National Association of State Foresters, the U.S. Fire Administration, and the National Fire Protection Association.

RESULTS

The results of the *Draft Community Wildland Fire Assessment* rated the Galena Unit 1 community as being at ***HIGH RISK*** for loss of property and/or life during the event of a worst-case scenario wildfire (Appendix B). The Galena Unit 1 Community score was 66 points on a scale ranging from 61 to 75 points for the HIGH RISK category.

The worst-case scenario fire would be one that started in the shrublands south of the community around noon on a high hazard day[2]. As the fire spread northward, it would consume the existing ground fuels (grasses and shrubs) that provide a vertically continuous fuel column (ladder fuels), allowing the fire to burn into the tree crowns. Once the fire is carried through the tree crowns, it is too dangerous for firefighters to provide structure protection on the ground until after the fire passes through the Community. Heavy smoke conditions produced from a crown fire would also make evacuation difficult. The amount of time that firefighters would have to make an effective stand against the fire would depend on how fast the fire moved into the tree crowns, and the distance between the Community and the fire start.

Another worst-case scenario wildfire would be one that started in the mountains west or northwest of the community, in one of the prevalent drainages such as Galena Creek. Downslope winds would rapidly push a crown fire into the Galena Unit 1 Community from the west.

Both of these scenarios describe fires that would create extreme fire behavior with flame lengths of more than 100 feet, seriously threatening lives and property in the Galena Unit 1 Community.

Other fire conditions could threaten homes within the Community including ground fires ignited within the neighborhood, burning in heavy brush growing around existing structures.

Fire Suppression Resource Availability

The proximity of local fire stations to the Galena Unit 1 Community is shown in Figure 5. As part of the Sierra Front Wildfire Cooperators, the first alarm response to a wildfire would include resources from the Nevada Division of Forestry, Reno Fire Department, Incline Village Fire Department, and the US Forest Service. On the first alarm, the estimated time of arrival (ETA) for two NDF Type 1 Engines and two Type 3 Engines would be 6 to 10 minutes. Two Type 3 Engines from the Reno Fire Department would arrive within 10 to 12 minutes. The US Forest Service response will vary, but could include two additional Type 3 Engines. The Woods and Callahan Volunteer Fire Departments will respond based on firefighter availability with brush engines and water tenders. On high hazard days and days with predicted lightning, NDF will stage a hand crew, a bulldozer, and a helicopter in the Galena area.

[2] A "high hazard day" would be one with temperatures in the 90's with winds coming from any direction at 25 to 35 miles per hour. (Prevailing winds are usually from the south/southwest.). Fires along the Sierra Front change direction erratically due to the local weather conditions, and the effect of mountainous topography.

Figure 5. Galena Forest Estates, Unit 1 General Location of Fire Suppression Resources Within a Five-Mile Radius.

Risks and Hazards

Fuels. Overall, the vegetative fuel hazard within the Galena Unit 1 Community ranges from moderate to extreme. Fuels in the community can be classified into three general categories: 1) brush, 2) trees, and 3) trees with a brushy understory. Brush thinning on some parcels has left behind a dense tree stand with smaller trees serving as ladder fuels. In this case, the fuel condition still presents a high degree of hazard for carrying a dangerous crown fire. In other areas where there are no trees, dense, tall brush creates a high fuel hazard. The worst fuel condition occurs on parcels that are over-stocked with trees and have dense brush ladder fuel undergrowth. Some of the community parcels also have an increased fuel volume and an extreme hazardous condition from dead and downed trees and larger shrubs. A few parcels in the community have adequate defensible space through thinned brush and trees close to the house, and combustible vegetation replaced by fire retardant landscaping.

Cheatgrass, a highly flammable annual grass, is currently limited to small patches and roadside areas within the Community. Cheatgrass will aggressively invade disturbed sites, creating a high potential for additional hazardous ground fuels in the Galena Unit 1 area.

Rare Plants - No federal or state-listed threatened, endangered, or special management species are known to occur within the Galena Unit 1 Community that would constrain implementation of fuel reduction treatments. A small plant in the mustard family, Galena Creek rockcress (*Arabis rigidissima* var. *demota*), is listed as 'Sensitive' within the Humboldt-Toiyabe National Forest. A search for Galena Creek rockcress prior to initiating any ground-disturbing activity, particularly within the Galena Creek drainage, would allow any existing populations of this species to be avoided. More information on Galena Creek rockcress is included in Appendix C.

Structural and Landscaping Designs. Some building materials used within the Galena Unit 1 Community include wood shake roofs, wood siding, and large pane windows that create severe problems under fire conditions. Other structural features and conditions that increase the risk of structure ignition include wooden decks, unenclosed balconies and eaves, unscreened vents and woodpiles adjacent to structures. Combustible vegetative materials including pine needles, limbs, shrubs and trees that collect on roofs or otherwise contact structures greatly increase the risk of structure fires during a wildfire.

Structure Density. Structure density, or spacing between homes, is extremely close in some areas of the Community with adjacent houses less than 100 feet from each other. This can create challenges for homeowners trying to create defensible space when their home lies within 30 feet of the adjacent property line. This also creates a hazard if a structure is ignited during a wildfire. The radiant heat from a nearby-ignited structure can ignite other structures.

Access. Most streets within the Galena Unit 1 Community are in excellent condition for access by fire equipment and evacuation of residents. The few dead-end streets within the community can cause access and evacuation problems under dense smoke and fire conditions. NDF is currently preparing an evacuation plan for the Galena Unit 1 Community.

Private driveways vary from excellent to moderate for fire apparatus use and vegetation clearance. When dense vegetation aligning a driveway burns intensely, dense black smoke creates a zero-visibility condition that prevents fire engines from accessing structures for fire

protection. Address signage is variable throughout the community, and can create difficulty for fire suppression personnel responding to structures under adverse visibility conditions.

Potential Ignition Sources. The most probable cause of wildfire in the vicinity of the Galena Unit 1 Community is human negligence. Potential ignition sources include discarded smoking materials from the Mount Rose Highway, residential or public day-use-area barbeques, and a prescribed or controlled burn that grows out of control. The potential for natural-caused fires from lightning strikes is high. Arcing power lines outside the community during high winds is also a potential ignition source for wildfire. Many propane tanks in the community do not have the minimum 10-foot flammable material clearance necessary for protecting the tank from ignition. This especially becomes a problem in the event of a wildfire within the community. Ignited materials in close proximity to a propane tank could cause the tank to explode. Ignition sources in the vicinity of the Galena Unit 1 Community are shown in Figure 6.

