Lowell Fire, July 2015 – 2,304 Acres

COMMUNITY WILDFIRE PROTECTION PLAN
NEVADA COUNTY, CALIFORNIA

~~*FINAL*~~

~~Prepared for:~~

~~**Fire Safe Council of Nevada County**~~

Updated April 2016

Acknowledgements

This Community Wildfire Protection Plan (CWPP) represents the efforts of the Fire Safe Council of Nevada County, Inc.(FSCNC) in cooperation with a wide variety of organizations, private citizens and agencies working together to improve the preparedness for the hazards from wildfire while reducing the factors of risk.

This report was produced in cooperation with the Bureau of Land Management (BLM), CALFIRE, Caltrans, home owners, Nevada County Fire Chief's Association, Nevada County Office of Emergency Services (OES), Nevada County Planning Department, Northern Sierra Air Quality Management District (NSAQMD), Sierra Pacific Industries (SPI), Tahoe-Donner Association Firewise Community, and the USDA Forest Service, Tahoe National Forest (USFS.) Individual local fire districts in Nevada County and members of the Nevada County Board of Supervisors all provided valuable support and input. Members of the numerous Firewise Communities/USA® committees also provided their time and effort in support of the planning effort during the update of the countywide CWPP.

The initial analysis completed in the original CWPP plan completed in 2006 by TSS Consultants has been retained due to lack of new residential development in a sluggish economy and only two wildfires of any significance.

Sincere appreciation to the Natural Resources Conservation Service (NRCS) for their partnership and grant funding to develop Geospatial Information Systems (GIS) capabilities and mapping at the FSCNC. This partnership provided funding to map new CWPP projects and analysis the benefit to communities at risk to strategically prioritize treatments.
A special thanks to the volunteer CWPP Core Team members who gave countless hours for meetings, field trips and project scoping and analysis: Gretchen Bennitt, Northern Sierra Air Quality Management District; Jeff Bodde, Caltrans; Bill Boyl, Homeowner; Mike Cherry, Tahoe National Forest; Chip Close, Nevada Irrigation District; Tina Costella, Botanist; Joanne Drummond, FSCNC; Vic Ferrera, Nevada County Office of Emergency Services; Brian Foss, Nevada County Planning Director; Sean Griffis, Cal Fire; Bill Houdyschell, Registered Professional Forester/Tahoe-Donner Association; Jason Jackson, NRCS; Warren Knox, FSCNC; Jerry Martinez, Bureau of Land Management; Brian Mulhollen, Bureau of Land Management; Rob Paulus, FSCNC; Christopher Ruff, Tahoe National Forest; Eric Sweet, Sierra Pacific Industries; Donn Thane, Tahoe National Forest/FSCNC; Don Wagner, Nevada County Fire Chief's Association Representative; and Hank Weston, Nevada County Supervisor.

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1.0 EXECUTIVE SUMMARY

Residents of Nevada County are concerned about the effects of wildfire on their community. RecentDevastating wildfires in the arearegion have heightened the awareness of the potential impacts and have prompted local residents, government officials, and fire department personnel to join together to proactively review and update the Community Wildfire Protection Plan (CWPP) for Nevada County and plan and implement actions to be taken to protect human life and, property, and reduce the risk of future wildfire-related disasters to the natural environment. Nevada County encompasses approximately 978 square miles of diverse and rugged rural lands

in the northern Sierra Nevada Range. These landscapes are fire prone with both natural and anthropogenic sources of ignition.

Through the initial planning process ~~and~~, production, evaluation and update of ~~a Community Wildfire Protection Plan (~~the CWPP~~),~~ the Fire Safe Council of Nevada County (FSCNC) and the residents of Nevada County aim to protect their community from the effects of wildfire through outreach, education, strategic planning, ~~and action.~~collaboration, direct action and creating nationally recognized Firewise Communities/USA®. They wish to face each fire season confident that they have done everything possible to prepare for and mitigate the effects of ~~a potential~~the next forest fire in their county. The direction of spatial analyses, Community Base Map creation, and the designation of Community Hazard Reduction Priorities have been entirely steered by a community-based CWPP Core Team. The Core Team is comprised of members of the fire management community and concerned homeowners. These community members are all participating ~~in~~on behalf of their larger ~~community~~Firewise Communities, relaying critical information to neighbors and council members as the CWPP planning process continues ~~to unfold.~~in perpetuity. Many of these homeowners are already involved with fuels reduction and fire education efforts in the area as part of homeowner ~~association efforts~~associations, Fire Safe Council ~~efforts.~~, Firewise Communities or simply on their own.

The primary goal of the CWPP is to protect human life, private property, ~~and~~ essential infrastructure and natural resources through the implementation of fire prevention projects that work to increase public awareness, improve forest health, sustain local wildlife and preserve the natural beauty of the area. ~~Most~~ through a shared responsibility concept. Many CWPPs ~~tend to~~ focus on the number of acres treated and treatment costs associated with mitigation without adequately assessing the benefits of these treatments. or the social change in attitudes about living with wildfire. While some evaluations account for the value of protected structures or the avoided costs of suppression, few account for the ecosystem service value of protected natural resources capital assets. This CWPP is unique in its use of the Natural Assets Database for integrating ecosystem services values into its assets at risk (identified as important by members of the community based Core Team~~).~~) The total economic value approach to environmental assessment used in this CWPP provides a method for quantifying these assets so that they can be counted and prioritized. This approach is consistent with current regulatory trends through the United States federal government and the National Cohesive Wildland Fire Management Strategy to: 1. Restore and maintain resilient landscapes; 2. Create Fire Adapted Communities (FAC) also known as Firewise Communities/USA®; and 3. Safe and effective wildfire response. Due to the high inter-mix of development in Nevada County, an all-lands approach is necessary to effectively meet the objectives stated above by strategically emphasizing fuels treatments around communities at risk, critical ingress/egress routes and essential infrastructure.

While this CWPP is unique in its integration of ecosystem services into its spatial analyses, it was the Core Team's decision to make the CWPP Mitigation Action Plan concentrate on safety issues in the following categories: Firewise Communities education and outreach~~,~~; fuels reduction~~,~~; and improved protection capabilities. With this in mind, hazardous fuel reduction projects will be prioritized based upon high fire hazards, community density and those ridge top roads and other critical ingress/egress routes that can provide both evacuation corridors and effective staging grounds for fire suppression efforts. In summary, projects that address

community benefit human safety issues will be of a higher priority than projects that only benefit homes.

2.0 INTRODUCTION

Fire management by California communities is complex -- a reflection of the complicated relationships between people, regulatory agencies and the land. For fire management to succeed, the individual parts must work independently and the ensemble of those parts must work as a whole. Fire control and prescribed fire use, for example, can demand distinctive practices, separate agencies, even specialized personnel. Yet these agencies and practices can, and must, serve common land-use objectives for Nevada County and will, and must, share a common infrastructure (such as emergency management systems, communications, roads, etc). Their common cause is what transforms fire practices into successful fire management, and their shared institutions are what organize those practices into a system of fire management programs. For Nevada County, these shared institutions must coordinate their efforts to cover and protect 612,900 acres in a fire-prone landscape. Effectively mitigating wildfire in the checkerboard pattern of public and private ownership is a shared responsibility. Homeowners often fail to accept their part in protecting their own lives and property and look to local, state and federal agencies to solve the problem. For this reason, the first objective is to educate residents about the risk they face living in a heavily forested environment and that the leading cause of home ignitions is ember intrusion and not direct flame contact. The National Fire Protection Association's (NFPA) Firewise Communities/USA® program was adopted into the mission of the FSCNC in 2009. Since that time 17 communities (Appendix A) have attained the national recognition in and have retained it through volunteer efforts to actively mitigate wildfire through social change in attitudes about their part in wildfire mitigation through a shared responsibility.

Nevada County is located in the Sierra Nevada mountain range. The County is characterized by small towns and rural development that is largely integrated into the natural environment. It covers over 612,900 acres and climbs from 300 mean feet above sea level (msl) on the western boundary to 9,143 feet msl at the crest of the Sierras before the County's eastern boundary adjoins the State of Nevada.

In recognition of widespread declining forest health, the Healthy Forest Restoration Act (HFRA) was passed in 2003 to expedite the development and implementation of hazardous fuel reduction projects on federal land. A key component of the HFRA is the development of CWPPs as a mechanism for public input and prioritization of fuel reduction projects. A CWPP provides background information about a project area, discussion of community values at risk, community base maps, a fire risk assessment, and recommendations that identify treatment areas for reducing fuels and promoting education and awareness about wildland fires, as well as monitoring and assessment strategies. Collaboration between federal agencies and communities is necessary to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. In addition, communities that have CWPPs in place will be given priority for funding of hazardous fuels reduction projects carried out under the auspices of the HFRA. The three key components of a CWPP as defined in the HFRA are: 1. Collaboration; 2. Prioritized fuel treatments; and 3. Treatment of structure ignitability.

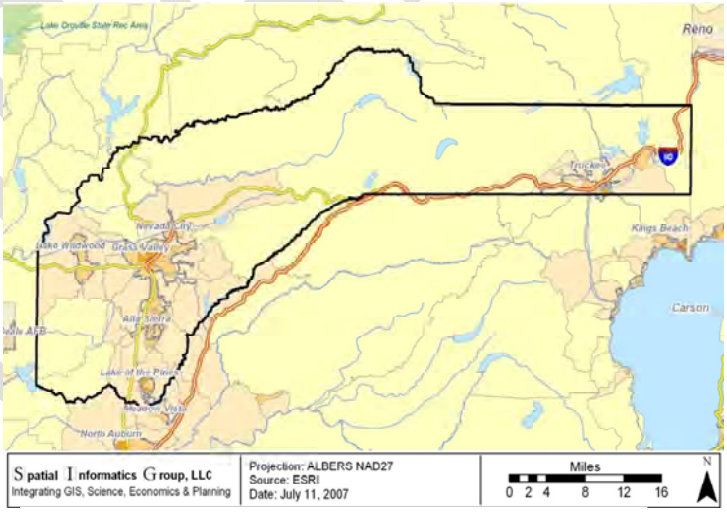
Collaboration between all land managers is important, however, treatment of structure ignitability is the most critical to the loss of homes in wildfire events.

~~Although the HFRA and~~ The specific guidelines ~~are relatively new, the~~and principles behind the CWPP program are not new. The National and State Fire Plans, the Western Governors' Ten-Year Comprehensive Strategy, and the Federal Emergency Management Agency Disaster Mitigation Act of 2000 all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multi-agency cooperation.

Community values at risk provide a measure of people, property, ecosystem values, and natural resources that could suffer losses in a wildfire. Examples of these values may include but are not limited to housing, businesses, infrastructure (including utilities, irrigation features, roads), natural resources, cultural resources, environmental concerns, recreation areas and open space, scenic resources (including significant landscapes), and water resources. Community values at risk identified by community members strongly influence the recommendations and the risk assessment in a CWPP. Working to align the community values to public land management objectives is key to the all-lands approach.

2.1 County Context

Nevada County encompasses approximately 978 square miles of diverse and rugged rural lands in the northern Sierra Nevada Range (Figure 1). With Nevada County's proximity to metropolitan areas of Sacramento ~~and~~, San Francisco Bay and the strong appeal of the Sierras, long-time and new residents are attracted to the County for multiple reasons, but most have indicated that quality of life trumps over economic values as the main driver of growth (Walker et al. 2003~~).~~.)

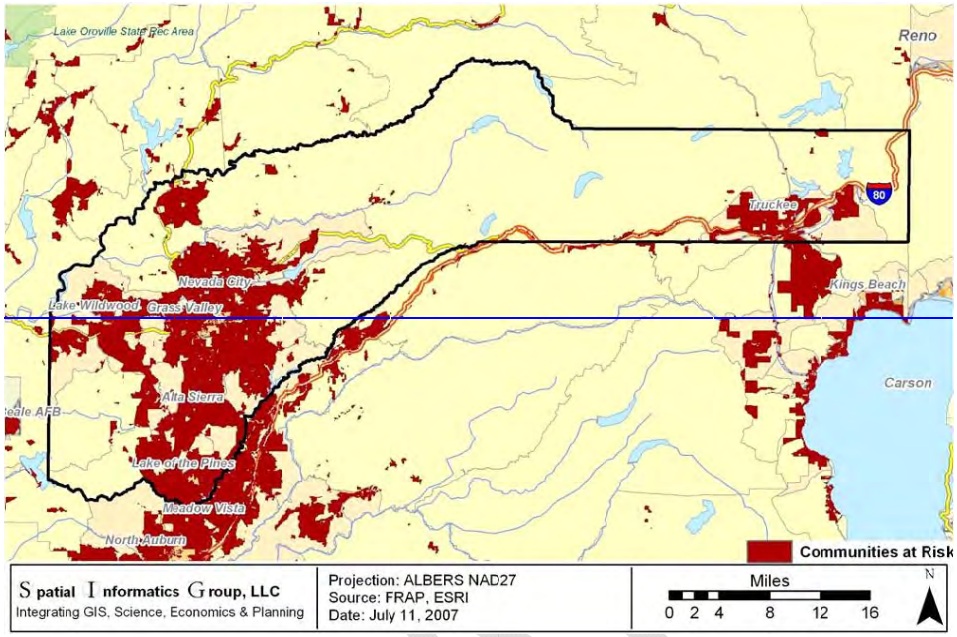


~~**Figure 1: Map of Nevada County and Prominent Cities**~~

The cities and communities of Grass Valley, Nevada City, Lake Wildwood, Alta Sierra, Penn Valley, Rough and Ready, North San Juan, Cedar Ridge, Lake of the Pines, dominate the western Sierra Nevada foothills. Truckee and the communities of Soda Springs, Kingvale, Norden, Glenshire-Devonshire, Hirschdale and Prosser Lakeview Estates are prominent cities and communities of the eastern portions of the

County within the Sierra Nevada range. All of these communities contribute to the County's fire challenge, considered "Communities at Risk" (as defined by the California Fire Alliance and formally registered), meaning that they are at risk from major wildfires. In ~~1995~~2007, CALFIRE's Forest Resource Assessment Program (FRAP) mapped the Communities at Risk for Nevada County, which shows the vast majority of communities in the western county as at risk from wildfire events (Figure 2).

Public and private lands in the county are governed by three main jurisdictions: ~~state/federal,~~ local (city/town~~, and~~ incorporated known as the Local Responsibility Area or LRA); state (state owned property or unincorporated County lands~~.~~ protected by CALFIRE for wildland fire known as the State Responsibility Area or SRA); and federal (initial fire response by the BLM and USFS known as Federal Responsibility Area or FRA.) The federal government provides oversight on BLM and USFS ~~and BLM~~ lands (approximately 10,500 and 178,400 ~~and 10,500~~ acres respectively), while state government provides oversight on state parks and other smaller state property (approximately 23,600 acres within holdings like the Spenceville Wildlife Management and Recreation Area, Malakoff Diggins State Historic Park, and Empire Mine State Historic Park). Almost 62% of the land falls under the unincorporated county jurisdiction, while 35% is within the federal or state jurisdiction, and only 4% of the area is in city or town jurisdiction. City/town governments have jurisdiction in the incorporated areas of Grass Valley, Nevada City and Truckee, which again is primarily private property and city/town-owned lands. These percentages of ownership highlight the need for individual residents and landowners to understand their role in addressing the wildfire hazard on their own properties and to actively mitigate structure ignitability as their land represents the highest ownership category in Nevada County.



~~**Figure 2: Communities at Risk in Nevada County**~~

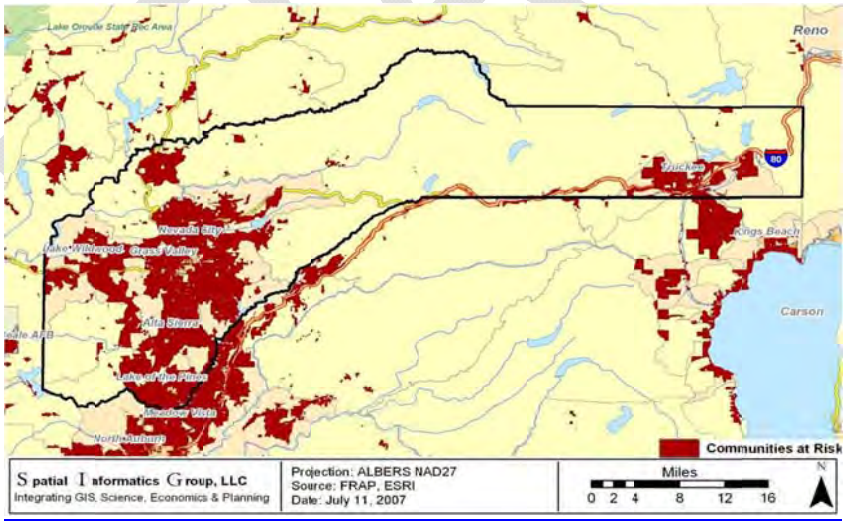


Figure 2: Communities at Risk in Nevada County

Five local fire districts also assume fire marshal duties and responsibilities based on jurisdiction:

City of Grass Valley, City of Nevada City, Nevada County Consolidated Fire District, North San Juan Fire District and Truckee Fire Protection District. The designated fire marshals for these areas review and enforce the county fire safety codes and local fire district fire safety codes. In addition, the Nevada County Fire Chief's Association coordinates and reviews the local, county and state fire safety codes. The Nevada County Fire Chief's Association and the Forest Integrated Resources Safety Taskforce (FIRST) are examples of coordinated activities between the various fire and resource agencies within Nevada County. Fire protection services are determined by jurisdiction and responsibilities. In general, the local fire districts and city departments assume responsibility for structure fire protection, emergency medical services, and other emergency responses within their respective jurisdictions. Many of the districts are volunteer departments or utilize volunteers to support full-time staff.

In western Nevada County, a unique partnership with the City of Grass Valley, Nevada County Consolidated Fire District and the Nevada City Fire Department provides emergency response as one fire department. Known as the Joint Operating Agreement, these cooperators respond as if they were one agency and in which the key feature is the response of the closest available resource to an incident regardless of jurisdiction. In addition, local fire districts are active participants in local and statewide mutual aid and some are home to a California Emergency Management Agency engine that is routinely dispatched throughout the State to assist with major emergencies. These partnerships for wildfire response directly address the objective of the National Cohesive Wildland Fire Management Strategy to provide a safe and effective response to wildfire suppression.

In the unincorporated areas of western Nevada County, there are ten fire districts/departments which provide fire protection services for the cities in Table 1.

Table 1: Fire Districts and Departments in Western Nevada County

Grass Valley City Fire Department	Higgins Fire Protection District
Nevada City Fire Department	Nevada County Consolidated Fire District
North San Juan Fire Protection District	Ophir Hill Fire Protection District
Peardale-Chicago Park Fire Protection District	Penn Valley Fire Protection District
Rough ~~and~~& Ready Fire Protection District	Washington County Water District

In eastern Nevada County, only the Truckee Fire Protection District provides fire protection services, which is unique in that it provides fire protection services for jurisdictions in three counties (Nevada, Placer, and Sierra) and for the incorporated Town of Truckee and the unincorporated areas in eastern Nevada County.

2.2 Defining the WUI for Nevada County

The Healthy Forests Restoration Act defines the Wildland-Urban Interface (WUI) as (§ 101. 16. Section A) "an area within or adjacent to an at-risk community that is identified in recommendations to the secretary in a community wildfire protection plan." The U.S. Department of Interior ~~[~~(USDI~~]~~) and U.S. Department of Agriculture (USDA 2001) defines the

WUI as areas where human habitation and development meet or are intermixed with wildland fuels. This CWPP includes a collaborative process that successfully delineates the intermix boundary and provides the forum for local communities to create its own unique description of the WUI for their community.

This CWPP relies heavily on the experience and professional expertise of the local fire chiefs ~~and FS/~~, BLM and USFS personnel in deciding where "~~urban~~urbanized" areas exist within the County. There was lengthy discussion and debate concerning how to specifically apply HFRA's definition in determining the boundary of the WUI and complying with the funding parameters of the HFRA's location requirements of being 1.5 miles from any federal jurisdictions. Ultimately, there was no substitution for the experience of the local participating residents, government~~,~~ agencies, local fire chiefs, BLM and ~~FS/ BLM~~USFS personnel in arriving at the logical WUI boundary description. Population growth, urban expansion, land management decisions, and the preference of homeowners to live outside of the city limits has resulted in rapid development intermixed across the landscape into natural, wildland areas that inherently have associated wildfire risks.

Human encroachment into wildland ecosystems is increasing throughout the west. The extent of the WUI and intermix of home development is therefore having a significant influence on fire management practices within these areas. The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. The expansion of the WUI into areas with high and very high fire risks, combined with the collective effects of past management policies ~~and~~, resource management practices, land use patterns, hydrologic changes, and introduction of non-native species have created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI (Pyne 2001; Stephens and Ruth 2005~~).~~.) Where fuels and fire management mitigation techniques have been strategically planned and implemented in WUI areas, it has proven to be effective; however, all WUI mitigation focus areas will be different and should be planned for accordingly.

Nevada County's population of ~~92,000~~98,877 people resides in ~~45,000~~53,080 housing structures~~.~~ (US Census v2014.) In the unincorporated areas of the County, approximately 28,000 parcels are in the WUI. According to Cal Fire's ~~2006~~2007 Fire Hazard Severity Zone maps, 8% of the County is living within the moderate zone, 29% in the high zone and 62% in the very high zone. Therefore, the vast majority of the population, homes and other resources occur in very hazardous areas where the effects of wildfire could be devastating. The WUI areas have become public safety issues and best addressed at the local government level where the responsibility and authority include local values.

From 1970 to ~~2000~~2014, Nevada County's population has risen by ~~67,000~~73,877 new residents, amounting to a ~~268~~278% increase, and the number of households changed from 9,600 to ~~43,500~~53,080, a ~~353~~453% increase. Most of the new landowners of these subdivided lands were "in-migrants" and retirees from metropolitan areas of California desiring to escape the confines of the city areas. The median parcel size decreased from 550 acres in 1957 to 9 acres in 2001 (Walker et al. 2003~~).~~.) These trends are indicative of a dynamically changing social landscape. Within a county of continued growth, it was clear to the CWPP Core Team (Section 3.2 and

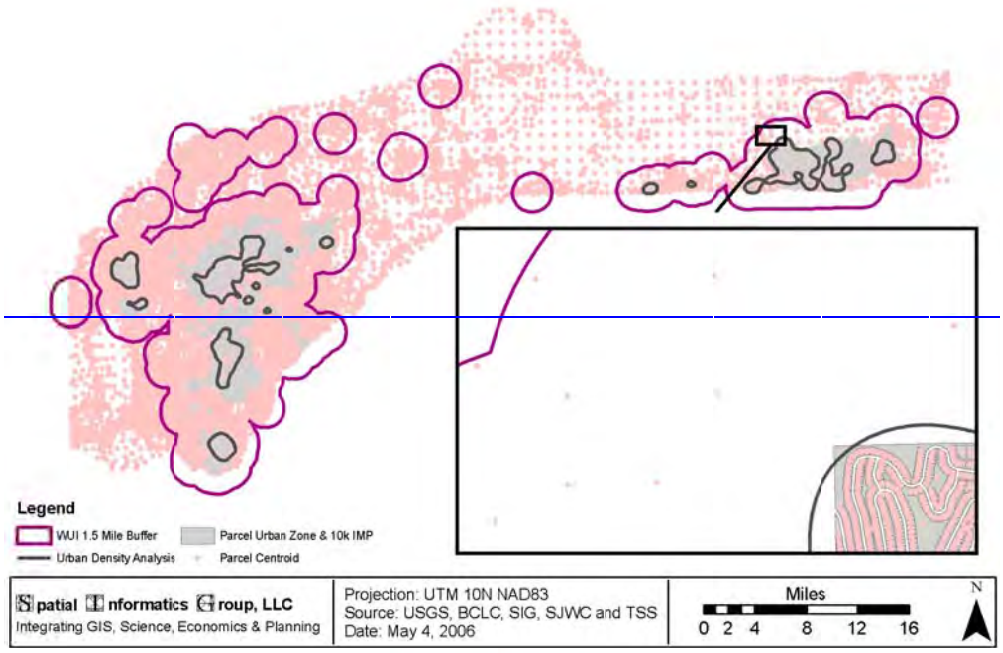
Appendix ~~A~~B) and the fire chiefs that a density analysis ~~is~~was needed to determine the exact location of the WUI for Nevada County.

Given the ongoing development of homes and communities in wildland fire prone areas throughout Nevada County, this CWPP has defined the WUI as a 1.5 mile buffer around highly dense housing, urban ~~and~~ /commercial zoning and parcel improvement values above $10,000 (Figure 3~~).~~.) Density analysis alone did not provide an adequate WUI zone so additional zoning and improvement values layers were weighted to allow for a WUI that is more reflective of real conditions ~~with~~known to the Core Team participants.

Given the 1985 FRAP analysis described in the ~~County's~~Nevada County Fire Plan, 75% of the 28,000 parcels are in the unincorporated areas of the County's WUI and are considered in a very high threat zone. These are probably very conservative given the population growth since 1985. With the Nevada County zoning, improvement values, and density analysis, the urbanized areas and buffer designations are clearly defined as the wildland-urban interface (Figure 3~~).~~.)

At least 50 percent of all funds appropriated for projects under HFRA must be used within the WUI area. This CWPP does not advocate the use of the WUI designations for anything other than applying for federal funding and prioritizing treatments. The CWPP's central priority for allocating treatments are on those WUI areas with high fire hazard, high density parcel improvement values (above $10,000), and where ridgetops and roads co-align (for evacuation and staging purposes~~).~~.) The focus is thus on protecting the lives and property of the at-risk communities, specifically the evacuation corridors and the 28,000 parcels that exist in the WUI. This is further explained in the CWPP Core Team analysis section of this CWPP report.

A CWPP offers the opportunity for collaboration between land managers to establish a definition and a boundary for the local WUI to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area, as well as to prioritize and plan fuels treatments to mitigate fire risks. The designation of the WUI areas offers an opportunity for collaboration between land managers to establish common fire management objectives across jurisdictions. This is the intent of including the 1.5 mile buffer around urbanized centers in the Nevada County CWPP's definition of the WUI (Figure 3~~).~~.)


Legend
WUI 1.5 Mile Buffer
Parcel Urban Zone & 10k IMP
Urban Density Analysis
Parcel Centroid
Spatial Informatics Group, LLC
Integrating GIS, Science, Economics & Planning
Projection: UTM 10N NAD83
Source: USGS, BCLC, SIG, SJWC and TSS
Date: May 4, 2006
Miles
0 2 4 8 12 16
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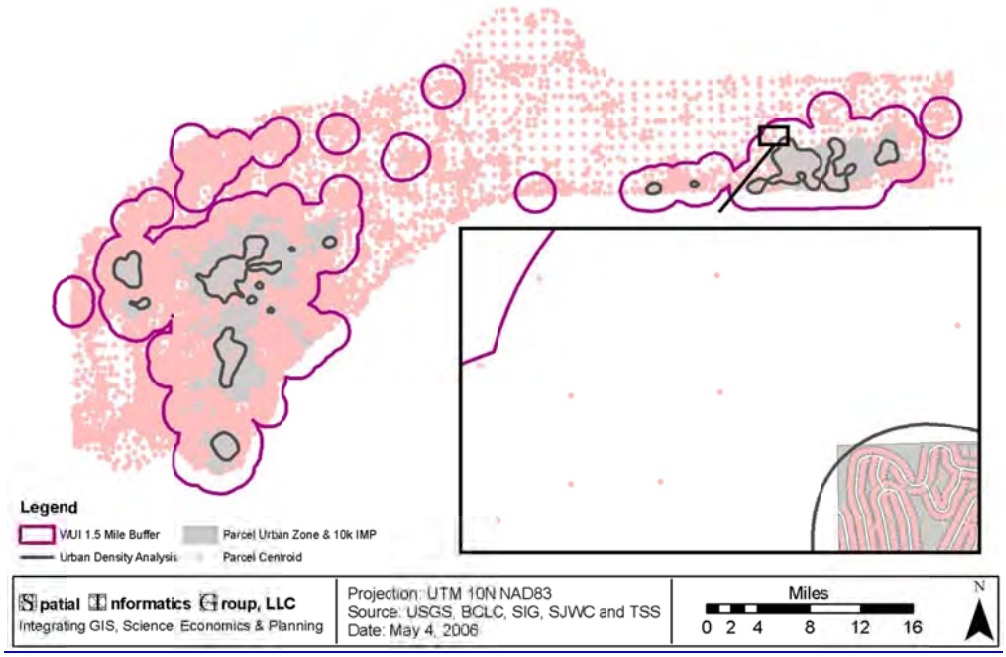
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Source: USGS, BCLC, SIG, SJWC and TSS
Date: May 4, 2006
Miles
0 2 4 8 12 16
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Figure 3: WUI Buffer of 1.5 Miles Around Urbanized Centers

2.3 Fire Ecology and Historic Conditions

Historically, Nevada County's ecosystems have been kept healthy and in balance by a variety of natural disturbances, including fire, insects, pathogens, wind throw, floods, weather variations, landslides, avalanches and earthquakes. Over the last few centuries, this balance has been affected by human introduced disturbances of fire exclusion/suppression, livestock grazing, roads and development, logging, and introduced plants, animals and pathogens.

Fire is the disturbance of primary interest for this Nevada County CWPP, and it is affected by most of the other disturbances mentioned. ~~Lightening~~Lightning and human-caused fire ignitions occur frequently in the area. Vegetation grows, dies and produces organic matter. Fire consumes organic matter, kills some vegetation, stimulates many types of plants and recycles nutrients. Without fire to perform these functions at the intensities and frequency under which they evolved, ecosystems can fall out of balance.

Fire regime is a generalized description of the role fire plays in an ecosystem and is an effective way to classify the effects of fire on vegetation by scale, frequency and severity. Fire regimes are based on the historic fire behavior in a given vegetation type, describing the potential fire behavior under historic conditions. Patterns of vegetation and their associated fire regimes are also related to local landforms, topography and weather patterns in the particular area.

Due to changes in ecosystem disturbance patterns, fire behavior may now deviate considerably from the historic fire regime. These changes may benefit some species, but they put others at risk. More importantly, altered fire regimes potentially destabilize ecosystems and landscapes, thus creating conditions that may promote unprecedented catastrophic disturbance events. In turn, they may seriously reduce ecosystem resiliency, the ability to return to prior levels of productivity.

Prior to Euro-American settlement, fires occurred every 35 years or less in a white fir mixed conifer ecosystem, and were seldom stand replacing events. In the ponderosa pine dominated and mixed conifer portion of the County, data shows that generally low severity surface fires covering several thousand acres burned at intervals of less than 15 years, with larger burns of 10,000 to 30,000 acres every 10 to 20 years (Skinner and Chang 1996~~).~~.) These frequent fires, caused by both lightning and Native Americans, reduced ground fuels, limited the establishment and growth of thin-barked, shade-tolerant species, and perpetuated early seral species, particularly Ponderosa pine and sugar pine. Forests were composed primarily of Ponderosa pine with a smaller component of Douglas fir and white fir, since the pine can survive frequent surface and ground fires at a much younger age than the fir species.

The historic landscape was dominated by uneven-aged, park-like forests with one or two canopy layers, numerous large, old (250-400 years) trees, and vertical discontinuity between ground vegetation and tree crowns. Frequent fires maintained understory vegetation of native grasses, shrubs and wildflowers, and generally limited establishment of tall and dense shrub communities.

Riparian areas, northerly aspects and other moist sites were the exception to the open, park-like landscape. Better growing conditions on these sites allow riparian hardwoods, sugar pine, Douglas fir, lodgepole pine and shrubs to become established during fire-free intervals. Higher moisture in these areas may also have prevented the spread of fire into them. With slightly less frequent fires, there would be more variation in burn intensities, resulting in a greater variety of vegetation species and structures. A similar situation may have occurred in forested areas which are isolated from surface fires by rock and sparse vegetation, resulting in longer fire-free intervals, more dense vegetation, and more variability.

Insects and pathogens also play ~~a~~an important role in these forests, contributing to the development of ~~important~~critical wildlife habitat, nutrient cycling, ~~and~~forest stand and landscape-level diversity. Historically, beetles, dwarf mistletoe and root diseases operated primarily in small patches across the landscape, and in combination with fire, increased diversity of structure and wildlife habitat. Frequent surface and ground fires helped limit the size and extent of these disturbances.

2.4 Current Conditions

~~Fire has undoubtedly played a significant historical role in defining the current vegetative strata of Nevada County. Over the last fifty years, Nevada County has seen its share of large wildfires, those being over 500 acres in size (Table 2, Figure 4). Some forests under a more frequent fire regime still retain a low density and park-like structure similar to historic conditions. However, the majority of these Sierran forests have been radically altered and now exhibit substantially increased densities of trees, a higher proportion of white fir, Douglas fir, and incense cedar, and greater susceptibility to insects and disease.~~

~~Table 2: Nevada County's Recent Fires Over 500 Acres (1950 -2006)~~

YEAR_	FIRE_NAME	Area (acres)
2001	MARTIS	14,127
2001	GAP	2,447
1996	COLUMBIA HILL	1,517
1994	HIRSCHDALE	1,069
1994	TRAUNER	536
1988	49'ER	36,343
1987	PALMER	1,972
1977	FREEWAY	1,305
1976	KEYSTONE	897
1976	OAKTREE	885
1961	BILDERBACK	926
1961	SELBY #2	864
1961	MAYS	711
1960	DONNER RIDGE	43,374
1960	NORTH SAN JUAN	5,840
1960	NEWNAN LIGHTNIN	739
1955	SNOW TENT	1,486
1953	CAMP BEALE #5	881
1951	RATTLESNAKE	586
1951	CAMP BEALE #1	585
1950	CAMP BEALE	669

The exclusion of from 3 to over 10 predicted cycles of fire results from a combination of fire suppression, elimination of Native American ignitions, and elimination of fine fuels from prior livestock grazing. Small trees, most of which would have been killed in the historic fire regime, have been allowed to grow for over a century, converting park-like ponderosa pine forests into multi-layered, dense forests with a smaller proportion of pines.

Large, old ponderosa pines, which are resistant to fire and important for many wildlife species, have become less prevalent due to logging, recent uncharacteristic fires, and moisture stress. These trees thrived in the open conditions maintained by frequent low intensity fire but do not get sufficient sun and moisture in dense forests.

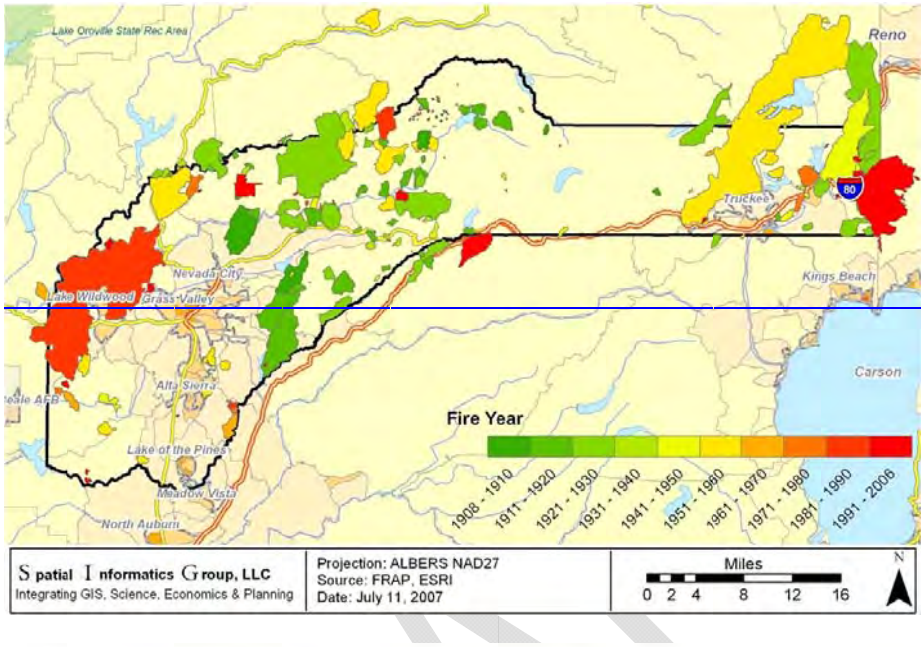
The frequent historic fire interval kept forest undergrowth from building up to the dangerous condition we see today. During the Gold Rush west migration era land use practices greatly modified the vegetation and fire regime. After the start of the 20th century, fire suppression efforts became more organized, better funded and benefitted from improving knowledge and technology, such as aircraft, chemical retardants and bulldozers. This allowed great success in fire suppression efforts and improved public safety. Unfortunately, these successes led to a buildup in forest fuels never experienced in this region. In our local climate the accumulation of vegetation (i.e., fuel) greatly exceeds the decomposition rate. This leads to an incessant annual buildup in fuel loading. As a result, recent fires have become more difficult to control, and, combined with the increase in population, more threatening to life, property and natural resources.

The fire regime cannot be returned to its original conditions. Fuels, however, can be modified through many available methods. Each landowner is responsible for fuel management on their property. If all landowners actively reduce fuel levels and flammability wildfires burning in the area will be easier to control and result in less property and environmental damage. These management practices on private property can also help to create a mosaic of conditions that more closely resembles historic conditions with more open, park-like forest conditions around homes in the form of defensible space. We can no longer expect the fire protection agencies to save our homes without our own contributions to active vegetation fuel management which can help emulate the historical fire regime in the ecosystem.

Table 2: Nevada County's Recent Fires Over 500 Acres (1965-2015)

Year	Fire Name	Cause	Acres
1976	OAKTREE	Unknown/Unidentified	885
1976	KEYSTONE	Unknown/Unidentified	897
1977	FREEWAY	Misc	1,305
1987	PALMER	Lightning	1,972
1988	49'ER	Debris	36,343
1994	TRAUNER	Powerline	536
1994	HIRSCHDALE	Equipment Use	1,069
1996	COLUMBIA HILL	Debris	1,517
2001	GAP	Campfire	2,447
2001	MARTIS	Campfire	14,127
2008	SCOTCHMAN	Lightning	1,165
2008	FALL	Lightning	2,417
2009	YUBA	Powerline	3,829
2015	Lowell	Unknown/Unidentified	2,316

Fire has undoubtedly played a significant historical role in defining the current vegetative strata of Nevada County. Over the last fifty years, Nevada County has seen its share of large wildfires, those being over 500 acres in size (Table 2, Figure 4.) Some forests under a more frequent fire regime still retain a low density and park-like structure similar to historic conditions. However, the majority of these Sierran forests have been radically altered and now exhibit substantially increased densities of trees, a higher proportion of white fir, Douglas fir, and incense-cedar, and greater susceptibility to insects and disease.