Figure 6. Galena Forest Estates, Unit 1 General Locations of Current Risks and Hazards.

RECOMMENDED HAZARD REDUCTION PLAN

In a fire environment area, it is often said that it is not a matter of 'IF' a fire occurs, but rather 'WHEN' the fire will occur. Under these circumstances, such as the Galena Unit 1 Community, the most effective means of reducing the risk for loss of life and property is applying treatments that will reduce the severity of the fire when it happens. Eliminating and reducing fuels will reduce the severity of a fire in the Galena Unit 1 Community, improve firefighter safety, and increase fire suppression opportunities.

The recommendations for the Galena Unit 1 Community are prioritized as shown below and illustrated in Figure 7. The first order of priority for the recommendations is to protect individual lives and property; and secondly to lessen the severity of wildfire and improve the potential for fire suppression. Although the recommendations are presented in order of priority, the optimal hazard reduction plan includes immediate implementation of each recommendation.

Priority 1. Defensible Space and Fuel Reduction Treatment on Private Property.

Priority 2. Fuel Reduction Treatment on Galena Unit 1 Community Parcels and Washoe County Property

Priority 3. Shaded Fuel break Construction around the Community Perimeter

Priority 4. Southern Extension of the Shaded Fuel Break Along the Mt. Rose Highway.

Priority 1. Defensible Space & Fuel Reduction Treatment – Private Property

The first priority for mitigating wildfire risks to life and property in the Galena Unit 1 Community focuses on private property[3]. Defensible space, fuel reduction, structure modification, and improved address identification are included as Priority 1 treatments.

Defensible Space

Defensible space refers to a ***minimum*** 30-foot area around houses and other buildings where vegetation has been significantly modified or removed. The purpose of creating defensible space is to reduce the risk of losing homes and other property improvements to a wildfire. All parcels should have defensible space treatments installed and maintained according to the distances specified in Figure 8. The UNR Cooperative Extension publication "Living With Fire…in the Tahoe Basin" describes in detail how to create defensible space.

[3] Parcel number 4705112 was also included in the private parcel recommendations even though it is not included in the Galena Unit 1 Homeowner's Association.

Figure 7. Galena Forest Estates, Unit 1 Priority Fuel Reduction Treatments.

Figure 8. Standard Defensible Space Recommendations for Homeowners

Fuel Reduction

Variable fuel conditions within the Galena Unit 1 Community require three treatment specifications defined below. Recommendations for private property are shown in Figure 9. These recommendations describe the type of fuel reduction treatment that should occur, extending from the defensible space zone throughout the entire lot.

Treatment 'A' - Tree Thinning – The number of trees per acre should be reduced to minimize the likelihood of carrying a crown fire through the community. The appropriate number of trees on a parcel depends on the size of the tree. Larger trees require more space for healthy growth.

Trees should be thinned to approximately 80 square feet of basal area[4] per acre. As a rule-of-thumb, the spacing between trees can be calculated by multiplying the diameter of the tree at breast height (DBH) (4.5 feet above ground level) by a factor of 1.7. The spacing required between different sizes of trees to establish the recommended stocking rate is given in Table 1. Tree spacing is measured between the tree trunks.

Table 1. Tree thinning guide to maintain the recommended tree stocking level of 80 square feet basal area per acre.

Tree Diameter (inches) (Measured at breast height)	Tree Spacing (feet) (Diameter x 1.7)	Number of Trees Per Acre
10	17	147
12	21	101
16	28	57
20	34	36
24	41	25
30	52	16

In selecting trees for removal, follow these general rules:

1. Remove trees with forked tops. Forked-top trees can become a hazard, as they tend to split over time and can cause personal injury and damage to structures or other valuable property.

2. Remove trees with basal scars that are indicators of wood-boring insects and ants in the tree trunk.

3. Remove trees with dead or broken tops. These trees attract bark beetles.

4. Remove trees that are infested with dwarf mistletoe. If a tree is only infected in the lower branches and the tree is in a desirable location, prune and dispose of the infected branches. Mistletoe is a parasitic plant that spreads by seed and will eventually kill the tree.

[4] "Basal area per acre" is defined as the cumulative cross-sectional tree trunk area per acre. The cross-sectional area is measured at breast height and is expressed in square feet.

Figure 9. Galena Forest Estates Unit 1 Private Property Fuel Reduction Recommendations.

5. Remove small trees that are not in a dominant position in the canopy and are being crowded by taller trees. Both Jeffrey and ponderosa pine need direct sunlight. Overcrowded conditions create competition between trees for limited moisture and nutrients resulting in poor vigor and condition, and high susceptibility to attack from pine beetles.

6. Homeowners should contact a professional forester with NDF or a private consultant to provide assistance in assessing the stand conditions and marking the trees for removal.

Treatment after thinning:

1. Treat stumps with borax powder (decca hydrate borax) to prevent harboring harmful root-rot fungi (*Fomes annosus).*

2. Promptly remove all wood debris (limbs, tops, and trunks) from the treatment site to a pre-designated disposal area. If wood is kept for firewood, it should be promptly cut and split to promote drying. Wood should not be stacked next to buildings or under decks, and should be covered with clear plastic (four to five mm) to destroy bark beetles.

3. Revegetate all disturbed areas and created openings with the recommended seed mixture provided in Appendix E, or other fire-resistant landscaping to protect bare areas from erosion and invasion of weeds and cheatgrass.

Treatment 'B' – Brush Removal and Thinning – Manipulation or removal of fuels reduces the likelihood of rapid spread rates and increases the effectiveness of fire suppression. Thinning and pruning are effective risk management tools because they reduce the "ladder" effect of fuels. Thinning plants or thinning to leave clusters of plants can greatly modify the fuel load and associated fire behavior.

The ground fuels, comprised primarily of grasses, forbs, pine needles, dense shrubs, small trees, and dead plant material should be thinned to a spacing equal to two (2) times the height of shrubs. More flammable species such as manzanita, bitterbrush, snowberry and sagebrush should be removed and replaced with fire-resistant landscaping ***within the defensible space zone***. If these native shrubs are not removed, they should be heavily pruned to reduce flame lengths if ignited. Pine needle litter should also be reduced to less than a two-inch thickness in the defensible space "clear zone." If brush removal creates bare openings, revegetation, as described in Appendix E, or replacement landscaping should be installed to provide erosion control and prevent cheatgrass and weed invasion.

Treatment 'C' - Combination Tree and Shrub Fuel Reduction – The majority of the property in the Galena Unit 1 Community requires tree and shrub removal to reduce the ladder fuels and reduce tree density. The importance of treating both fuel layers is to prevent a ground fire from moving through ladder fuels and into the tree canopy. Once a wildfire advances into the tree canopy, the crown fire cannot be attacked from the ground, and resources cannot be deployed for structure protection. Specifications for removal of the trees and shrubs are discussed in the previous sections.

Treatment Maintenance – Effective fuel modification treatments require periodic maintenance. As trees and shrubs grow, they will require additional limbing and pruning, and possibly additional removal.

Cheatgrass can be controlled though annual applications of pre-emergent herbicides such as CASARONE in the fall and/or spring applied immediately before rainfall or applied and followed by light watering. In the absence of chemical control, use of a weed eater can be used to effectively mow the annual grass. However, it is important to rake and remove the cut material when the operation is completed.

Structure Modifications and Address Identification

Galena Unit 1 homes should be inspected for structure modifications and improvements that would improve survivability during a wildfire. Shake roofs that have not been treated with fire retardant sealant within the last five to six years should be examined for retreatment. Screening vents, decks and porches will reduce the risk of smoldering embers igniting the structure during a fire. Removing flammable materials within 10 feet of propane tanks, or burying the tanks will reduce explosion risks in the event of a wildfire.

All homes should have clearly visible, reflective address numbers, at least four-inches in height on a contrasting background. Improving address identification greatly facilitates deployment of fire engines to properties in need of structure protection.

Priority 2. Fuel Reduction Treatment – Community and Washoe County Property

Galena Creek Stream Zone

This community area consists of three parcels; two parcels owned by the Galena Homeowners, and the stream corridor which is owned by Washoe County Parks. Recommended treatment for this area consists of reducing the dense fuels that are dangerously close to adjacent homes. Treatment recommendations are specified below for each parcel.

North Stream Zone – The community property on the north side of Galena Creek includes the south-facing slope below Joy Lake Road. The east end of the parcel has dense brush and mountain mahogany ladder fuels. Shrubs and dead material should be removed in this area to break up the continuity of the brush layer. The specifications for tree and shrub removal are similar to recommendations given above for treatment on private property. Small trees should be removed. Limbs on remaining trees should be pruned to a height of 15 feet (or no more than ⅓ of the total crown). Trees with crowns overhanging or close to structures should be removed.

A large pile of wood located west of the aspen stand and dead and down wood within the aspen stand should be removed. (The aspen stand is located in the southern part of the parcel.) Woodpiles can be burned in the late fall or winter when there is snow on the ground. Using hand crews to pile and burn in this area eliminates the need for using equipment on steep slopes and reduces site disturbance. Burn piles should be small to reduce burning time. Piles can be covered with plastic or Kraft paper to keep them dry until burning. Keeping the core of the piles dry reduces the amount of smoke, and the time that it takes for the piles to burn completely. Burning will require an air quality permit from Washoe County. Woodpiles could also be transported to the Carson City landfill.

The most practical access to this area is from the Mt. Rose Highway. Access would require an encroachment permit from the Nevada Department of Transportation (NDOT).

Washoe County Parks Stream Zone - This parcel would benefit from eliminating dead and down wood, diseased, and standing dead trees.

South Stream Zone – The south parcel needs minimal tree thinning, but would benefit from pruning lower tree limbs and eliminating brushy ladder fuels. Hand crews would also work best in this area due to the steep slopes.

Upper and Lower Douglas Fir Drive

These parcels are in need of tree thinning and removal of small tree and brush ladder fuels. These areas could also serve the community for temporary storage of biomass removed from private parcels. Stockpiled woody debris could be chipped at this site and transported out of the community. Providing a community stockpile and chipping area could reduce fuel reduction treatment costs for homeowners by eliminating the need for moving a chipper from one parcel to the next. Upon completion of chipping, the parcels would require reseeding to establish a desirable, fire resistant plant community.

Blue Spruce

This parcel needs brush removal treatment to break up the dangerous, continuous surface fuels. High groundwater in this area precludes its potential for use as a community stockpile area. Some trees on this parcel should also be pruned to treat dwarf mistletoe.

Yellowstone Drive

Fuel reduction treatment on this parcel requires tree removal to the recommended 80 square feet of basal area described for private property. Ladder fuels should also be removed from beneath remaining trees.

Priority 3. Shaded Fuel Break Construction - Community Perimeter

The purpose of constructing fuel breaks is to create a barrier to stop or slow approaching wildfires, or to provide a control line from which firefighters can work. Creating an effective ***shaded fuel break*** consists of removing or thinning the majority of the fuel load (trees, shrubs, deadfall) from a swath of land large enough to stop or slow the advance of a raging wildfire. When located along roads, a fuel break can improve safe evacuation for residents and safe access for firefighters.

RCI specialists used a fire behavior analysis computer program (BEHAVEPlus) along with professional judgment to derive a minimum fuel break width of 300 feet for the Galena Unit 1 Community. Shaded fuel breaks are recommended for the Galena Unit 1 Community on the north, west and south perimeters. These bearings represent the highest risk for a wildfire approaching the community from an outside start based upon slope, aspect and existing fuel conditions. Fuel breaks are recommended for construction on private, federal, state, and county lands.

The west boundary fuel break is recommended for construction within the Nevada Division of Transportation (NDOT) Mt. Rose Highway right-of-way, and on Washoe County property

between the NDOT right-of-way and the Galena Unit 1 property line. The north side fuel break is recommended on the Humboldt-Toiyabe National Forest, which contains a large expanse of extremely hazardous fuel conditions. The southeast fuel break is recommended for construction on private parcels within the Galena Unit 1 Community, and community parcels owned by adjacent subdivisions.