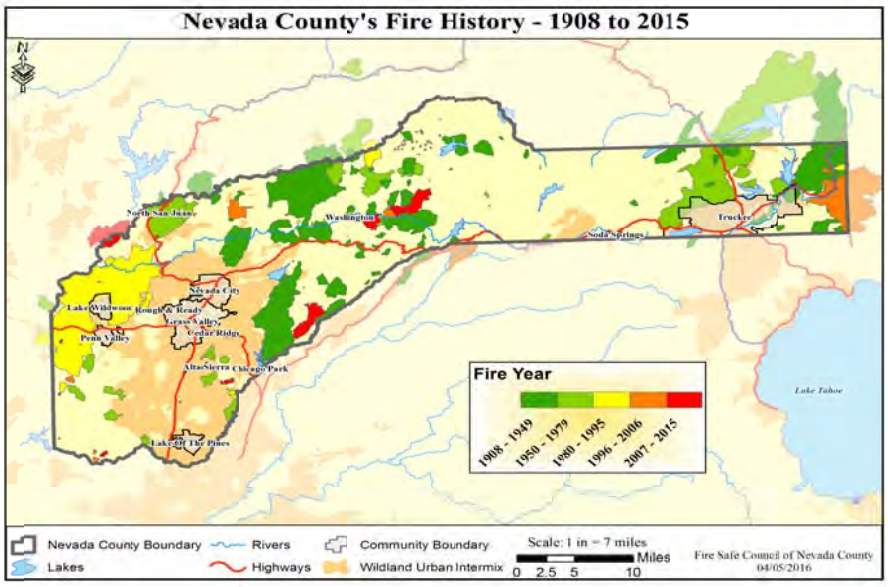


Figure 4: Nevada County's Mapped Fire Perimeters (1908-~~2006~~2015)

Dense, multi-layered stands are more susceptible to bark beetles, defoliators, root diseases and dwarf mistletoe infestations than the park-like pine stands they replaced. Susceptible host trees now grow in close enough proximity across landscapes to create the continuity required for major outbreaks. While insects and pathogens have replaced fire in the role of cycling biomass and nutrients, they are less efficient in this capacity than fire. The resultant accumulation of dead trees, logs and branches decays slowly in the dry climate and has increased fuel levels above historic conditions.

When fire does return to these dense, dry forests, they are more likely to burn uncharacteristically, at moderate and high intensity, rather than the historic low intensity level. The increased fuel accumulation results in greater flame lengths, more crown ~~fire~~fires and greater resistance to control. Tree mortality is often high, even for the fire resistant ponderosa pine and large Douglas firs. Soils, understory vegetation, and wildlife populations, which evolved with low intensity fires, are at risk of long-term damage from uncharacteristic fire intensity.

Nevada County encompasses a number of vegetation types, most of which are prone to burning at various levels of intensity. Vegetation zones are primarily a function of elevation, slope, aspect, substrate, and associated climatic regimes. Although there is some overlap, the biophysical habitat types are best described by topography and location within the County. Vegetative characteristics change over time; thus, historic vegetation conditions are discussed because they play a large role in historic fire regimes. Vegetation can be described by its habitat type, which for Nevada County is best delineated and described by the ~~CA~~California Department of Fish and Game's California Wildlife Habitat Relationships (CWHR~~).~~.) The CWHR system provides a relatively simple and accurate method for classifying large patches of vegetation.

The Nevada County Natural Resources Report (Nevada County 2002), which has been suspended and discredited by the Board of Supervisors, uses the CWHR system as the primary method for describing the "large-patch" and "small-patch" ecosystems. This was *not* used by the CWPP for any analyses or setting priorities. Large-patch ecosystems are defined in this report as the County's dominant vegetation types at a watershed scale (i.e., continuous patches >10 acres in extent~~).~~.) Table 3 provides the "large-patch" vegetation classification systems. This information was used purely ~~used~~ as means to show the diversity of land cover types and relative percentages.

Table 3: Extent, Percent Private and Elevation Range of Large-Patch Ecosystems in Nevada County (Adapted from Nevada County Natural Resources Report)

NH 2020 Large Patch CWHR Land Cover	Total Acres	% of County	Private Acres	Private (%)	Elevation (feet)		
					MIN	MAX	MEAN
Annual Grassland	31,910	5.12%	30,616	96%	272	4,360	1,588
Aspen	385	0.06%	285	74%	5,138	7,887	6,560
Barren	24,866	3.99%	8,650	35%	525	9,127	6,393
Cropland	374	0.06%	374	100%	1,175	2,979	1,821
Eastside Pine	29,612	4.75%	14,762	50%	5,098	7,503	6,086
Eastside Riparian	646	0.10%	295	46%	5,111	8,415	6,772
Eastside Scrub	11,735	1.88%	7,298	62%	5,092	8,907	5,919
Foothill Chaparral	9,354	1.50%	7,207	77%	272	5,029	2,473
Foothill Hardwood	37,671	6.04%	34,062	90%	253	3,291	1,220
Foothill Riparian	5,844	0.94%	5,288	90%	272	2,523	1,238
Fresh Emergent Wetland	4,552	0.73%	3,106	68%	347	7,972	5,079
Lacustrine	11,731	1.88%	4,794	41%	253	7,930	5,069
Lodgepole Pine	4,736	0.76%	2,622	55%	5,659	8,287	6,656
~~Mixed-Conifer~~	~~197,704~~	~~31.72%~~	~~102,079~~	~~52%~~	~~1,030~~	~~8,980~~	~~4,854~~
Montane Chaparral	24,988	4.01%	11,292	45%	2,838	9,045	6,554
Montane Hardwood	29,245	4.69%	21,018	72%	528	6,493	2,722
Montane Meadow	3,708	0.60%	1,737	47%	2,710	8,855	6,572
Montane Riparian	4,006	0.64%	3,241	81%	853	7,969	2,791
Oak-Foothill Pine	43,587	6.99%	39,854	91%	289	4,324	1,542
Orchards	118	0.02%	118	100%	1,634	3,012	2,553
Ponderosa Pine	65,149	10.45%	52,198	80%	522	5,161	2,437
Red Fir	35,167	5.64%	15,804	45%	5,587	9,058	7,270
Riverine	11,006	1.77%	6,657	60%	279	8,720	3,549
Riverine (miles)	1,850	n/a	1,343	73%	279	8,720	3,549
Serpentine/ Gabbrodiorite	n/a	n/a	n/a	n/a	1,020	4,495	2,341
Subalpine Conifer	2,437	0.39%	643	26%	6,588	8,802	7,882
Subalpine Dwarf Scrub	797	0.13%	45	6%	7,710	9,127	8,436
Urban**	32,917	5.28%	29,278	89%	528	7,697	3,483
Vineyards	555	0.09%	555	100%	1,165	2,523	1,632

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Riverine (miles)	1,850	n/a	1,343	73%	279	8,720	3,549
Serpentine/ Gabbrodiorite	n/a	n/a	n/a	n/a	1,020	4,495	2,341
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Subalpine Dwarf Scrub	797	0.13%	45	6%	7,710	9,127	8,436
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Vineyards	555	0.09%	555	100%	1,165	2,523	1,632

Field Code Changed

The Nevada County Wildlife Habitat Relationships (NCWHR) system is similar to the CWHR system except that some related habitat categories are combined as one major type. The NCWHR classification system recognizes 27 large-patch ecosystems in Nevada County that occur in one or several elevation zones (Table 3~~).~~.) In addition to native vegetation types, NCWHR large-patch ecosystems included croplands, orchards, vineyards, and urban/suburban areas that are also recognized in the CWHR system.

The Nevada County study (2002) defines the "small-patch" ecosystems as isolated or unique plant or soil communities. These may include rare habitats with highly restricted ranges, those that have unusual qualities and rare species, and those that are generally small in size (i.e., <10 acres per occurrence~~).~~.) Small-patch ecosystems may include some disjunct occurrences of larger ecosystems that may be more common elsewhere but are rare in the Sierra Nevada. The NCWHR system recognizes the following small-patch ecosystems in Nevada County: seeps,

springs, and "fens" (bog-like habitats); locally scarce stands of late-successional conifer forests; McNab cypress, whitebark pine, knobcone pine, and leather oak chaparral; serpentine and gabbrodiorite soils; volcanic lava caps and mudflows, and caves and mineshafts (Table 4~~). Because~~.) Due to this information has ~~been~~being suspended and discredited by the Nevada County Board of Supervisors for accuracy flaws, the CWPP only looks at small patch ecosystems for those that are prone to fires and this report has **not** been used for any analyses.

Table 4: Extent, Percent Private and Elevation Range of Small-Patch Ecosystems in Nevada County (Adapted from NH 2020 Report)

					Elevation (feet)		
Small Patch Ecosystem Type	Acres	% of County	Private Acres	Percent Private	MIN	MAX	MEAN
Caves and Mine Shafts				80.4%	600	7,382	3,335
Gabbrodiorite Soils	9,903	1.59%	8,622	87.1%	1,191	3,671	2,471
Knobcone Pine Stands	74	0.01%	13	17.1%	2,457	3,602	2,822
Late-Successional and Old-growth Mixed-Conifer Stands	847	0.14%	127	15.0%	1,772	4,898	3,876
Late-Successional and Old-growth Red Fir Stands	3,203	0.51%	956	29.8%	6,348	8,573	7,519
Lava Caps and Volcanic Mudflows	73	0.01%	70	95.3%	2,369	2,982	2,640
Leather Oak Chaparral Stands	197	0.03%	170	86.3%	2,175	2,703	2,427
McNab Cypress Stands	174	0.03%	123	70.9%	2,008	3,110	2,449
Serpentine Soils	4,553	0.73%	3,199	70.3%	1,020	4,495	2,753
Springs, Seeps and Fens				68.2%	682	6,604	3,781
Valley Oak Woodland	1,804	0.29%	1,702	94.4%	338	2,300	1,456
Whitebark Pine Stands	32	0.01%	0	0.0%	8,651	9,009	8,799

In addition to the vegetation and all of the anthropogenic impacts that have degraded natural fire regimes, climate change has also played an extensive role in altering fire occurrence and severity. Climate change has influenced the vegetative cover and available burnable fuel across the Western landscape. In the past few years, fires have grown to record sizes, are burning earlier and longer, and are burning hotter and more intensely than they have in the past (Westerling et al. ~~2006).~~2011.)

According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires greatly increased over the last 20 years. Within just the last ~~seven~~ten years, a record number of acreages have burned and numbers are continually getting larger (NIFC ~~2006).~~2014.) Although fire suppression is still aggressively practiced, fire management techniques are continually adapting and improving. Due to scattered human developments and values throughout the WUI and intermix, suppression will always have to be a priority in those areas. However, combining prescribed fire and wildland fire use with effective fuels management and forest restoration techniques will help reestablish natural fire regimes and reduce the potential for catastrophic wildfires.

2.45 Documenting the Rationale for a County-wide CWPP

This county-wide wildland fire protection planning process is the result of ~~nearly ten months~~over two years of collaborative community meetings, field trips to potential project sites and the compilation of documents, reports, and data developed by a wide array of contributors. ~~This~~An original plan was compiled in ~~2008~~2006 in response to the federal Healthy Forests Restoration Act of 2003, with the Fire Safe Council of Nevada County as the lead proponent. An update began in 2014, with a review of the prior plan, implemented projects, progress in stakeholder engagement through the National Fire Protection Association's (NFPA) Firewise Community Program, recent fires and development since the original plan was approved.

This county-wide CWPP meets the requirements of the HFRA by:

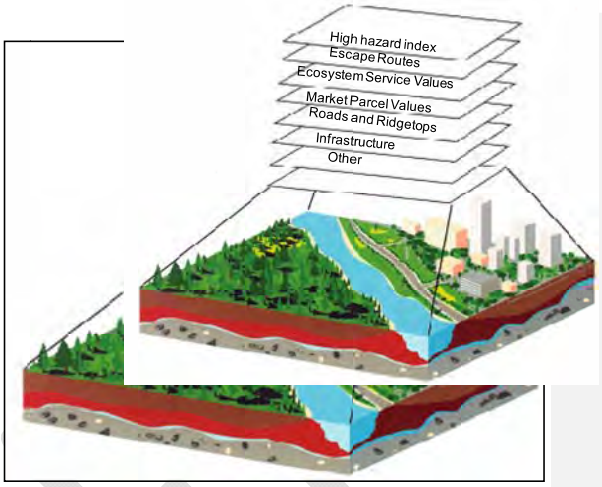
1) ~~1)~~ having been developed collaboratively by multiple agencies at the local and state ~~and local level~~ in consultation with federal agencies and ~~other~~ interested parties.
2) ~~2)~~ identifying and prioritizing ~~and identifying~~ fuel reduction ~~treatments~~projects and recommending the types and methods of treatments to protect ~~at risk~~ communities at-risk and pertinent infrastructure.
3) ~~3) suggesting~~engaging in multi-party mitigation, monitoring, and outreach.
4) ~~4)~~ recommending measures and action items that residents and communities can take to reduce the ignitability of structures.
5) ~~5)~~ facilitating public information meetings to educate and involve the community to participate in and contribute to the development of the CWPP.

The wildfire threat to the visitors, residents, and communities within Nevada County is manageable if multi-jurisdictional agencies continue to work together and in cooperation with residential and community-based treatments. Local and state fire agencies, as well as community fire protection groups, are excellent resources for information and assistance. A combination of homeowner and community awareness, public education, and agency collaboration and treatments could assist in reducing wildfire risk.

This section of the Nevada County CWPP emphasizes the need to protect communities from wildland fire and documents the need to mitigate fire hazards. By assessing the wildfire trends in the County and assessing the community values at risk, this CWPP aims to protect the residents and visitors to the County from the effects of wildfire through outreach, education, strategic planning, and action.

Evaluation of the vegetative fuels and assets at risk on federal and nonfederal land in the County was conducted through a spatial fire behavior model called FlamMap ~~(version 3.0)~~ and spatial analysis using GIS technology in a series of overlays ~~(Figure 5).~~. This analysis helped the CWPP Analysis Team identify high, moderate, or low fuel-hazard risk areas. For each area of Nevada County, the vegetation density, type, and distribution as well as slope and aspect analyses were modeled in a comprehensive manner for the CWPP to have the finest resolution of fire risk and hazard information (Figure ~~6).~~5.)

Figure 5 ~~**Figure 6: CWPP Spatial Overlay Analysis**~~



The rationale for choosing the FlamMap model and the modeling parameters used for Nevada County are presented in Appendix ~~D~~E.

The outputs of this fire hazard modeling are similar to what FRAP has done with its California Fire Hazard Severity Zone Map Update Project but are at a finer resolution specifically for project level planning ~~(CALFIRE 2007).~~. The County was also broken into three smaller subcomponents, and hard copies of this fire behavior analysis was provided to the Fire Safe Council, the Truckee Fire District and the Nevada County Fire Chief's Association. ~~Additionally, the layers of this analysis will be provided to CALFIRE and the Nevada County RCD.~~

This fire behavior modeling was conducted to assist in the categorization of areas at highest risk of fire ignition and spread from wildland fuels in the WUI. The advantage of this modeling is that it allows for site specific calibration and evaluating fire behavior at the 95 percentile worst case wind conditions. Modeling can identify where fuel modification treatments are needed to alter potentially catastrophic fire effects. For a county-wide effort like this CWPP, this site specific modeling makes it possible to see fire hazard differentiation between firesheds, regional landscapes and jurisdictional boundaries (Figure ~~7~~6). This type of spatial overlay analysis also lends itself to design and prioritize fuels reduction on strategically located areas so that treatments will have the greatest benefit for the entire county.

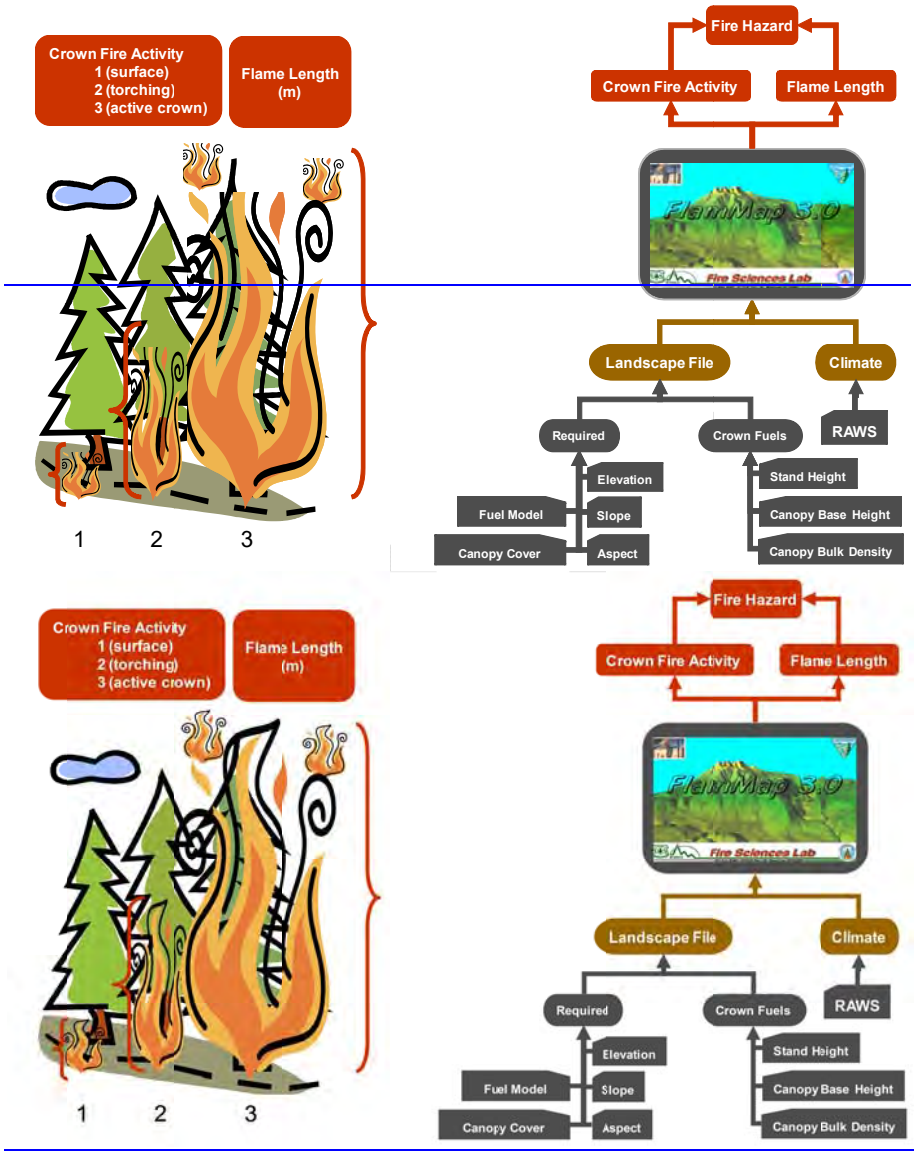


Figure 6: FlamMap (Version 3.0) Model's Spatially Explicit Inputs and Outputs

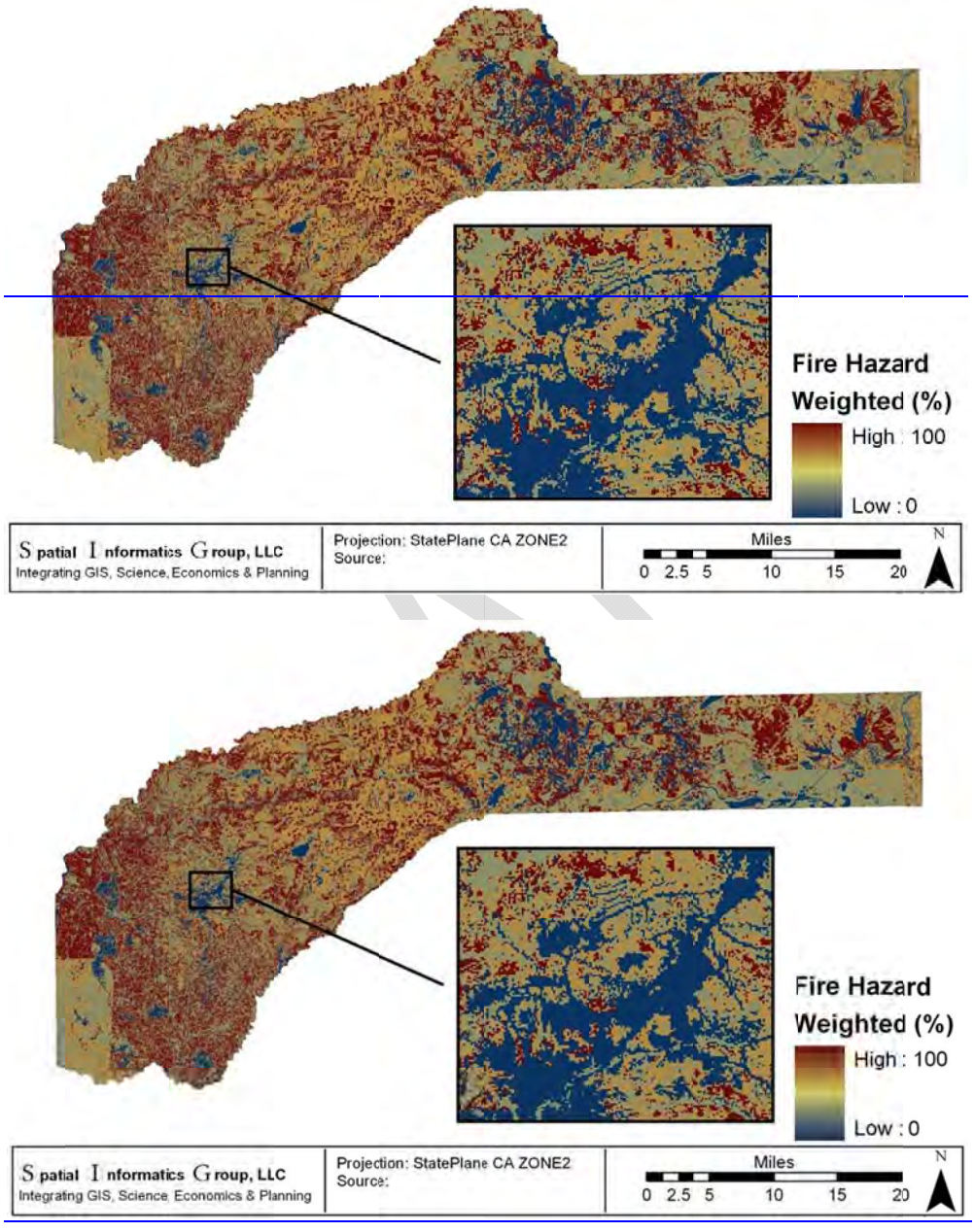


Figure 7: Normalized Fire Hazard Index for Nevada County

3.0 CWPP OBJECTIVES

The primary goal of the CWPP is to protect human life, private property, and essential infrastructure and natural resources through the implementation of fire prevention projects that work to increase public awareness, improve forest health, sustain local wildlife and preserve the natural beauty of the area.

The CWPP, in coordination with the County's Fire Plan, has placed the majority of its emphasis on developing a community base map, modeling hazards and priorities for community protection, and developing partnerships with individuals, communities, and local, state and federal governments to collaborate in the plan's implementation. The benefits of having the Fire Safe Council's leadership role in this CWPP process is to ensure that public concerns are directly included in the process. Language in the County's General Plan Safety Element (Goals, Objectives, and Policies, Goal FP-10.9, 10.10 and 10.11) inherently links the CWPP into its goals, objectives and policies to benefit from one another under the Healthy Forest Restoration Act of 2003 by meeting the following objectives:

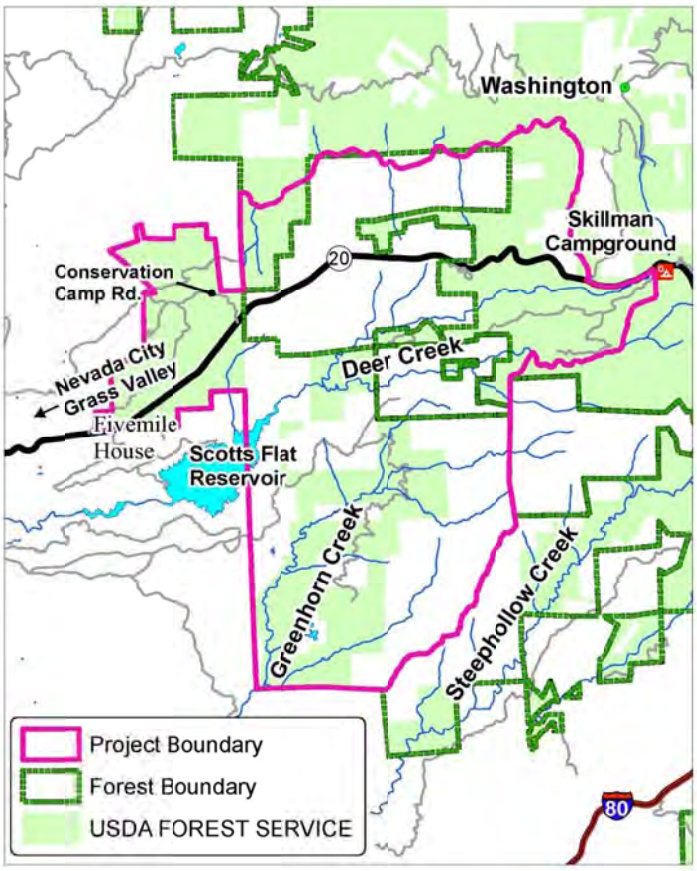
1. To reduce wildfire risk to communities, municipal water supplies, and other at-risk Federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects.
2. To authorize grant programs to improve the commercial value of forest biomass (that otherwise contributes to the risk of catastrophic fire, or insect or disease infestation) for producing electric energy, useful heat, transportation fuel, and petroleum-based product substitutes, and for other commercial purposes.
3. To enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape.
4. To promote systematic gathering of information to address the impact of insect and disease infestations and other damaging agents on forest and rangeland health.
5. To improve the capacity to detect insect and disease infestations at an early stage, particularly with respect to hardwood forests.
6. To protect, restore, and enhance forest ecosystem components, including the possibility to:
    a. promote the recovery of threatened and endangered species;
    b. improve biological diversity; and
    c. enhance productivity and carbon sequestration.

3.1 Coordination with Public Agency Activities

In order to maximize the fuels reduction work planned for private land, it would be desirable for complementary projects to take place on adjacent federal and state managed lands in and adjacent to the CWPP planning area. ~~USFS~~BLM and ~~BLM~~USFS coordination with the existing plan and through a series of plan updates will ensure that these complementary projects are coordinated. The CWPP is also recognized as the instrument necessary to organize and educate the public to further encourage and suggest design of such future projects.

Within the Nevada County CWPP, there are existing and planned BLM/Forest Service projects that include pre-commercial thinning, commercial thinning, pruning, piling, burning, and under burning treatments. The development of this document will facilitate the identification of areas to be included in the Community Hazard Reduction Priorities (CHRP) and the Mitigation Action Plan. The CHRP and Mitigation Action Plan will meet the objectives of landscape fuels reduction and discontinuity in the pattern of fuels in the proximity of Nevada County's WUI. ~~In the future, the CWPP updates will continuously review potential landscape fuels treatments in order to maintain a 5 and 10 year Action Plan.~~

Figure 8: Western Nevada County Community Defense Project



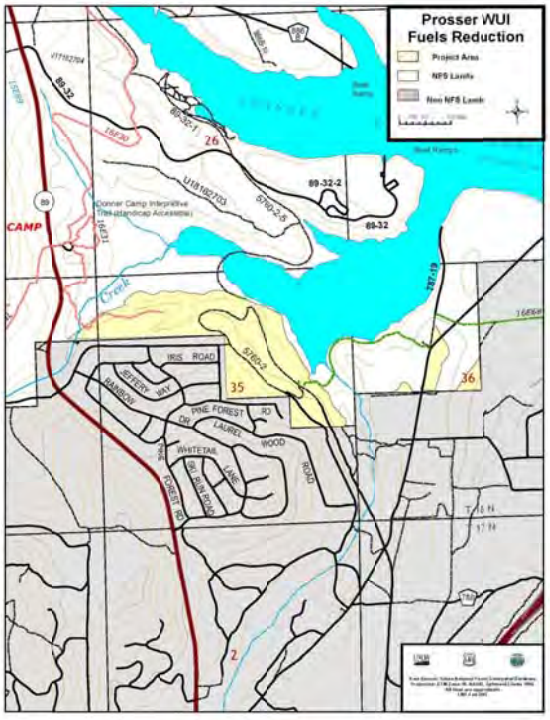
Efforts will continue to be made to cooperate in projects that maximize the benefits of landscape fuels reduction involving other public and private entities, and as outlined within the CWPP Mitigation Action Plan, and may be considered for inclusion in the USFS-Tahoe National Forest 5-year Action Plan and Forest Plan Revision process as it is amended in the future.

One such effort, is the Tahoe National Forest's Western Nevada County Community Defense Project (WNCCDP) (Figure 8.) This project was developed in two phases, the first being Madrone Springs treating 900 acres of hazardous fuels within the WUI east and north of the communities of Grass Valley, Nevada City, and Cascade Shores. In the first year of the first phase, 466 acres were hand cut, pruned and piles and 11,000 piles on 222 acres were completed. The second year, the project continued with hand cutting, piling and burning taking place on 326 acres. Mastication (mechanical thinning) of brush, small understory trees and downed woody fuels occurred on 289 acres. The goal of the project is to reduce catastrophic wildfire risk and promote forest health while creating safer public evacuation and wildfire suppression routes.

The WNCCDP proposes to reduce surface fuel loadings and ladder fuels, remove the biomass created where practicable, and create or enhance the defensible space around at risk communities (Grass Valley, Nevada City, and Cascade Shores), while fostering and promoting conditions under which wildfire risks would be reduced to a level that would allow safe fire suppression in the case of a wildfire. The proposed action is designed to modify landscape-scale fire behavior by implementing management direction for strategically placed area treatments. Additional benefits from these treatments include improving overall tree health; improving within-stand structural diversity; and enhancing wildlife habitat across a broader landscape. To accomplish the purpose and need of this project, the Forest Service is proposing the treatments on approximately 4,321 acres of national forest lands on the Yuba River Ranger District, within western Nevada County.

Another project in the Truckee River Ranger District of the Tahoe National Forest is designed to address the hazardous fuels in close proximity to the residential development of Prosser Lakes (Figure 9.)

Figure 9: Prosser WUI Fuels Reduction



These projects proactively addresses community concerns, as reflected in the Nevada County Board of Supervisors' July 2013 resolution affirming the urgency and requesting specific actions for reducing hazardous fuels on public lands in Nevada County. The project demonstrates the Tahoe National Forest's ongoing efforts to join the Nevada County Board of Supervisors, the Fire Safe Council of Nevada County, CAL FIRE, and private landowners in prioritizing and implementing strategic hazardous fuels reduction efforts.

Including specific projects in the county-wide CWPP will help facilitate funding these projects by sources not directly available to agencies but through collaborative efforts with the community based non-profit, FSCNC in an all-lands approach to wildfire mitigation. While the FSCNC cannot seek funding, nor manage all lands throughout Nevada County, it's goal to collaborate and facilitate projects aligned with the strategic placement of treatments across property ownerships is within the stated mission of the organization. To realize this mission, the FSCNC collaborates with agencies such as BLM

and USFS to optimize our efforts and also may serve as the fiscal sponsor for agency projects that otherwise may not avail themselves of particular grant funding opportunities.

3.2 CWPP Core Team

A CWPP Core Team ~~is~~(Appendix B) was established for the purpose of assisting with ~~development~~the update of the Nevada County CWPP. This committee is made up of concerned homeowners who live, work and play in the WUI, are willing to participate on behalf of their community, and have responded to information about developing a Community Wildfire Protection Plan for the ~~Fire Safe Council~~FSCNC and the County. Many of these homeowners are already involved with fuels reduction and fire education efforts in the area as part of homeowner association led efforts~~,~~ and certified Firewise Communities/USA®, Fire Safe Council efforts, or simply on their own. The team has provided the bulk of feedback from community members during the development of the plan. It has been decided by the Core Team that the primary focus of the Nevada County CWPP will be to help ensure human safety and structure protection on private land. Based on this, team members have decided to make the Mitigation Action Plan concentrate on safety issues in the following categories: Firewise Communities education and outreach, fuels reduction, and improved protection capabilities. Projects that address human safety issues will be of a higher priority than projects that benefit homes. No home is worth a life.

Firewise Communities education and outreach were identified as important tools to be included in the plan. It was recognized by the committee that landowners will need to be informed of the need and means to ~~"FireWise"~~become "Firewise" (under the National Fire Protection Association program and Fire Adapted Communities concept) on their own property and ensure the safety~~.~~ of their families. In addition, Firewise education and outreach will need to reach people who are only part-time residents or visit frequently but may not live in the planning area. A relatively high percentage of the homeowners do not live full time in the area. Several items were identified as a means to get fire information out to the public (see Mitigation Action Plan, page ~~36).~~42.) The objective of this portion of the plan is to provide information to landowners and visitors to increase knowledge and understanding of fire-related issues. Means considered to accomplish this include hosting ~~future "firesafe"~~ongoing Firewise presentations ~~and,~~ workshops~~.~~ and homeowner education events.

Fuels reduction, both around homes, ingress/egress routes and across the landscape, ~~was~~were the ~~second priority~~priorities of the CWPP Core Team. The committee agreed that implementing defensible space around homes and along ingress/egress routes to provide for emergency evacuation and suppression equipment was the first priority for fuels reduction ~~while.~~ The second priority was the general landscape. Landowners will be encouraged (and information provided on how) to create ~~a~~an effective defensible space around their own homes~~, but~~ and along ingress/egress routes. A high percentage of roads in Nevada County are private and lack the vegetation management to safely provide for fire fighter access. Financial assistance should be provided to assist those landowners that do not have the ~~funds~~financial resources or physical ability to do it all on their own. While shaded fuel breaks and other landscape level treatments ~~are the first line of defense and~~ should be pursued for implementation, the scale of this work will not return the immediate benefits that come from creating defensible space around individual

homes~~.~~ and providing effective ingress/egress routes. Creating and properly maintaining defensible space and ~~maintaining it to protect~~ingress/egress routes protects structures ~~will~~and provide a type of "back-up" ~~if future fires spread to private lands~~to landscape treatments as the intermix throughout the forest. Landscape treatments and shaded fuel breaks should be located based on terrain, fuel conditions, prevailing wind direction and community density, critical infrastructure etc., and implemented regardless of ownership and jurisdictions.

The steep, rugged topography of the CWPP area limits most roads to valley bottoms and ridgetops. Limited roads, particularly a lack of secondary access roads into populated areas of the planning area, were identified as a substantial concern to safety. Means to improve/upgrade existing roads to provide for secondary access during emergency evacuation conditions should be pursued with the appropriate ~~landowner~~landowners. For this reason and the ability of firefighters to stage suppression efforts, the CWPP Core Team focused on where ridgetops and roads co-aligned with one another.

The CWPP Core Team ~~will assist~~assisted with investigating and prioritizing on-the-ground wildfire prevention and protection projects in the Nevada County CWPP (see Mitigation Action Plan, Page ~~35).~~42.) In general, projects will ~~be~~are prioritized based upon their location in the planning area and ability to address High Hazard Zones and Community Hazard Reduction Priorities (CHRP~~).~~.) The focus will first be on those areas with high fire hazard, high parcel improvement densities (values ~~(~~above $10,000), where ridgetops and roads co-align, and those within the WUI. The focus will be to design fuels treatments along these roads and ridgetops and work outward toward communities and then to adjacent public lands. Consistent with existing budget constraints and priorities, the BLM and USFS ~~and BLM~~ will cooperate and use this CWPP to work in conjunction with the CHRP to protect the same assets at risk. Firewise Communities education, outreach and ~~overall~~ongoing communication were also identified by the CWPP Core Team to be addressed in the plan (to work in concert with hazardous fuels reduction projects~~).~~.) Specifically, immediate communication of accurate information to landowners and appropriate emergency personnel in the event of a fire-related emergency is critical.

~~In the same spirit of open lines of communication for the CWPP process, a Sharepoint site was created to facilitate dialogue between the CWPP Core Team members and the general public. All CWPP Core Team members received a login name and password so that they can use Sharepoint to give direct feedback to the planning process (specifically for defining the community assets at risk, defining the WUI, designing the methods by which priorities are set and modeled, and providing input into the Draft CWPP). The blog and discussion components of this Sharepoint site are also open to public comments (albeit anonymously submitted). Partnering agencies and fire districts were also encouraged to use this website for increasing feedback, especially since most public meetings were held after hours when community participation could be optimized. The Sharepoint link and all data sources will remain active and continue to be available to the Fire Safe Council and the CWPP Core Team for at least five years until the first CWPP update period (see Plan Updates). For more information on the utilities of the Nevada County CWPP Sharepoint site, please visit:~~

~~http://208.179.82.233/Projects/Nevada_CWPP/default.aspx~~[1]

3.3 Community Opinions

A critical and unique component of this CWPP planning process is the integration of community values into the Community Base Map and the community assets at risk through a series of workshops and model iterations. The initial CWPP Analysis Team (Appendix ~~D~~B) worked diligently on building an interactive model which would allow community values to be integrated on the fly during a series of workshops/meetings (Figure ~~8).~~10.) Communities at these workshops were polled using the numerical survey (once they understood the interactive model) so that weights could be placed onto the Community Base Map, Community Hazard Reduction Priorities and assets at risk. Two such workshops were held in Truckee and Grass Valley with broad-based attendance and media coverage. While the survey (Appendix ~~B~~C) and interactive workshops were not designed to be a complete representation of the community's values, the results indicated that there are several different constituents with dynamically different perspectives on what assets are at risk and the priorities for wildfire prevention strategies. For instance, the Truckee community valued ecosystem services and certain infrastructure while the Grass Valley community valued parcels and transportation systems highest. Our findings show that in general, the community perceives greater assets at risk (especially when integrating ecosystem services) than the fire prevention community which tended to prioritize based upon human safety and parcels. When the CWPP Analysis Team stratified the community surveys into five different categories of community members, the analysis differs significantly (Appendix ~~B).~~C.) Figures ~~9~~11 and ~~10~~12 demonstrate visual representations of the average opinions and standard deviations between the various stakeholders. The standard deviation map represents where people agree (green) and disagree (red) on assets at risk and hazardous fuels.