The south perimeter fuel break is proposed for construction on private property within the Galena Unit 1 Community and on private property in adjacent subdivisions. A high tree density on this south-facing slope represents one of the highest risk areas in the community. Achieving the recommended 300-feet of treatment area on this perimeter will necessitate cooperation from adjacent property owners, who would benefit from pre-suppression fuel reduction if a fire were to start within the Galena Unit 1 Community and threaten adjacent properties.

Specifications for shaded fuel breaks are similar to previous recommendations for fuel reduction:

- Reduce tree density to 80 square feet basal area per acre, ranging from approximately 20 to 50 feet between tree trunks according to the size of the trees.

- Remove ladder fuels and break up continuous ground fuel layers.

Priority 4. Extended Shaded Fuel Break Treatment – South Mt. Rose Highway

Extending the fuel break treatment further south along the NDOT Mt. Rose Highway right-of-way to the point where the highway turns west could potentially provide a safe “anchor point” where fire suppression resources can make an effective attack against an oncoming wildfire.

ALTERNATIVES FOR IMPLEMENTATION OF FUEL REDUCTION TREATMENTS

Homeowners have several alternatives for tree and brush removal. **In all cases, it is critical that a professional forester mark the trees to be removed with paint so there is no question as to which trees are to be cut down.** A forester can help identify hazardous trees that should be removed to protect structures, and trees to be removed to prevent the spread of insect and disease to healthy trees that remain.

1. Hire a professional tree service or logger that specializes in shrub and tree removal in and around homes. These companies can generally do a complete job that includes thinning trees, chipping biomass, and hauling away woody debris. Professionals are required to remove trees located next to structures. These trees must be climbed and the tree cut in sections that are then lowered to the ground. Extreme care must be taken to protect existing structures and landscaping. When hiring a private contractor, it is the homeowner's responsibility to:

- Check to assure that the contractor has liability insurance in the event of an accident.
- Ask for references and past experience.
- Obtain written cost estimates.
- Agree to a property access and debris removal plan, and schedule.
- Document these details in a signed contract.

Costs. Cost estimates obtained from local contractors who have done similar work varied based upon the amount of treatment involved. Costs range from a low of $900.00- $1,100.00 for small lots with limited brush removal to a high of $2,200.00 - $5,000.00 for parcels with high-density fuels (Kingsley, Macke, and Williams 2003).

2. NDF Conservation Camp Crews can thin trees and remove brush on undeveloped lots and common areas. Crews usually pile debris to be burned at a later date (late fall or winter with snow on the ground). NDF does not have equipment to chip or haul debris from the job site. Separate arrangements must be made to haul and/or chip woody debris for removal from the job site (Wiese 2003).

Costs. Crews may cost as much as $600.00 per day for a 10 to 12 person crew that could treat approximately 0.5 acres per day. Crews cannot fall trees near structures, as the State does not provide liability insurance.

3. Nevada Conservation Corps has hand crews that can thin and prune trees and remove brush. The crews do not have equipment to haul away debris or chippers to process debris (Baker 2003).

Costs. The cost for an 8-person NCC crew is approximately $4,450.00 per week.

SUMMARY

The recommendations in this report have been specifically developed for the Galena Forest Estates Unit 1 Community. They expand on standard recommendations generally proposed for similar regions, and are based upon site-specific characteristics observed during the wildfire risk assessment field visits performed by RCI in April 2003. On a scale of 1 to 20, full implementation of the priority recommendations in this report will reduce the risks associated with wildfire in the Galena Forest Estates Unit 1 Community to a score of 10. There are no mitigation measures to offset the natural hazards associated with living in a **high hazard fire environment**.

Full implementation of the priority recommendations will require a collaborative approach between the Galena Unit 1 Homeowner's Association, private landowners, Nevada Fire Safe Council, Washoe County, NDOT, and the USFS. On private lands, combining efforts of many landowners for hiring contractors will be the most efficient and effective method for implementing the Priority 1 and 2 recommendations. The Homeowner's Association will need to play and integral role in organizing the fuel reduction contracting efforts within the Community. Collaborative assistance from the Nevada Fire Safe Council will be vital to the full implementation of the Priority 3 and 4 recommendations, as they require a cooperative effort over many different ownerships and jurisdictions.

The general and specific recommendations in this report provide a critical starting point for the community and local and state agencies to take a proactive approach to reduce the risks to property and life from a wildfire. It will take a long-term commitment from all landowners and agencies to implement and maintain the priority recommendations as well as develop long-term fuels management plans for the area.

There are no guarantees against the loss of life and property during a wind-driven crown fire in the dense Jeffery pine woodland that characterizes the Galena Unit 1 Community. The recommendations in this report have been compiled to significantly reduce the risks and improve the chances of saving lives and homes during a catastrophic wildfire. Fuels reduction must be adopted and implemented on a community-wide bases. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others are just some of the approaches that will be necessary to meet the Galena Unit 1 Homeowner's Association goals to improve fire safety in the community.

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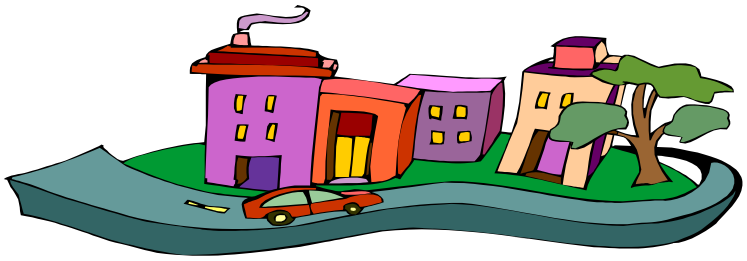
APPENDIX A

Public Meeting Notices and Questionnaire



Galena Forest Estates

Fire Hazard Risk Assessment

The Nevada Fire Safe Council and the Nevada Division of Forestry have contracted with Resource Concepts, Inc. (RCI) to conduct a Fire Hazard Risk Assessment in our neighborhood.

The purpose of the assessment is to determine the current risk for loss of life and property during a wildfire, and to develop plans to minimize that risk.

During the first two weeks of April, the RCI Risk Assessment Team will be driving or walking through the neighborhood and evaluating home construction, landscaping, roads and native vegetation as part of the initial data collection phase.