Figure ~~8~~10: Interactive Model for Mapping Community Values

[1] ~~If you are not a member of the CWPP Core Team, please click 'cancel' at the sign-in prompt and it will automatically take you into the Sharepoint site.~~

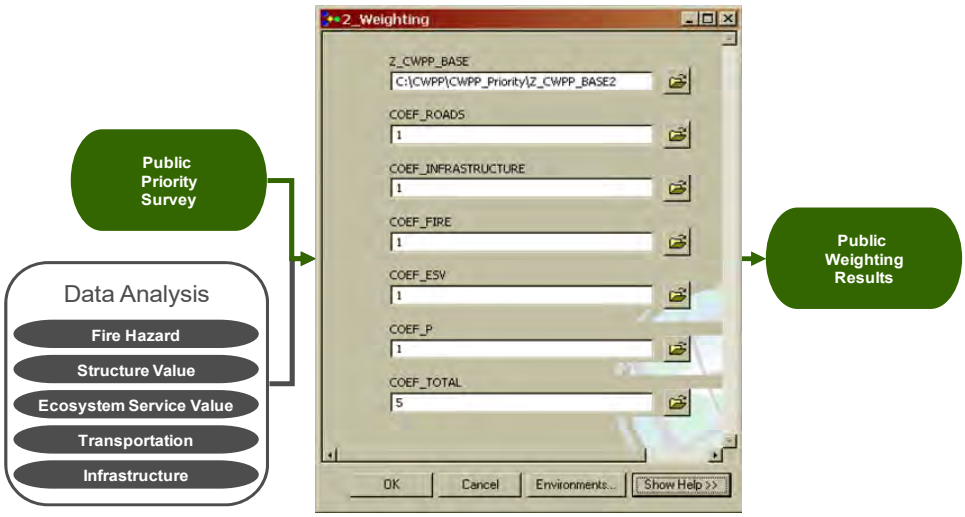
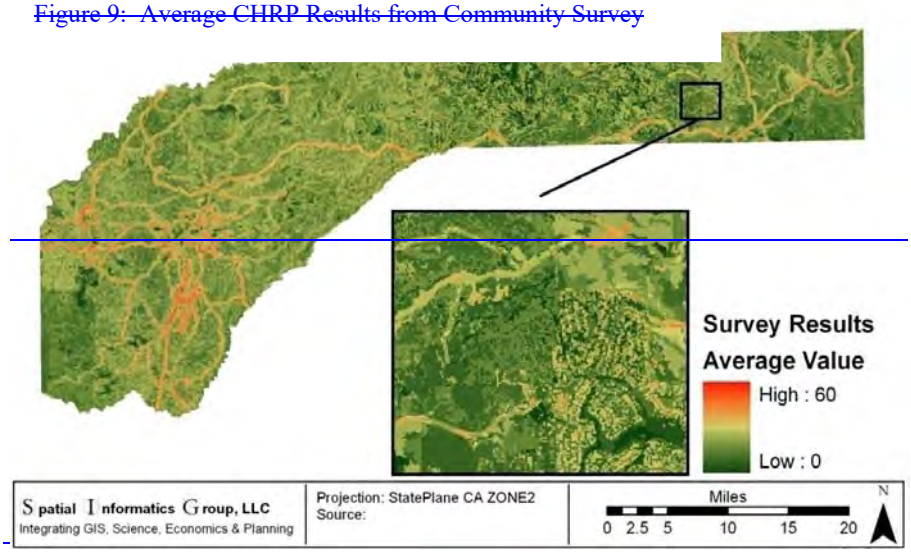
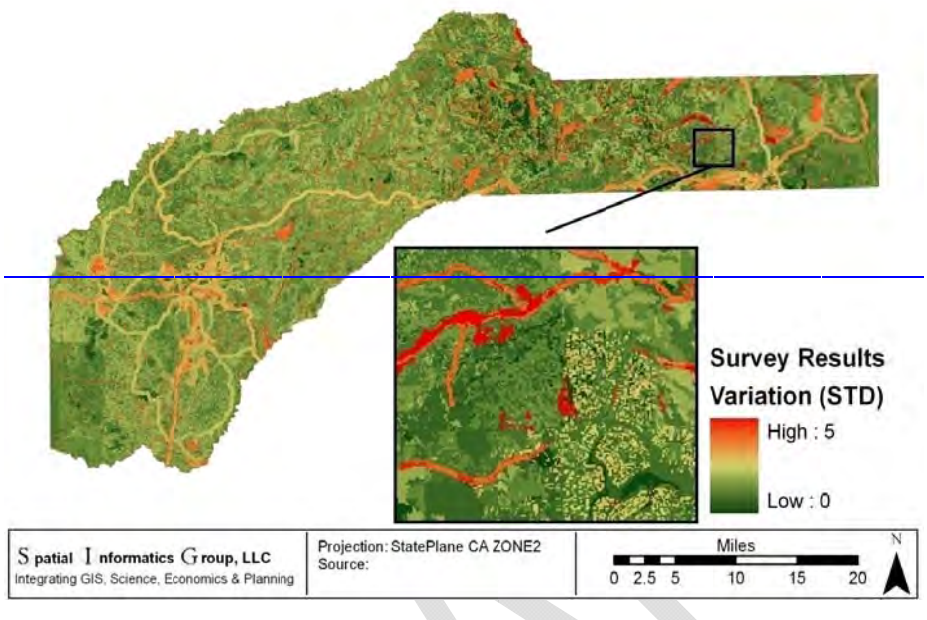


Figure 9: Average CHRP Results from Community Survey





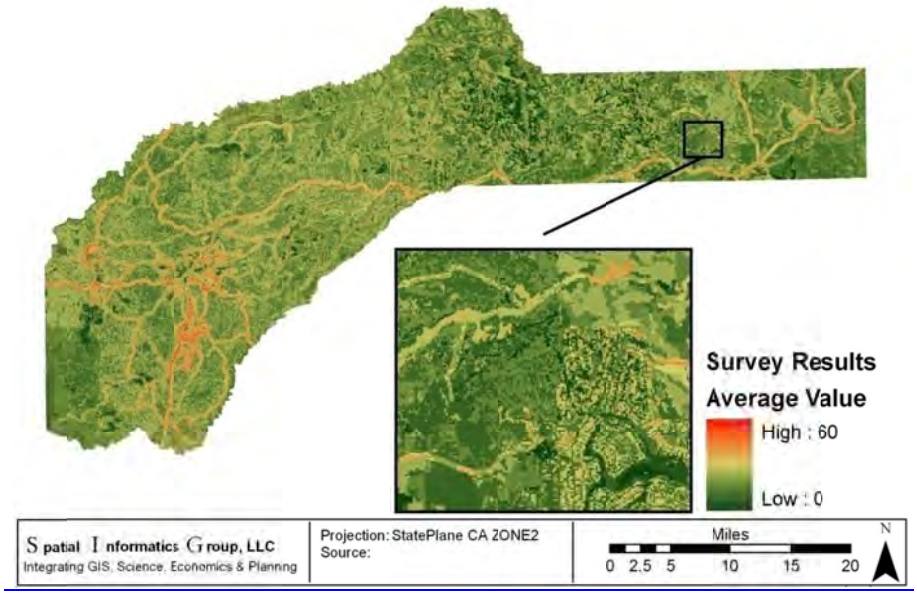


Figure 11: Average CHRP Results from Community Survey

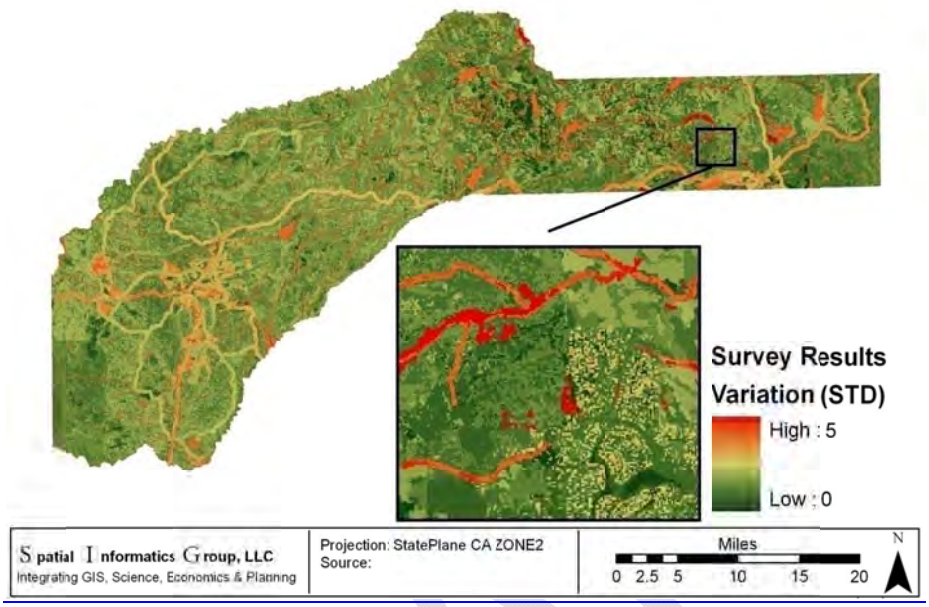


Figure ~~10~~12: Standard Deviations of Community Survey Results

Figures ~~9~~11 and ~~10~~12 indicate that while there is certainly agreement in the areas of high fire hazard and the need for well-marked and safe evacuation corridors (transportation), there is still some debate whether to include certain infrastructure (such as cemeteries, parks, and places of worship) and ecosystem services. Again, because the community survey was only designed to be used at these community workshops and attendance was limited, these survey results do not represent the entire county. These results may only infer what is happening within the larger County context. In reviewing the numerical summaries (Appendix ~~B~~C), it is clear that the perception of assets at risk deviates between the five groups polled at these community meetings. For this reason, the CWPP Core Team decided to rely on the fire chiefs and the spatial analysis to prioritize CHRP based upon high fire hazards and those ridge top roads that can provide both evacuation corridors and strategic locations for fire suppression. As a result, the CHRP Community Survey was used to guide the CWPP Core Team and the fire chiefs in selecting analysis that reflects the areas of highest agreement (represented by the green areas of Figure ~~10).~~12.) The Community Survey certainly met the purpose of including community perceptions in the formulation of the Community Base Map and the CHRP (Figure 11). ~~Because of~~From this innovative approach, the CWPP Analysis Team ~~intends to publish~~used the results of this community participation survey and ~~its use within~~ a real-time spatially explicit model for mapping CHRP.

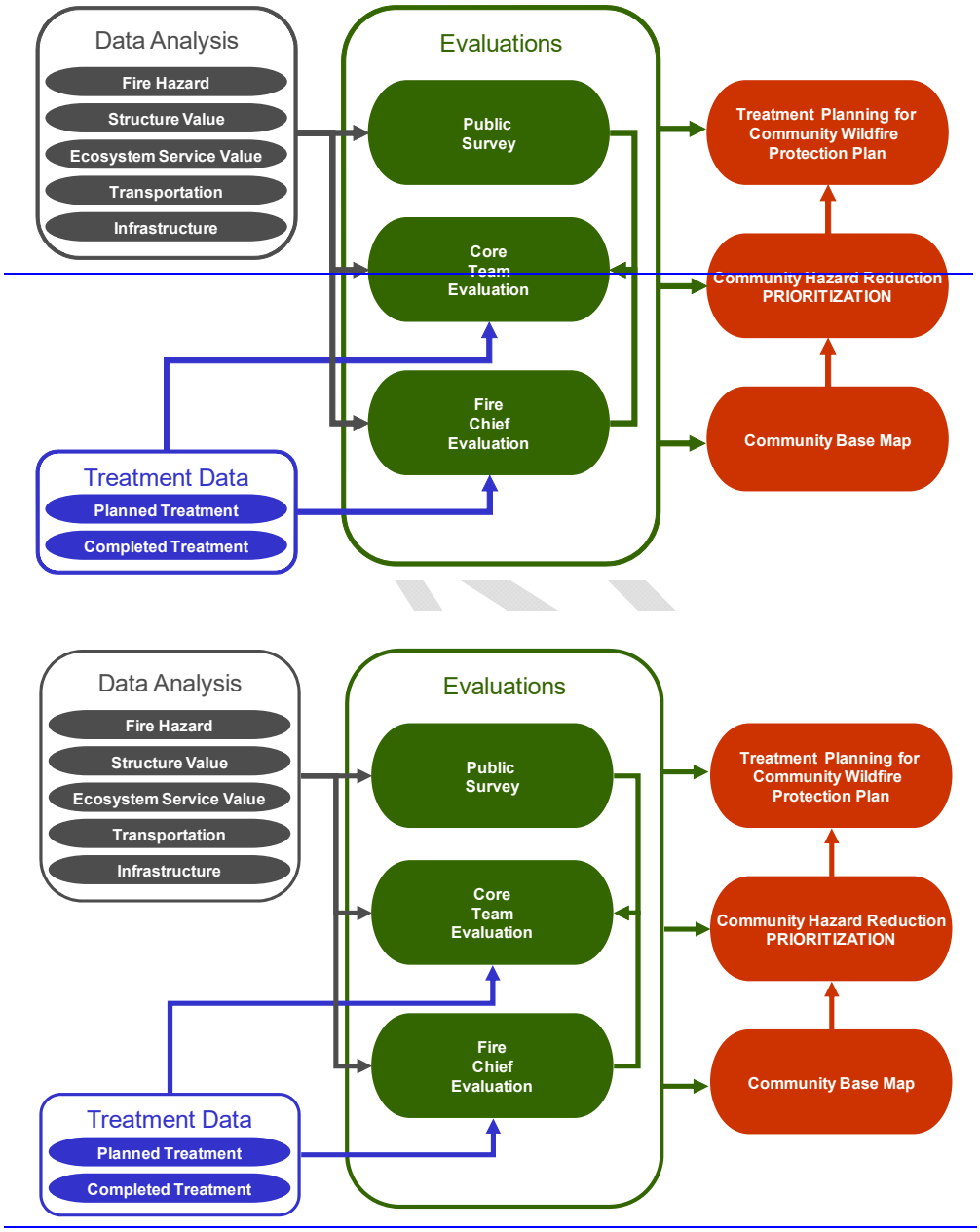


Figure ~~11~~13: CHRP Analysis Flowchart

3.4 Fire Chiefs' Evaluation

In addition to community perceptions of assets at risk, the Core Team decided that this CWPP should place immediate emphasis on the existing knowledge base of how wildfires behave in Nevada County. The purpose of this survey was to use the knowledge and experience of local officials to identify areas in need of improvement and incorporate local preparedness information into the CWPP. Representatives from CALFIRE ~~and,~~ the Nevada County Fire Chief's Association and USFS worked with the CWPP Core and Analysis Teams to evaluate those areas of highest risk specifically for the CWPP to address with its CHRP design and analysis. This Fire Chiefs' survey considered the range of factors, including critical weather patterns and structure-to-structure ignitability that may contribute to the probability of fire ignitions and/or extreme fire behavior. Given the expert knowledge ~~in the room~~, this analysis also measured the ability of local suppression resources to protect structures in various parts of the County.

In the initial CWPP, several priority areas were identified including the Truckee Donner area along the Highway 80 corridor (protecting the Northwoods Community) as well as the Deer Creek, Alder Creek and Greenhorn Creek watersheds. Several projects were ~~immediately~~ identified for inclusion in the first version of the CWPP such as the Deer Creek Community Fuel Break Project ~~(Figure 12),~~ the Greenhorn Creek Fuel Break Project ~~(Figure 13),~~ the Truckee Fuel CHRP Projects ~~(Figure 14)~~ and the Alder Hill Community Fuel Break ~~(Figure 15). Additionally, attention will be given to maintaining the Lake Ridge Fuel Break and the Purdon Fuel Break. These projects are described in the Mitigation Plan.~~.

The numerous priority projects have been nearly implemented and therefore a plan update is required to identify, scope and prioritize new projects for funding and implementation.

Phase I of the Deer Creek Community Fuel Break was implemented in the fall of 2011. The initial funding was insufficient to fully implement the vision of the project. Additional funding from the State Responsibility Area (SRA) Fee through the California Conservation Corps provided crews to continue the work in 2013-2014 as Phase II. A Pacific Gas & Electric CEMA grant has funded the final phase of the project and will be implemented in 2016.

Due to concerns from our federal partners regarding vegetation management opening up land to off highway vehicle (OHV) users in the Greenhorn Creek area, this project has been removed from our list of priorities for western Nevada County.

The West I-80 Fuel Break was fully implemented in the fall of 2010 and is therefore being removed from the project list. The Alder Creek Fuel Break was fully implemented in the fall of 2011 and is also removed from the project list. The Lower Skislope Fuel Break (Figure 18) was implemented in 2013. This project is located in the Tahoe Donner Homeowners' Association, which is the largest single housing subdivision in Eastern Nevada County and provides protection for thousands of homes.

New projects in order of priority for western and eastern Nevada County are:

Western Nevada County: 1. Ponderosa West Grass Valley Defense Zone (Figure 14); 2. North Bloomfield/Harmony Ridge Ingress/Egress Improvement (Figure 15); 3. Scotts Flat/Cascade

Shores Ingress/Egress Improvement (Figure 16); 4. Red Dog/Buckeye Ingress/Egress Improvement (Figure 17); 5. Western Nevada County Community Defense Project (Figure 8.)

Eastern Nevada County: 1. Juniper Hills Ingress/Egress Improvement (Figure 18); 2. Glenshire Green Belt Fuels Reductions (Figure 19); 3. Tahoe-Donner Fuels Reductions I, II & III (Figure 20); 4. Prosser Lake WUI (Figure 9) ; and 5. Pombo Fuels Reduction (Figure 20.) These projects are described in the Mitigation Plan.

Figure 14: Ponderosa West Grass Valley Defense Zone

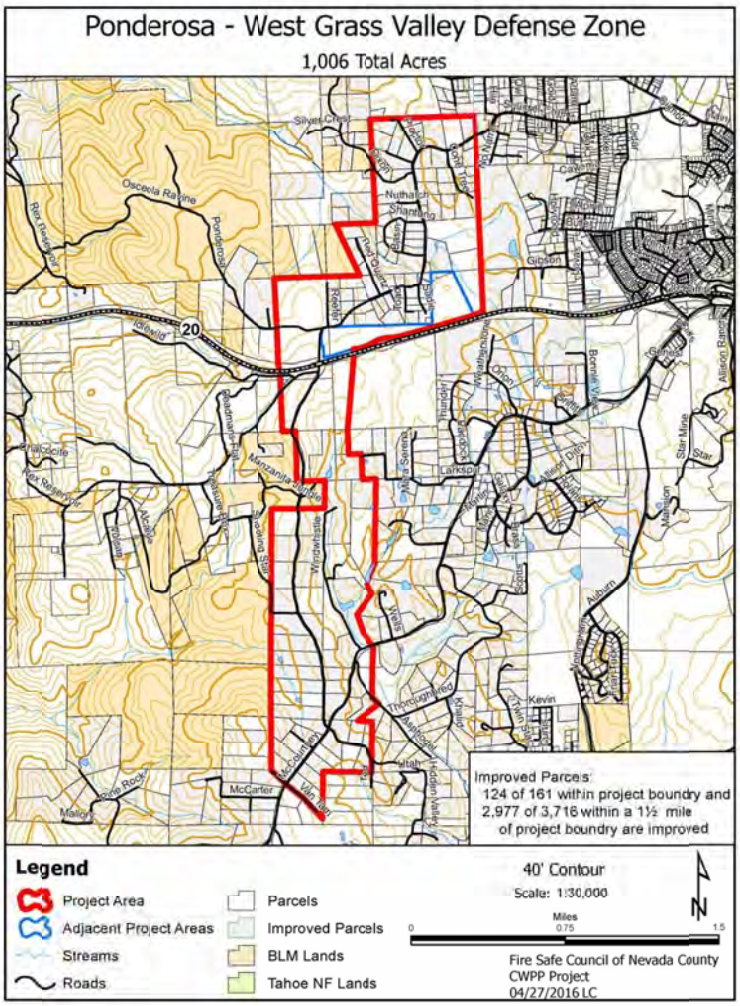


Figure 15: North Bloomfield/Harmony Ridge Ingress/Egress Improvement

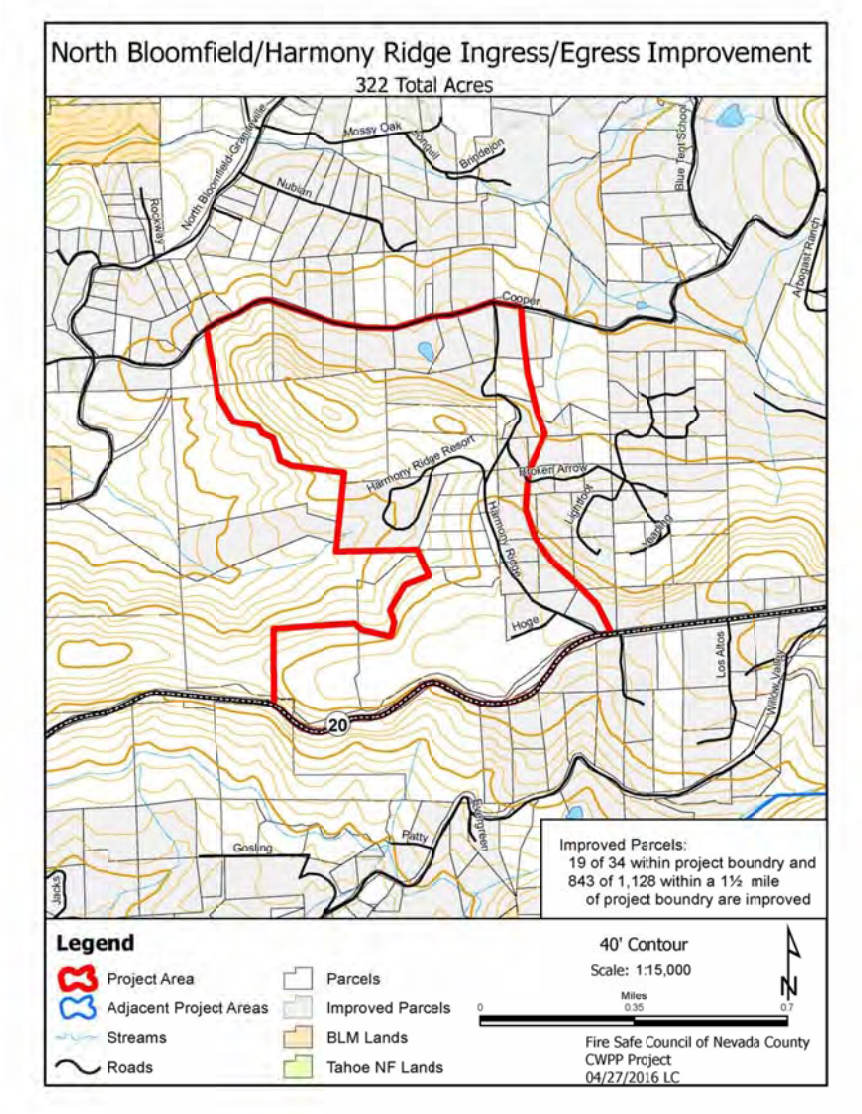


Figure 16: Scotts Flat/Cascade Shores Ingress/Egress Improvement

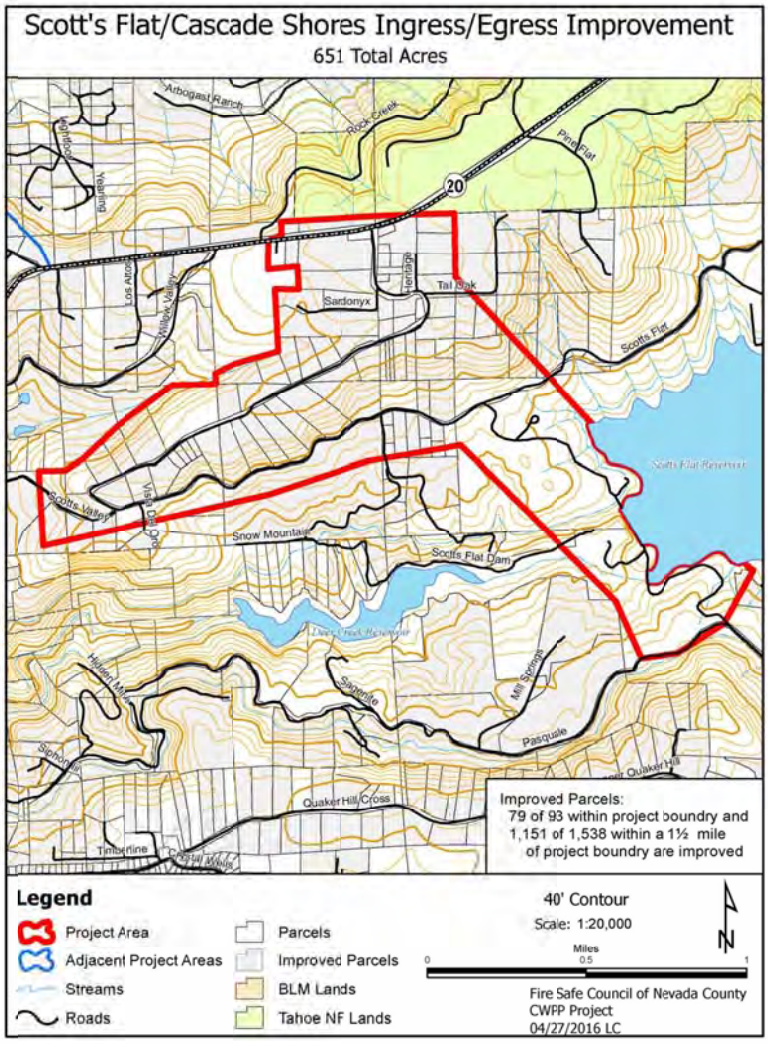


Figure 17: Red Dog/Buckeye Ingress/Egress Improvement

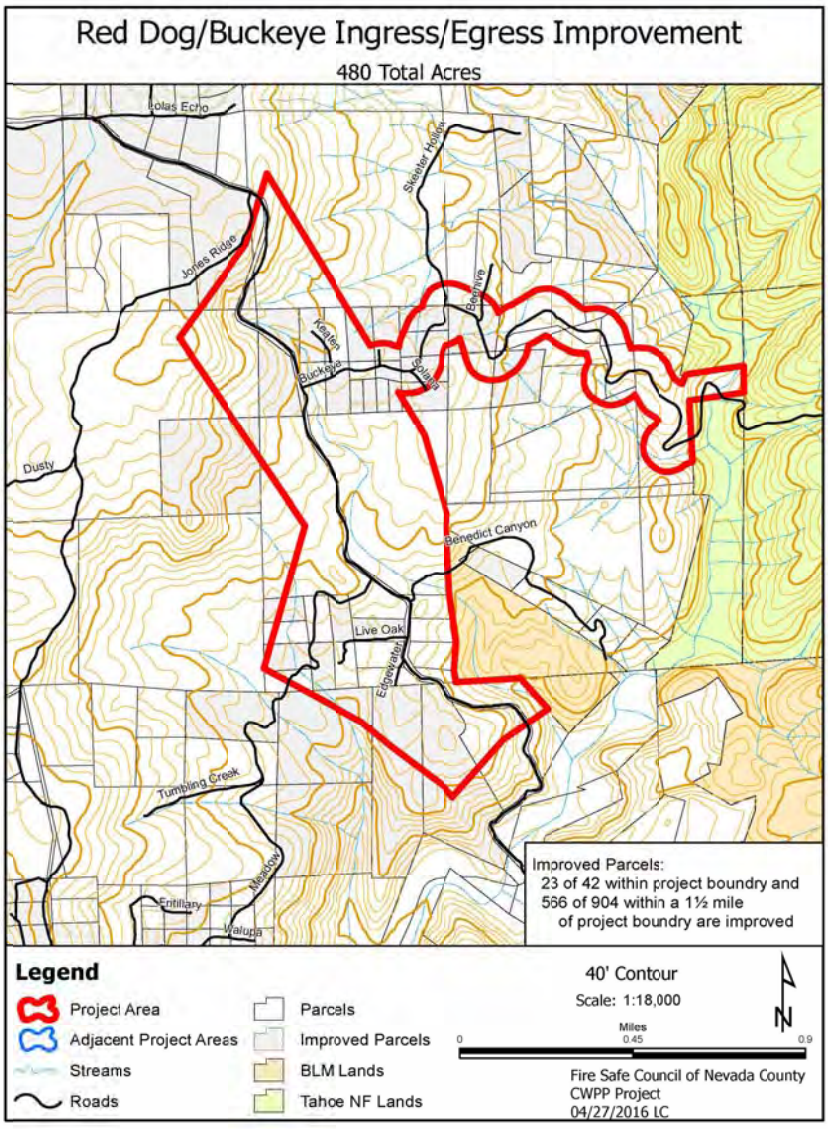
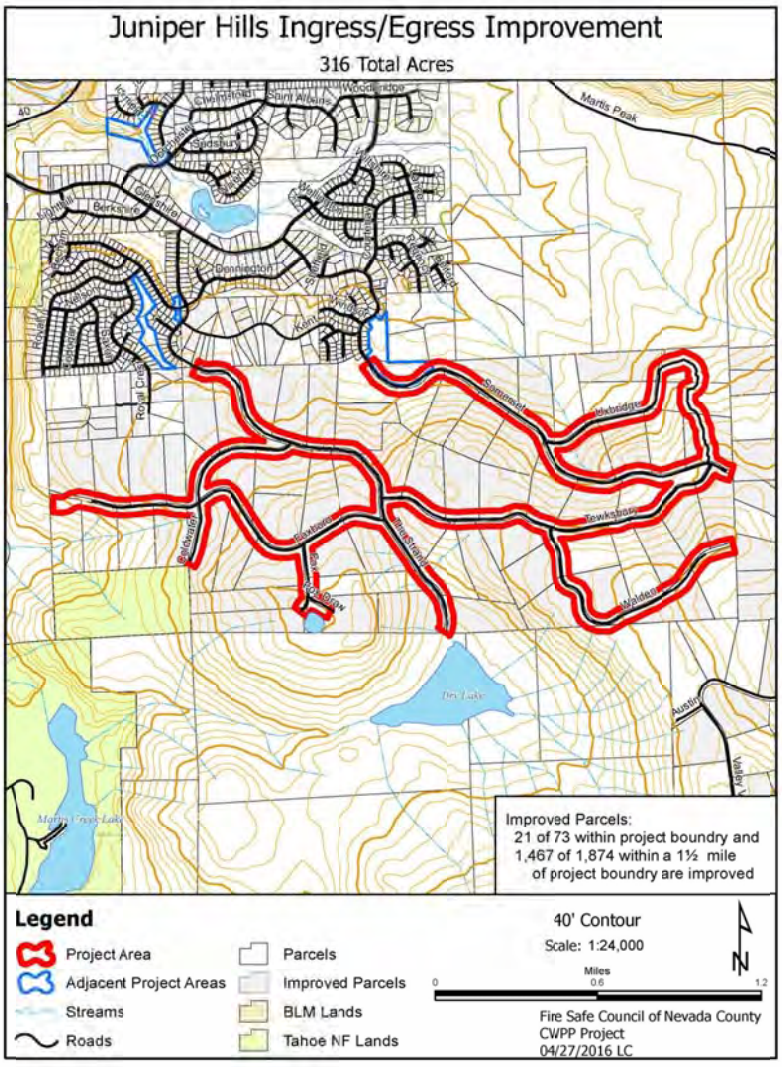

Red Dog/Buckeye Ingress/Egress Improvement
480 Total Acres
Lolas Echo
Jones Ridge
Steeter Hollow
Beehive
Keeler
Buckeye
Spring
Dusty
Benedict Canyon
Live Oak
Edgewater
Tumbling Creek
Meadow
Entillary
Walupa
Improved Parcels:
23 of 42 within project boundry and
566 of 904 within a 1½ mile
of project boundry are improved
Legend
Project Area
Adjacent Project Areas
Streams
Roads
Parcels
Improved Parcels
BLM Lands
Tahoe NF Lands
40' Contour
Scale: 1:18,000
Miles
0
0.45
0.9
N
Fire Safe Council of Nevada County
CWPP Project
04/27/2016 LC

Figure 18: Juniper Hills Ingress/Egress Improvement



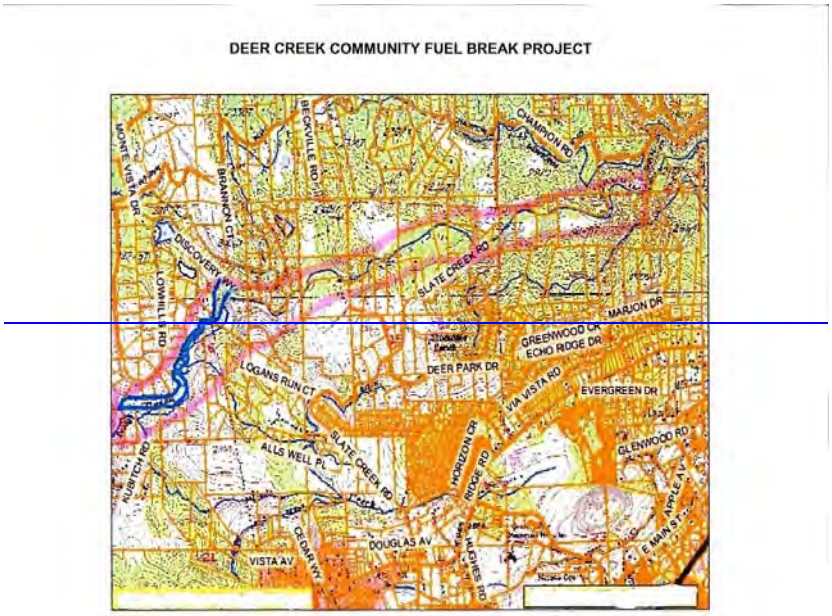
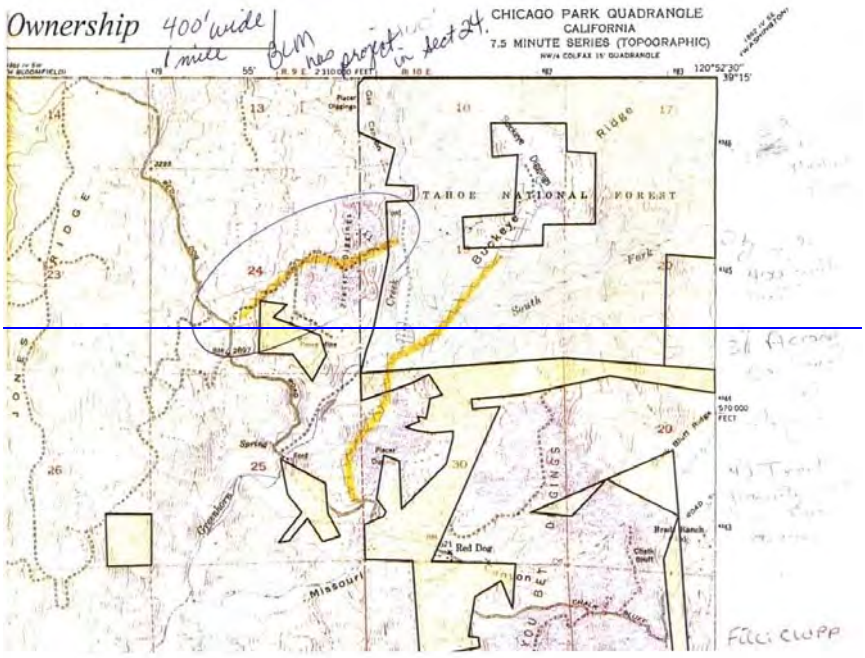
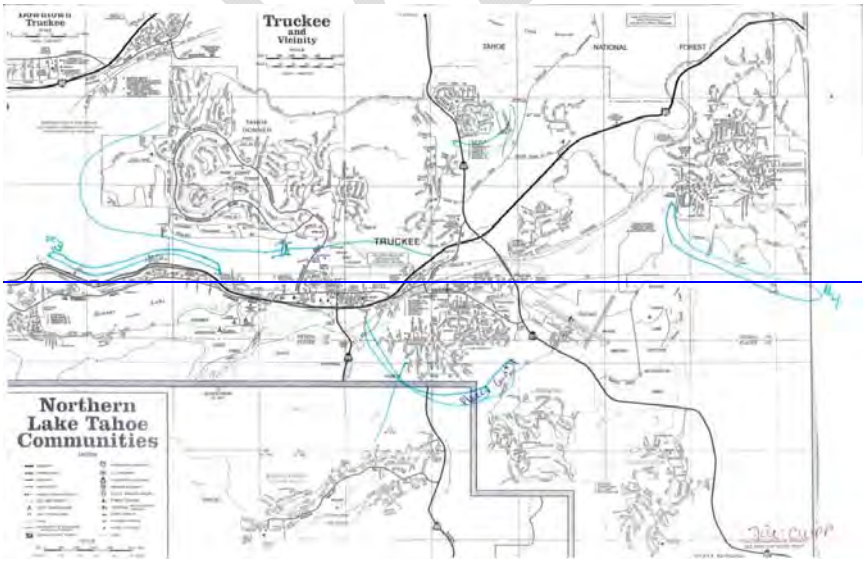


Figure 19:

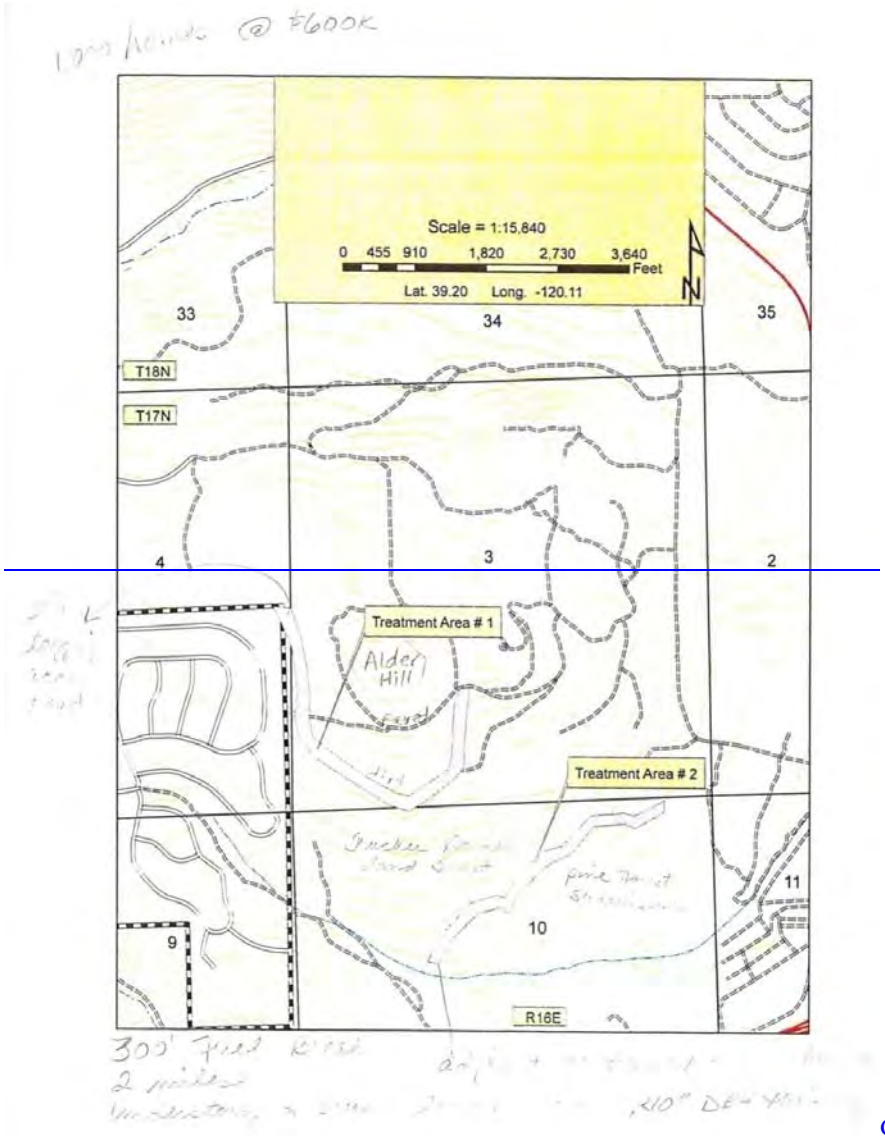
~~Figure 12: Deer Creek Community Fuel Break~~