Informational meetings for homeowners on the Risk Assessment Project will be held on the following dates in the **faculty dining room at Galena High School, accessed from the back parking lot**.

April 7, 2003—7 p.m. – Project orientation for homeowners
April 28, 2003—7 p.m.–Initial assessment results and preliminary recommendations
May 28, 2003—7 p.m. – Presentation of final recommendations

If you cannot attend the meeting on April 7, please log onto the RCI website at www.rci-nv.com and respond to the Galena Forest Estates fire hazard questionnaire.

GALENA FOREST ESTATES COMMUNITY FIRE HAZARD QUESTIONNAIRE

The Nevada Fire Safe Council, on behalf of Galena Forest Estates Unit 1 has retained Resource Concepts, Inc. to develop a Community Fire Safe Plan for the Galena Forest Estates. RCI needs strong community involvement for gathering information and project development. Please take a moment to fill out and return this questionnaire. This form may also be accessed via our website at www.rci-nv.com. The form must be received **no later than April 14, 2003**, at the following address:

Resource Concepts, Inc.
340 N. Minnesota Street
Carson City, NV 89703-4152
Attn: Tracy Benson/Tina Davis

Name _____
Address _____
_____
Phone (optional) _____

Please circle the appropriate answer:

1. Is your roof Metal Composite Wooden Shingle Tile Other_____
2. Is your home Metal Siding Stucco Wood Siding Brick Other_____
3. Are you Full Time Occupant Seasonal Occupant
4. How many outbuildings are on the property? _____
5. Is your address visible from the road Yes No
6. Would you participate in a Fuel Reduction Program? Yes No
7. Has your neighbor participated in a Fuel Reduction Program? Yes No
8. Do you have an enclosed balcony or deck, stilts, etc.? Yes No
9. Would you like information on fuel treatments for your neighborhood? Yes No

If you have performed defensible space work on your property, please describe the work.
_____
_____
_____

Describe what is important to you about the area in which you live.
_____
_____
_____

Appendix B

Results of the Draft Community Wildland Fire Assessment For Galena Forest Estates Unit 1

Community
Wildland Fire Assessment

County: Washoe County

Community: Galena Forest Estates Unit 1

Identify the predominant features of the community

A. Urban Interface Condition

1. Interface Condition: ____
Structures abut wildland fuels; there is a clear line of demarcation between the structures and the wildlands fuels along roads, back fences, etc. Fuels do not continue into the development area. There are 3+ structures per acre.

2. Intermix Condition: X
Structures are scattered throughout the wildland area; there is no clear line of demarcation between structures and fuels along roads, back fences, etc. Density ranges from structures very close together to one structure per 40 acres.

3. Occluded Condition: ____
Usually occurs within a city where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between structures and wildland fuels along roads, back fences, etc. Density is similar to those found in the interface condition and the occluded area is usually less than 1,000 structures in size.

4. Rural Condition: ____
Scattered small clusters of structures (ranches, farms, resorts or summer cabins) are exposed to wildland fuels. There may be miles between the clusters.

B. Community Design

1. Ingress/Egress:

Two or more primary roads	1	X
One road	3	____
One-way road in, one way out	5	____

2. Width of Primary Road:

>24 feet	1	X
>20 feet and < 24 feet	3	____
<20 feet	5	____

3. Accessibility:

Road grade 5% or less	1	____
Road grade more than 5%	3	X

B. Community Design Con't

4. Secondary Road Terminus:

Loop roads, cul-de-sac with an outside turning radius of 45-feet or greater.	1	____
Dead-end roads 200 ft. or less in length.	3	X
Dead-end roads greater than 200 ft.	5	____

5. Average Lot Size:

10 acres or larger	1	____
1 to 10 acres	3	X
Less than 1 acre	5	____

6. Street Signs:

Present	1	____
Not Present	5	X

7. Proximity of state/federal lands:

Adjacent, more than 1 mile, but less than 3 miles	1	____
Adjacent within 1 mile of Community	3	____
Adjacent within ¾ mile of Community	5	____
Adjacent within ½ mile of Community	7	____
Adjacent within ¼ mile of Community	10	X
Within townsite boundaries	15	____

C. Vegetation

1. Fuel Types/Density:

Light	1	____
Medium	3	X
Heavy	5	____

2. Defensible Space:

70% or more	1	____
30% to 70%	3	____
Less than 30%	5	X

Community
Wildland Fire Assessment

County: _____

Community: _____

Identify the predominant features of the community

C. Vegetation Con't

3. Fire Behavior Potential:

Situation #3

Fine and/or sparse fuels surround structures; infrequent wind exposure; flat terrain with little slope and/or north aspect. No large wildland fire history and/or moderate fire occurrence. 3 ____

Situation #2

Moderate slopes; broken moderate fuels; some ladder fuels; composition of fuels is conducive to torching and spotting; conditions may lead to moderate suppression success; some fire history and/or moderate fire occurrence. 7 X

Situation #1

Continuous fuels in close proximity to structures; composition of fuels is conducive to crown fires or high intensity surface fires; steep slopes; predominately south aspects; dense fuels; heavy duff; prevailing wind exposure and/or ladder fuels that may reduce suppression effectiveness; history of some large fires and/or moderate fire occurrence. 10 ____

D. Topography

1. Slope:

8% or less	1	____
8% to 20%	4	X
20% to 30%	7	____
30% or more	10	____

2. Aspect:

North	1	____
East	4	X
West	7	____
South	10	____

E. Fire Protection-Water Source

500 gpm hydrants within 500 feet of structures.	1	____
500 gpm hydrants or draft site within 1,000 feet of structures.	2	X
Water source 20 min. or less round trip.	5	____
Water source farther than 45 min. round trip.	10	____

F. Existing Building Materials

1. Roofing Materials:

Non-combustible covering.	1	X
Combustible covering.	10	____

2. Siding and Decks:

Non-combustible siding/deck.	1	____
Non-combustible siding with combustible deck.	3	____
Combustible siding/deck.	5	X

G. Utilities

All underground utilities	1	____
One underground, one above	3	X
All above ground utilities	5	____

H. Fire Protection Within 5 Miles

Career Department	1	____
Combination Career/Volunteer	3	X
Volunteer with seasonal staffing	5	____
All Volunteer Department	7	____
No Organized Department	10	____

Community
Wildland Fire Assessment

County: _____

Community: _____

Identify the predominant features of the community

I. Risk to Social, Cultural and Community Resources

Situation #3
The setting is characterized by dispersed single homes and other structures that are more than a mile apart. This situation may also include areas where efforts to create a more fire-resistant landscape have been implemented on a large scale throughout a community watershed.
1 ____

Situation #2
The setting is with scattered areas of high density homes, summer homes, youth camps, or campgrounds that are less than a mile apart. Efforts to create defensible space or otherwise improve the fire-resistance of a landscape are intermittent. This situation would cover impaired watersheds or scenic byways. There is a risk of erosion or flooding in the community if vegetation burns.
3 X

Assessment total: 66 pts.