~~Figure 13: Greenhorn Creek Community Fuel Break~~



~~Figure 14: Truckee Community Hazard Reduction Priorities Projects~~



Glenshire Green Belt Fuels Reduction

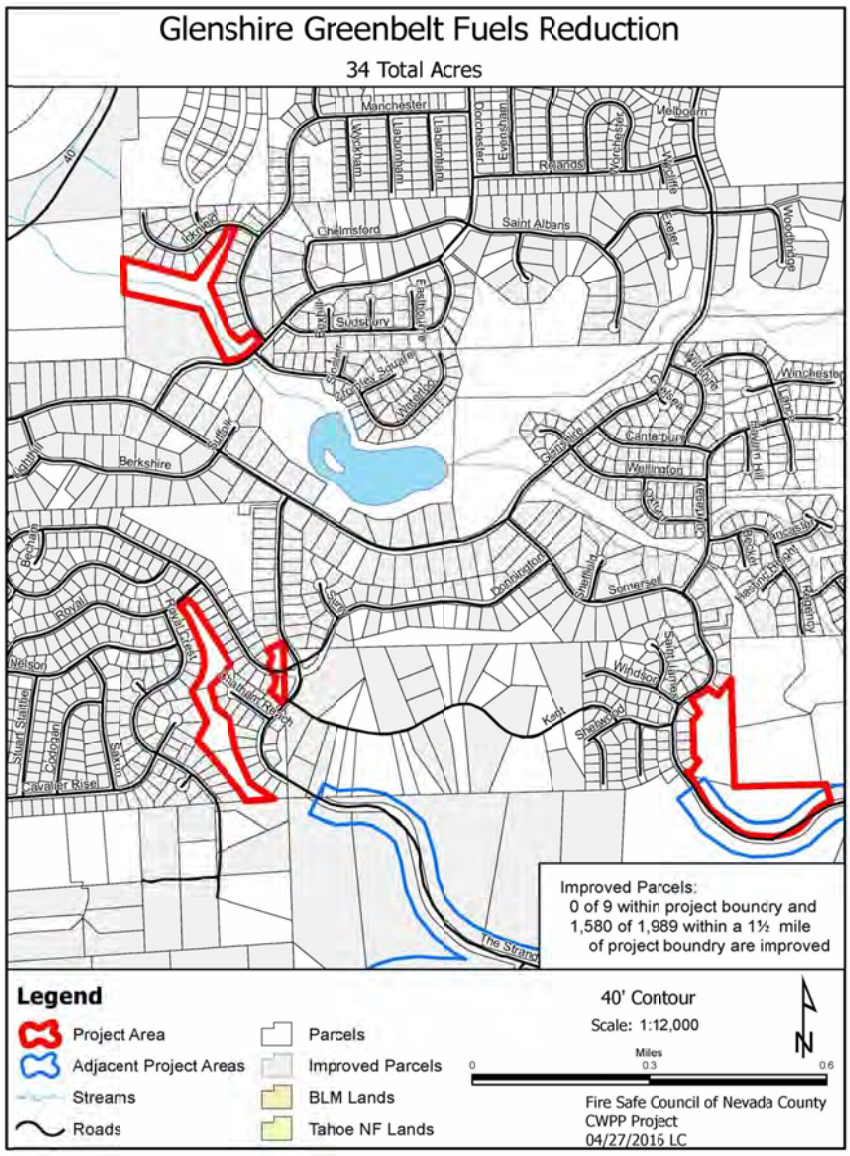


Figure 20a: Tahoe-Donner Projects I, II & III

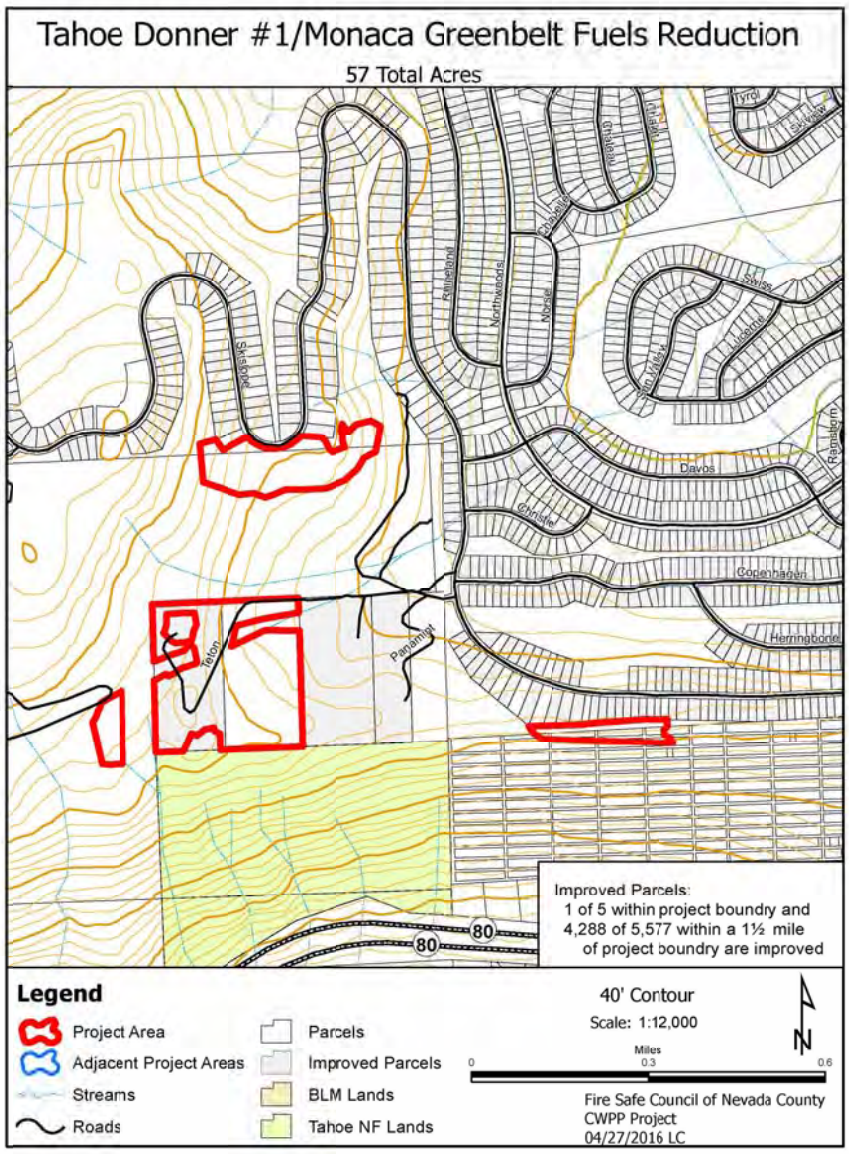


Figure 20b: Tahoe-Donner Projects I, II & III

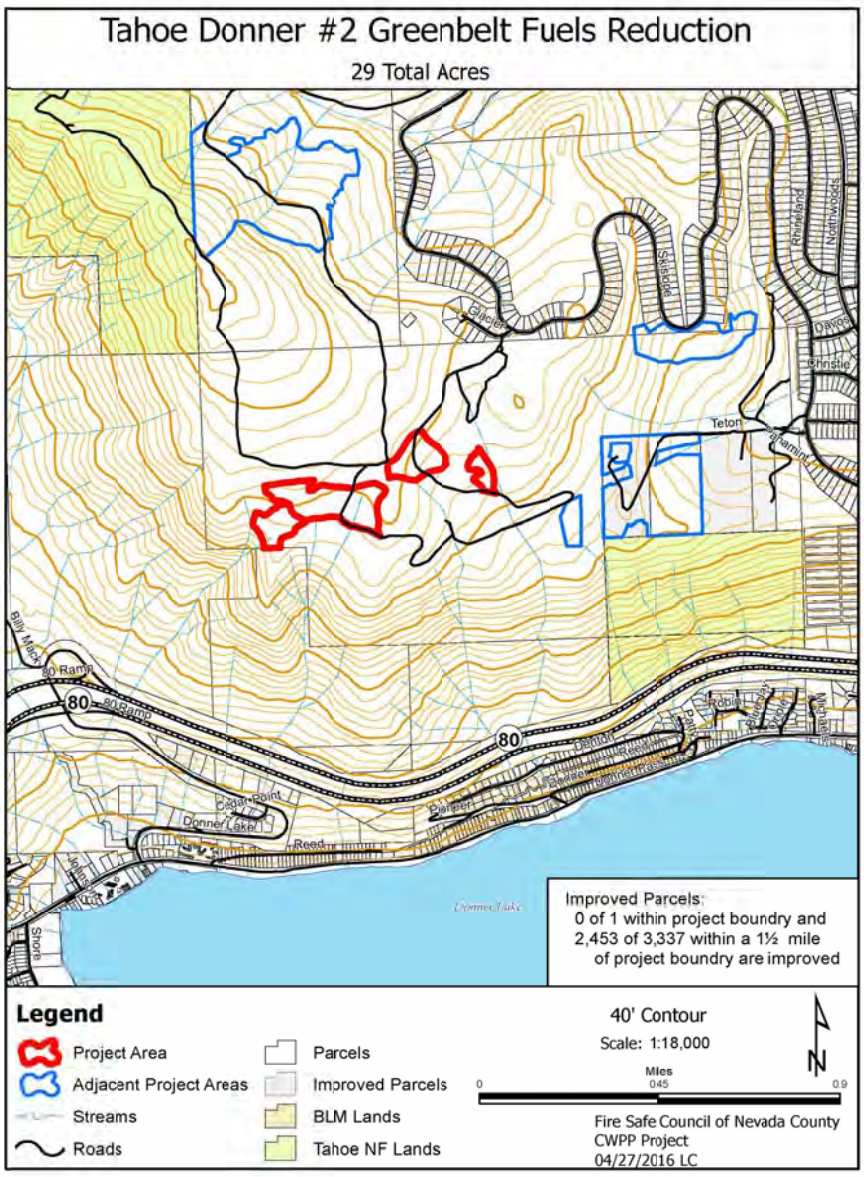


Figure 20c: Tahoe-Donner Projects I, II & III

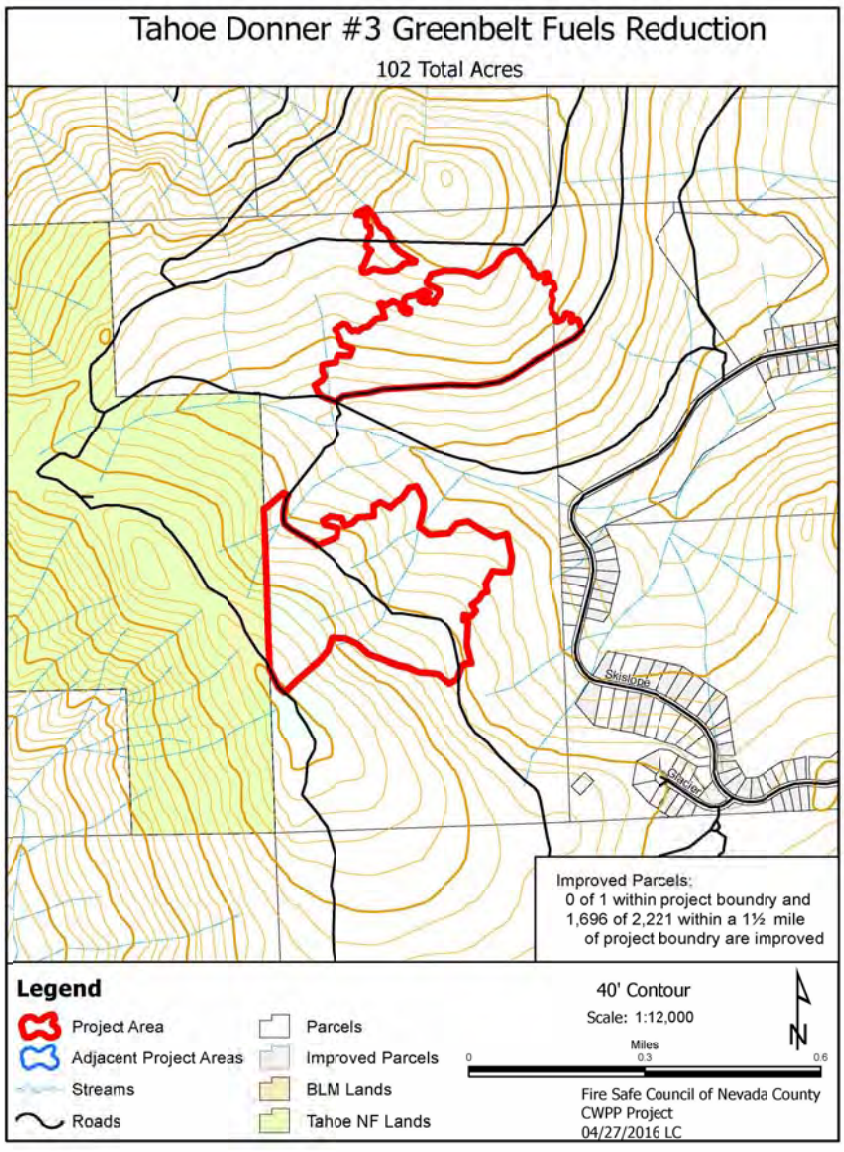
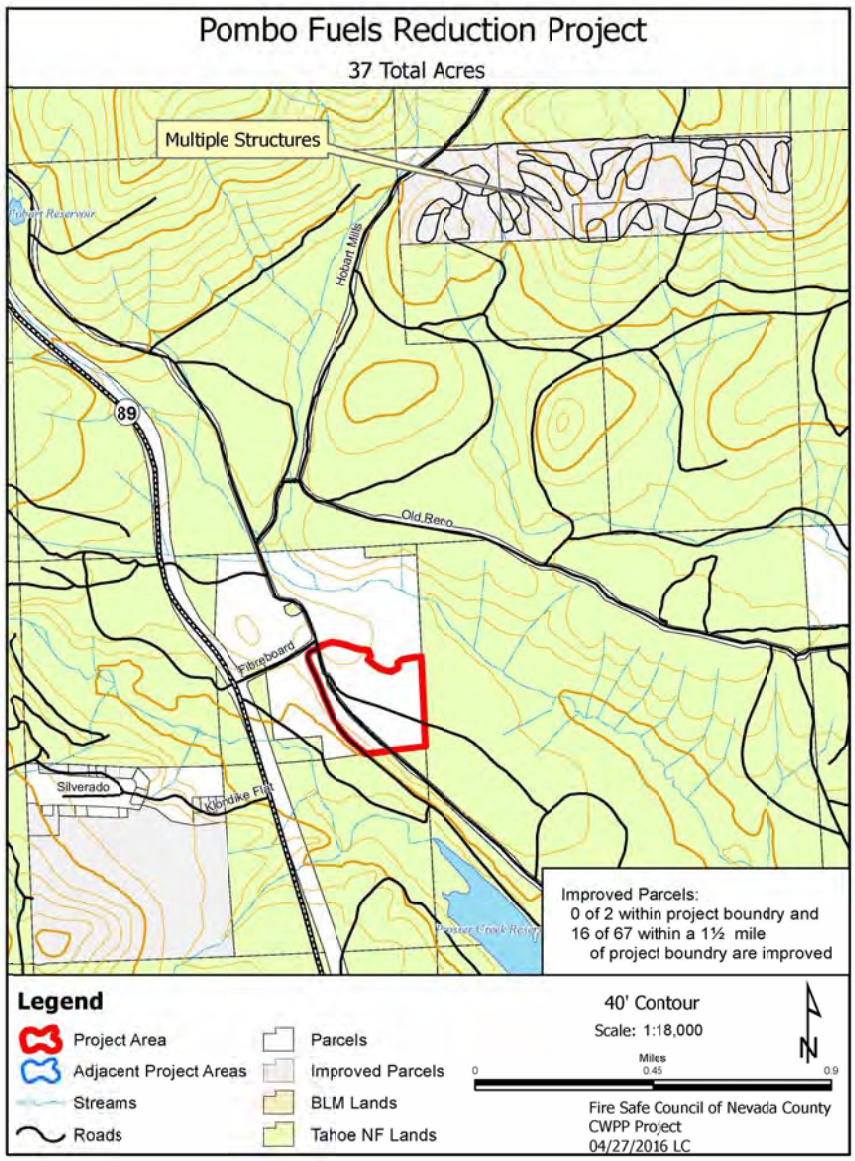


Figure 21: Pombo Fuels Reduction



~~Figure 15: Alder Hill Community Fuel Break Project~~

These projects have been identified by the Fire Chief's independent review of critical weather patterns and structure-to-structure ignitability that may contribute to the probability of fire ignitions and/or extreme fire behavior. The placement of these projects is strategic, and they are all consistent with the spatial analysis presented in the Analysis and Results section. Additionally, ongoing attention will be given to maintaining prior fuel reduction projects.

3.5 Community Hazard Reduction Priorities

The Core Team began scoping and conducting field reconnaissance to identify new projects for the CWPP in 2014. Over fifteen sites were visited and assessed on the ground with follow up analysis by GIS to determine the number of homes protected within a 1.5 mile ember distance prioritizing on protecting Communities at Risk and ingress/egress routes. GIS analysis of slope and aspect aided in aligning projects with ridgetops and prior work for maximizing performance of the fuels treatment placement.

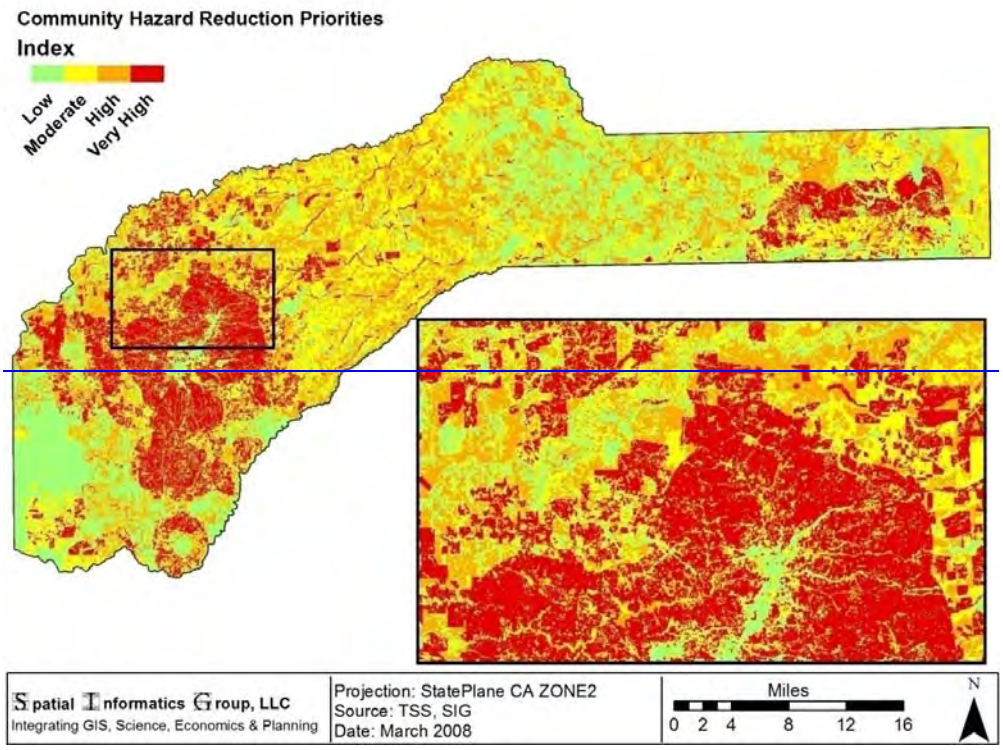
The priority projects for western Nevada County in order are: 1. Ponderosa West Grass Valley Defense Zone; 2. North Bloomfield/Harmony Ridge Ingress/Egress Fuels Reduction; 3. Scotts Flat/Cascade Shores Ingress/Egress Fuels Reduction; 4. Red Dog/Buckeye Ingress/Egress Fuels Reduction; 5. Western Nevada County Community Defense Project (USFS Project.)

The priority projects for eastern Nevada County in order are: 1. Juniper Hills Ingress/Egress Fuels Reduction; 2. Lower Skislope Fuel Break, Phase II; 3. Tahoe-Donner Community Fuels Reductions, Phases I, II and III; 4. Glenshire-Devonshire Greenbelt Fuels Reductions; 5. Prosser WUI Fuels Reduction (USFS Project); and 6. Pombo Fuels Reduction.

Discussion in the community regarding illegal camping activities and the risk of ignitions for wildfire was lengthy. With numerous ignitions concern is high about how to mitigate the risk with a demographic that is difficult to contact, may possess mental health, drug or alcohol issues yielded no easy answers. Many illegal camp sites are prevalent throughout the community but particularly in the LRA. Working with local law enforcement task force members, the FSCNC began educating property owners on the method to post the property for "no trespassing", authorize law enforcement to remove the trespassers, and manage the vegetation to make the environment more fire safe. Typically the illegal campers do not prefer the limbed and thinned forest as their camp sites are exposed. There have been several projects that have successfully removed illegal campers. Caution was given by the Core Team that continuing fuel reduction activities within the LRA may force these camp further out into the forested SRA where there are no pressurized fire hydrants and longer response times for initial attack which may be a recipe for disaster. It has not been forgotten that the 1988 49'er Fire was started by an illegal camper burning debris on a Red Flag Warning Day. The FSCNC and Firewise Communities/USA® members developed educational signage for trails where there is known illegal camping stating "Don't Burn Down Our Town!" Reports from communities are that they are helping to serve as a deterrent when illegal campers recognize residents know they are present. The Core Team members agreed, illegal camp fires are the biggest risk of ignitions for wildfires in the community.

4.0 Analysis and Results

The Community Hazard Reduction Priorities have been stratified into low, moderate, high and very high based upon the spatial overlay analysis defined by the CWPP Core Team Analysis. This analysis, which represents the findings of the Community Survey and the Chief's Evaluation, focuses on the WUI (as defined in Section 2.2), the parcel improvement values above $10,000 (a surrogate for population densities), where roads and ridgetops are co-aligned (excluding any riparian zones that may intersect roads via bridges, overpasses or culverts), and lastly where the FlamMap fire behavior modeling indicated areas of highest hazards (Appendix E). This CWPP Core Team overlay analysis combines the expert opinions of the fire chiefs and the community perception of assets at risk with strong weighting towards road corridors and the fire hazard. Figure 16 gives a visual representation of the County's CHRP stratified into the quartile indices of very high (red), high, moderate and low (light green). Splitting the County into four categories is the best approach for prioritization, especially since the fire hazard modeling is already normalized (Section 2.4; Figure 7). Table 5 depicts the number of acres by priority index, State and local responsibility area (SRA and LRA) and the Direct Protection Areas (DPA) and local Fire Districts.



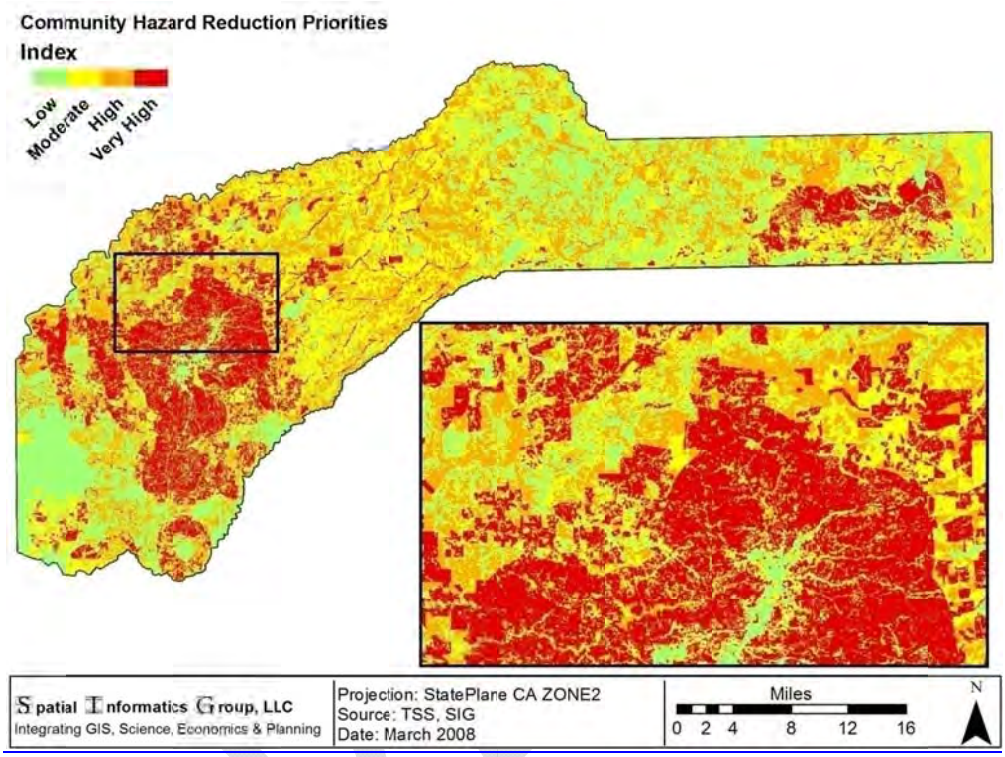


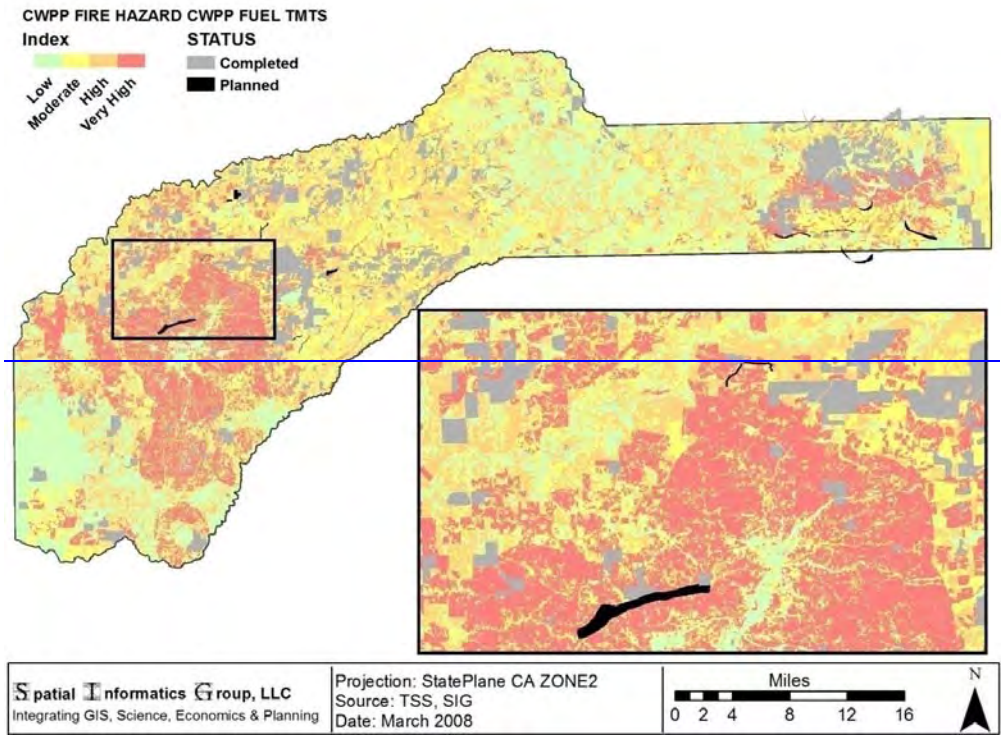
Figure ~~16~~22: Nevada County Community Hazard Reduction Priorities Stratified by Priority Index

Table 5: Number of Acres in Nevada County Community Hazard Reduction Priorities by Priority Index, Responsibility Areas, Direct Protection Areas, and Local Fire District

			ACRES				
RA	DPA_AGENCY	Fire District	Low	Moderate	High	Very High	Grand Total
FRA	USFS/ BLM	NEVADA COUNTY CONSOLIDATED	83	2,166	843	246	3,339
		TRUCKEE	768	820	1,132	1,784	4,505
		Other	37,384	53,130	59,753	7,592	157,859
	CDF	HIGGINS	167	190	88		445
		NEVADA COUNTY CONSOLIDATED	320	1,272	1,376	973	3,941
		NORTH SAN JUAN	1,243	4,900	3,866	289	10,298
		OPHIR HILL				21	21
		PEARDALE-CHICAGO PARK	86				86
		PENN VALLEY	536	284	527	18	1,365
		ROUGH & READY	35	158	222	460	875
		TRUCKEE	1,707	1,114	2,238	984	6,044
		Other	2,104	6,957	5,200	332	14,593
	LOCAL	TRUCKEE				10	10
		Other				21	21
SRA	USFS/ BLM	NEVADA COUNTY CONSOLIDATED	47	232	87	104	471
		TRUCKEE	1,080	783	260	199	2,322
		Other	32,960	33,192	22,807	2,746	91,705
	CDF	GRASS VALLEY	16	6	8	10	39
		HIGGINS	21,357	10,312	11,127	6,118	48,914
		NEVADA CITY	3			6	9
		NEVADA COUNTY CONSOLIDATED	9,614	12,709	19,478	37,050	78,851
		NORTH SAN JUAN	5,746	8,792	11,154	8,295	33,986
		OPHIR HILL	401	690	907	3,369	5,367
		PEARDALE-CHICAGO PARK	3,448	2,619	2,886	2,747	11,699
		PENN VALLEY	24,778	6,720	12,919	12,324	56,741
		ROUGH & READY	344	621	1,188	2,675	4,828
		TRUCKEE	4,014	5,395	2,116	3,250	14,775
		Other	11,654	16,280	12,003	5,224	45,161
	LOCAL	GRASS VALLEY				11	11
LRA	USFS/ BLM	Other	14	5	24		42
	CDF	TRUCKEE	73	12	10		96
	LOCAL	GRASS VALLEY	1,762	305	304	560	2,930
		NEVADA CITY	503	202	208	408	1,321
		NEVADA COUNTY CONSOLIDATED	61	43	39	50	192
		TRUCKEE	4,176	8,061	3,385	3,661	19,283
		Other	72	34	62	287	456

Table 5 shows that within State Responsibility Areas, the Nevada County Consolidated District has the highest number of acres within the CHRP designated areas. Within Local Responsibility Areas, the Truckee Fire District has the most acres within the CHRP designated areas. Under the federal jurisdiction, albeit some overlap with SRA and LRA (using FRAP's 2007 DPA Layer, there may be some GIS slivers that need to be addressed), within the 260,241 acres in the CHRP designated areas, 12,670 acres are in the very high priority class and 84,907 acres are considered high priority. However, this analysis purely looks at the locations where hazardous fuels treatments are needed given those areas with high fire hazard, high parcel improvement values (above $10,000), where ridgetops and roads co-align, and those high hazard areas that lie within the WUI. This analysis does not consider where treatments have already been placed. The

CWPP Analysis Team spent considerable time aggregating GIS datasets to try to depict how many acres have been treated (and when~~).~~.) Certainly, this effort needs to be updated periodically as new treatments are implemented. Given the RCD's effort to do this for Placer, El Dorado and Nevada counties, it is extremely important to the CWPP implementation that there is coordination between federal, state and local partners to maintain the quality of this spatial data. The CWPP Analysis Team has digitized and integrated layers to depict where projects have been performed and those future planned projects as delineated by CALFIRE, the fire chiefs and federal partners. Given the current datasets, a total of 80,907 acres have been treated in the County with another 1,612 acres planned for implementation in 2008. Figure ~~16~~23 is the most recent version of this effort with treated areas in grey and ~~future projects in~~ black. The CWPP Analysis Team has suggested that this layer become an on-line tool for communities and HOAs to view where work is needed. ~~A possible home for this on-line tool would be UC Berkeley's Center for Fire Research and Outreach (CFRO), as it is currently using an address-based system to show people where their homes are in relation to FRAP's Fire Severity Zones (CFRO website).~~ This is discussed further under the Mitigation Plan's Outreach and Education.



In 2015, the Natural Resources Conservation Service (NRCS) providing grant funding to the FSCNC to develop a countywide base map of past, current and future projects. Gathering the spatial data layers is ongoing and volunteers with the FSCNC are conducting field reviews of past projects to determine current viability. The base map will also depict the development and accomplishments of the Firewise Communities in Nevada County and their macro efforts within

their neighborhoods to address fuel hazard issues. Ultimately, an inter-active online map on the FSCNC's website will enable residents to view their home site and the fuels reduction efforts surrounding them. The grant funding from the NRCS has made the goal of a countywide base map a reality and ongoing effort to help align projects for more cohesive and better performing fuels treatments in wildfire events.

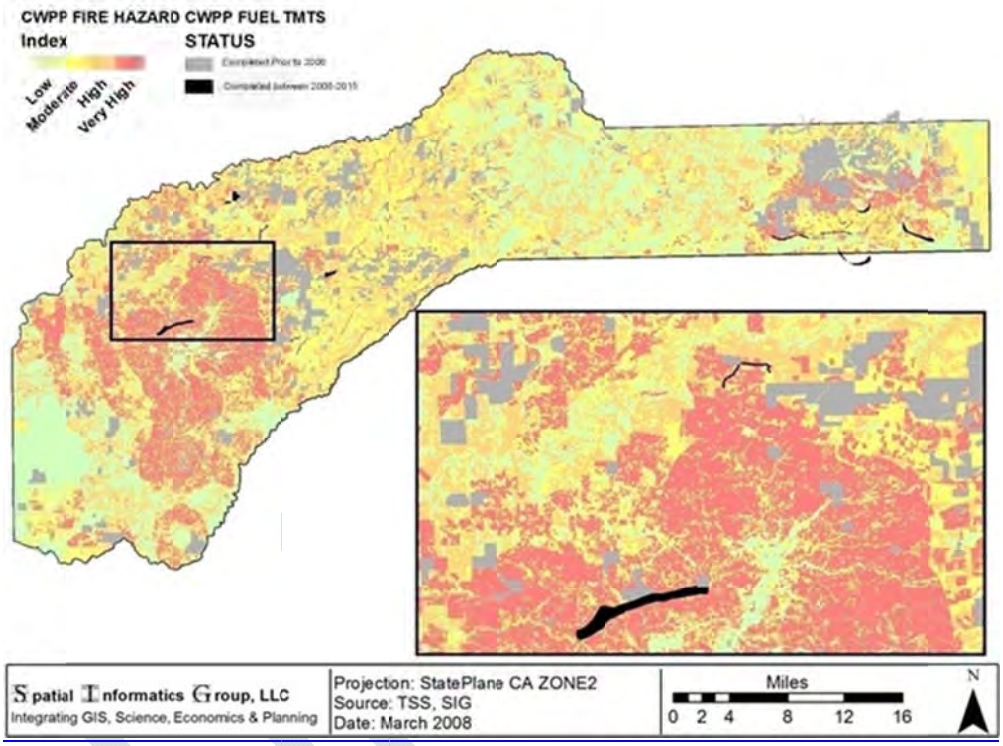


Figure ~~16~~23: Nevada County CHRP Priority Index with Completed ~~and Planned~~ CWPP Fuel ~~Treatment~~Treatments

Using the NaturalAssets™ Information System, the ecosystem services for Nevada County account for a value of $380,634,312 over a range of eleven CalVeg cover types (excluding urban) and integrating valuation data from 73 peer-reviewed sources and 163 ecosystem service valuation estimates (see Appendix ~~C) .~~
D.) The NaturalAssets™ Information System has its own strengths and limitations, often restricting its use to a select range of ecosystem goods and services within a given landscape (described in detail in Appendix ~~C~~D). But for evaluating valuations trends and landscape comparisons, it is currently the best system available for Ecosystem Service Values (ESV~~).~~.) An overwhelming proportion of ecosystem service values in Nevada County come from its forests and riparian boundaries (64.2%). The County's relatively large area of forested cover accounted for nearly 39% of total ESV delivery by naturally functioning ecological systems in the study area. While on a per-unit basis some forest types provide a lower stream of benefits than many

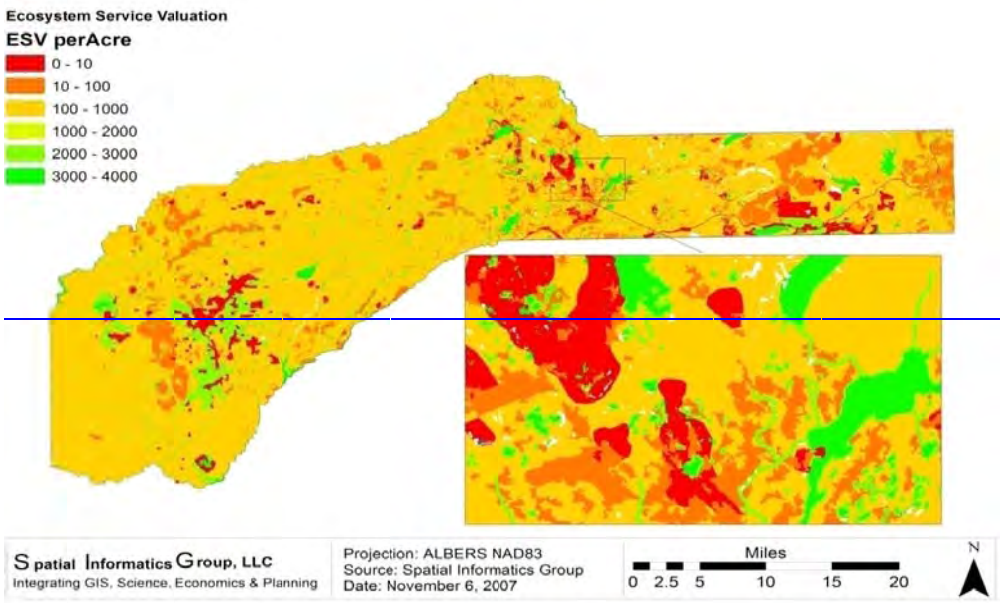
non-forested types, the size of forested area in Nevada County means that ESV benefits from forests and riparian systems dominate (especially as the dominant land cover types with 424,400 acres). This contribution is primarily due to its size and the dominance of riparian vegetation and spotted owl habitat (Table 6~~).~~.)

Table 6: Average Ecosystem Service Values by Land Cover Types, Acres of Nevada County Land Cover Types, Total ESVs and Percentage of Total County ESVs

Cover type	Average total ESV/ac/yr	Acres	Sum of ESVs	% of County ESVs
agriculture	**$142**	6427	$912,692	0.2%
chaparral	**$15**	68654	$1,029,803	0.3%
forest (general)	**$350**	424400	$148,540,121	39.0%
grassland	**$165**	7810	$1,286,928	0.3%
oak woodland	**$144**	11218	$1,615,414	0.4%
open water	**$3,261**	11811	$42,336,762	11.1%
riparian owl habitat	**$3,215**	1077	$3,453,585	0.9%
riparian vegetation	**$2,985**	32821	$95,785,937	25.2%
spotted owl habitat forest	**$429**	10247	$4,396,133	1.2%
urban		27916		0.0%
urban greenspace	**$2,268**	18335	$41,584,608	10.9%
wetland	**$4,025**	10283	$39,692,329	10.4%
Total value			**$380,634,312**	

In sum, this assessment has provided the Fire Safe Council with a baseline analysis of ecosystem service benefits (albeit not used in the CWPP Core Team analysis~~).~~.) Future applications may build upon the current assessment so that the conservative baseline become further refined and broadened to reflect more ecosystem goods and services.[2] Figure ~~17~~24 demonstrates the distribution of ESVs throughout the County while Figure ~~18~~25 compares and contrasts the ESVs with structural/parcel improvement values (both normalized across the County).

[2] For instance, if grey-scale literature with valuations studies were included, we might have ESV values for some of the land cover types not included in the peer-reviewed literature.



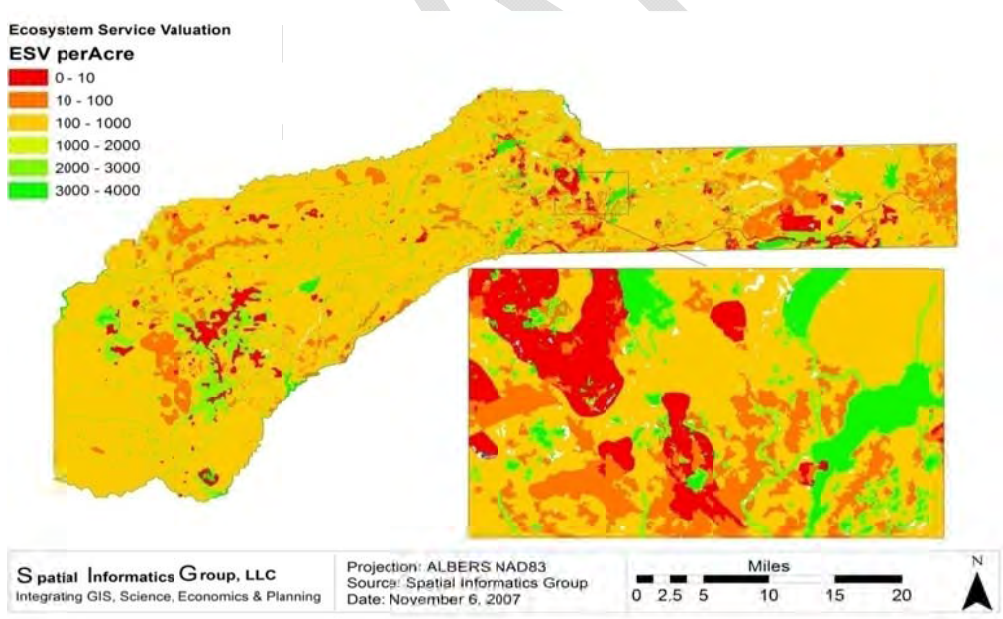


Figure ~~17~~24: Nevada County Average ESVs per Acre (all values are in 2006 USD/acre/year)

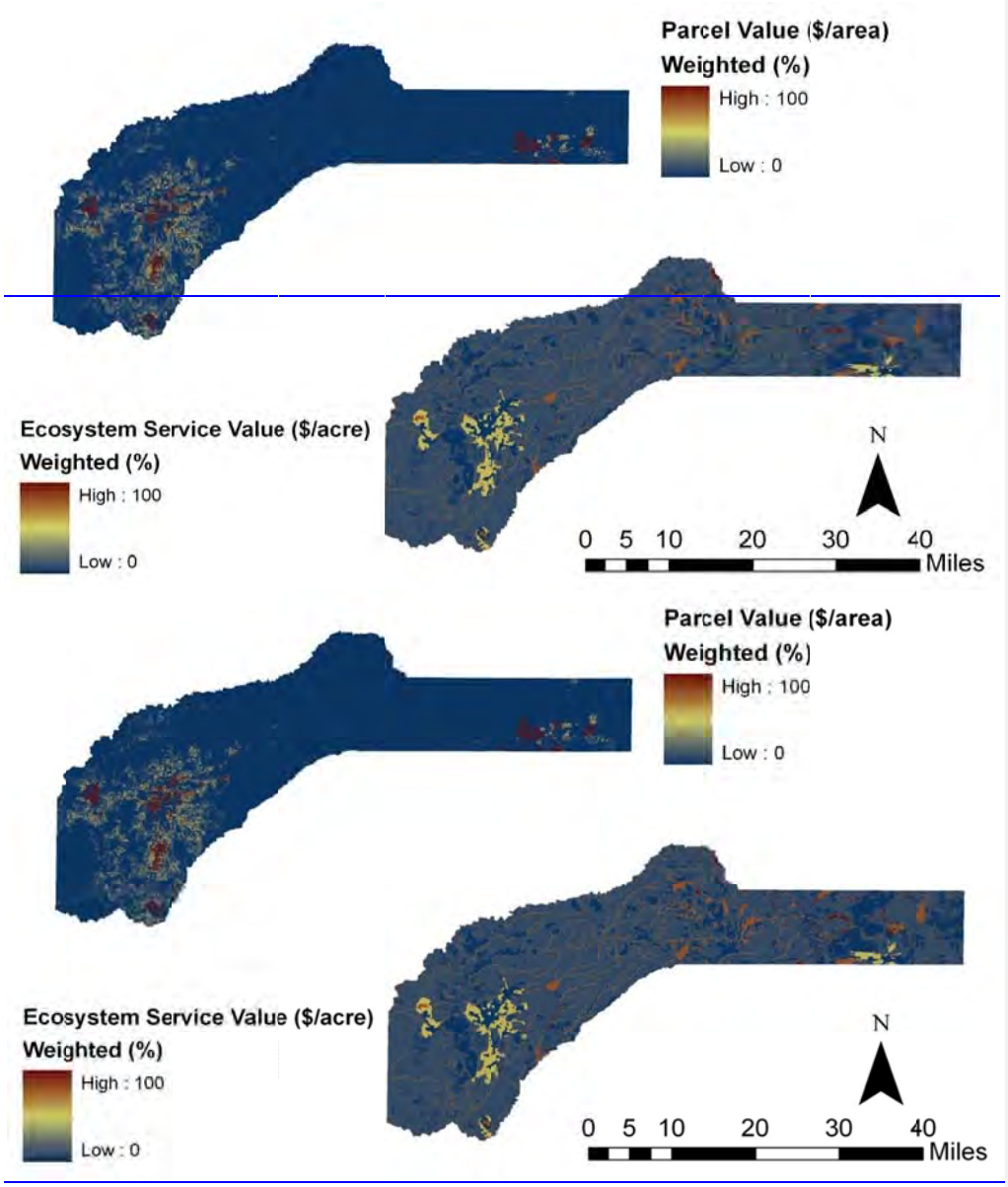


Figure ~~18~~25: Nevada County Comparison of ESVs and Parcel Values

5.0 CONCLUSIONS

5.1 Mitigation Action Plan

There are three main categories of mitigation actions identified by the CWPP Core Team. Categories include fuels reduction, Firewise Community education and outreach, and fire prevention and suppression in the WUI area. Recommendations are organized into categories but are not listed in order of priority. Rather, each project type identified is of equal value to the community and should be performed in concert with one another for maximum effectiveness in achieving the stated objectives.

Fuels Reduction

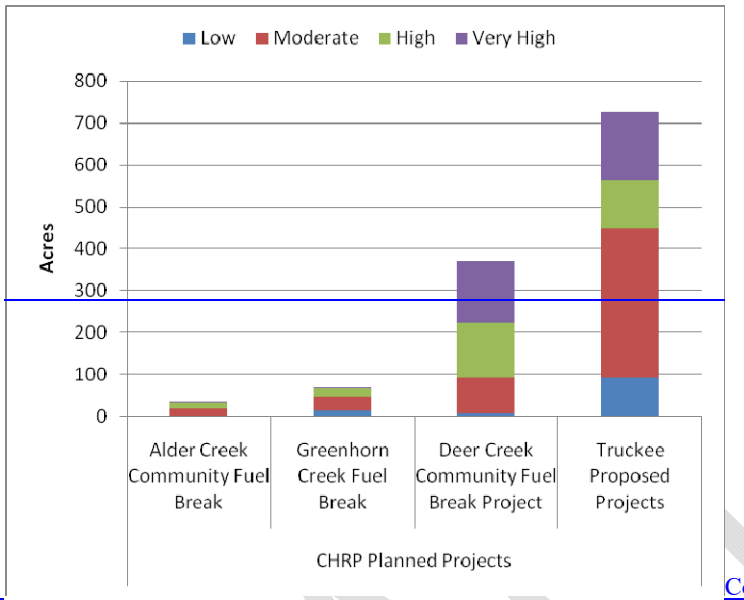
1. ~~Implement~~Continue the "Nevada County ~~Fire Safe~~Firewise Communities" recommendations within a minimum distance of 100 feet of all private homes and essential infrastructure. Actions include the establishment ~~of~~and maintenance of effective defensible space, adequate turn-around space for emergency equipment, and clear, consistent address signs. ~~Work~~Continue to ~~obtain~~work with individual homeowners associations, road associations and neighborhoods to achieve the ~~firewise communities~~National Fire Protection Association's *Firewise Communities/USA*® designation for all of Nevada County through the implementation of the goals of this CWPP.
2. Continue to offer free chipping services (see Appendix ~~F). Encourage the County~~G) through grant funds to ~~acquire~~incentivize landowner's fuels reduction efforts on their own properties. The FSCNC received a ~~smaller, mobile~~USDA Forest Service grant to purchase a chipper~~(s) that can be used by the Fire Safe Council and constituents in the CWPP area~~ to dispose of brush generated through fuels reduction efforts rather than burning. The reduction of material going to landfills and improving air quality is the objective. ~~BLM has recently purchased such a chipper and is willing to coordinate with the County, the Fire Safe Council, and other parties to make sure that it is used effectively.~~
3. Identify ~~and,~~ develop ~~sites~~and pursue grant funding for locations for the short-term collection of material generated from fuel reduction efforts on private land see (Appendix ~~F~~G Defensible Space Chipping Program~~).~~.) The use of multiple temporary collection sites will allow for easier access for home and landowners throughout the County and provide more time for ground work rather than transporting material to the regional transfer station. Work with Nevada County government to permit sites at no or low cost as part of the public fire safety partnership.
4. Identify extreme hazard sites and work with landowners and communities to reduce fuel loads of these sites to improve safety for an entire area. Much of this effort may be accomplished through the development of a certified Firewise Community.
5. Treat vegetation along roads and driveways to improve site access and ~~fire fighting.~~firefighting capabilities. This ~~can~~may include shaded canopy defensible space on both sides of the roads.
6. Implement fuels reduction on strategically located areas that will have the greatest benefit for the entire County. The objective of the proposed CHRP projects are to help reduce

the potential of a wildfire moving from public to private lands and vice versa across the landscape. ~~Particular attention will be placed on the Truckee Donner area along the Highway 80 corridor (protecting the Northwoods Community), as well as the Deer Creek watersheds (see Appendix G for project descriptions). Alder Hill and Greenhorn Creek were also identified as critical CHRP projects by the Fire Chiefs' Evaluation (Section 3.4). For BLM lands, particular attention will be given to maintain the Lake Ridge and Purdon Fuel breaks, defensible space around the Grizzly Hill School, and maintaining the Burlington prescribed fire area.~~

~~As Table 7 below shows, these projects are compatible with the analysis performed in this CWPP with a significant number of acres within the very high and high CHRP index. Of the four currently planned projects, the priority goes to the Truckee and Deer Creek projects (Figure 19).~~

~~Table 7: Total Number of Acres within Projects Completed and CWPP Proposed Projects with Number of Acres in CHRP Index Classes~~

Area (Acres)			CWPP Fire Hazard Class				
PRJ_STATUS	PROGRAM	PROJECT	Low	Moderate	High	Very High	Grand Total
Completed Projects 1944 - 2007 (not complete dataset)			10,590	27,752	27,601	14,964	80,907
Planned	BLM Planned Follow-up Projects	Burlington Rx burn	2	28	76	0	106
		Grizzley Hill School Fuels Reduction Project	21	93	69	8	191
		Lake City Ridge Fuel Break Maintenance Project	9	56	12		77
		~~Purdon~~	~~0~~	~~5~~	~~9~~	~~20~~	~~33~~
	CHRP Planned Projects	Deer Creek Community Fuel Break Project	8	84	131	148	371
		Truckee Proposed Projects	93	357	113	165	727
		Alder Creek Community Fuel Break		20	16	0	36
		Greenhorn Creek Fuel Break	14	33	23	1	72
Planned Total			147	675	449	342	1,612
Grand Total			10,736	28,427	28,050	15,306	82,520



7. Conduct periodic inspections of past fuels reduction projects for necessary maintenance is critical for long term viability and retention of the desired condition for fire mitigation. Sending periodic maintenance reminders to those participating in grant funded fuel reduction projects to notify them of their agreement to retain the treatment prescription.

~~Figure 19: CWPP Proposed Projects Total Number of Acres within CHRP Index Classes~~

~~7.~~8. Encourage the USFS and the BLM to continue current fuels reduction activities at the landscape scale with an emphasis of restoration of low intensity fire regime and creating strategic fuel breaks that will enhance local fire suppression efforts and utilize "natural" fuel breaks where feasible (such as orchards, ridgetops, highways, rock outcrops and irrigated pastures~~).~~.)

~~8.~~9. Encourage the consideration of the CWPP Hazard Reduction Priorities in ~~the USFS Tahoe National Forest 5-year Action Plan and Forest Plan Revision process~~agency partner planning efforts as ~~it is~~they are amended in the future. Encourage similar activities on other ~~state and federal~~public lands adjacent to private ownership within the CWPP area as the risk assessment and prioritization process continues.

~~9.~~10. Encourage similar activities within the Truckee area in coordination with the Placer Fire ~~Safe Council~~Alliance so that there is a comprehensive strategy for the entire Truckee Fire Protection District. Include the currently developing Truckee CWPP into the Countywide CWPP document as an appendix upon its completion and approval.

~~10.~~11. ~~Develop and~~Identify, maintain or develop safe areas, shelters, and staging locations as a base for ~~fire fighting~~firefighting operations. ~~Investigate whether~~Educate the ~~shelter-in-place concept is relevant~~public about the need for ~~this climate and fire~~

~~behavior. Potentially test its application in one community in the central Sierras before advocating its larger use (Example: Alta Sierra Two community currently being built as a~~ early evacuation once orders are given. Also educate residents about the potential ~~"Safe Zone"~~ for ~~sheltering through a large conflagration).~~"fire entrapment" and the steps they may take to identify safety zones, or in the event fire has blocked the evacuation route, to shelter in place to help residents survive a catastrophic wildfire.

~~11.~~12. Encourage adjacent landowners and agencies to perform complementary treatments on their land ~~by being more involved~~through ongoing collaboration in the public planning process and inviting neighboring private landowners to participate in Fire Safe Council meetings~~ to be held locally.~~.

~~12.~~13. Ensure that current regulations governing fuel reduction and road maintenance along creeks, wetlands and lakeshores will be ~~compiled and made available through this CWPP implementation process. If regulations would prevent necessary vegetation management, community members will work with agencies for waivers or special standards.~~ adhered to and made available to interested parties. All fuels treatments will adhere to California Forest Practices Rules and all CEQA requirements for private lands and the NEPA for public lands.

~~13.~~14. ~~Investigate~~Continue to pursue biomass conversion technology for opportunities to implement biomass utilization ~~technology~~ in the CWPP area and ~~regionwide~~region wide as part of fuel reduction projects with neighboring Fire Safe Councils and federal partners. The Nevada County Biomass Task Force completed the Biomass Feasibility Study in 2014. A planning grant is currently underway to permit and conduct site planning for a small community scale gasification technology biomass utilization energy facility. The FSCNC serves as the fiscal sponsor for these efforts.

~~14.~~15. Encourage the USFS and BLM to use active forest management practices to accomplish fuels reduction projects. The means the removal of biomass materials through viable commercial means (through stewardship contracts or timber sales~~).~~.) Through active forest management, the removal of commercial timber products will have the added benefit of generating revenues to help ~~off set~~offset the costs associated with fuel reduction projects. The focus should be on reducing surface fuels, breaking-up ladder continuity, and improving the health and vigor of the remaining stands through active forest management.

Education and Outreach

1. Continue to ~~have a Nevada County~~convene the Fire Safe Council Education Committee to review appropriate education and outreach opportunities throughout the County and to network with the numerous Firewise Communities for best practices.
2. Conduct Firewise risk assessments of individual structures through the volunteer based *Defensible Space Advisory Visit Program.* Also provide Firewise Communities/USA® Hazard Assessments for residential neighborhoods and essential infrastructure for the entire planning area and implement identified recommendations.
3. Utilize ~~existing billboards on highway to~~social media such as the FSCNC website, Facebook page and Twitter account to provide fire-related information such as Red Flag warning days, fire danger level, burn ban regulations, informational messages or reminders (i.e., "No campfires" or "Use your ashtray"~~), and/or what to do if smoke or a~~

~~fire is detected. (i.e., "Report signs of smoke or fire immediately – Call 911".~~" "One Less Spark – One Less Wildfire"), and/or work with other agencies to establish a catchy slogan that people can easily remember to motivate people to think of fire safety. One such slogan developed by the FSCNC Education Committee and Firewise Communities volunteers is the "Don't Burn Down Our Town!" campaign. These posters are used by residents to post at trail heads and sites of known illegal camping to focus attention on "hot sparks and illegal campfires put everyone at risk" with some success.

4. Continue to compile essential "Fire Safe and Firewise" information and distribute it to landowners in and adjacent to the Nevada County CWPP area (such as the Placer County neighbors in Truckee~~).~~.) Information presented should cover landowner responsibilities and residential security options (i.e., creating defensible spaces and fire breaks, "Fire Safe" construction materials, etc.), and individual preparedness (i.e., how to create a ~~Personal Emergency Action~~Family Evacuation Plan and kit, what to do and what not to do in the case of a wildfire, etc.).
5. Participate with Forest Service opportunities. Community members will work with the Forest Service to pursue fuel treatments on private lands that complement adjacent federal and state fuel reduction efforts. Opportunities to incorporate cooperative agreements to implement strategic treatments on the landscape scale as opposed to individual efforts which increase cost and reduce efficiency will be pursued. In the event agencies cannot avail themselves of particular grant resources, consider facilitating funding opportunities by FSCNC serving as the non-profit fiscal sponsor.
6. Along with Federal lands, County and State agencies like CALFIRE and California Fish & ~~Game~~Wildlife should be encouraged to work in conjunction with federal and private landowners. When possible, design and implement joint projects or work that work within management objectives of these partnering agencies. Specifically, identify those parcels where appropriate fuels reduction projects compliment the overall fuels reduction strategies for the area. The new NRCS funding for the countywide base map will fulfill this objective once complete.
7. Provide information to non-residents who own property and/or vacation homes of steps they can take to reduce the threat of fire to their homes and property, especially since their non-action places their neighbors' lives and properties at risk. Promote the use of the Firewise Community 30-Day Courtesy Notice to engage landowners with the Firewise effort and provide absentee landowners specific direction on what needs to be accomplished. Provide the FSCNC licensed contractor list on the website for pre-screened, local contractors to get the work done.
8. Continue to highlight the Tahoe-Donner Association fuel management work by in-house forester and Core Team member, Bill Houdyschell, as an effective means of community education and landowner/ HOA responsibility. Following the Angora Fire near Lake Tahoe in 2007, the Tahoe-Donner Association began inspecting individual properties for compliance with Public Resource Code 4291. The first year they completed approximately 25% of the community and continue rotating through the community even after all have been initially contacted to highlight the importance of maintenance.
9. Coordinate and partner with Nevada County Office of Emergency Services to develop and produce emergency preparedness and evacuation ~~route maps~~ guides for the general public as well as at the community level ~~and coordinate with the County Public Works Department. Provide~~. Community level guides can provide specific maps of primary

and potential alternate emergency evacuation routes and how to register cell phones for emergency ~~contact information~~notifications to landowners in the CWPP area.

10. ~~Work~~Promote educational outreach with the Nevada County Building Department to provide fire-rated building materials information to developers and home builders during the permitting process.
11. Continue GIS efforts to provide online information to residents and non-residents using the CHRP Index ~~and Current and Planned Fuels Projects (Figure 16).~~, Firewise Communities locations, and fuel reduction projects. The purpose of this interactive website is ~~purely~~to empowering local communities to view the larger context~~.~~ of the FSCNC and partner efforts. It ~~would~~will be designed so that home owners can see how individual defensible space fits into the larger context of landscape-scale community protection efforts. ~~A suggested home for such an on-line system would be UC Berkeley's Center for Fire Science and Outreach, although some funding would be needed for server upkeep and maintenance.~~

Improving Protection Capabilities/Human Safety

1. Emergency Safety Issues
    - ~~Address coordination~~
    - ~~Road signs~~
    - Proper and visible address signage (4 inch reflective numbers recommended pursuant to California Fire Code standards) for emergency responders
    - Proper and visible road/street signage (4 inch reflective letters recommended pursuant to California Fire Code standards) for emergency responders
    - Effective ingress/egress evacuation escape routes
    - Work with the County of Nevada to develop warning systems and safe escape routes, including the following:
        1. Mark exit routes on maps ~~(OES and Emergency Management may already have).~~, such as the community-based evacuation plans developed for specific areas (see Appendix H.)
        2. ~~Make~~Recommend directional emergency exit signs (which may require State and County OES involvement) so that in the event of a fire, these signs can be used by Homeowner Associations and other community groups. Lake of the Pines Firewise Community has created these signs and have also conducted an Emergency Evacuation Drill and Poker Run as part of their Firewise Education Day event to help highlight alternate evacuation routes within this private, gated community where most residents routinely use the security gate entrance on a daily basis.
        3. ~~Procure and install warning sirens.~~
        4.3. ~~Contact~~Continue partnerships with local radio ~~station~~stations and YubaNet.com for ~~possible help with~~ assistance in communicating emergency information~~.~~ to the public.
        5.4. ~~Make signs saying~~Include information on where to obtain information in case of ~~emergency,~~ emergencies, such as tune your radio to appropriate emergency information~~.~~ news outlets (radio/internet.)

6. Continue localized efforts for creating community based evacuation plans such as those currently being develop updated and revised for Alta Sierra and Cascade Shores Evacuation Plan (see Appendix G).

2. Obtain portable pumping stations for fire fighting efforts. These stations allow flexibility for use during fire events as they can be moved from site to site.

3.2. Continue fuel reduction efforts along County roadways in coordination with the Nevada County Public Works Department and/or California Department of Transportation (CalTrans).) The CWPP should prioritize roadways for fuel reduction actions as per its level of use by the county residents (Rod McConnell, personal communication, October 17, 2007). Neighbors should also be encouraged to organize their own clearing projects (these might include driveways and clearing along non-countyprivately managed roads). The Fire Safe Council and the Nevada County Consolidated Fire District should collaborate on roadway projects with neighbors and landowners.) Mitigation actions should improve accessingress/egress for fire equipment and evacuation for residents while maintaining and enhancing the neighborhood's sense of place and aesthetic value.

4.3. Fuel reductionPromote fuel reductions along "primitive" roadways. Nevada County has established road standards , conditions of design and construction. However, many of the rural roads in the County are classified as "primitive" (Warren Knox, personal communication, October 2007).". These primitive roads can be steep, narrow, dead-ended, and seasonal or in some other way limit access to fire-fighting equipment. The considerable expense of upgrading these roads means that most will remain primitive for the foreseeable future.

4. DevelopPromote the Nevada County Hazardous Vegetation Management Ordinance to address the lack of defensible space across property boundaries where home sites are threatened by neighboring properties hazardous vegetation. The goal is for all homes to have effective defensible space (minimum 100 feet in all directions of structures) and a safe working environment for firefighters.

5. Work with agency partners and individuals to assess additional roads that canmay be used to evacuate during an emergency.
   - Specific attention has been requested by FONA for certain communities in and around Nevada City which have limited access.
   - CoordinatedSeek an effort between those areas of concern and the Nevada County Public Works Department and/or California Department of Transportation (CalTrans).)

6. The Fire Safe Council and the Nevada County Consolidated Fire District should collaborate with neighbors and landowners in order to develop fuel reduction plans and to inform the residents on the level of service they should expect. The Fire Safe Council and the Fire District are encouraged to try to accommodate the many special circumstances found on primitive roads in the Nevada County area, including promoting stewardship contracts for those road areas within federal jurisdictions. Also, there may be specific landowners who will provide safe zones and/or turnarounds for fire fighters and equipment.

5.2 Monitoring and Evaluation

Using this Nevada County CWPP (in conjunction with the HFRA), the USFS, BLM and other agencies will be able to allocate their federal dollars to specific fuel treatments based upon weighing the potential benefits from a treatment against cost. This CWPP has produced a baseline wildfire damage probability under a no-treatment scenario. The amount and probability of damages to both structures and environmental assets can be compared to the predicted amount and probability of damages under alternative treatment scenarios and net cost of treatment. Treatment scenarios can range from shaded fuel breaks, strategically placed land area treatments (SPLATS), or the breakup of fuel continuity around individual communities and homes. Well-designed treatments should result in lower burn probabilities as well as fewer burned acres when a fire does occur. Because these models are spatially explicit, the predicted fire perimeters can be overlain on the Nevada County baseline ESV and Community Base Map to estimate what the extent of damage would be under each scenario. For each scenario, including the baseline, then, the cost of treatment (zero in the case of the baseline) can be compared to the probability of fire multiplied by the estimated damage from each fire. This can be a valuable tool for communities in the Urban/Wildland Interface as they engage in wildfire protection planning and evaluate the best use of their grant money.

Outreach projects should have a realistic target number for performing the outreach and should have monitoring systems in place to measure the efficacy of the effort. The CWPP Analysis Team suggests four different types of evaluation.

1) Formative evaluation usually takes place during the planning phase of a communications project and provides information on the strengths and weaknesses of materials or initiative strategies.

2) Process evaluation takes place during the implementation phase of the outreach project and is used to assess whether the grant recipient(s) has conducted the tasks, procedures, and activities as originally planned.

3) Impact evaluation is used to determine the short-term effects of the program on the target audience(s), such as an increase in their knowledge and awareness levels or changes in attitudes or behaviors.

4) Outcome evaluation assesses the long-term results of the program, such as a decrease in numbers of acres burned in a particular watershed.

Developing an action plan and assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of the Nevada County CWPP. Such a strategy would include monitoring and evaluation of completed fuels reduction projects.

An often overlooked but critical component of fuels treatment is monitoring. It is important to evaluate whether fuels treatments have accomplished their defined objectives and whether there have been any unexpected outcomes. In addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions

of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform future management decisions.

Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students. The monitoring of each fuels reduction project would be site specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by project. Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it.

The most important part of choosing a monitoring program is selecting a method appropriate to the people, place, and available time. There are several levels of monitoring activities that meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. Based upon previous planning models that use principles of Participatory Action Research (Figure ~~20~~26), the CWPP Analysis Team recommends that there be adequate attention to incorporate the accomplishments of the CHRP projects. The process would include periodic revision of the CWPP priorities using the overlays generated in the Core Team analysis and additional community and stakeholder input from the various stages of implementation. This feedback mechanism is important in order to monitor the implementation of CHRP, adapt future projects accordingly, and ensure that the CWPP is maintained and adjusted for emerging threats and new priorities. They include the following levels.

~~**Figure 20: Participatory Action Research Planning**~~

- Minimum—Level 1: Pre- and post-project photos.
  Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.
- Moderate—Level 2: Multiple permanent photo points.
  Permanent photo locations are established using rebar or wood posts, and photos are taken on a regular basis. Ideally, this process would continue over several years. This approach might be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments.
- High—Level 3: Basic vegetation plots.
  A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percent cover, and frequency; monitors then can record site characteristics such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols

based on the types of vegetation present and the level of detail needed to analyze the management objectives.

- Intense—Level 4: Basic vegetation plus dead and downed fuels inventory. The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974) or an appropriate photo series (Ottmar et al. 2000) or FIREMON plots.

This Nevada County CWPP makes recommendations for prioritized fuels reduction projects, improved education and outreach and improved human safety**.** However, each fuels reduction or homeowner education project/program will be unique and will require distinct steps to complete the identified tasks. The tasks will be further identified as the projects begin to take place. On-the-ground implementation of the recommendations in the CWPP will require development of an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing highest priority projects (SAF 2004~~).~~.)

5.3 Plan Updates

The CWPP Core Team and the Fire Safe Council will be responsible for monitoring existing projects and proposing and prioritizing future projects aimed at wildfire prevention and protection in the Nevada County CWPP. Members of this committee will take on the task of coordinating with outside groups and agencies to investigate, write, and submit future grants. This group is also responsible for partnering with appropriate agencies to review and update this CWPP ~~on a timely basis~~ under the direction and assistance of the Fire Safe Council of Nevada County and with assistance from state and federal land managers. Similarly, local counterpart plans may need facilitation skills to update their plans in concert with the CWPP updates (such as the North San Juan Community Fire Plan~~).~~ which is being updated in 2016.)

As the needs of community members shift or environmental conditions change, the CWPP will need to be modified. While a specific timeline for updating the plan has not been determined as part of this document, the Core Team should continue to communicate after the plan is completed to discuss the best method for making revisions to reflect changing conditions. The HFRA allows for maximum flexibility in the CWPP planning process, permitting the Core Team to determine the time frame for updating the CWPP. ~~While it is suggested that the spatial layers and the CHRP projects be revised at least once a year (typically during the grant application cycle), it is more reasonable for the monitoring and maintenance plans to be updated every five years (in a collaborative manner with the timing of USFS Tahoe National Forest 5-year Action Plan and Forest Plan Revision process).~~

5.4 *Funding Sources*

As part of the CWPP implementation process, the Core and Analysis Team have identified the following potential sources of funding:

Federal and State

~~Fire Safe California Grants Clearing House~~
~~Sierra Nevada Conservancy~~
~~Prop 40~~
~~Title II and Title III~~
~~FEMA Disaster Mitigation Grants~~
~~CDF WUI Grants~~
~~Nevada County Board of Supervisors~~
~~Nevada County Fire Districts~~
California Disaster Assistance Act (CDAA)
~~Fire Corps~~
Federal Title II and Title III
FEMA Disaster Mitigation Grants
Fire Safe California Grants Clearinghouse
Nevada County Board of Supervisors
Nevada County Local Fire Districts
Proposition 1
Proposition 40
Sierra Nevada Conservancy
Stevens Act
Western States Wildland-Urban Interface Grants

Federal Funding Database
~~http://ric.nal.usda.gov/nal_web/ric/ffd.php~~
http://ric.nal.usda.gov/nal_web/ric/ffd.php

Private

Action Without Borders
Charles Stewart Mott Foundation
Community Foundation Finder
Council on Foundations
First Nations Development Institute
~~The Ford Foundation~~
~~The Foundation Center~~
~~U.S. Endowment for Forestry and Communities~~
~~Pacific Gas and Electric~~
~~The Foundation for Rural Education and Development~~

~~Action Without Borders~~
Local Initiatives Support Corporation
~~Network for Good~~
~~Charles Stewart Mott Foundation~~
National Rural Funders Collaborative
Network for Good
National Forest Foundation
Northwest Area Foundation
~~The Pew Charitable Trusts~~
Pacific Gas & Electric
Private Insurance Companies
Rural Community Assistance Corporation
The Ford Foundation
The Foundation Center
The Foundation for Rural Education and Development
The Pew Charitable Trusts
The W.K. Kellogg Foundation
U.S. Endowment for Forestry and Communities

5.5 List of Contractors

A list of resource professionals and vegetation management contractors is maintained by the Fire Safe Council of Nevada County on their website at ~~www.firesafecouncilneveo.com.~~www.areyoufiresafe.com. Information on how to hire a contractor is also provided to assist landowners in working to complete and understand the various types of treatments, costs associated and effective duration for wildfire mitigation. Certain types of treatment require a license while others do not. Landowners are encouraged to carefully plan their project in order to obtain the ~~desire~~desired condition from the treatment without unintended consequences by seeking education and advice prior to implementing their project. Additional resources may be located through yellow page phone book listings and local newspaper advertisements.

5.6 Potential Next Steps

In evaluating the CWPP and CHRP planning process, the CWPP Analysis Team has come up with a list of potential next steps that would enable the County and the Fire Safe Council to further assess the efficacy of their programs and to integrate the lessons learned from this assessment into future monitoring and evaluation systems.

In addition to the Mitigation Plan, there are a number of areas for future research and analysis in the realms of ecosystem service valuation and decision support for Nevada County. First, it is critical to improve the quality of spatial and valuation data and the coordination of all fuels mitigation efforts throughout the County. In order to improve the quality of spatial valuation data, the land cover typology needs to include more precise land cover classes (e.g. breaking down forest type by each successional stage). This would broaden the typology to include classes that may not be present in the three study areas and add valuation studies to the database estimate values for the resulting new land cover classes. Lastly, it is possible to develop an automated approach for incorporating data from short-term and long-term monitoring projects directly into a coordinated system between CALFIRE (CFIP), BLM, NRCS (EQIP~~), BLM,~~) USFS and the RCD (which hopefully will integrate Fire Safe Council projects as contributions~~).~~) This objective is currently being pursued through a grant from the NRCS to develop a comprehensive countywide base map. Data layers, slope/aspect, topography analysis tools have been provided by the USFS to aid in the completion of this project. A special thanks to volunteer, Alan Doerr, a GIS Specialist retired from the Tahoe National Forest who has volunteered to assist with this effort and mentor staff at the FSCNC to utilize this system for analyzing projects in the 2016 CWPP update.

~~Further, the Analysis Team hopes to develop a decision support system integrating a series of automated modules. Ideally, this system would integrate existing fire models, such as the research by the Center for Fire Science and Outreach, and would allow for the calculation of probabilities of fire damage under current and alternative scenarios. Scenarios could include different types of vegetative treatments, different estimated suppression responses and different development patterns. The predicted damage from each fire scenario could then be estimated by calculating loss to market values, like structures, timber, and crops, as well as ecosystem services. Calculating market values is simply a matter of obtaining the necessary data. The NaturalAssets™ Information System would be used to calculate the opportunity cost of the lost ecosystem service values. Utilizing these estimates of forgone benefits in the event of fire, the probabilities of occurrence, and the costs of treatments under each scenario, the Analysis Team can then test the cost effectiveness of each treatment type.~~

~~In summary, outlined below are the potential next steps for the integration of ecosystem goods and services and the CWPP coordination.~~

~~Ecosystem Goods and Services~~

1. ~~Further refine the NaturalAssets™ information system and broaden the literature review to reflect more ecosystem goods and services.~~
2. ~~Integrate the ESV layer that the Analysis Team has generated for Nevada County into the County GIS system so that all County agencies can have the benefit of this planning layer.~~
3. ~~Re-evaluate the baseline assessment in five years' time within the County to see if there has been a change in ecosystem goods and services based upon the most up-to-date land cover data.~~
4. ~~Request that all fuels reduction projects submit a map of the project's footprint or sphere of influence (for instance, chipping programs may have a larger sphere than individual parcel defensible space). If this is done using GIS, request that the original datafile of the footprint or sphere of influence is also submitted. For those that do not have this capability, request that they send a USGS quad with their project's treatment footprint and sphere of influence.~~
5. ~~Build a decision support system integrating the CHRP and ecosystem services analysis provided in this CWPP that allows for the calculation of probabilities of fire damage under current and alternative fuel management scenarios.~~

CWPP Coordination

- *Plan Coordination*

  The County fire plan and the CWPP should proceed in parallel with one another. Language in the County's General Plan Safety Element (Goals, Objectives, and Policies Goal FP-10.9, 10.10 and 10.11) inherently links the CWPP into its goals, objectives and recommendations plans to benefit from one another under the Healthy Forest Restoration Act of 2003. Efforts to maintain the coordination between these two plans will require that the Nevada County Planning Department take an active role with the Fire Safe Council as the CWPP's CHRP projects are implemented, monitored, and the plan annually updated.

- *GIS Fuels Treatment Coordination*

  The regional RCD has initiated an effort to collect GIS data to create a regional database to integrate resource conditions with future strategic fuel/forestry planning efforts. The RCD GIS coordinator is working with each RCD, USFS, CALFIRE, BLM, Sierra Nevada Conservancy, Fire Safe Councils, State Parks, and others to generate a similar layer to what was described in Section 4~~ (Figure 16).~~. This task will focus on the region-wide Fire Threat datasets to increase fuel management efforts at a more local level. Within the region, public and private lands have benefited from fuels reduction projects such as defensible space, shaded fuel breaks, chipping programs, farmland planning, and other forest health and vegetation management programs. These programs have reduced the threat of catastrophic wildfire to watershed resources. Mapping where landscape treatments have occurred under these various programs with statewide Fire Threat datasets will help agencies and communities identify and prioritize future projects, quantify treatments, and increase coordination of multiple agencies focused on common goals. ~~In order for the CWPP to continue to coordinate with its county, state and federal partners, it will need to share resources and updates of the CWPP.~~

5.7 Conclusions

The Nevada County CWPP 2016 update was developed to meet the requirements of a CWPP as specified in the Healthy Forest Restoration Act. The CWPP addresses how to prepare for wildland fire throughout Nevada County and assesses the risk of this type of fire event creating damage to communities in Sierra WUI areas. The planning process emphasized public participation and collaborative planning among federal, state, county, and local governments and other contributing agencies. Organizations and stakeholders were contacted through

local mailings and encouraged to participate in plan development by submitting comments at ~~one of the~~ public meetings ~~or by use of the Sharepoint CWPP site~~.

The net benefits to society are captured in a total estimated value associated with each land cover type. In this assessment, the market values of structures have been included, and we recommend the inclusion of other market values in future uses of the proposed cost-effectiveness analysis. Irrespective of the kind of fuel hazard reduction treatment performed (and the costs associated with them), by accounting for these market and non-market assets, there is a net benefit to society. This document makes recommendations for including market and non-market assets in evaluating the efficacy of fuels reduction treatments. It also provides some suggestions for educational outreach activities and the reduction of structural ignitability within Nevada County's communities. The recommendations are based on the fire risk assessment, identification of the CHRP, and comments from community members, and are general in nature to provide high levels of flexibility in the implementation phase. The goal of the CWPP is to reduce the risk for catastrophic wildfire in Nevada County by providing specific information regarding what is most at risk and how to protect these areas and community values. The protection strategy includes treating adjacent US Forest Service and Bureau of Land Management lands and collaboratively planning for wildfire protection. The CWPP is a living document and should be revised as environmental conditions change or social issues arise.