Moderate Hazard: 41 – 60
High Hazard: 61 – 75
Extreme Hazard: 76+

Situation #1
The setting contains a high density of homes, businesses, and other facilities that continue across the interface. There is a lack of defensible space where personnel can safely work to provide protection. The community watershed for municipal water is at high risk of being burned compared to other watersheds within that geographic region. There is a high potential for economic loss to the community and likely loss of housing units and/or businesses. There are unique cultural, historical or natural heritage values at risk.
5 ____

Appendix C

Galena Creek Rockcress Fact Sheet

Insert fact sheet here.

Appendix D

Risk/Hazard Identification and Mitigation Project Worksheets

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

Name of Community: **GALENA FOREST ESTATES UNIT 1** Date: **JULY 25, 2003**
Project Title: **Priority 1 – Private Property Fuel Reduction and Structure Modifications**
.

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

Vegetative Fuel: *The Galena Forest Estates Unit 1 Community is located in an area characterized by over-grown forests with dense tree stands and dense brush understory. Once ignited, especially under windy conditions, this vegetation complex will produce flame lengths in excess of 100 feet long. Firefighters cannot attack a fire of this nature with ground resources.*

Structures and Addresses: *There are several structural modifications that can be implemented to reduce the risk of structure damage due to a wildfire. Also, improving address identification will improve firefighter response in low visibility conditions.*

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

There are a total of four recommendations.

Fuel reduction on private property is the Number 1 priority *recommendation to reduce the hazardous risk to life and property from wildfire in the Galena Forest Estates Unit 1 Community.*

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

For the most part, with the exception of a few lots, the vegetative fuel hazard is prevalent throughout the entire Galena Unit 1 Community. Figure 8 explains the standard defensible space distances recommended for each parcel. Private property parcels in need of fuel reduction treatments are shown in Figure 9.

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.

Follow the tree and shrub removal guidelines provided in the Priority 1 Section of the Hazard Reduction Plan. Figure 9 illustrates the location of the three recommended treatments. Estimated volumes will vary among parcels and property owner preferences for thinning and tree removal.

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

Creating defensible space and reducing hazardous fuel conditions will reduce the risks to life and property more than any other action recommended in this report. *In the event of an advancing crown fire and high-wind conditions, ground crews cannot be deployed for structure protection due to the dangerous conditions for firefighters. In a worst-case scenario fire, the best chance for structure protection is having adequate defensible space.*

However, implementation of this recommendation will not change the fact that the Galena Unit 1 Community is located in a high hazard fire environment.

If all of the recommendations in this report are implemented, there is still no guarantee that a devastating wildfire will not occur in the Galena area. However, community awareness and individual attention to fuels management on private property and fuel reduction on state, federal, and county property will help to achieve the highest level of wildfire safety possible.

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.

Galena Creek rockcress is listed as a sensitive species on the Humboldt-Toiyabe National Forest. It could potentially occur in the Galena Creek drainage. It is not expected to occur throughout the upland areas that are characteristic of the private parcels. A reconnaissance survey prior to start of work should allow impacts to this species to be avoided if it is found on site.

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

Cleared and disturbed areas resulting from treatment implementation should be revegetated according to the specifications in Appendix E, or replanted with fire-resistant landscaping of the homeowner's choice.

Community parcels used for stockpiling, chipping, and processing woody debris will require reseeding with the seed mixture and specifications given in Appendix E.

Estimated Timeline:

Desirable time of year to complete:
As soon as possible. Vegetation removal can occur throughout the spring, summer, fall, and into winter if weather permits. Debris burning, if used should occur in the late fall or winter, with a minimum of four inches of snow on the ground.

Estimated time required to complete project:
The time required to complete the project depends upon the individual homeowner's commitment to the project. With collaboration and coordination among homeowners, the project could be completed within 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.

224 of the 227 private land parcels in Galena Unit 1 are recommended for treatment. Cost estimates provided ranged from $1,100 to $5,000 per parcel depending upon size. Using these costs, the total cost of fuel reduction on the Galena Unit 1 private lands ranges from $246,400 to $1,120,000. Collaboration and coordination among homeowners can reduce costs associated with mobilization and biomass removal.

Total cost for structure modifications and address identification improvement is variable and site-specific.

Project Maintenance Requirements:

Maintenance requirements are given in Appendix G and include pruning, tree removal, cheatgrass treatment, debris and pine needle clearing, and some irrigation (optional).

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

All work on private property must be agreed upon by the respective landowners. No work on private property shall begin before a signed written agreement is obtained.

Burning as a method of biomass removal requires an air quality permit from Washoe County.

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

Name of Community: **GALENA FOREST ESTATES UNIT 1** Date: **JULY 25, 2003**
Project Title: **Priority 2 – Community and County Property Fuel Reduction Treatment**

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

Vegetative Fuel: *The Galena Forest Estates Unit 1 Community is located in an area characterized by over-grown forests with dense tree stands and dense brush understory. Once ignited, especially under windy conditions, this vegetation complex will produce flame lengths in excess of 100 feet long. Firefighters cannot attack a fire of this nature with ground resources.*

Topography: *The Galena Creek Stream zone contains the steepest terrain in Galena Unit 1. Up to 60 percent slopes lie on both south and north facing aspects, leaving the homes at the top of the slopes in extreme danger in the event of a wildfire.*

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

There are a total of four recommendations.

Fuel reduction on community property is the Number 2 Priority *recommendation to reduce the hazardous risk to life and property from wildfire in the Galena Forest Estates Unit 1 Community.*

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

The vegetative fuel hazard is prevalent throughout all of the Galena Unit 1 Community properties as well as the Washoe County Parks property. The parcels recommended for fuel reduction treatment are shown in Figure 9.