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Appendix A: Firewise Communities/USA® in Nevada County

CERTIFIED FIREWISE COMMUNITIES ASSISTED BY THE FIRE SAFE COUNCIL OF NEVADA COUNTY
As of March 30, 2016

Lake Wildwood Homeowners Association (2007) Pop= 5,800
Phyllis Guerwitz, Environmental Management Office
11255 Cottontail Way, Penn Valley, CA 95946
(530) 432-0633

Lake of the Pines Association (2009) Pop=4,996
Gordon Mann, LOP Firewise Committee Chairman
11665 Lakeshore North, Auburn, CA 95602
(530) 268-0135

Mountain Lakes Estates Homeowners Assn. (2010) Pop=96
Charlie Babiarz, Fire Safety Committee Chairman
12609 Mindy Lane, Nevada City, CA 95959
(530) 470-8964

Friends of Banner Mountain (2010) Pop=2,000
Chuck Staetz, President
12830 Quaker Hill Cross Road, Nevada City, CA 95959
(530) 798-6510

Tahoe-Donner Association (2010) Pop=18,500
Bill Houdyschell, Registered Professional Forester
11509 Northwoods Blvd., Truckee, CA 96160
(530) 587-9432

Greater Cement Hill Neighborhood Association (2012) Pop=600
Susan Wiesner, Chair
PO Box 2120, Nevada City, CA 95959
(530) 265-4824

Serene Lakes Property Owners' Association (2012) Pop=1,800
Bill Kirkham, Firewise Chairman
6600 Twin Cities Road, Elk Grove, CA 95757 (Placer Co.)
(916) 813-1638

Greater Alta Sierra Firewise Community (2012) Pop=8,250
Peter Beesley, Chair
21540 Oak Ridge Drive, Grass Valley, CA 95949
(530) 274-9430

Golden Oaks Homeowners Association (2013) Pop=75
Debbie Porter, Association President
10701 Sharmiden Way, Grass Valley, CA 95949
(530) 268-0248

Rattlesnake Ridge Estates (2013) Pop=30
John Parry, Firewise Committee Chairman
14583 Silver Pick Court, Grass Valley, CA 95945
(530) 263-0134

Ridgeview Woodlands Homeowner's Association (2014) Pop=45
Mike McLean, Fire Safety Chairman
10571 South Ponderosa Way, Rough & Ready, CA
(530) 273-535

Cascade Shores Homeowner's Association (2014) Pop=1,000
Joan Hardy, Coordinator
12864 Spanish Lane, Nevada City, CA 95959
(530) 470-0196

Glenwood-Maidu-Charlene Neighborhood (2014) Pop=175
Jerry Henderson, Chair
446 Glenwood Road, Grass Valley, CA 95945
(530) 554-1366

Rattlesnake Neighborhood Association (2014) Pop=275
Kathy Piper, Chairman
Grass Valley, CA 95945
(530) 273-1271

Toller Ridge Court (2015) Pop=32
Dennis Davis, Chairman
10014 Toller Ridge Court, Nevada City, CA 95959
(530) 913-7844

Stonebridge Homeowners Association (2015) Pop=70
Dave Hood, Chairman
10711 Murchie Mine Road, Nevada City, CA 95959
(530) 265-9150

Greater Champion Neighborhood Association (2015) Pop=828
Sam Gitchel, Chairman
265 Giles Street, Nevada City, CA 95959
(530) 265-1949

Brunswick East Condominiums
REPORT COMPLETE – ACTION PLAN PENDING
Charles Hart, Chairman
563 Brunswick Road, Unit #4, Grass Valley, CA 95945
(530) 470-0639 (Hart)

The Gazebos
REPORT & ACTION PLAN COMPLETE – ED DAY PENDING
Dorothy Cain, Chair
127 Windsor Lane, Grass Valley, CA 95949
(530) 274-7826

Lower Colfax Firewise
FIELD ASSESSMENT COMPLETE – REPORT PENDING
Dario Davidson, Chair
14041 Agony Hill Road, Grass Valley, CA 95945
(530) 477-5509

Sherwood Forest Firewise
FIELD ASSESSMENT COMPLETE – REPORT PENDING
Debie Ogden, Chair
12609 Friar Tuck Lane, Grass Valley, CA 95945
(530) 273-4241

WAITING LIST FOR FIELD ASSESSMENT
1. You Bet Neighborhood
2. Ananda Village, North San Juan
3. Darkhorse HOA, Auburn
4. Echo Ridge Community, Grass Valley
5. Lake Vera Road Association, Nevada City
6. John Born Road, Penn Valley
7. Foxwood Estates, Grass Valley
8. Wolf Creek Lodge Condos, Grass Valley
9. Greenhorn Road Association, Grass Valley
10. Ranch Road HOA, Rough & Ready
11. Sierra Knolls, Grass Valley

Appendix B: CWPP Core Team Members and Initial CWPP Analysis Team

CWPP UPDATE CORE TEAM MEMBERS	AFFILIATION	INITIAL CWPP ANALYSIS TEAM
~~Walt~~Bennitt ~~Bailey~~Gretchen	No Sierra Air Quality Mgmt Dist	David Ganz, Ph.D
~~Jim~~Bodde ~~Barrilleaux~~Jeff	Caltrans	David Saah, Ph.D
~~Geri~~Boyl ~~Bergen~~Bill	Homeowner	Austin Troy, Ph.D
~~Fred~~Cherry ~~Besch~~Mike	USFS	Katrin Maffroid, MS
~~Gary~~Close ~~Brown~~Chip	NID	Dennis Schuetzle, Ph.D
~~Mark~~Costella ~~Brown~~Tina	FSCNC	Tad Mason, RPF
~~Nicole~~ ~~Dorr~~		
~~Joanne~~ Drummond Joanne	FSCNC	
~~Kathleen~~ ~~Edwards~~		
~~Victor~~ Ferrera Vic	OES	
~~Tim~~ Foss ~~Fike~~Brian	Nevada County	
~~Gubera-~~		
~~Lori~~Griffis ~~Stengel~~Sean	Cal Fire	
~~Helene~~ ~~Hall~~		
~~Bill~~ Houdyschell Bill	Tahoe Donner	
~~Jim~~Jackson ~~Hurley~~Jason	NRCS	
~~Eric~~ ~~Jorgensen~~		
Knox Warren	~~Knox~~FSCNC	
~~Lynn~~Martinez ~~Larson~~Jerry	BLM	
~~Esther~~ ~~Mandeno~~		
~~Rod~~ ~~McConnell~~		
~~Brian~~ Mulhollen Brian	BLM	
~~Ryan~~Paulus ~~Murano~~Rob	FSCNC	
~~Bob~~Ruff ~~Rhodes~~Christopher	USFS	
~~Barbara~~Sweet ~~Rivenes~~Eric	Sierra Pacific Industries	
~~Tony~~Thane ~~Sims~~Donn	USFS	
~~Rick~~Wagner ~~Solinsky~~Donn	Fire Chief's Association	
~~Sheila~~Weston ~~Stein~~Hank	Nevada County	
~~Joe~~ ~~Straub~~		
~~Dave~~ ~~Stonum~~		
~~Phil~~ ~~Storms~~		
~~Gary~~ ~~Stoddard~~		
~~Alex~~ ~~Terrazas~~		
~~Chuck~~ ~~Thomas~~		

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~~Nancy~~	~~Weber~~	
~~Kevin~~	~~Whitlock~~	
~~Ken~~	~~Wilde~~	
~~Paul~~	~~Wilford~~	

Appendix ~~B~~C: Hazard Reduction Priorities Community Survey and Results

Nevada County Community Wildfire Protection Plan - Hazard Reduction Priorities Survey

Name: _____

Affiliation/ Organization: _____

For prioritizing fuels mitigation in Nevada County, what ranking on a scale of one to ten do you give the Fire Hazard Index? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

For prioritizing fuels mitigation, what ranking on a scale of one to ten do you give the major road corridors? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

For prioritizing fuels mitigation, what ranking on a scale of one to ten do you give the county infrastructure? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

Give the following features a value of importance from one to ten with ten being the most important to you? Feel free to explain why?

☐ Hospitals ☐ Cemetery

☐ Fire Stations ☐ Community Buildings

☐ ☐

Parks ☐ Schools ☐

Places of Worship ☐ Airports

For prioritizing fuels mitigation, what ranking on a scale of one to ten do you give the Nevada Irrigation District infrastructure? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

For prioritizing fuels mitigation, what ranking on a scale of one to ten would you give the parcel values? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

For prioritizing fuels mitigation, what ranking on a scale of one to ten would you give to the County's ecosystem goods and services? (circle one)

(Least) 1 2 3 4 5 6 7 8 9 10 (Most)

Would you like the CWPP facilitator, a core team member and/or the Fire Safe Council to contact you once the Hazard Reduction Priorities have been made?

Yes ☐ _____ No ☐ _____

Yes ☐ _____ No ☐ _____

If so, how would you like to be contacted (by phone or by e-mail)?

Phone/ E-mail: _____

If by phone what is the best time to reach you? _____ AM/ PM

FireSafe COUNCIL NEVADA COUNTY

154 Hughes Road, Suite 5
Grass Valley, CA
Phone: (530) 272-1122
Fax: (530) 272-3232
E-mail: fscnc@sbcglobal.net

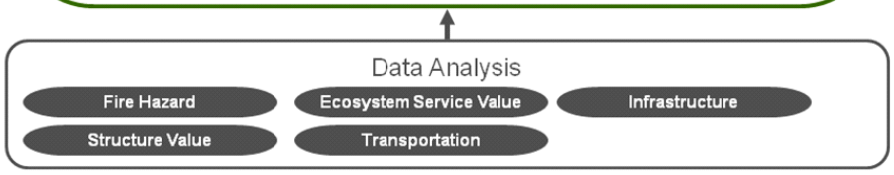
USF University of San Francisco

Spatial Informatics Group, LLC

tss consultants

Public Survey

Index	CORE	FIRE	FOREST	RESIDENT	UNKOWN
Hazard	9	7	8	8	9
Roads	9	8	5	8	7
Infrastructure	6	6	5	5	5
Airports	7	3	4	7	5
Cemetary	3	3	2	1	4
Community Buildings	6	6	5	6	6
Fire Stations	8	6	8	9	8
Hospitals	8	6	10	10	8
Parks	7	4	6	4	5
Places of Worship	4	5	4	3	5
Schools	6	6	9	6	7
NID	6	6	5	6	5
ESVs	6	4	9	7	7
Parcel Values	5	8	7	7	8



Fire Safe Council of Nevada County
PO Box 1112
Grass Valley, CA 95945-1112
(530) 272-1122
www.aryeoufiresafe.com

Public Survey

Index	CORE	FIRE	FOREST	RESIDENT	UNKOWN
Hazard	9	7	8	8	9
Roads	9	8	5	8	7
Infrastructure	6	6	5	5	5
Airports	7	3	4	7	5
Cemetary	3	3	2	1	4
Community Buildings	6	6	5	6	6
Fire Stations	8	6	8	9	8
Hospitals	8	6	10	10	8
Parks	7	4	6	4	5
Places of Worship	4	5	4	3	5
Schools	6	6	9	6	7
NID	6	6	5	6	5
ESVs	6	4	9	7	7
Parcel Values	5	8	7	7	8

Host

Data

Figure ~~21~~27. Hazard Reduction Priorities Community Survey Results Stratified into Five Groups

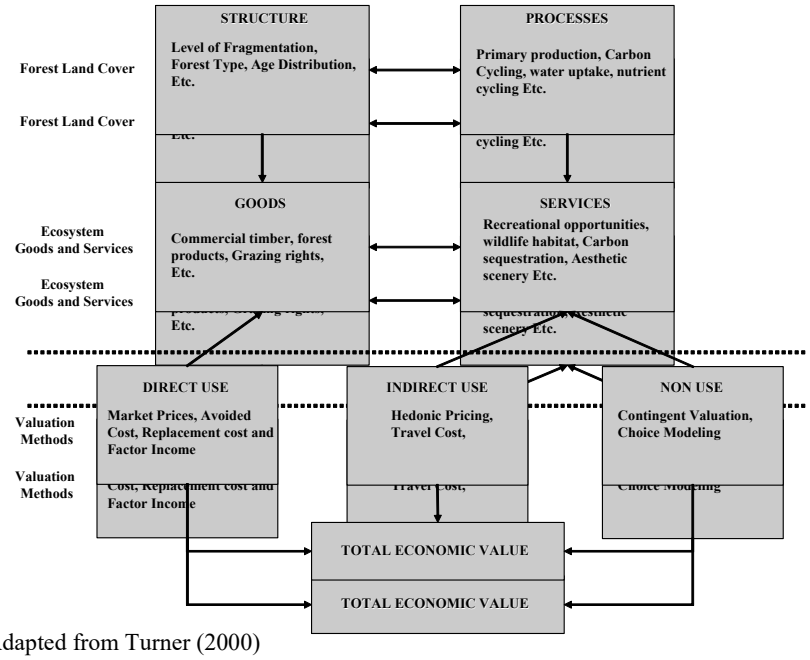
Groupings include the CWPP Core Team (Core), the Fire Chiefs that attended public workshops (Fire), the United States Forest Service and the Bureau of Land Management (Forest), the community participants (Residents) and an unknown/ anonymous category (Unknown).

Appendix ~~C~~D: *Ecosystem Service Valuation*

Economic valuation can help to ensure that ecosystem services that are not traded in markets and do not have market prices receive explicit treatment in economic assessments. The CWPP's goal is not to 'create' values for ecosystems. Rather, our purpose is to generate a conservative baseline estimate of the values that people already hold with respect to these ecosystems through an assessment of the best available literature. Such information will in turn assist in our assessments of the benefits provided by community assistance and hazardous fuels programs in California. This approach is consistent with that being taken in the international Millennium Ecosystem Assessment, which focuses international policy makers' attention on the contributions of ecosystems to human well-being (Argady *et al* 2005; Millennium Ecosystem Assessment 2003).

The Total Economic Value Framework

The *total economic value* (TEV) framework is based on the presumption that individuals can hold many different kinds of values for ecosystems in the study area ranging from *market-based* values like timber to *non-market* values like aesthetics and beauty (see Figure 22). It also provides a basis for clearer understanding of how the myriad values or benefits provided by ecological systems affect people. Although any taxonomy of such values is somewhat arbitrary and may differ from one use to another, the TEV framework is necessary to ensure that all values are given recognition (Bishop et al 1987).



* Adapted from Turner (2000)

Figure ~~22~~28: Total Economic Value Framework for Ecosystem Goods and Services*

The framework shown in Figure 22 distinguishes between *use* values and *nonuse* values associated with forest ecosystems. The former refer to those values associated with current or future (potential) market-based uses of an environmental resource by an individual or group, while the latter arise from the continued existence of the resource and are unrelated to use in the market place (Duffield 1997; Freeman 1993). Typically, use values involve some human interaction with the resource whereas nonuse values do not. Importantly, within this framework an individual can hold both use and nonuse values for natural ecosystems.

A number of TEV frameworks have been proposed in recent decades (Bishop *et al* 1987; Freeman 1993; Turner 2000). Although varied in detail and application, the distinction between market-based use and non-market, nonuse values is a fundamental theme. As the discussion below reveals, several alternative methods have been developed to measure non-market components of TEV.

Value Transfer of Non-Market, Nonuse Estimates

One of the primary goals in this CWPP is to shed light on the non-market economic benefits of ecosystem goods and services associated with the landscapes in Nevada County that are affected by fire hazard mitigation efforts.

Yet, the problem immediately arises: how does one estimate the economic value of goods and services that are not widely traded in the marketplace? While a fair amount of research has been done on the economic value of ecosystem services globally (Costanza et al 1997; Millennium Ecosystem Assessment 2003), relatively limited peer-reviewed work has been done to estimate the specific economic values of ecosystem services located in Nevada County. Because limited empirical ecosystem service valuation research has been done at the study sites, the Nevada County CWPP ESV assessment is required to "transfer" values from other sites (See Glossary of Terms below).

To estimate the economic value of ecosystem services used in this report, the CWPP planning team used a decision-support methodology developed by Spatial Informatics Group (SIG), LLC, the NaturalAssets™ Information System, that allows the CWPP team to dynamically select, review and query peer-reviewed economic valuation research that has already been done in similar areas.

While measuring the use values associated with marketed goods and services simply requires monitoring market data for observable trades, non-market values of goods and services are much more difficult to measure (Bingham et al 1995). When there are no explicit markets for ecosystem goods and services, more indirect means of assessing economic values must therefore be used. A subset of economic valuation techniques commonly used to establish values when market values do not exist are identified in Table 8 below[3].

Table 8. Conventional Non-Market Valuation Techniques
Avoided Cost (AC): services allow society to avoid costs that would have been incurred in the absence of those services; flood control (barrier islands) avoids property damages, and waste treatment by

[3] This list of non-market valuation techniques is not intended to be all-inclusive. Rather, it is intended to reveal the breadth of available empirical techniques that have been and are currently being, explored in the field of ecosystem service valuation.

wetlands avoids incurred health costs.
Marginal Product Estimation (MP): Service demand is generated in a dynamic modeling environment using production function (i.e., Cobb-Douglas) to estimate value of output in response to corresponding material input.
Factor Income (FI): services provide for the enhancement of incomes; water quality improvements increase commercial fisheries harvest and thus, incomes of fishermen.
Travel Cost (TC): service demand may require travel, whose costs can reflect the implied value of the service; recreation areas attract distant visitors whose value placed on that area must be at least what they were willing to pay to travel to it.
Hedonic Pricing (HP): service demand may be reflected in the prices people will pay for associated goods: For example, housing prices along the shore of pristine freshwater lakes tend to exceed the prices of inland homes.
Contingent Valuation (CV): service demand may be elicited by posing hypothetical scenarios that involve some valuation of alternatives; people would be willing to pay for increased water quality in freshwater lakes and streams.

As the descriptions in Table 8 suggest, each non-market valuation methodology represented in the NaturalAssets™ information system has its own strengths and limitations, often limiting its use to a select range of ecosystem goods and services within a given landscape. For example, the economic value generated by a naturally functioning ecological system can be estimated using Avoided Cost (AC), based on the estimated cost of damages due to lost services. However, because these estimates are highly sensitive to market conditions used to estimate costs, they must be used with great caution. While rigorous and well established in the field, Travel Cost (TC) is primarily limited to estimating recreation values, while Hedonic Pricing (HP) is used for estimating property values associated with aesthetic qualities of natural ecosystems. On the other hand, Contingent Valuation (CV) surveys are often widely used to estimate the economic value of less tangible services like critical wildlife habitat or biodiversity. The challenge with CV and related methods like choice modeling is that estimated values are highly sensitive to the survey format and context of valuation (Heberlein et al 2005).

In this study, the full suite of ecosystem valuation techniques is used to account for the economic value of goods and services provided by natural landscapes in Nevada counties.

Value transfer by definition involves the adaptation of existing valuation information or data to new policy contexts with little or no data[4]. The transfer involves obtaining an estimate for the economic value of non-market goods or services through the analysis of a single study, or group of studies, that have been previously carried out to value similar goods or services. The transfer itself refers to the application of estimated point values,

[4] Following Desvouges et. al. (1998), the term 'value transfer' is used instead of the more commonly used term 'benefit transfer' to reflect the fact that the transfer method is not restricted to economic benefits, but can also be extended to include the analysis of potential economic costs, as well as welfare functions more generally.

derived utility functions, and other information from the original 'study site' to a 'policy site' (Desvousges et al 1998; Loomis 1992).

While we accept the fundamental premise that primary valuation research will always be a "first-best" strategy for gathering information about the value of ecosystem goods and services (Downing & Ozuna 1996; Kirchhoff et al 1997; Smith 1992), we also recognize that value transfer has become an increasingly practical way to inform policy decisions when primary data collection is not feasible due to budget and time constraints, or when expected payoffs are small (Environmental Protection Agency 2000; National Research Council 2004).

In other words, value transfers will always represent a policy-relevant compromise solution. When primary valuation research is not possible or plausible, then value transfer, as a "second-best" strategy, is important to consider as a source of meaningful baselines for the evaluation of management and policy impacts on ecosystem goods and services. However, the real-world alternative is to treat the economic values of ecosystem services as zero; a status quo solution that, based on the weight of the empirical evidence, will often be more error prone than value transfer itself.

Ecosystem Service Valuation (ESV) Data

The raw material for the value transfer exercise in this report comes from previously published studies that empirically measured the economic value of environmental goods and services. Generally speaking, there are three types of valuation research that exist in the field today:

- Peer-Reviewed journal articles, books and book chapters, proceedings and technical reports that use conventional environmental economic valuation techniques and is restricted to an analysis of social and economic values
- Non Peer-Reviewed publications that include PhD dissertations, non peer-reviewed technical reports and proceedings as well as raw data available on the WWW.
- Secondary analysis (e.g., meta analysis) of peer reviewed and/or non peer-reviewed studies that use both conventional and non-conventional valuation methods

The critical underlying assumption of the NaturalAssets™ Information System is that the ESV's for ecosystem goods or services at the selected study sites can be inferred with sufficient accuracy from the analysis of existing non-market valuation studies. Clearly, as the level of information increases within the source literature (i.e., more studies are done), the accuracy of the value transfer likewise improves. The research team developed a set of explicit decision rules for querying economic results from the raw data contained in the NaturalAssets™ system that would allow us to estimate with sufficient accuracy the economic value of ecosystem services in Nevada County. The research team selected valuation studies that were:

- Peer reviewed and published in recognized journals
- Focused on temperate regions in either North America, Canada or Europe

- Focused primarily on non-consumptive use

Using these search criteria, we were able to obtain data from a set of viable studies (n=73) whose results were then standardized to 2006 U.S. dollar equivalents per acre to provide a consistent basis for comparison[5]. Because each study may contain more than one estimate of value, the end result is a collection of valuation data points that are coded by temporal (i.e., time of study), spatial (i.e., place where study was done) and methodological (i.e., method used) criteria thereby allowing the research team to derive a lower bound and upper bound estimate of dollar values for the study site. For this study, we were able to generate a total of (n=163) individual point estimates for reviewed land cover types. This journal list of 73 individual studies is available upon request as it is a proprietary component of the NaturalAssets™ Information System. Given the aforementioned restrictions and gaps in the available literature, this approach yields conservative, baseline economic values for Nevada County.

In sum, the transfer method adopted in this report involves obtaining an estimate for the value of ecosystem goods or services through the analysis of peer-reviewed research that has been previously collected and stored in the NaturalAssets™ Information System in a standardized format so that it can further be augmented with site-specific GIS data (i.e., land cover, socioeconomic characteristics) to ensure reliable valuation estimates at the study site.

Spatial Analysis Methods

Another principal goal in this project is to link the ESV estimates for ecosystem goods and service to available land cover/land use data in Nevada County (see Results, Section 5). We have developed a decision-support tool that helps decision makers assess whether the economic benefits of today's development—jobs, increased tax revenues—compensate for the economic costs to natural resources that will be borne by society now or in the future. The NaturalAssets™ Information System provides us with the ability to account for and track environmental assets and potential liabilities in a fully customized, spatially explicit format that then can be used in conventional economic assessments. Combining Geographic Information Systems (GIS) and relational database technology, provided our team with the ability to generate maps and economic statistics for specific counties by linking together summaries of peer-reviewed economic valuation studies with GIS land cover layers in a flexible decision-making environment.

Thanks to the increased ease of using Geographic Information Systems (GIS) and the availability of land cover data sets derived from satellite images, ecological and geographic entities can more easily be attributed with ecosystem services and the values they provide to people(Wilson & Troy 2005; Wilson et al 2004). In simplified terms, the technique discussed here involves combining one land cover layer with another layer representing the geography to which ecosystem services are aggregated - i.e. a watershed. While the aggregation units themselves are likely to be in vector format, because vector

[5] All dollar values are standardized to 2006 using Consumer Price Index tables published by the U.S. Department of Labor. ~~http://www.bls.gov/cpi/home.htm~~ http://www.bls.gov/cpi/home.htm.

boundaries are most precise, the land cover layer may be either raster or vector[6]. Spatial disaggregation increases the contextual specificity of ecosystem value transfer by allowing us to visualize the exact location of ecologically important landscape elements and overlay them with other relevant themes for analysis - biogeophysical or socioeconomic. A common principle in geography is that spatially aggregated measures of geographic phenomena tend to obscure local patterns of heterogeneity (Fotheringham et al 2000; Openshaw et al 1987).

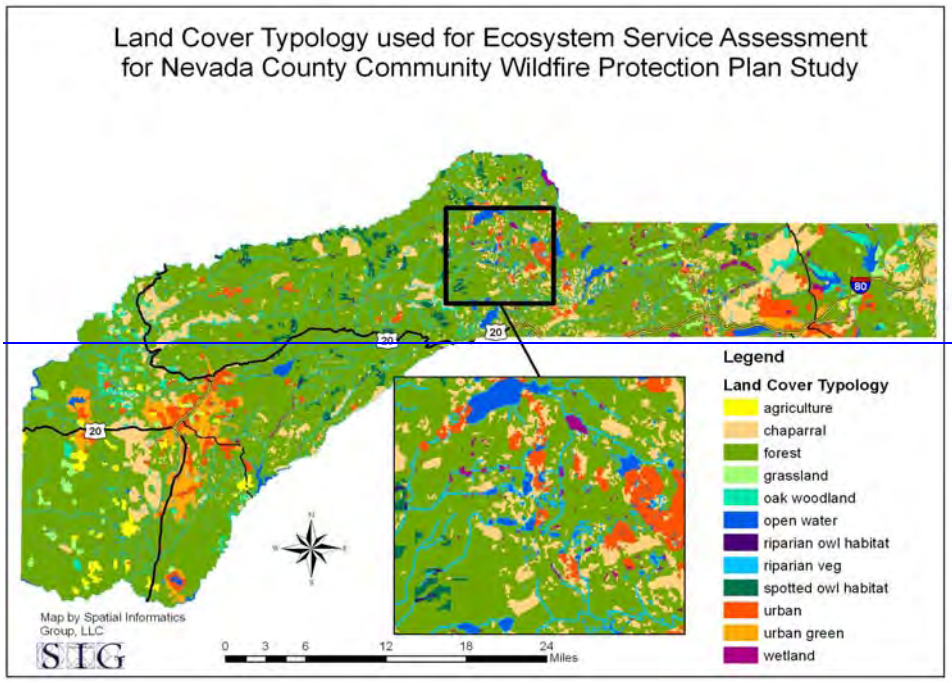
Analogously, aggregate measures of non-market values, while useful, can also obscure the heterogeneous nature of the underlying resources that provide those services and thus provide misleading results. For example, an aggregate measure of ecosystem services at the global level may indicate significant amounts of a land cover type associated with nutrient cycling and waste treatment, such as estuaries (Costanza et al 1997). This measure does not tell us, however, whether the estuaries are distributed evenly throughout the world or are all clustered in one region. Obviously, those two possibilities have significantly different ramifications for resource use and landscape management. Not only does a clustered pattern of estuaries imply that some regions have more than others, but it also means that the social cost of losing one estuarine system is much higher in the areas of scarcity than in the areas of clustering.

Development of Land Cover Typology and Spatial Data

The ESV analysis required accurate, high resolution and categorically meaningful depictions of land cover. Before developing the ESV map, a land cover typology was created. To do this, we assessed available data coverages to determine which land cover classes at what level of categorical precision could be mapped at a usable scale and with acceptable levels of accuracy. Once an initial typology was created, the CWPP Analysis Team assessed the availability of peer reviewed literature placing values on those cover types. In cases where a cover type was not known to be valued, it was either given a value of zero (but still mapped, in case an applicable study should be found later) or lumped in with another similar class for which valuation studies existed.

A number of publicly available layers needed to be combined in each case to yield a map with this typology. The California Land Cover Mapping and Monitoring Program 2003 vegetation layer (referred to from here on as “Calveg”) are used as the base map from which additional features from other layers were added (Figure 23). While this map contained many of the categories listed in the typology, it was still missing many critical categories. Also, while fairly accurate for terrestrial vegetation type, it lacked accuracy for other classes, like urban areas, agriculture and wetlands.

[6] The vector data model represents spatial entities with points, lines and polygons. The raster model uses grid cells to represent quantities or qualities across space.


Land Cover Typology used for Ecosystem Service Assessment
for Nevada County Community Wildfire Protection Plan Study
Legend
Land Cover Typology
agriculture
chaparral
forest
grassland
oak woodland
open water
riparian owl habitat
riparian veg
spotted owl habitat
urban
urban green
wetland
Map by Spatial Informatics Group, LLC
STG
0 3 6 12 18 24
Miles
80
20
20
20

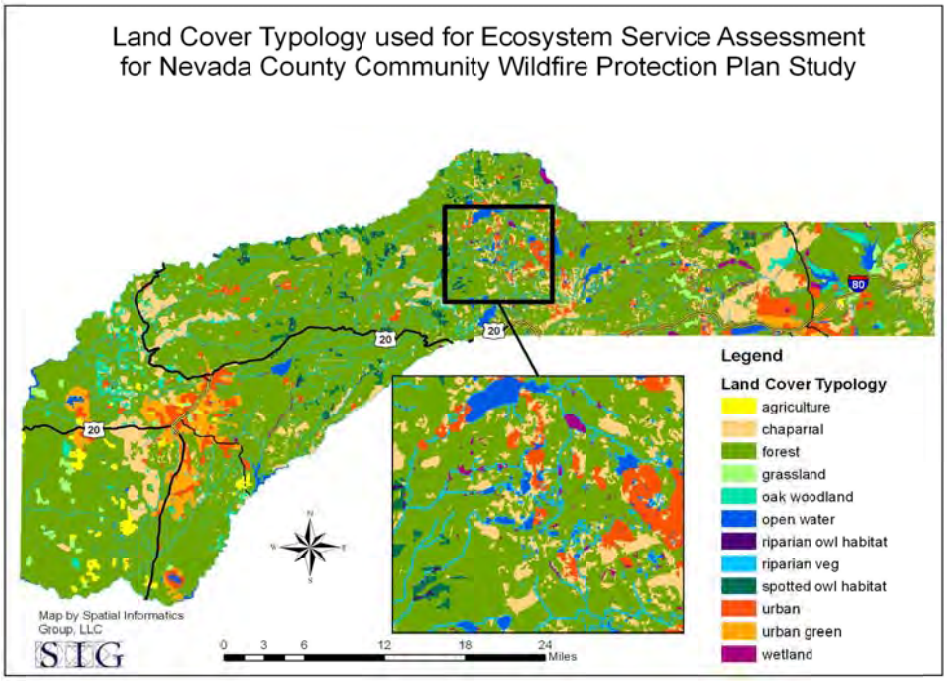


Figure ~~23~~29: Nevada County Land Cover Typology Used for Ecosystem Service Valuation

To address this, the CWPP Analysis Team updated our maps using other layers that had better information for certain poorly represented or absent categories. In some cases, an ideal layer for a certain category (e.g. wetlands) only had partial coverage necessitating us to obtain such a class from a variety of sources. To create output land cover layers with the appropriate typology, the processing steps described in detail below were used.

1. Obtained following layers: land cover layer from Nevada County, NH2020, spotted owl nesting areas from US Forest Service, USFWS wetlands (only partial for county), CALVEG for the Tahoe National Forest (from FS region IX), NHD water bodies, river polygons (for Yuba river) and streams, and urban areas from ESRI
2. extracted perennial streams and “artificial paths” and buffered by 50 m.
3. Buffered NHD waterbodies by 50 m
4. Generated a layer of oak woodlands and chaparral from the CalVeg layer, setting new attributes “oakwoodland” and “chap” to 1 where each was true based on the following:
    a. Oak woodlands: ([SAF_COVER_TYPE] = '249' OR [SAF_COVER_TYPE] = '255') AND([TREE_CFA_CLASS_1] = '40'

OR [TREE_CFA_CLASS_1] = '20' OR [TREE_CFA_CLASS_1] = '01'); includes canyon live oak, coast live oak where canopy is less than 60%.
    b. Chaparral and scrub: [SAF_COVER_TYPE] = '262' OR [SAF_COVER_TYPE] = '242'; chaparral or mesquite.
    c. Selected only those two categories and exported to new layer (oak_and_chap).
5. Unioned waterbodies and buffer of waterbodies and used field calculations to designate outer buffer of water body and internal open water
6. added attributes to all input layers for tracking and querying (e.g. openwat=1, riparian=1)
7. Did union of vegetation, spotted owl layer, yuba river layer, waterbody and waterbody buffer union, perennial streams buffer, wetlands, urban areas, USFWS wetlands, and oak_and_chap layer.
8. created field called “typology” in new unioned layer
9. Deleted any overhanging features outside county.
10. Reclassed polygons in typology using field calculator.
    a. Urban: [FULL_NAME] = 'Bare Exposed Rock' OR [FULL_NAME] = 'Commercial and Services' OR [FULL_NAME] = 'Confined Feeeding Operations' OR [FULL_NAME] = 'Industrial' OR [FULL_NAME] = 'Mixed Urban or Built-up Land' OR [FULL_NAME] = 'Other Urban or Built-up Land' OR [FULL_NAME] = 'Strip Mines, Quarries, Gravel Pits' OR [FULL_NAME] = 'Transportation, Communication, Utilities' OR [FULL_NAME] = 'Residential'
    b. Forest: ([FULL_NAME] = 'Deciduous Forest Land' OR [FULL_NAME] = 'Evergreen Forest Land')
    c. Urban green: Urban=1 AND ([FULL_NAME] = 'Deciduous Forest Land' OR [FULL_NAME] = 'Evergreen Forest Land')
    d. Agriculture: [FULL_NAME] = 'Cropland and Pasture' OR [FULL_NAME] = 'Other Agricultural Land'
    e. Chaparral: [chap] =1 OR [FULL_NAME] = 'Shrub and Brush Rangeland'
    f. Grassland: [FULL_NAME] = 'Herbaceous Rangeland'
    g. Oak woodland: [oakwoodland] =1 OR [FULL_NAME] = 'Mixed Rangeland'
    h. Spotted owl habitat: owl=1
    i. Open water: [FULL_NAME] = 'Lakes' OR [FULL_NAME] = 'Reservoirs' OR [openwat2] =1 OR [openwat]=1
    j. Riparian vegetation: ([waterbodbuff] =1 OR [streambuff]=1) AND ([FULL_NAME]= 'Deciduous Forest Land' OR [FULL_NAME] = 'Evergreen Forest Land' OR [FULL_NAME]= 'Mixed Rangeland' OR [FULL_NAME] = 'Shrub and Brush Rangeland' OR [oakwoodland] =1 OR [chap] =1)
    k. Wetland: [WETLAND_TY] = 'Freshwater Emergent Wetland' OR [WETLAND_TY] = 'Freshwater Forested/Shrub Wetland' OR [WETLAND_TY] = 'Riverine' OR [FULL_NAME] = 'Nonforested Wetland'

l. Riparian owl habitat: ([waterbodbuff] =1 OR [streambuff]=1) AND ([FULL_NAME]= 'Deciduous Forest Land' OR [FULL_NAME] = 'Evergreen Forest Land' OR [FULL_NAME]= 'Mixed Rangeland' OR [FULL_NAME] = 'Shrub and Brush Rangeland' OR [oakwoodland] =1 OR [chap] =1) AND owl=1

11. A lookup table was then created of each $/acre/year estimate average which was then joined in ArcGIS and per acre per year values were multiplied by acreages.
12. A summary query was then performed in Access to give to value by type.

Glossary of Common Terms

Benefits Transfer: Economic valuation approach in which estimates obtained in one context are used to estimate economic values in a different context. This approach is widely used in policy settings because of its relative efficiency and low cost, but has limitations because value estimates are context-specific and must be carefully used and interpreted. Also referred to as *value-transfer*.

Contingent Valuation: Economic valuation technique based on the stated preference of respondents to a survey regarding how much they would be willing to pay for specified benefits of an environmental good or service. CV is designed to circumvent the absence of markets by presenting consumers with hypothetical markets in which they have the opportunity to 'buy' the good or service in question. A detailed description of the good or service is provided along with details about how it will be provided.

Cultural Services: The non-material benefits that people obtain from ecosystems through cognitive development, recreation opportunities, aesthetic experiences and spiritual or cultural enrichment.

Direct Use Value: In the total economic value framework (see below), the benefits derived from the goods and services provided by an ecosystem that are used directly by an economic agent. These include consumptive uses (e.g., harvesting timber) and nonconsumptive uses (e.g., enjoying scenic views). Agents are often physically present in an ecosystem to receive direct use value. Compare to *indirect use value*.

Ecosystem Function(s): An intrinsic ecosystem characteristic related to the set of conditions and processes whereby an ecosystem maintains its integrity (e.g., primary productivity, food chain, nutrient cycles). Ecosystem functions include such processes such as nutrient cycling, biomass production and decomposition. See also *supporting services* for related discussion.

Ecosystem Services: The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood control

and waste assimilation; supporting services such as nutrient cycling; and cultural services such as recreational or aesthetic benefits.

Existence Value: The value that an economic agent places on knowing that a resource exists, even if they will never directly use that resource (also commonly referred to as *passive use value* or *conservation value*).

Geographic Information System (GIS): A computerized system organizing data sets through a geographical referencing of all data included in its collections. A GIS allows the spatial display and analysis of information.

Hedonic Price Methods: Economic valuation methods that use statistical techniques to break down the market price paid for goods and services into the implicit prices for each of their attributes, including environmental attributes such as access to a nice view or clean water. For example, the price of a home may be broken down to see how much the buyers were willing to pay for a home in a neighborhood with cleaner air.

Indirect Use Value: The benefits derived from the goods and services provided by an ecosystem that are used indirectly by an economic agent. For example, an agent at some distance from an ecosystem may derive benefits from drinking water that has veen purified as it passed through the ecosystem. Compare to *direct use value.*

Intrinsic Value: The value of something in and of itself, irrespective of its utility to another economic agent.

Option Value: The Value of preserving the option to use services in the future either by oneself (option value) or by others including heirs (bequest value). Quasi option value represents the value of avoiding irreversible decisions until new information reveals whether certain ecosystem services have values that society is currently not aware of.

Provisioning Services: The products obtained from ecosystems, including, for example, genetic resources, food, fiber, and raw materials.

Raster Data: A type of GIS data that describes the characteristics of a geographic area using a continuous grid, with each cell, or pixel, assigned a value.

Regulating Services: The benefits obtained from the regulation of ecosystem processes, including, for example the regulation of climate and water cycles.

Replacement Cost: A method for valuing the ecological services by estimating the cost of replacing the service or treating the damages arising from the loss of the service. For example the presence of a wetland may reduce the cost of municipal water treatment for drinking water because the wetland system filters and removes pollutants. The cost of water treatment can thus be used as a proxy for the value of waste treatment provided by

the wetland. Given that the method is extremely sensitive to the market conditions under which cost assumptions are being made, however, this method should be used with great caution.

Supporting Services: Ecosystem services that are necessary for the production of all other ecosystem services. Examples include biomass production, nutrient cycling and provisioning of habitat.

Total Economic Value Framework: The presumption of this framework is that people can hold multiple values for an ecosystem. A widely used taxonomic framework to disaggregate the components of economic value, including *direct* and *indirect use value*, *option value*, *quasi-option value* and *existence* value. A TEV approach is necessary to ensure that double counting of values does not occur when multiple valuation methods are used such as in the case of *benefits transfer*.

Travel Cost Methods: Economic valuation techniques that use observed costs to travel to a destination to derive demand functions for that destination, often based on the environmental quality of the site. Developed primarily to value the recreational uses of protected areas.

Union: A geo-processing step in which two overlapping polygon geographies are combined to the full extent of both

Valuation: The process of expressing a value for a particular good or service in terms of something that can be quantified through economic methods.

Value Transfer: See *benefits transfer*.

Vector Data: A type of GIS data that uses points, lines and polygons to represent geographic features.

Appendix ~~D~~E: *FlamMap Model Choice and Modeling Parameters*

FlamMap (version 3.0) is a software program for assessing fuel hazard in terms of fire behavior. FARSITE is also a fire behavior and growth simulator for use with Windows but it requires the user to predetermine ignitions and duration. Both models produce maps of surface and crown fire behavior characteristics across a landscape. FlamMap runs on FARSITE data layers but contains computational efficiencies for fuel treatment planning. The purpose of FlamMap is to generate fire behavior data that are comparable across the landscape for a given set of weather and/or fuel moisture data inputs. The fire behavior models in FlamMap are used to make calculations for all cells of a raster landscape, independently of one another. However, there is no contagious process that accounts for fire movement across the landscape or among adjacent cells. Fire behavior modeling using FlamMap gives WH and WHF a prediction of likely fire behavior given a standardized set of conditions and a single point source ignition for every 5 by 5 meter area. This fire behavior modeling effort is static for pre building conditions and does not consider the cumulative impacts of increased fire intensity over time and space. The modeling effort also does not calculate the probability that a wildland fire will occur but rather assumes that it will occur.

Model Selection

FlamMap was used over FARSITE to model fireline intensity, flame length, and crown fire activity for a number of reasons, including:

1. FlamMap's primary design is to distinguish hazardous fuel and topographic conditions, making pre- and post-treatment comparisons and contrasts across landscapes much easier and more suitable than in FARSITE.

2. Although historical fire occurrence was used in this analysis, there is no guarantee future fires will occur in areas, although it is likely in this Mediterranean climate. While a pattern is often evident, demographics, human activities, and climatic conditions can change; therefore, selecting a specific fire start is often subjective—particularly with little or no ignition data—yet tremendously significant to the outcome of the simulation(s). FARSITE requires the input of discrete ignition points at locations across the landscape. These points of ignition can be unacceptably subjective and difficult to predict. Thus not requiring this input, as in the case of (FlamMap), is advantageous.

3. Other parameters, such as determining the distance to the treated area, developing the wind file, specifying the simulation duration, and setting fire behavior parameters, are largely at the discretion of the modeler and difficult to fully substantiate, whereas fewer subjective parameters are required in FlamMap.

4. Many fires that often impact an area of concern, start considerable distances away from the area they threaten, so assessing an area with a single, localized run is limiting.

FlamMap is a spatial fire behavior mapping and analysis program that requires a FARSITE landscape file (*.LCP), as well as fuel moisture and weather data. The basic terrain, weather and fuel model inputs are the same for both models. Using historic fires in the area, one can use FARSITE to calibrate the FlamMap fuel models, fire weather and other inputs. However, unlike FARSITE, FlamMap assumes that every pixel on the raster landscape burns and makes fire behavior calculations (e.g., fireline intensity, flame length) for each location (cell), independent of one another. That is, there is no predictor of fire movement across the landscape and weather and wind information can be held constant. By so doing, FlamMap output lends itself well to landscape comparisons (e.g., pre- and post-construction) and for identifying hazardous fuel and topographic combinations, thus aiding in prioritization and assessments.

Model Inputs

The FlamMap model has a total of eight input layers, five of which are mandatory while three are optional. In developing a model to assess fire behavior for the Montserrat project area, we used the best available geoscience techniques to gather customized information on the terrain, fuels and fire weather so that the model performs as close to the fire behavior that one might expect for this property. In this section, we describe both the required and optional inputs into the model and how these were derived.

Required Model Inputs

This type of fire behavior model requires five inputs that are considered part of a fuel hazard system (Finney 1998; Keane et al. 1998). We derived the first three (slope, aspect and elevation) from publicly available geospatial data through the USGS. Four of the eight inputs are forest structural characteristics that are generated by the USFS Stewardship and Fireshed Assessment Team (calibrated using field measurements for federal lands). Additional inputs for ground fuels are also used to calibrate the model but these measurements were not collected due to the fact that the CWPP Core Team is not tasked with building custom fuel models for the County.

Canopy cover is a required and necessary theme for computing wind reduction factors and shading in the optional dead fuel moisture model. Canopy cover was generated using the California Department of Forestry and Fire Protection (CDF) Fire and Resource Assessment Program's (FRAP) Multi-source Land Cover Data (2002). CDF-FRAP compiled the "best available" land cover data into a single data layer to support the various analyses required for the 2002 Forest and Range Assessment. Canopy cover is the horizontal percentage of the ground surface that is covered by tree crowns. It is a stand-level descriptor.

The last of the required themes is the fuel model. Typically, fire behavior modeling will rely on predetermined fuel models from Scott and Burgen (2005) generated from the Stewardship and Fireshed Assessment Team (Berni Bahro and Nathan Amboy, personal communications, November 2007, March 2008) for federal lands and LANDFIRE for private lands. In comparing the outputs from this modeling venture to CALFIRE's

California Fire Hazard Severity Zone Map Update Project (CALFIRE 2007), the hazard mapping results from using these fuel models are considered comparable with the FRAP's results.

In addition to the layer inputs above, the user must define weather conditions, live and dead fuel moistures, and wind speed. Fire behavior modeling of the County with FlamMap modeling of the County used fuel moistures approximating the 95th percentile drought conditions with sustained wind speeds of 36 miles per hour (representative of worst case weather conditions) with dominant wind directions blowing uphill. Fire behavior weather data is based upon the Remote Automated Weather Station (RAWS) at the following nine locations (Table 9, Figure 24). The weather data was processed from these eight RAWS using a computer model called FireFamily Plus (version 3.0.5.0). The weather data is then formatted and imported into EXCEL where FlamMap's initial fuel moisture (.FMS) file, a weather (.WTR) file, and wind (.WND) files were generated. The weather file contains daily observations on temperature, humidity, and precipitation that depict a temporal weather stream. The fuel moistures from the Initial Fuel Moistures (.FMS) file can be used one of two ways (this modeling effort chose to use the later) within FlamMap.

1) The fuel moistures from the file are used to calculate the fire behavior characteristics in the FlamMap run.

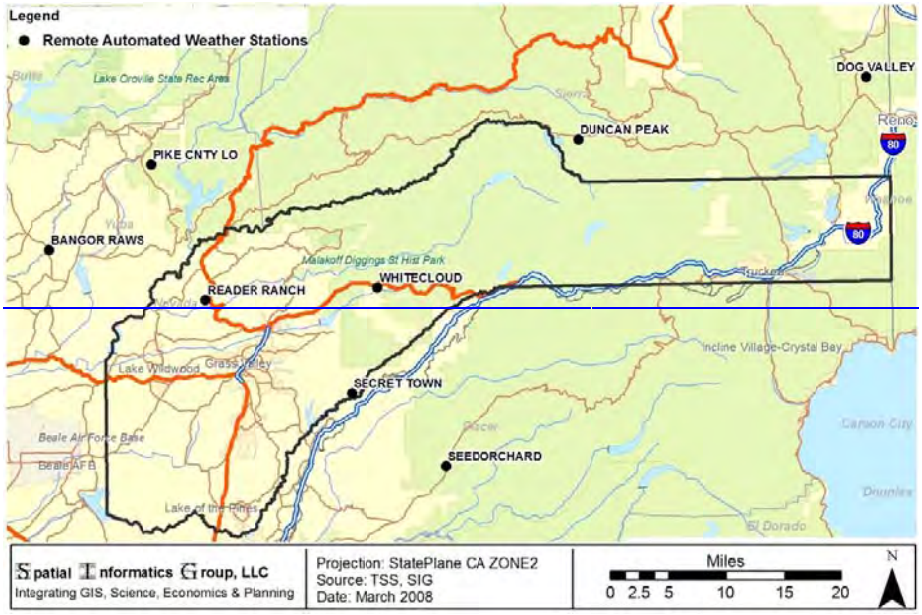
2) The fuel moistures are used as a starting point for the optional dead fuel moisture model which also requires a Weather (.WTR) and Wind (.WND) file. The starting fuel moistures are modified during a conditioning period based on the weather streams, topography, and shading before calculating the fire behavior characteristics in the FlamMap run. Foliar moisture content was set at 80%.

TABLE 9: Elevations of Remote Automated Weather Stations Used For FlamMap Modeling

NAME OF RAWS STATION	ELEVATION (ft)
White Cloud	4320
Duncan Peak	7182
Seed Orchard	4355
Secret Town	2826
Reader Ranch	1955
Dog Valley	5880
Pike County LO	3714
Bangor	803

Additional Model Inputs

Crown Base Height, Crown height and crown bulk density inputs are all generated from Forest Vegetation Simulations (FVS) from a tree list generated from FIA plots on federal and private lands.



~~Figure 24~~

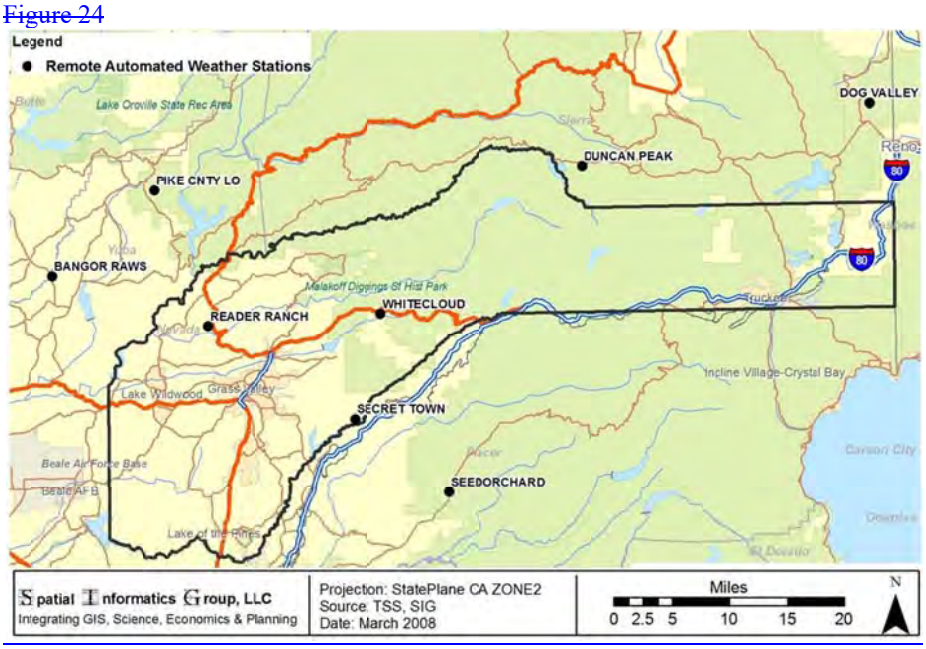


Figure30: Remote Automated Weather Stations Used For FlamMap Modeling

Appendix ~~E~~F: CWPP Core Team CHRP Analysis

The CWPP Core Team CHRP Analysis is comprised of high fire hazard, high parcel improvement values (above $10,000), where ridgetops and roads co align (Figures ~~25,~~ ~~26~~31, 32 and ~~27~~33), and those that lie within the WUI.

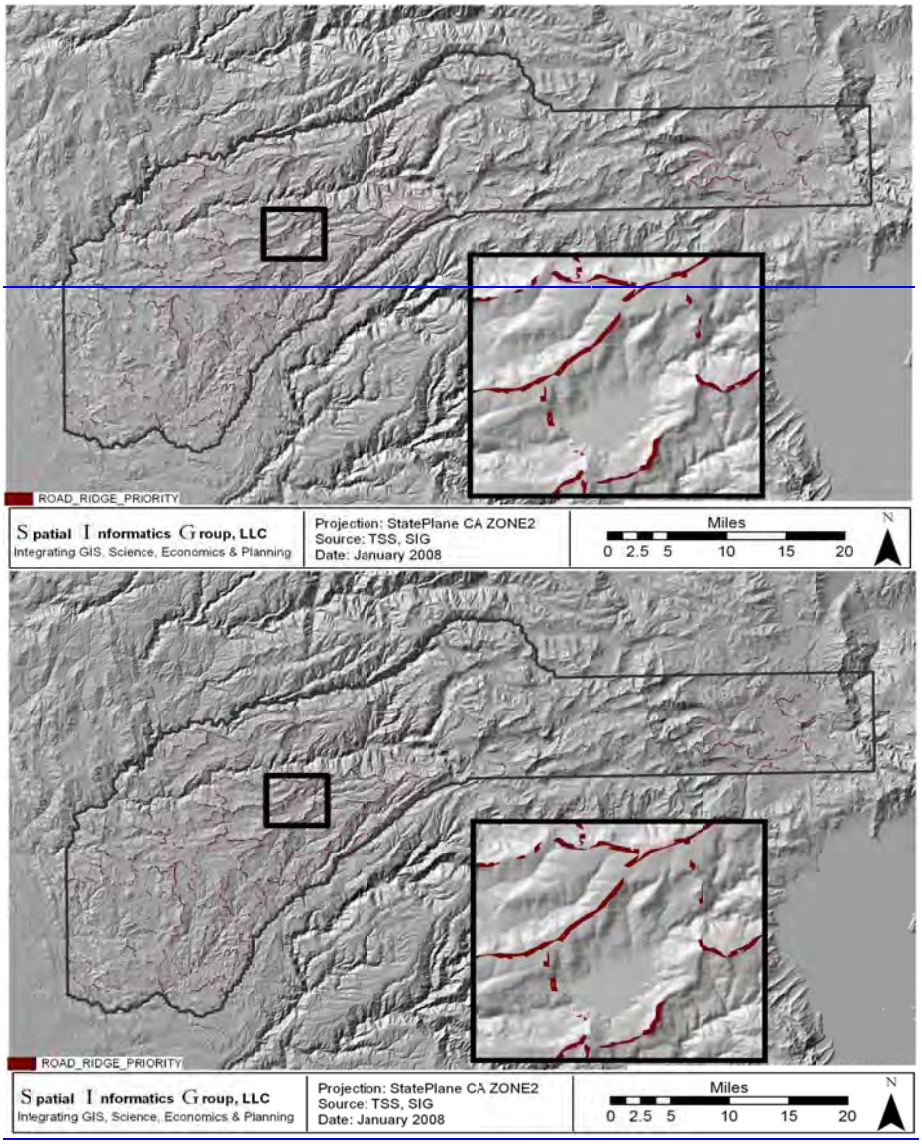


Figure ~~25~~31: Spatial Analysis of Road and Ridge Top Alignment

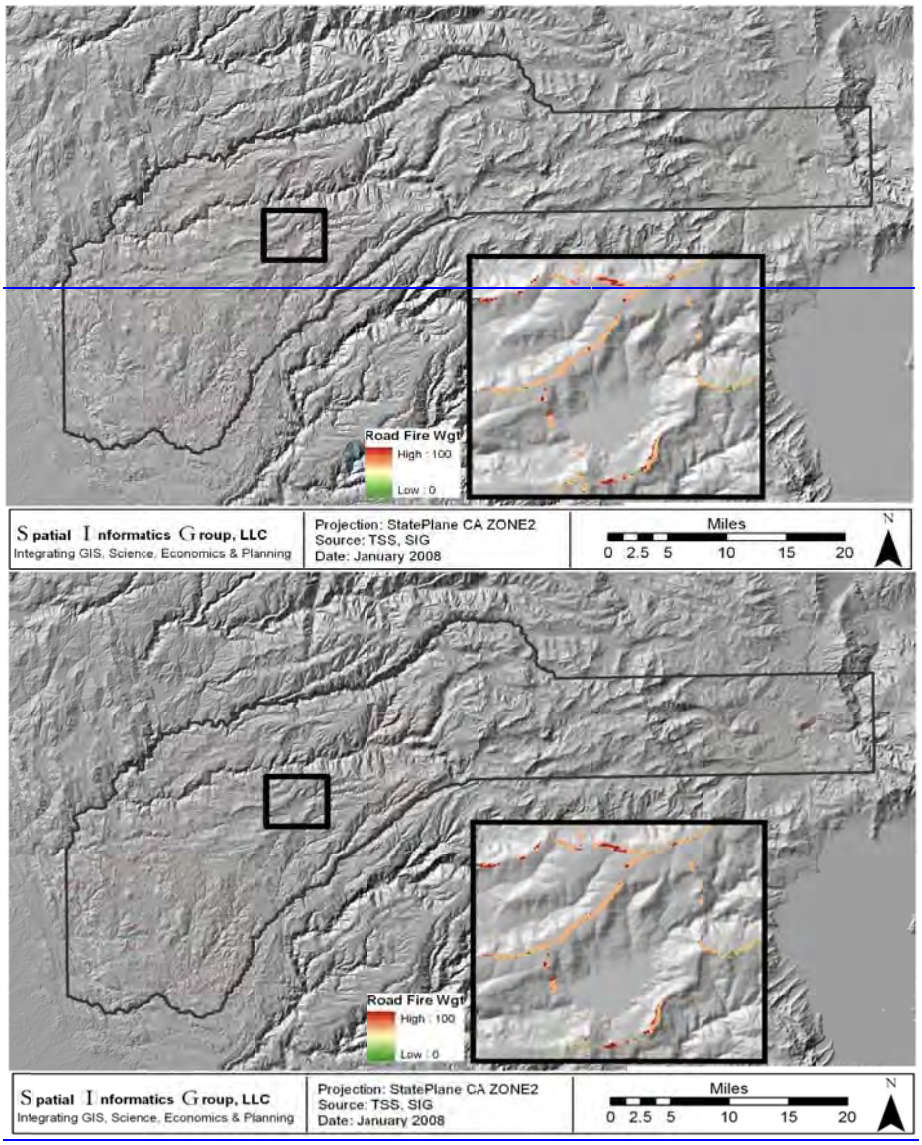


Figure ~~26~~32: High Fire Hazard Overlay On Road and Ridge Top Alignment Priorities

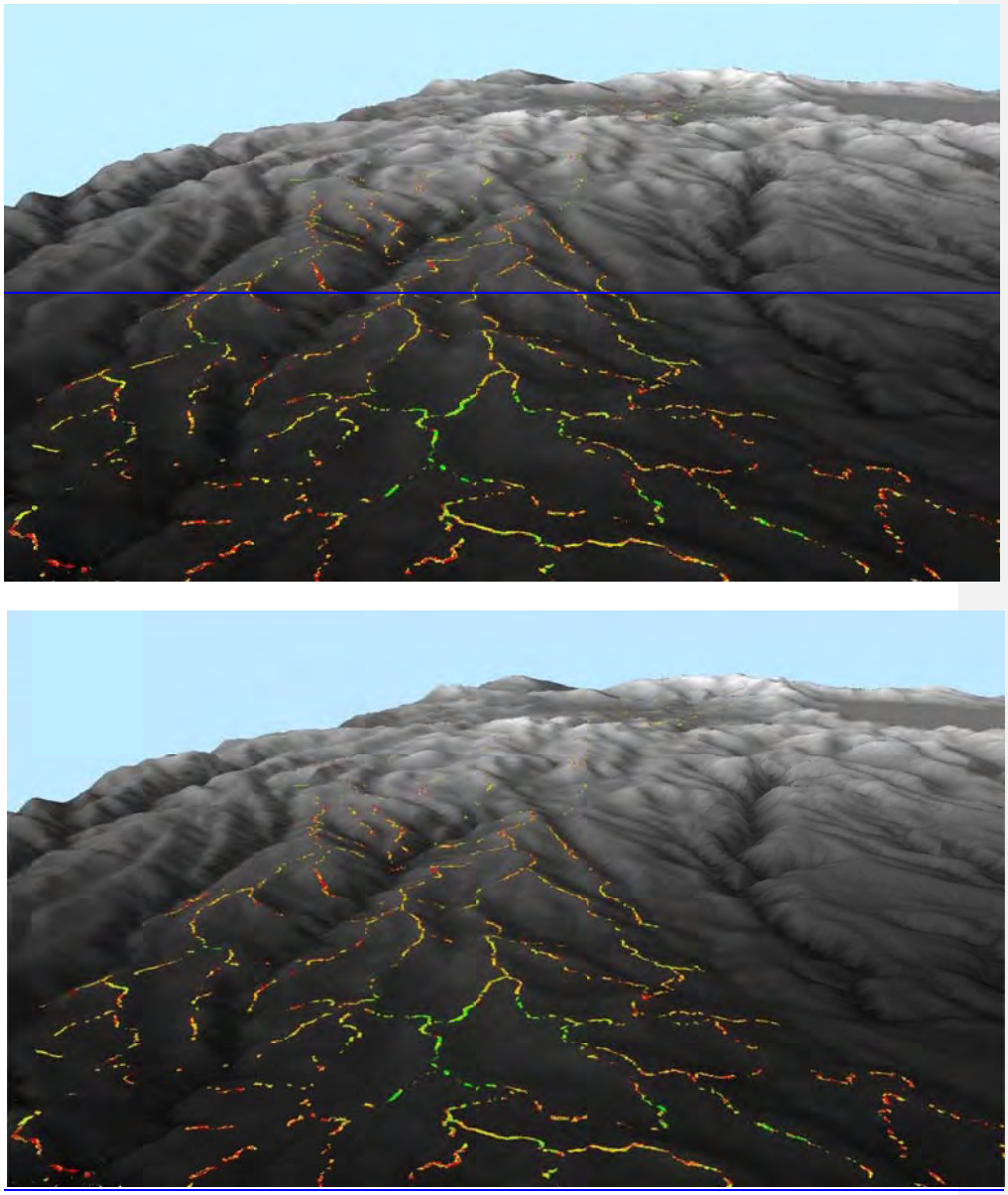


Figure ~~27~~33: 3-D View High Fire Hazard Overlay On Road and Ridge Top Alignment Priorities

Appendix ~~F~~G: CWPP Phase One Project Descriptions

West Truckee Interstate 80 Fuel Break
(Adapted from Sierra Conservancy Grant Application)

The history of fire along Interstate 80 (I-80) began with its construction and has continued to be a source of ignition near the Town of Truckee. In 2007, a fire started near Donner Lake, crossed I-80 and began burning upslope to the largest housing subdivision in the Truckee area – Tahoe-Donner Homeowners Association. The area burned the forested land in the 1950's during construction of the freeway, but has re-vegetated with highly flammable brush with sparse mixed conifers. This condition continues to concern local and state fire officials as well as residents of the Tahoe-Donner subdivision. The Town of Truckee serves as the bedroom community for the Tahoe Basin, where many are employed, but few can afford to live. We seek to mitigate this hazard by the implementation of a two mile community fuel break running along the north side of I-80 below the subdivision continuing to Negro Canyon.

This project will create a community fuel break along the I-80 corridor for approximately 2 miles, 300 feet wide where landowners are willing to participate. Removal of the understory ladder fuel brush while retaining the tree canopy within the estimated 70 acre project site, providing fire protection for the subdivision homeowners, neighboring communities along Donner Lake and the Town of Truckee. Participating landowners will work with a contracted Registered Professional Forester to flag their individual property boundaries, save vegetation and develop a suitable sivilculture fuels treatment prescription for the project while respecting private property owner values. Preferred treatment will be mastication. Hand clearing and chipping will be utilized in areas that have a watercourse flowing into Donner Lake. Assessment of the biomass utilization element of the project at regional cogeneration facilities yielded additional cost to the project and was therefore removed. An assessment of the ecological value of leaving the biomass generated on site was deemed preferable due to the use of the chipped biomass for soil retention in the watershed as well as abating vegetation regrowth.

The Town of Truckee serves as the gateway to the Tahoe Basin. Tourists and day trippers to the area use the I-80 corridor for travelling into this world renowned destination. A wildfire along this important corridor can cause the interstate to be closed, which would cause an interruption of goods and people moving through this national transport system. Smoke, particulate matter and ash would be carried by the wind and likely be sent into the Tahoe Basin causing health hazards and potentially impacting the lake clarity. If structures were consumed in a wildfire in the Tahoe-Donner subdivision, toxins and sediment would run into Donner Lake creating serious impacts to the resource.

Implementation of this project would serve to mitigate the potential impacts from a wildfire at this historically high ignition point.

A. *Water and irrigation districts with facilities near or within West Truckee Interstate 80 Fuel Break*

The Truckee Donner Public Utility District offers water service in the Truckee area. They are a non-profit, publicly owned utility governed by officials elected by the registered voters of the District. All the benefits of public power remain in the District in the form of reliable and high quality water at fair, reasonable prices. TDPUD is owned by its customers, not by stockholders, and is overseen by a locally elected Board of Directors.

B. *West Truckee Interstate 80 Fuel Break Agency Collaboration*
This project was developed as a high priority through our countywide Community Wildfire Protection Plan (CWPP) and has included collaboration with the City of Grass Valley, City of Nevada City, the Town of Truckee, County of Nevada, CAL FIRE, Bureau of Land Management, and US Forest Service. Additional collaboration with local entities such as the Federation of Neighborhood Associations (FONA), Tahoe-Donner Homeowners Association, community organizations and environmentally focused groups and individual property owners was also achieved through the CWPP process.

C. *Overall watershed assets' risk rank of West Truckee Interstate 80 Fuel Break*
Nevada County is rated high in the CAL FIRE Watershed Assets at Risk FRAP Project as well as within the CWPP CHRP analysis. Nevada County is rich with watercourses and is home to one wild and scenic river and has high potential for significant erosion after a fire. The county is host to Pacific Gas and Electric hydroelectric plants, and various riparian areas with endangered species and recreational water areas. Nevada County's development has taken place in the wildland urban interface which has the potential to adversely affect the watersheds in the event of wildfire. These issues are intertwined as one affects the other when, after a disastrous wildfire incident, the associated watershed and water supply system can be adversely affected by soil runoff, erosion, and vegetative debris accumulation. In addition, if structures are consumed by the wildfire, household and other toxic chemicals can be introduced into the watershed. Historically speaking, settlers within the Sierra Nevada Region located their towns adjacent to some sort of water source which provided a vital resource for the future of the community. Water developments such as lakes, streams, ponds, and rivers were paramount for the survival of the community. In addition to towns most transportation routes and systems were also located adjacent or within proximity to rivers and other water sources.

D. *West Truckee Interstate 80 Fuel Break Project Maintenance for the next ten years:*
The Tahoe-Donner Homeowners Association is situated just above the proposed fuel break project. They have an ongoing maintenance program and have a Registered Professional Forster on staff who has committed to working with the adjacent landowners to maintain the fuel break once created.

F. *West Truckee Interstate 80 Fuel Break Project's protection and restoration of rivers, lakes and streams, their watersheds and associated land, water and other natural resources:*

The watershed correlation would be the relationship of disastrous fire with associated structure loss/damage to the baking of the soil immediately below the lost structure and around the immediate area thus causing soil erosion and the subsequent destruction of water quality and of water delivery systems, due to the potential runoff of household

items such as; paint, pesticides, cleaners, oil, plastics, and petroleum products that could have a detrimental effect on the watershed if allowed to wash into a water source. By reducing the fuel loading on private lands and near homes the reduction of risk is tremendous as structures provide another component of fuel loading. Structures, once ignited, add additional and significant intensity to the fire and require additional protection resources that can divert these precious resources from the wildland fire suppression effort thus allowing the wildland fire to become larger and more damaging to natural resources and the watershed. Since the late 1970's, development of homes in the wildland has increased throughout Nevada County. By completing hazardous fire fuel reductions in community greenbelt areas around structures and associated landscapes the risks from fire can be significantly reduced thereby providing protection to the associated watershed. The US Forest Service is currently experimenting with Strategic Land Area Treatments (SPLATs), which are designed to change wildfire behavior across the landscape. Wildfire behavior computer models have shown this tactic to be extremely effective at reducing the rate of spread and overall effects of fire. Clearing hazardous wildfire vegetation in community greenbelt areas embedded throughout the watershed would mimic this strategy and reap the potential benefits in a wildfire incident to reduce the effects of the fire. Post disastrous fire effects in the Wildland Urban Interface Zone can produce household chemicals mixing with nutrient rich soil and create sediment with extraordinary levels of hazardous chemicals and household products, sometimes in excess of 50 times that of pre fire levels thus ruining fisheries, destroying water quality and greatly escalating the costs of rehabilitation of the water supply system and the watershed.

This *West Truckee Interstate 80 – Fuel Break Project* provides the following Land and Water benefits while avoiding adverse impacts:

1. Protection of the watersheds from catastrophic wildfire the creation of a fuel break along Interstate 80 to stop a fire from spreading to nearby Donner Lake.
2. Avoid the potential for erosion into the watershed from a catastrophic wildfire involving structures in the Tahoe–Donner subdivision just above the fuel break and Donner Lake.
3. Avoid the potential for toxic chemicals to be released from burnt homes into the watershed through the implementation of a community fuel break.
4. Decrease the amount of water utilized by vegetation growing on the landscape, allowing for increased water flows into the watercourses.
5. Increase the ability of fire suppression to contain fires through the implementation of a community fuel break.
6. Avoiding adverse air and water quality impacts by chipping hazardous fire fuels rather than a wildfire burning, which will release smoke and particulates into the air and toxins into the watershed.

Deer Creek Community Fuel Break
(Adapted from Sierra Conservancy Grant Application)

The Deer Creek watershed winds through Nevada City and continues just outside the boundary of Grass Valley in a wildland urban interface area which threatens thousands of homes in the subdivision communities of Morgan Ranch, Mountain Lake Estates, Foxwood, residential properties developed in the Slate Creek Road area and the cities of Grass Valley and Nevada City.

Deer Creek is within the boundaries of the Mountain Lake Estates subdivision for approximately one mile, with extremely heavy ladder fuel conditions including manzanita, blackberry, deer brush, dogtail grass and coffeeberry vegetation in the understory of mixed conifers. The creek, which is accessible by the general public in this area, has upslope contours along most of it's path and those slopes, with at least five identified landscape chutes, run up to homes in the subdivision communities in the vicinity. Additionally, the nearby incorporated cities of Grass Valley and Nevada City are also at risk to catastrophic wildfire danger as a result of their proximity to the heavy fuel conditions and topography of the landscape.

Access to the creek on the public land owned by the Bureau of Land Management provides high public recreational use in this area and thus concern by adjacent landowners for a wildfire ignition.

This project will create a community shaded fuel break along the Deer Creek for approximately 2 miles, 100 feet on each side where landowners are willing to participate. Removal of the understory ladder fuel brush while retaining the ground cover and tree canopy within the estimated 40 acre project site, providing fire protection for the subdivision homeowners, the communities of Nevada City and Grass Valley as well as watershed protection from wildfire for Deer Creek environment. Proposed treatment would include clearing on Bureau of Land Management land (APN 35–01–03 and 35–01–04) in the project area. Participating landowners will work with a contracted Registered Professional Forester and local volunteer coordinator to flag their individual property boundaries, save vegetation and develop a suitable fuels treatment prescription for the project while respecting private property owner values. Preferred treatment will be hand clearing and chipping in the watercourse. Assessment of the biomass utilization element of the project at regional cogeneration facilities yielded additional cost to the project and was therefore removed. An assessment of the ecological value of leaving the biomass generated on site was deemed preferable due to the use of the chipped biomass for soil retention in the watershed as well as abating vegetation regrowth. There are few other viable solutions to clearing fire hazard ladder fuels in this area other than hand clearing to provide a shaded fuel break due to the potential for soil disturbance on the slopes from mechanical equipment. Chemical reduction of ladder fuels would not be an appropriate treatment of the environs of the creek waterway.

The City of Nevada City owns property upstream within one and a half miles from the project site. Nevada City was awarded a grant under FEMA for a fuels reduction project

on approximately 44 acres adjacent to the city's only wastewater treatment plant, which was later disqualified. An appeal is currently underway for the city's project, but is on hold awaiting a formal decision. The dollar value of the wastewater treatment plant is $2.5 Million with an immeasurable practical value. Uncontrolled discharges from this plant, caused by a wildfire, would be in the range of 300,000 gallons of untreated sewage into Deer Creek per day with an accompanying fine of $10,000 per day to the city. A fire starting in this area of Deer Creek would directly endanger the historic commercial district of Nevada City starting at Spring Street with potential losses in excess of $70 Million.

This project was identified as a high priority in the CWPP's Community Hazard Reduction Prioritites, the FEMA approved DMA 2000 Multi-Hazard, Multi-Jurisdiction Hazard Mitigation Plan.

The protection of the Deer Creek watershed from wildfire is critical to the Yuba River Watershed and other downstream entities that rely on Deer Creek for irrigation, water storage systems, recreation and wildlife habitat. The loss of that watershed with its attendant sediment problems would be devastating sending toxins from structure loss into the creek and larger watershed downstream, not to mention the potential for wastewater to flow into the creek if the treatment plant were affected. The proposed project would mitigate the wildfire hazard and protect the watershed values, the homeowner's improvements, and the wastewater treatment plant by reducing the heavy ladder fuels currently present.

Alder Hill Community Fuel Break
Adapted from CalFire Prop 40 Grant application

This project encompasses the creation of two community fuel breaks near Alder Hill. One fuel break is adjacent to the Tahoe Donner and Alder Hill Estates subdivisions while the second is adjacent to the Pine Forest subdivision. These two project areas would create a mid-slope and ridge top shaded fuel break. Tahoe Donner is the largest single subdivision in the Truckee area with 5,948 parcels while Pine Forest, Alder Hill Estates, Prosser Lake Heights, Prosser Lake View Estates and other larger parceled subdivisions account for a little over 1,000 additional parcels. After the Angora Fire near Lake Tahoe last summer, the residents have a heightened concern about wildfire and seek to implement a project to help protect their homes and the watershed in the event of a wildfire. Both sections of the shaded fuel break would be approximately one mile in length and 300 feet wide in strategically placed areas around the communities near Alder Hill.

This project is a cooperative effort between the Fire Safe Council of Nevada County, Alder Hill Estates, Truckee Donner Land Trust and the Tahoe Donner Homeowners Association. The proposed fuel break will benefit watersheds in the vicinity by removing fuels and allowing firefighters to more effectively combat wildfire at this strategic location. Any catastrophic wildfire will affect one or more watersheds by decreasing overall watershed health, water quality, and habitat.

The Fire Safe Council of Nevada County (FSCNC) will work with landowners in the project area to educate them on PRC 4291 compliance to ensure they are doing their part to be compliant with the law and proactive in their approach to the wildfire threat. Landowner agreements provide a stipulation that private property owners participating will maintain the fuel break for a minimum of ten years to ensure longevity of the work and buy-in by the participants. The FSCNC will solicit proposals and contract with a Registered Professional Forester (RPF) to write the fuels treatment prescription, provide environmental review and surveys and submit for an exemption under CEQA for project implementation. Competitive bids will be obtained for the fuels reduction ground work specified by the RPF and will be selected by committee. Budget for the project was scoped using mastication and hand clearing and chipping methods of treatment pending the full project review by an RPF.

Fiscal management, reporting and administration will be completed by the council. Local oversight coordination will be provided in-kind by FSCNC board member and Registered Professional Forester, Bill Houdyschell.

The FSCNC will provide:

- Education to landowners on PRC4291
- Provide Individual Defensible Space Advisory Visits to landowners in the project area
- Coordinate a town hall style meeting to introduce the project, and contract with RPF to meet with the landowners on their property
- Communicate with local and state fire officials
- Obtain landowner participation and maintenance agreements
- Solicit competitive bids for the ground work, contract for services, monitor progress
- Administrative support services for maintaining records, collecting information, fiscal audit requirements and reporting
- Committee and Board of Directors oversight of the staff and volunteer coordinator
- Upon conclusion of the project complete a detailed report, including photographic evidence of the project and submit to the CAL FIRE Prop 40 representative

Contractor will:

- RPF will work with landowners to write a treatment prescription for a community shaded fuel break
- RPF will submit environmental compliance documentation to CAL FIRE for exemption for fuel break
- Fuels Reduction Contractor will supply labor, equipment and tools to implement the treatment
  prescription specified in the request for proposal to complete the scope of work
- Provide proper licenses, permits and insurance to complete the scope of work
- A periodic activity report to the FSCNC listing:
  a) the number of hours worked,

~~b) the milestones of work completed, and~~
~~c) invoice for services completed~~

~~• Be entirely responsible for any damages their operations cause to public and private property and boundary landmarks. Roads, curbs, fences, utilities or other permanent improvements that are damaged shall be repaired to the condition that existed before the commencement of the contract work~~

~~• Adhere to all fire safety requirements.~~

Community Protection Projects

Western Nevada County
Top priority continues to be the Deer Creek and Greenhorn Creek Watersheds due to community development patterns, fire history, weather, vegetation class.

Ponderosa West Grass Valley Defense Zone – from McCourtney Road to Highway 20 along South Ponderosa Road originally part of the 1933 CCC 800-mile long fire break through the Sierra Nevada's. Creates a 300 foot wide landscape shaded fuel break insulating the higher density community developments to the east from large public lands in a vegetation transition zone from moderate to high hazard levels.

North Bloomfield/Harmony Ridge Ingress/Egress Improvement – from Highway 20 to Cooper Road. 300 feet wide, landscape shaded fuel break on private property. Creates landscape fuel break above Nevada City and provides emergency evacuation access from the greater North Bloomfield and Cooper Road areas to Highway 20. Currently this route is identified on the Cement Hill, North Bloomfield evacuation guide by the County of Nevada but needs sufficient vegetation management to be successfully used for citizen evacuation under wildfire conditions.

Scotts Flat/Cascade Shores Ingress/Egress Improvement – from Highway 20 to Pasquale road. 300 feet wide, shaded fuel break working on NID property and private lands. Creates landscape fuel break across the creek, provides emergency equipment access over dam road while utilizing Pasquale and Quaker Hill for citizen evacuation.

Red Dog/Buckeye Ingress/Egress Improvement – roadside fuel break clearance to provide emergency access from the backside of Banner Mountain to You Bet Road and onto Highway 174. Historically, there was a bridge crossing Greenhorn Creek, but after failure in the 1980's it was never rebuilt. 4WD emergency evacuation access in summer months is relatively easy provided high clearance vehicles are used and adequate roadside vegetation management is conducted.

Eastern Nevada County
Priority projects to protect communities at risk including Juniper Hills and Glenshire-Devonshire community developments as well as continuing efforts around the largest single housing subdivision in the Truckee area, Tahoe-Donner Association.

Juniper Hills Ingress/Egress Improvement – a phased project creating a 300 foot wide, shaded fuel break adjacent to the roadways to provide landscape fuels reduction and access for firefighting equipment.

Glenshire Green Belt Fuels Reductions – fuels reduction on common areas embedded between home site developments to reduce wildfire potential.

Tahoe-Donner I, II & III – fuels reduction work on common areas embedded between home site developments to reduce wildfire potential.

Prosser Lake Fuels Reduction – USFS fuels reduction project on public land directly adjacent to a community at risk.

Pombo WUI Fuels Reduction – private land fuels reduction treatment to fill in an area that has not been treated for cohesive landscape fuels mitigation.

Public Education & Outrech

Resident education and outreach is ongoing. The FSCNC provides educational materials such as the Firewise Plant Guide for Western Nevada County, and the comprehensive annual Prepare for Fire Season guide. Working with schools throughout Nevada County the council distributes children's fire safety education activity and coloring books. Most publications are available on-line for quick access via the Fire Safe Council's website at www.areyoufiresafe.com.

The FSCNC also has a tremendous wealth of information on forestry, wildfire, Firewise landscaping and construction. A catalog was developed to promote in-depth learning through our free library resources including books, DVD's and scientific periodicals. All resources are available at no-cost to residents wanting to learn more.

Firewise Communities/USA®

Nevada County continues to be a recognized leader in California in bringing people together to address the wildfire hazard under the National Fire Protection Association's Firewise Communities/USA® program.

Defensible Space Advisory Visit Program

A Defensible Space Advisor is trained on how to identify the vegetation model, how much defensible space is needed based on home siting and what would be needed to create this space under California Public Resource Code 4291. Defensible Space Advisors complete a two-day training course which includes classroom instruction and field site visits. Advisors teach homeowners about Firewise landscaping techniques around the home, provide valuable resources and specifications on proper access, new building materials and construction techniques to shield your home from wildfire embers.

Defensible Space Verification Service

The Defensible Space Insurance Verification service is an independent, third-party

verification of defensible space for homeowners' insurance or home sale escrow transactions. This program meets the FSCNC mission by the effective implementation of defensible space on the ground within a short time frame due to the non-renewal notification or home sale. This program was developed in direct response to the community need for this service. Many homeowner's insurance companies have been issuing non-renewal notices due to the high fire hazard. This is a fee for service program.

Defensible Space Chipping Program
(Adapted from Sierra Conservancy Grant Application)

CAL FIRE and the Nevada County CWPP have rated most all of Nevada County as a high or very high risk for wildfire in their wildfire hazard assessment. The FEMA approved DMA 2000 Multi−Jurisdiction, Multi−Hazard Mitigation Plan (MJMHMP) for Nevada County identifies urban and wildland fire is the most significant natural hazard threatening our county. The MJMHMP identifies community assistance as a high priority in the projects they developed in the plan to address this threat. Specifically, the plan outlines two fuel management prescriptions – Defensible Space and Community Defensible Space. The Nevada County General Plan Safety Element concurs with this, placing a high priority on landowner assistance for meeting defensible space requirements. Finally, the Core team of the Fire Safe Council of Nevada County's countywide Community Wildfire Protection, released in April 2008, has identified landowner education and assistance as a high priority to help mitigate the overall risk of catastrophic wildfire.

Historically residents would burn their brush, but with more stringent air quality regulations the window of opportunity to burn vegetative material has been greatly restricted, leaving little options for residents working to create increased defensible space to 100 feet or more on sloping topography. Another option is to load and haul the material to the McCourtney Road Transfer station. This additional effort greatly increases the time and cost to landowners to achieve their fuel reduction goals. Considering the danger of residential burns getting out of control, the free chipping program gives an effective alternative for maximizing efforts to reduce fuels on a landscape basis throughout the county.

Since 2000, the FSCNC has provided free chipping services to Nevada County residents working to create and maintain their defensible space. Residents are asked to clear the hazardous fuels from the defensible space around their homes and work with their neighbors to reduce fuels along driveways and evacuation routes. Residents then submit a request for chipping to the FSCNC, who will schedule their free chipping service. The FSCNC utilizes a customized Microsoft Access database system for inputting, tracking and scheduling the chipping program with the assistance of a volunteer professional computer programmer. This allows the system to be updated for newly established roads, program improvement, report queries and quality assurance. Currently the FSCNC has a rotating route schedule for two contracted chipping crews, so that a chipper is working in

each area of the county on a monthly basis. After the service is completed, all program participants are provided a Quality Assurance Survey to monitor the effectiveness of the program and the contractors. Quality Assurance results are provided to the FSCNC Executive Director and Board of Directors for oversight of the contractors and staff management of the program.

~~This proposal is to purchase a chipper and lease a tow vehicle and develop the use of~~The program utilizes trustee ~~inmates~~labor from the Wayne Brown Correctional facility in Nevada City with supervision by qualified ~~retired CAL FIRE~~ employees. ~~Working with our CAL FIRE board representative, three qualified retirees have been identified and are willing to job−share the program with each of them working a couple of days a week on a rotating schedule.~~ These individuals have experience supervising inmate crews which was a critical component of implementing our plan. This program model is being used by Placer County and proves to be a very cost−effective solution to contracting the chipping services out. ~~The FSCNC currently works with the Nevada County Sheriff's Department on our~~ Grant funding provides for operations~~*Special Needs Assistance Program*~~.