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 guidelines for Priority 2 are given in the Hazard Reduction Plan for the project specifications. The tree thinning recommendation is to establish a stocking rate of 80 square feet of basal area per acre, or spacing between trees of 20 to 50 feet depending on tree size. (Larger trees need more space).

The spacing between shrubs is recommended to be twice the shrub height.

The expected biomass volume to be removed from this project is approximately 570 tons.

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

Implementation of the Priority 2 recommendation will especially reduce risks to the homes above the Galena Creek drainage. The combined effects of implementing the Priority 1 and 2 recommendations will provide the optimum fire-resistant conditions within the Community.

However, again, **if all of the recommendations in this report are implemented, *there is still no guarantee* that a devastating wildfire will not occur in the Galena area. Fuel hazard reduction on private, state, federal, and county property will help to achieve the highest level of wildfire safety possible.**

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.

Galena Creek rockcress is listed as a sensitive species on the Humboldt-Toiyabe National Forest. It could potentially occur on the Galena Creek drainage on Community or Washoe County Parks parcels. An ocular reconnaissance survey of these parcels prior to work should allow impacts to this species to be avoided if it is found on site.

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

Community parcels used for stockpiling, chipping, and processing woody debris will require reseeding with the seed mixture and specifications given in Appendix E.

Disturbances and openings created during treatment will require revegetation with the seed mixture and specifications given in Appendix E.

Estimated Timeline:

Desirable time of year to complete:
As soon as possible. Vegetation removal can occur throughout the spring, summer, fall, and into winter if weather permits. Debris burning, if used should occur in the late fall or winter, with a minimum of four inches of snow on the ground.

Estimated time required to complete project:
The time required to complete the project depends on the type of resources used. A private contractor or NDF crews should complete the job within 6 to 8 months.

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.

There are 29 acres of Community property in Galena Unit 1. The Washoe County Parks parcel along Galena Creek is 9 acres, for a total acreage of 38 acres. The cost estimates provided to RCI for Community parcels ranged from $900 to $2,200 per acre. This results in an estimated cost range of $34,200 to $83,600.

Project Maintenance Requirements:

Maintenance requirements will include periodic pruning, tree removal, and litter and debris removal.

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

An encroachment permit will be required from the Nevada Department of Transportation to create an access point for implementing the fuel treatments on the three Galena Creek stream zone parcels. Coordination efforts will be required between the Galena Unit 1 Homeowners' Association and the Washoe County Parks Dept. for implementing the project on Washoe County Lands.

If debris burning is used for biomass disposal, an air quality permit from Washoe County is required.

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

Name of Community: **GALENA FOREST ESTATES UNIT 1** Date: **JULY 25, 2003**
Project Title: **Priority 3 – Shaded Fuel Break**

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

Vegetative Fuel: *Over-grown forests with dense tree stands and dense brush understory characterize the vegetation in the Galena Forest Estates Unit 1 Community and surrounding areas. Once ignited, especially under windy conditions, this vegetation complex will produce flame lengths in excess of 100 feet long. Firefighters cannot attack a fire of this nature with ground resources. A fire starting south, west, or northwest of Galena Unit 1 could quickly burn into the community and threaten homes and lives.*

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

There are a total of four recommendations.

A Shaded Fuelbreak around the perimeter of the Community is the Number 3 priority *recommendation to reduce the risk to life and property from wildfire in the Galena Forest Estates Unit 1 Community.*

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

The planned shaded fuelbreak is located along the north perimeter of the Community on USFS property, along the west perimeter in the State Route 431 right-of-way and on Washoe County Parks property, and along the south perimeter of the Community on private property. Figure 7 illustrates the shaded fuelbreak locations.

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 tree thinning recommendation is to establish a stocking rate of 80 square feet of basal area per acre, or a spacing between trees of 20 to 50 feet depending on tree size. (Larger trees need more space).

The spacing between shrubs is recommended to be twice the shrub height.

The expected biomass volume to be removed from this project is approximately 1,320 tons.

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

The recommended shaded fuel break will act to slow the advance of a ground fire, reduce the potential for a crown fire to burn through the Community, and provide a line from which firefighters can attack a ground fire. In the event of a crown fire under windy conditions, the fuel break will not stop an advancing crown fire or prevent a wildfire from burning through the Community.

However, as previously stated, ***even if all of the recommendations in this report are implemented, there is still no guarantee that a devastating wildfire will not occur in the Galena area.***

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.

Galena Creek rockcress is listed as a sensitive species on the Humboldt-Toiyabe National Forest. It could potentially occur in the Galena Creek drainage. It is not expected to occur throughout the upland areas that are characteristic of the proposed fuel break locations. A reconnaissance survey prior to start of work should allow impacts to this species to be avoided if it is found on site.

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

Disturbances and openings created during treatment will require revegetation with the seed mixture and specifications given in Appendix E.

Estimated Timeline:

Desirable time of year to complete:
As soon as possible. Vegetation removal can occur throughout the spring, summer, fall, and into winter if weather permits. Debris burning, if used should occur in the late fall or winter, with a minimum of four inches of snow on the ground.

Estimated time required to complete project:
The time required to complete this project using an experienced contractor is less than six months.

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 planned Priority 3 shaded fuelbreak lies within USFS, NDOT, Washoe County, and private ownership. Approximately 30 acres of the 88-acre fuelbreak are within the State Route 431 (NDOT) right-of-way. Approximately 12.5 acres are owned by the USFS, five acres by Washoe County, and 40.5 acres by private landowners. The USFS will have different requirements and funding sources than the other landowners for implementing this project. The remaining 75.5 acres are estimated to cost between $166,000 and $377,500.

Project Maintenance Requirements:

Maintenance requirements will include periodic pruning, tree removal, and litter and debris removal.

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

This project will require approval from the USFS, the Nevada Dept. of Transportation, Washoe County Parks, and many private landowners. No work shall be initiated on private lands without a signed authorization form.

If debris burning is used for biomass disposal, an air quality permit from Washoe County is required.

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

Name of Community: **GALENA FOREST ESTATES UNIT 1** Date: **JULY 25, 2003**
Project Title**: Priority 4 – Extended Shaded Fuel Break**

.

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

Vegetative Fuel: *The Galena Forest Estates Unit 1 Community is located in an area characterized as over-grown forests with dense tree stands and dense brush understory. Once ignited, especially under windy conditions, this vegetation complex will produce flame lengths in excess of 100 feet long. Firefighters cannot attack a fire of this nature with ground resources.*

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

There are a total of four recommendations.

*Extending the shaded fuel break to the south is the **Number 4** priority recommendation to reduce the hazardous risk to life and property from wildfire in the Galena Forest Estates Unit 1 Community.*

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

The planned shaded fuelbreak is located along State Route 431 right-of-way for a distance of approximately 2,400 feet. Figure 7 illustrates the shaded fuelbreak location.

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 tree thinning recommendation is to establish a stocking rate of 80 square feet of basal area per acre, or a spacing between trees of 20 to 50 feet depending on tree size. (Larger trees need more space).

The spacing between shrubs is recommended to be twice the shrub height.

The expected biomass volume to be removed from this project is approximately 338 tons.

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

Extending the shaded fuel break provides additional protection against the loss of life and property in the Galena Unit 1 Community, and provides additional opportunities for firefighters to stage an initial attack from a safe-zone.

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.

Galena Creek rockcress is listed as a sensitive species on the Humboldt-Toiyabe National Forest. It could potentially occur in the Galena Creek drainage. It is not expected to occur throughout the upland areas that are characteristic of the proposed fuel break corridor. A reconnaissance survey prior to start of work should allow impacts to this species to be avoided if it is found on site.

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

Disturbances and openings created during treatment will require revegetation with the seed mixture and specifications given in Appendix E.

Estimated Timeline:

Desirable time of year to complete:
As soon as possible. Vegetation removal can occur throughout the spring, summer, fall, and into winter if weather permits. Debris burning, if used should occur in the late fall or winter, with a minimum of four inches of snow on the ground.

Estimated time required to complete project:
The time required to complete the project by an experienced contractor would be less than six months.

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 extended shaded fuelbreak is approximately 22.5 acres in size and lies entirely within the State Route 431 right-of-way. The estimated cost range for this project is $49,500 to $112,500.

Project Maintenance Requirements:

Maintenance requirements will include periodic pruning, tree removal, and litter and debris removal.

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

This project will require approval from the Nevada Dept. of Transportation.

Appendix E

Seed Mixture and Planting Specifications

Revegetation Specifications for Fuel Reduction Areas

The soils in Galena Unit 1 are characterized by very deep, well drained soils on the alluvial fans, and moderately deep soils on the steeper slopes. The soils are very stony sands and loams. Precipitation averages from 12 to 25 inches per year. When disturbed, the steeper slopes within Galena Unit 1 are highly susceptible to erosion. Broadcast seeding the mix below where any ground disturbance occurs will aid in reducing the potential erosion of the site, and provide competition for cheatgrass.

Common Name	***Scientific Name***	***Seeding Rate (PLS[1] lbs./acre)***
'Sodar' streambank wheatgrass	*Elymus lanceolatus ssp. psammophilus*	*4.00*
Sandberg bluegrass	*Poa sandbergii*	*1.00*
'Bromar' mountain brome	*Bromus marginatus*	*6.00*
"Shoshone" creeping wildrye	*Leymus triticoides*	*6.00*
Silky lupine	*Lupinus sericeus*	*4.00*
Arrowleaf balsamroot	*Balsamorhiza sagitata*	*3.00*
Rocky Mountain penstemon	*Penstemon strictus*	*0.25*
Western yarrow	*Achillea millefolium*	*0.25*
	Total PLS pounds per acre	***24.50***

Combine the seeds of the above mix for broadcast seeding. Seed with a "whirlybird" hand-held seeder, or with a similar device mounted on an all terrain vehicle. Seed all areas disturbed during the fuel treatment process. Lightly rake to cover seed at an approximate depth of ¼ to ½ inch. Uniformly apply a one-inch layer of clean, pine needle mulch. The best times for seeding are in the early spring or fall.

1/ Seeding rates are specified in terms of Pure Live Seed (PLS).

Appendix F

Photo Plates

Appendix G

Hazard Reduction Maintenance Guide

This checklist includes actions both homeowners, the Galena Unit 1 Homeowners' Association, Washoe County, and the US Forest Service can perform to maintain the fuel reduction treatments recommended as Priority treatments.

Annual Maintenance Actions

- ❑ Remove all tree limbs within at least 15 feet of chimneys, decks, and open overhangs. Prune trees of dead limbs and prune shrubs to remove dead stems and maintain shrub height.

- ❑ Remove woodpiles, obvious accumulations of trash, pine needles, dried vegetation, or other debris from defensible space areas and within 10 feet of propane tanks.

- ❑ Remove all dead and diseased tree branches. After initial fuel reduction treatments, it is recommended that tree limbing occur during late fall and winter to lessen the chance for disease and attacks by pests.

- ❑ Harvested vegetation and trimmings must be immediately removed from the premises to assure that fuel reduction treatments are effective. All harvested biomass should be moved to a predetermined disposal area or safe zone approved by the Fire Department.

- ❑ All soil disturbances including those during biomass removal should be broadcast seeded according to the recommended species and rates provided in Appendix E.

- ❑ Clear rain gutters and roofs of leaves, needles, pinecones and other debris. Screen vents to prevent any embers from entering attics in the event of a wildfire.

- ❑ Check hoses, valves, and other water equipment to assure operability should a fire occur.

- ❑ During high precipitation years, when growing conditions produce exceptional amounts of weeds, care should be taken to reduce the height of fire-prone vegetation, particularly weeds and grasses that carry fire to the adjacent shrubs. Implements such as weed-eaters work well for this job.

- ❑ During the hot summer months, irrigate remaining trees to increase both the trees' survivability in the event of a fire, and the trees' resistance to bark beetles and other diseases.

Shaded Fuel break Maintenance

Remove small tree seedlings and saplings and new shrubs within the fuel break every three to five years. Mow grasses annually just prior to fire season to reduce the fuel load.
Prune dead limbs from trees and dead branches from shrubs. Rake and remove thick litter accumulations leaving only a ½ inch to 1-inch layer of pine needles to protect the soil.