Special Needs Assistance Program

The Special Needs Assistance Program (SNAP) provides free defensible space clearing for qualified low-income seniors and disabled. Many residents are in need of defensible space that are physically and financially unable to complete the work. To provide a cost-effective program, we partner with organizations such as Boy Scouts, Firewise Communities and 4-H Club volunteer crews to clear properties for those with special needs. Grant funding for this program is provided by the Allstate Insurance Foundation, PG&E and AmeriCorps NCCC. Grants provide for safety supplies, volunteer medical insurance, tools, equipment, fuel and contracted clearing when volunteers are not available.

Scotch Broom Challenge

The Scotch Broom Challenge was created to address the spread of this highly flammable and invasive plant in our community. Through our individual home advisory visits, we became aware that local nurseries were selling Scotch Broom to homeowners as ornamental landscaping. We developed a program to educate nurseries on why this particular plant is NOT suitable as ornamental landscape material in a high wildfire hazard area. We provided Firewise plant labels to be used at the retail point of sale to help identify safe plants to place next to your home. Nevada County Agricultural Commissioner, Jeff Pylman, banned the sale of Scotch Broom in our county in response to our program. In the spring of 2015, over 200 volunteers took the Scotch Broom Challenge and pulled on 12 community project sites in Nevada and Placer Counties.

Appendix ~~G~~H: Existing Community-Based Fire Plans and Evacuation Plans

~~Cascade Shores Evacuation Plan~~
~~Please refer to the following link:~~
~~http://www.necfire.com/Word%20Files/Case_Shores_Evac.pdf~~

~~Alta Sierra Evacuation Plan~~
~~Please refer to the following link:~~
~~http://www.aspoa.org/wp-content/uploads/2007/07/alta-sierra-emergency-plan.pdf~~
General and individual community family emergency preparedness and evacuation planning guides are available online through the Nevada County Office of Emergency Services website and the Fire Safe Council of Nevada County at the following links:

Nevada County OES:
http://www.mynevadacounty.com/nc/igs/oes/Pages/Community-Emergency-Preparedness-Guides.aspx

Fire Safe Council of Nevada County:
http://www.areyoufiresafe.com/get-fire-smart/emergency-preparedness/

North San Juan Fire Protection District

Community Fire Plan

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

1.1 PROBLEM OVERVIEW

The North San Juan Fire Protection District (NSJFPD) faces a severe risk of wildland fire. Years of fire suppression, soil disturbance, vegetation regrowth, rural development and road construction, often not to current specifications, have created severe fire and fire-fighting threats. During the summer fire season our dense mixed forest understory with ladder fuels is an obvious challenge; Scotch Broom on formerly-cleared land is another. Many of our buildings lack defensible space and some bridges, culverts and roads cannot safely accommodate fire apparatus. Water supplies are often inadequate for fire protection and many citizens are unaware of actions they can take independently to improve their personal safety and protect their property. The size of our District, 70 square miles, and its location north of Nevada City and Grass Valley, magnify these challenges and present a risk to Nevada County's major population areas.

1.2 PROCESS OVERVIEW

CDF asked the District to draft a community fire plan to coordinate with the County fire plan. The NSJFPD Board formed a committee including citizen volunteers which began work late in 2004. Data from the county, large-scale maps from CDF, other fire plans, state documents and consultants provided information. Sections were drafted by committee members, reviewed by the committee and revised. The plan was further revised through input from institutions, government agencies, businesses and the general public, all in open meetings previously announced.

1.3 OVERALL GOALS

The main goal of this Community Fire Plan is to reduce fuel loads to decrease the intensity of wildfire and limit fire danger to structures and life. The plan promotes safe evacuation and citizen protection in the event of wildfire, on-going education of the public and training of cooperative citizen teams, improving neighborhood safety and professional assessment of fire-related infrastructure needs throughout the District.

1.4 PRIORITY PROJECTS SUMMARY

a) Thin dense fuels on each side of several evacuation routes to form shaded fuel breaks, dividing the District into more defensible sections;

b) Establish safe areas;

c) Assess hazards, infrastructure and home safety in neighborhoods which volunteer for this service, also training citizen groups in self-protection, first aid, creation of defensible space and neighborhood safety measures they can take independently;

d) Reduce understory fuel loads in each neighborhood.

1.5 ACKNOWLEDGEMENTS

The following contributed significantly to this plan:

Community Fire Plan Committee: Bill Aufiero, Sharon Beckenbach, Carol Chadima, JoAnn Fites-Kaufman, Peter Goering, Boyd Johnson, Nancy Lorenz, Jean Nilsson, Rob Paulus, Bruce Sturm.

Agencies: CDF, Fire Safe Council, Nevada County GIS, Emergency Preparedness

Consultants: Steve Beckwitt, Tony Clarabut, Sean Griffis, Rich Reader

2. INTRODUCTION

2.1 Background, History of Accomplishments

The North San Juan Fire Protection District is considered by CDF to be a very high fire danger severity zone. Twice in the past half century this area has been the point of origin for major wildland fire: the large fire in the 1960's and the 49er Fire beginning in September 1988–which consumed hundreds of structures in the Penn Valley and Rough And Ready areas and is considered one of California's most destructive fires.

Over the past twenty years the District has grown from a volunteer fire department to a taxpayer-supported fire district still staffed mainly by volunteers. The District has worked to be proactive in areas of wildfire prevention as well as fire extinguishment. We were founding members of the Yuba Watershed Council and were instrumental in bringing the public benefits of a Proposition 204 grant to western Nevada County, which included substantial public education and fuels reduction components. We recognize the importance of public safety awareness and education regarding wildland fire. The NSJ FPD was one of the first fire agencies in Nevada County to adopt CAFS (Compressed Air Foam System) technology to increase our versatility and effectiveness in fighting wildland fires and protecting structures.

2.2 Mission Statement, Strategic Plan

This District shall provide fire protection, rescue and emergency medical services, education in fire safety and emergency standards, and other services to protect lives and property while maintaining the highest level of safety for firefighters/rescue personnel. Services shall be provided in a professional manner within the economic and demographic limitations of our community and in recognition of the need for dedicated volunteer involvement, using innovation and flexibility in response to local needs and conditions.

The NSJ Fire Protection District residents and visitors stand to gain a substantial benefit from reducing the risk of wildland fire and its potential impact to life, property and natural resources. As a large territory with a small population and small tax base we have a substantial challenge in implementing any such program.

A Strategic Plan for the District is still under development.

2.3 METHODOLOGY

The Nevada County GIS system, CDF large scale topographical maps showing fuels/fire history/population density etc. and the knowledge of fire ecologists were the major sources of information used to analyze the problem and develop an action plan.

3. WHAT IS FIRE SAFETY? HOW TO BE READY WHEN FIRE COMES

3.1 BEFORE THE FIRE

3.1.1 Defensible Space

Defensible space is the area between a structure and the oncoming wildfire, where vegetation has been modified to reduce the threat from fire and provide the opportunity for firefighters to defend the structure safely and effectively. Sometimes defensible space can be as simple as a well-maintained back yard. Specific advice on improving defensible space around your property is available from a number of sources including the NSJFPD's "How to Protect Your Property from a Catastrophic Wildfire," and various publications of the Nevada County Firesafe Council and the California Division of Forestry and Fire Protection.

3.1.1.1 Legal Requirements

In California PRC 4291 is the law regarding defensible space around homes. CDF and the NSJFPD are happy to do 4291 inspections or provide advice and consultation regarding compliance with this law.

3.1.1.2 Fire-Resistant Landscaping

Many plants that are less likely to burn can be used around homes. Fire resistant plants have moist, supple leaves, little dead wood and tend not to accumulate dry, dead material. Their sap is water-like and does not have a strong odor. Fire-wise plant books are available from the NSJFPD office.

3.1.1.3 Relocation of Flammable Materials

Simple actions that homeowners can take include removing wood piles and other combustibles from around homes. Decks and the materials that accumulate on and underneath them are an area of special vulnerability during a fire. Wood piles should be a minimum of thirty feet away from any structures. Fuels, solvents and other volatiles should be stored well away from homes when possible, since their presence in any structure puts the structure at far greater risk during a wildfire.

3.1.1.4 Recommended Building Materials/Fire-Wise Construction

Use fire resistant materials whenever possible in construction or in remodeling for fire safety, such as metal or tile roofing, fireproof siding materials. Decks, soffits and openings where fire could enter a structure should be enclosed and kept to a minimum.

3.1.2 Water Sources

Provide access to water for firefighting, such as ponds and buried or above-ground tanks. Provide standard fire department connections and close access to hydrants for fire trucks. Marking domestic water supplies can also make them available for fire fighting. Provide clear access to firefighters including Knox key boxes and provide information on water sources and alternative power sources for wells and pumps in case of power failure.

3.1.3 Neighborhood Emergency Response Teams

Some neighborhood groups will opt for emergency training in addition to assessment of the local infrastructure. In such cases, Red Cross certified trainers are available to provide C.E.R.T.

(Community Emergency Response Team) training. The NSJ Fire Department has instructors able to teach CPR, First Aid and other classes to the public.

3.1.4 Personal Tools, Equipment, Fire Protection Clothing

Neighborhood assessments will result in lists of recommended tools and clothing for purchase by local citizens. Assistance will be provided to them in finding grants or sales of used equipment as appropriate.

3.2 DURING THE FIRE

Fighting the fire yourself is an option that contains substantial risk, especially if your property is adjacent to heavy fuels or has not been well cleared. Fire departments and law enforcement agencies encourage evacuation and may indeed order it in an effort to reduce risk to life and increase firefighter safety and effectiveness. Individuals hoping to stay and fight a fire must plan ahead and listen to advice from fire officials. The NSJFPD has a home emergency preparedness plan available to anyone who asks.

Be ready to evacuate and identify safety zones and shelter-in-place locations.

3.2.1 Emergency Communications

a) Internal/tactical: a Federally-mandated conversion to narrow-band radio equipment would require grant or governmental funding, being beyond the capacities of our revenue. As communication equipment becomes inoperable or beyond economical repair, we will phase in new equipment with narrow band capability, but without a grant that would take several years.

b) External/public: The District hopes to establish an emergency “hot line” with a frequently updated and time-marked phone message for public information during emergencies. The county Rapid Notification telephone system may also be utilized in the event of evacuation. See Sec. 8.5.5.1

3.2.2 Evacuation Plan

See Sec. 8.5.5.

3.2.2.1 Safety Zones

See Sec. 8.1, 8.5.5.2.

3.2.2.2 Preparing Pets and Livestock for Emergencies & Evacuation

Plans for evacuation and shelter of pets and livestock should be developed by animal owners. Information and assistance may be available from animal rescue organizations, the American Red Cross and Nevada County Sheriff. In addition, literature explaining necessary preparation and evacuation procedures which is currently available will be distributed to citizens during public education sessions, when new residents enter the community, or by request.

3.2.3 Shelter-in-Place Plans

See Sec. 8.5.5.4.

3.3 AFTER THE FIRE

3.3.1 Assess Your Success, Evaluate and Plan for How to be Better Prepared Next Time

After a serious wildfire, the local Community Fire Plan Committee would meet with local, state, and federal officials to evaluate the plan and recommend any changes to the Board and county government.

4. PLANNING PROCESS

4.1 PLANNING AREA BOUNDARIES

Planning Area Boundaries are contiguous with those of the NSJFPD itself, which is a rural area in Sierra Nevada foothills covering 70 square miles bounded by the South Fork of Yuba to our south, the Middle Fork of Yuba to the west and north. Elevation ranges from approximately 1000' to 4000'. Land use is rural and residential with some agriculture, mining, and small commercial enterprises. We are zoned rural according to the county general plan. District population is approximately 2500 with approximately 700 housing units. Public lands include those of the TNF, California's South Yuba River State Park, BLM parcels and a jointly-managed BLM and community project called the '*Inimim Forest*.

4.2 PROCESS AND PLAN DEVELOPMENT

An interim Community Fire Plan Committee began meeting on October 13, 2004. The Board created an ad hoc Fire Plan Committee in December, 2004; the committee began compiling, consolidating and analyzing relevant information and identifying stakeholders. Two public meetings were held to provide institutional and citizen input to the plan.

4.3 STAKEHOLDERS: WHO, WHAT, WHEN, WHY

A Stakeholder meeting was held on May 10, 2005, for institutions and large (>100 acres) landowners; a draft of the plan was reviewed at this meeting. Comments and suggestions were then incorporated into a second draft.

Stakeholders invited were:

California State Parks	Ray Patton
U.S.Forest Service	Gary Fildes, Forest Fuels Mgm't. Officer
	Jeanne Masquelier, District Ranger
Yuba Watershed Inst.	Bob Erickson
Bureau of Land Management	Ken Hood, Ed Bollinger
South Yuba River Citizens' League	Jason Rainey, Exec. Dir.
CDF	Rob Paulus, Battalion Chief
Calif. Dep't. Of Fish & Game	Jeff Finn
USDA, NRCS	Mike Brenner, Dan Taverner
Fire Safe Council of Nevada County	Michelle Phillips

Northern Sierra Air Quality Bd.

Yuba Watershed Council

Joe Fish

Eric Jorgensen,

Don & Barbara Rivenes

Siller Bros. (logging company)

Sierra Pacific Industries (logging company)

These stakeholders have a direct relationship to land use in the District, to implementation of this plan or to environmental issues which the plan raises.

A public meeting for residents and others interested was held on May 21, 2005, with a similar process resulting in the final draft of the plan, presented to the District Board of Directors on June 21, 2005 for adoption.

5. COMMUNITY DESCRIPTION

5.1 General Environmental Conditions

The 70 square miles of the North San Juan Ridge are typical of the rich biological diversity and range of landscapes found in the Sierra Nevada foothills. Situated between the watersheds of the Middle and South Forks of the Yuba River, the terrain changes from the rolling grasslands, pastures and chaparral of the warmer lower altitudes of about 1000 ft., to the steeper creek ravines and mixed conifer and hardwood forests of the foothills. Altitudes vary from about 2000 to 3500 feet; dominant species are Incense Cedar, Douglas fir, Black Oak, Madrone and Manzanita. An evergreen forest of cedar and fir with sparser meadows dominates the landscape from about 3500 feet to the eastern end of the District, where snow and rainfall are heavier. Summers are dry and warm with prevailing westerly daytime breezes shifting to easterlies at night. Autumns bring some northerly winds and the most serious wildfire threats, until about mid-October, when the rainy winter season usually begins.

5.1.1 Topography, Slope, Aspect, Elevation

Situated between the South and Middle Forks of the Yuba River our District occupies steep canyon slopes with elevations ranging from approximately 2000 to 4000 feet.

Access is provided by four bridges over the South Fork of the Yuba – Pleasant Valley Rd and SR 49 with the capacity to handle vehicles of all weights and bridges at Purdon and Edwards Crossings with weight limits of 5 tons permitting access by light vehicles only. To the north access is provided on SR 49 over the Middle Fork and, within the District, at Tyler Foote Crossing by a 5 ton bridge.

5.1.2 Meteorology, Climate, Precipitation

See Sec. 6.4

5.1.3 Hydrology

The District is bounded by the South Fork of Yuba to our south, the Middle Fork of Yuba to the west and north. Oregon Creek flows into the Middle Fork at the District's northern boundary. The South Yuba has been declared a Wild and Scenic river by the State of California. The Middle Fork is dammed at "Our House," forming a reservoir suitable for helicopter water reloading. A scattering of ponds fed by springs or seasonal creeks can also provide some water for firefighting, though many are inaccessible to helicopters.

5.1.4 Ecosystem Types

Lower elevations in the District are characterized by dry chaparral, grasses and Ghost Pine. Most of the region above about 2200 feet consists of mixed conifer/hardwood forest, the predominate species being Douglas fir, Ponderosa, some Sugar Pine, Incense Cedar, Madrone, Manzanita and Black Oak. Above 3500 feet, hardwoods decrease in number, with fir and cedar prevailing.

5.1.5 Threatened and Endangered Habitat Types

Wildlife is diverse and typical of California Sierra foothills. Spotted Owls and Goshawks are the only rare or endangered species, both at higher altitudes.

5.2 Population, Demographics

Some 2500 people live here. Many are self-employed; others commute to jobs in nearby towns. Most residents live below 3500 ft., within ten miles of North San Juan. Summer visitors (State Parks estimate: 300,000 person-visits/year) use park facilities at Bridgeport, North Columbia, Oregon Creek and numerous swimming and fishing sites along both rivers. Additionally up to 200 visitors per week will live at Shady Creek Camp, a summer family facility located on Tyler Foote.

Population growth has been low, changing by fewer than 200 between the 1990 and 2000 census. Construction has increased, but no firm evidence confirms a corresponding population change. Nevada City and Grass Valley have experienced rapid growth over the same period; population pressures in town may shift growth to the District, but no data show that, as yet. The 30-minute commute time to Nevada City and the county general plan zoning limiting new parcels to 40 acres will inhibit growth. Redevelopment of North San Juan is possible but still an unknown. Population will probably grow slowly here for at least ten years.

5.3 COMMUNITY LEGAL STRUCTURE, JURISDICTIONAL BOUNDARIES

For fire jurisdiction, see Section 4.1

The District is part of Nevada County Supervisorial District 4 and falls within the jurisdiction of the Nevada County Sheriff, California Highway Patrol and CDF. Portions of the District are also areas of responsibility of the California State Parks Department, the US Forest Service (Tahoe National Forest), and the Federal Bureau of Land Management.

5.4 LAND USE/DEVELOPMENT TRENDS

The Ridge was extensively logged in the nineteenth and early twentieth centuries, leaving few old growth trees. The area includes several historic communities with “Western Colonial” architecture, such as French Corral, North San Juan, North Columbia and other former town sites. These communities have a small number of cottage industries, retail stores, ranches and truck farms, a medical and dental clinic, two schools and a relatively large religious community with facilities for visitors and residents. Development, its attendant fire suppression and lower levels of annual rainfall have resulted in a volatile, relatively dense forest with extensive “ladder” fuels in the understory.

5.5 INFRASTRUCTURE

Seven major paved roads serve these areas, while well over 100 private, unpaved roads provide access to the remoter regions of the District. Most roads, both paved and unpaved, passing through forested areas are threatened by dense forest and understory close to their borders. Some alternate escape routes for residents are blocked by fallen trees and vegetation or traverse private property and are blocked by gates; some road easements have fallen into disuse and are similarly blocked. Bridges at Edwards’ and Purdon Crossings of the South Yuba River are inadequate and dangerous for evacuation.

French Corral, North San Juan, North Columbia and the surrounding businesses and residences below 3500 feet receive electrical power from the Colgate-Allegany 60 KV power line which crosses the spine of the Ridge to about the 3000 ft. level and crosses the Middle Fork of the Yuba River, heading north into Sierra County. An electric sub-station is located along Tyler Foote Crossing Rd. near the intersection of State Highway 49. A relatively small number

of residences and business beyond North Columbia generate their own electrical power. Telephone service exists throughout the region; one microwave relay station is located in North Columbia. Cell phone service is limited, with reception being affected by terrain. Radio communication between emergency service vehicles is usually reliable but can also be adversely affected in canyons and ravines. A county-wide automatic call-up system is available for emergency use to notify residents; numbers must be entered in advance and changes maintained in the system.

Steep, rocky canyons make the rivers poor sources for firefighting water, and relatively few homeowners have water storage facilities. A small number of ponds and lakes are available, and the religious community has extensive water storage and distribution facilities. In the event of wildfire, water supplies would be overtaxed, although a CDF air attack station with water and fire retardant reloading facilities is only two minutes' flight time away, in Grass Valley.

No aircraft runway near a water supply exists in the District, but several landing sites and water refilling sites are available to helicopters. Water storage facilities are also available to fill tenders, but not in sufficient number to make vehicle travel times acceptable. Water storage sites are more numerous in populated areas below 3300 feet and sparse elsewhere. There are no hospitals on the Ridge; a private medical clinic near the Cherokee town site serves local residents. Twin Ridges School District operates one elementary school near North Columbia and has its central office in a currently vacant school site on Oak Tree Rd. The religious community of Ananda operates another school. High school and private school students must travel to Nevada City or Grass Valley.

5.6 EMERGENCY SERVICES

5.6.1 Fire Protection Response/Readiness

Fire protection and emergency medical service are provided by the North San Juan Fire Protection District, a volunteer service available for immediate response at any time. In summer months, similar service is provided by a CDF facility at about the 3500 foot level. Emergency medical transport is provided by ground ambulance from Grass Valley or several air ambulance helicopter providers located throughout the region. Ground ambulance takes about 25 minutes; helicopter about five minutes, but service can be delayed by the need to transport victims by ground ambulance to helicopter landing zones. Police service is sporadic, with unscheduled patrols provided by the California Highway Patrol and Nevada County Sheriff. The Sheriff's office provides service and implements evacuation during a wildfire emergency.

5.7 INSURANCE RATINGS

The rural areas of the community have an ISO rating of 9, and the central portion of the District including the town of North San Juan an 8.

5.8 FIRE SAFE COUNCILS, WATERSHED COUNCILS, RESOURCE CONSERVATION DISTRICTS, NON-GOVERNMENTAL ORGANIZATIONS, HOMEOWNERS' ASSOCIATIONS

The Fire Safe Council of Nevada County is the only such entity serving the District. NGO's include the Yuba Watershed Council, a coordinating group monitoring environmental protection and watershed preservation or restoration efforts in the county, and the Yuba Watershed Institute, which operates in partnership with BLM to manage specified tracts of watershed lands to preserve old-growth forests and habitat. Several road associations control maintenance on

local roads, but no tally or official listing of them is known. No known record of Homeowner Associations exists. Parts of the Neighborhood Assessments to be done for this plan include compiling information on such groups. The Natural Resource Conservation Service, a federal agency, provides technical advice and assistance to landowners on land improvement for agricultural development; they have helped the District in past efforts at watershed protection and fuels reduction under a NSJFPD managed Proposition 204 grant.

6. CURRENT Fire Environment

Fire has played an integral part in creating the forest environment of the Sierra Foothills and a significant function in shaping plant communities in the District. Historically, the District was a fire-dependent ecosystem with numerous fire-adapted species of plants and animals dependent on fire to recycle nutrients, regulate plant succession and wildlife habitat, maintain biological diversity, reduce biomass, and control insects and diseases. In recent decades, however, due to fire exclusion, grazing, timber harvest and mining, the ecosystems have changed dramatically. We now have a fire-prone ecosystem dominated by hot-burning fuels and thick brush.

6.1 Wildfire Problem Definition

Vegetation directly influences rate of spread, flame length, fire intensity, heat per unit area and other elements affecting fire suppression. A hillside with lots of fire-prone Manzanita, for instance, has a higher hazard rating than one with more fire-resilient species such as Madrone or Douglas fir. The fuel density in this area has increased the potential for devastating wildfires. Fire-prone species such as Manzanita and Scotch Broom are widespread.

6.2 Local Fire Ecology

Historically, wildland fire frequently burned in most areas of the District. But the fire ecology is no longer a healthy system with small ground fires. In recent decades fire exclusion, grazing, timber harvest and mining have changed the ecosystems dramatically. Fire exclusion would have less impact on the ecology of an area characterized by infrequent crown fires and severe surface fires than on an area that typically experienced light surface fires every one to twenty-five years. Our aggressive fire suppression for about sixty years has created a dense understory with ladder fuel. This will lead to a catastrophic wildfire with crown fires and devastating ground fires.

6.3 Fire History

From 1900-1919 there were 6 fires, all in remote areas and sized one square mile or less. Between 1920 and 1939 there were 4 fires in remote areas of similar size. Between 1940 and 1979 only one major fire burned 16 square miles. Between 1980 and 1999 one major fire burned 6 square miles and had its ignition point within the District. This was the 49er Fire, one of California's worst, which burned hundreds of structures south of the Yuba River in the Penn Valley and Rough & Ready Fire Districts. In 2004 numerous fires ignited but only one structure was lost.

6.4 Fire Weather

Summer brings dry weather with minimal precipitation to the District. Dry lightning is common in the higher elevations. In the fall, a dry wind from the north brings our highest fire danger when fuel moisture content drops to dangerously low levels. The frequency is difficult to predict but occurrence is definite. Up slope and down slope wind is a daily occurrence during the fire season, with prevailing winds shifting from westerly during days to easterly at nights.

6.5 Hazardous Fuels

The District's most fire-prone fuels are Manzanita and Scotch Broom. Manzanita is a native plant, but Scotch Broom is not. Because our forests are dense with vegetation, crown fires are common. This in turn makes all fuel within the forest hazardous. Fire suppression has also

resulted in extensive tracts of dense forest with dead material, fallen trees, ladder fuels and brush.

6.5.1 Fuel Hazard Ranking &

6.5.2 Condition Class

The fuels rank extreme/severe for much of the District, in CDF Condition Class 3. In this category fire regimes have been significantly altered from their historical range and fire frequency differs greatly from its historical pattern. Roughly 75% of the District currently fits into Condition Class 3, mostly due to fire exclusion. Fire exclusion has created vegetation and fuel conditions for large and catastrophic fires that are more difficult to suppress than smaller fires. Throughout the District, our forests present a continuous fuel supply both vertically, in small, thin trees and dead branches (ladder fuels), and horizontally, in an abundance of dead and down material.

6.5.3 Natural Fire Breaks

The District is bordered by two rivers which afford some natural fire break. Hwy 49 bisects the District north to south and Tyler Foote Rd. runs east to west. Pleasant Valley Rd. and Oak Tree Road run east to west. Four other fire breaks are formed by the Badger Hill, Columbia Hill, Malakoff diggings and the gravel beds of Shady Creek.

6.6 Ignition History: Source, Season, Slope, Aspect

Most of the fires in the District are human caused. However, lightning plays a role in the late summer and early fall. According to the CDF records for the District, over 50% of the ignition points are near or next to road ways. Given this fact we would expect future fires to ignite in the mid-to late-summer and near populated areas within the District.

7. RISK ASSESSMENT: IDENTIFYING & EVALUATING ASSETS AT RISK

7.1 Structures/Density

The population is concentrated in the center of the District in the area bounded by Highway 49, Oak Tree Road and Tyler Foote Road. Major population concentrations within this area include North San Juan, the Ponderosa subdivision along Blind Shady, Ananda Village and the old Cherokee town site. Other population clusters include French Corral, North Columbia and lots bordering Cruzon Grade at the east end of the District. The densest population is the town of North San Juan. Outside of North San Juan the most densely settled areas have a density of approx one unit per 3-5 acres.

7.2 INFRASTRUCTURE

Key infrastructure that would require priority protection in case of fire includes the telephone exchange in North San Juan and the electric substation on Tyler Foote Rd. near Ivy Lane. The Colgate-Allegany transmission line also crosses the District and crosses the Middle Yuba canyon through dense vegetation. The Birchville reservoir and attendant ditches and pipes are another area of concern.

7.3 ACCESS/TRANSPORTATION, ROADS, DRIVEWAYS, BRIDGES, GATES, CULVERTS

See Sec. 5.5

7.4 Business Commercial

A concentration of commercial establishments in North San Juan includes churches, transfer station, gas station, grocery, restaurant, bar, gift shop, recreation center, auto repair, fire hall/community meeting hall, bicycle parts distribution and a senior center. Ananda Village includes a market, jewelry shop, thrift store and chiropractic and massage offices. The industrial zone at Ananda Village currently holds construction, architectural design, publishing, financial consulting, graphic design, distance learning and herbal essences. Other commercial areas include: Peterson's Corner (bar/restaurant, motel), the corner of Oak Tree and Tyler Foote (market, fire station), Milhous on Highway 49 (farm supply store, center for troubled youth) Cherokee (medical clinic, jewelry manufacture, car parts fabrication, metal working) the North Columbia area (architect, market). Several camps and retreat centers are located in the District, including Shady Creek Camp, The Expanding Light retreat at Ananda Village, The Ananda Meditation Retreat off Jackass Flats Road, and the Ring of Bone Zendo off of Jackass Flats. Many home-based businesses scattered throughout the District include farms, ranches, nurseries, a winery and various art studios. Also of note to protect in a fire are two public schools: Oak Tree School on Oak Tree Rd. and Grizzly Hill School on Grizzly Hill Rd., and the private Milhous School and Ananda Living Wisdom School.

7.5 CULTURAL RESOURCES

Of particular importance to certain groups of residents are the Activity and Improvement Center and the Senior Center, both in North San Juan. Various Maidu Indian sites have been found throughout the District, including artifacts and grinding rocks. Because of the multitude of past fires and the short-lived nature of artifacts that could be damaged by fire, it is unlikely that any of the existing Maidu remains would be further damaged by wildfire. Fire suppression efforts involving heavy equipment could be a danger to these sites. A number of buildings and

facades of buildings have survived from the Gold Rush era of last century. Of particular importance to protect from fire is the North Columbia School House, a building dating from 1875, which now houses a cultural center and often holds collections of art work on display. The Methodist Church in North San Juan is of similar vintage and architectural and historic. There are several other 19th Century buildings in the North Columbia area. The Wells Fargo building on Pleasant Valley Rd. in French Corral and several of the buildings along Highway 49 in North San Juan are of historical significance. Lastly the restored covered bridge at the South Yuba Park headquarters in Bridgeport would merit special protection from fire.

7.6 Ecologically Sensitive Areas: Wildlife, Habitat, Plants, Ecosystem Health, Primitive Areas

The northern part of the District has nesting sites for goshawks, an endangered species. Remnants of old growth forest provide special habitat for species of concern such as the spotted owl. Other key habitat areas include Montezuma Hill (a winter migration area for the Nevada City deer herd), the upper reaches of Grizzly Creek, and the 'Inimim Forest' parcels administered by BLM in conjunction with the Yuba Watershed Institute.

The District spans over two thousand feet in elevation and several ecosystems. Approximately 8% of the forested area still exhibits old growth characteristics, but much of the forest has unhealthy fuel density with younger trees and large concentrations of brush species. The low human population density allows a large and diverse population of wildlife.

7.7 Water and Watersheds

The rivers flow largely unimpeded through this area, but both feed into reservoirs (Lake Englebright). A significant portion of the flow of the Middle Fork during certain seasons is diverted into the North Fork and then Bullard's Bar Reservoir via a small dam and diversion tunnel at Our House. The rivers are important for recreational and habitat areas. Secondary streams flow off the ridge into the major rivers, dropping steeply into the river canyons. Shady Creek has a longer watercourse and parallels the South Yuba before dropping into the river canyon. Spring Creek and Bloody Run are other major secondary streams. The steep drainages leading into the river could act as chimneys during wildfires. Large wildfires in the canyons will likely strip existing vegetation and increase winter erosion. Water quality in the Yuba River and its tributaries will decline, affecting aquatic populations, damaging popular recreation resources, and increasing sedimentation in the Bullard's Bar and Lake Englebright reservoirs.

7.8 Air Quality

This region is part of the greater Sacramento air basin because westerly winds regularly bring ozone and other pollutants from the large metropolitan areas to the west. Ozone concentrations at ground level have at times reached unhealthy levels. Air pollution levels may be affecting forest health and could lead to increased hazardous fuel load if trees begin to die. The Northern California Air Quality Management District restricts open burning on some days because of poor dispersion characteristics in the atmosphere. Landowners are constrained as to when they can burn debris created by thinning and brushing for fire protection. These restrictions and the obvious advantage of preventing air pollution favor chipping for disposal of cleared vegetation. Air quality also makes the scheduling of control burning of large acreage more problematic. The smoke from any large wildfire in or near the District combines with the already unhealthy air to create air pollution levels that exceed acceptable standards and can lead to health 'advisories.'

The effect of this air pollution is greater on children and older people. Schools and the senior center should be given special attention if smoke reaches dangerous levels.

7.9 Recreation

The Middle and South Forks of the Yuba provide major recreation areas for District residents and visitors. The State Park system maintains land along the South Yuba including a headquarters at Bridgeport and access points at Purdon and Edwards Crossings, including the nearby South Yuba Campground. Malakoff Diggins State park, on the eastern boundary of the District, attracts visitors to the historic Gold Rush era town, hydraulic mining pit, trails and campgrounds. Many tourists move through the District on Highway 49 to access recreation sites in Yuba, Sierra counties and beyond. Traffic on summer weekends increases by an estimated 40% or more along Highway 49. Dramatic vistas of forested hills and mountains are present at many places in the District. Wildfire would significantly degrade these scenic view sheds. Other recreation areas include, Activities & Improvement Center in North San Juan, facilities associated with Oak Tree and Grizzly Hill schools, and facilities at Ananda Village.

7.10 Natural Resource Management Areas

Special resource management areas are maintained on public land administered by the U.S. Forest Service, The Bureau of Land Management and California State Parks. The 'Inimim' forest cooperative management initiative developed with BLM, the Yuba Watershed Institute and the timber framers guild guides forest practices on a group of BLM parcels in the District. The plan seeks to return the forests to healthy old growth while managing for fire protection, wildlife habitat and recreation. BLM has thinned trees and masticated understory fuels on hundreds of acres. The State Parks system actively manages the South Yuba State Park and Malakoff Diggins State Park to reduce fuels and mitigate wildfire danger. A number of large privately-owned parcels zoned for timber production are managed by Siller Brothers and other private individuals. Owners of several large tracts of private land are working with CDF through their VMP program. Several growers operate commercial agricultural concerns in the District. Both CDF and Ananda Village maintain a network of shaded fuel breaks.

8. MITIGATION STRATEGY: THE ACTION PLAN

8.1 Desired Future Conditions

In general, our long term goal is to reduce fuel loads to a point where wildfire would be likely to burn at intensity low enough to be controlled without posing a serious threat to life or infrastructure. The plan calls not only for fuels reduction, but for safe evacuation and citizen protection in the event of catastrophic wildfire, on-going education and training of cooperative citizen teams serving in small neighborhoods during public safety emergencies and assessment of infrastructure improvement needs, also by neighborhoods, throughout the District.

8.2 MITIGATION Goals

8.2.1 Evacuation Routes

The District will be divided into five REGIONS to implement this fire plan. Each region will have evacuation routes and safe zones. Evacuation routes will also serve as shaded fuel breaks. Major evacuation routes will be thinned/brushed to 200 feet back on each side of the road; Neighborhood evacuation routes will be thinned/brushed to 75 feet back on each side of the road.

8.2.2 Regions & Safe Zones (safe zones in bold)

a) French Corral: Bridgeport east to Pleasant Valley/Birchville intersection, north and south to District boundaries.

b) Highway 49 Corridor: Route 49 and areas on either side from the southern to northern District boundaries, including Milhous, Reader Ranch, North San Juan. West to the Pleasant Valley Rd./Birchville Rd. intersection; east to the Ivy Rd./Tyler Foote intersection; southeast along Oak Tree Rd. to New School Rd. **Oak Tree School; North Gold Mountaineer Senior Center.**

c) Lower Tyler Foote/Purdon corridor: east from Ivy Rd. to the Welker hilltop and end of Blind Shady Rd.; north to the Brotherhood Way/Oak Tree Road intersection.

d) Ananda/Sages Rd.: area east of Oak Tree Road and north of Tyler Foote up to and including Fandor Road and all parcels along Sages Road from Cherokee Town site to the District boundary. **Ananda Village Center.**

e) Columbia: area along Tyler Foote from Fandor Road to the eastern boundary of the District, including the Jackass Flat/Fire Access area. **North Columbia Schoolhouse Cultural Center.**

8.2.2 .1 Major Evacuation Routes:

a) Highway 49 between District boundaries
b) Tyler Foote Road northeast from Hwy. 49 to District boundary
c) Oak Tree Road & Purdon Road from Tyler Foote to the District boundary*
d) Pleasant Valley Road from Hwy. 49 to Bridgeport

8.2.2.2 Neighborhood Evacuation Routes:

e) Blind Shady/Wah Way/Jackass Flats Roads (fuels reduction almost completed)

f) Sweetland Road
g) Sages/Salmon Mine/Ayodhya Roads
h) New School Road
i) Old Mill Road/Tyler Foote/Longpoint Road loop
j) Lake City & Grizzly Hill Roads from Tyler Foote to District boundary*
k) Birchville Road

*Bridges crossing the South Yuba River at Purdon and Edwards' crossings are inadequate in the event of an evacuation. These bridges, which would be essential in the event of a fire blocking Tyler Foote Road (as occurred in 2005) could be blocked by either an accident or stalled vehicle, as is true of the immediate approaches on either side. Nevada County should take responsibility for upgrading these structures and their approaches on county roads to make them suitable for evacuation.

8.2.3 Fuels Reduction

A sustainable plan will reduce all 'very high' and 'high' density fuel areas to moderate or low density (CDF Nevada County data) and maintain these levels of fuel load. Thinning, brushing, burning, logging, chipping and prescribed burning will be used to reduce fuel loads and to maintain the lower levels in compliance with the Nevada County General Plan Safety Element. Work will be performed by property owners and private contractors, with assistance from the NSJFPD, CDF, U.S. Forest Service, California State Parks, BLM, NRCS and the Fire Safe Council of Nevada County or other agencies.

8.2.4 Neighborhood Assessment and Training

On a voluntary basis, citizens will be encouraged to form NEIGHBORHOOD GROUPS. The size of the neighborhoods will depend on population density, terrain and road access but would generally not exceed about two square miles. As grant funding permits, firefighters with appropriate certification (NSJF, CDF, USFS, NC Fire Planner) will serve as ASSESSMENT & TRAINING OFFICERS. They will meet with each neighborhood group to assess fire hazards, bridge and culvert capacities, fuel loads, water supplies and communication needs in each neighborhood, assist in addressing the needs and train neighborhood teams in fire prevention, property protection and public safety. Such assessment and training may require regular meetings for a period of up to a few months. Periodic follow-up sessions for retraining and review may also be required.

8.2.5 Education

A COMMUNITY EDUCATION PROGRAM will be implemented to inform citizens of details of this plan, including provisions for evacuation, shelter in place, safety zones, fuels reduction and the neighborhood provisions for fire safety and prevention and public safety. The education program will include a District library of fire safety, fire-wise landscaping, defensible space, first aid and other literature for distribution to citizens on request. Copies of these materials and of this fire plan will also be available on the District web site. New residents will also be identified through voter registration rolls, building permit applications and parcel ownership changes so that these materials may be made available to them.

8.3 Current Projects

Fuels reduction projects have been in progress for several years, funded by Prop. 204 and by the Fire Safe Council of Nevada County.

Four shaded fuel breaks exist in the District, all developed by CDF and Nevada County: the Montezuma Break (Jackass Flat over Montezuma Hill to Miller Road and Bunker Hill); the North Columbia Break (N. Columbia to the northern boundary of the District along Tyler Foote Road to Cruzon Grade Road); the North Columbia Fuel Break Expansion (still in progress); and the Snow Tent Break (from the end of the North Columbia Break to Graniteville.)

Since we are a volunteer rural fire district with limited resources, grant funding will be essential to provide the neighborhood assessments and to train and assist Neighborhood Groups. Grant assistance may also be needed to help Neighborhood Groups defray costs of infrastructure improvements such as culvert, bridge, water supply improvements or communication equipment. The District Fire Plan Committee will be responsible for submitting or coordinating pertinent grant requests. Once funding is available, prioritization will be as follows:

1) The Community Education Program can begin almost immediately; materials and trained, certified instructors are currently available.
2) Fuels reduction along Evacuation Routes and establishment of Safe Areas can begin immediately and should be completed within two or three years.
3) Fuels reduction should begin immediately and will be on-going for the life of this plan. After evacuation routes and safe areas are completed, priority for fuels reduction will be given to areas of high fuel density, working toward lower density areas as funding permits.
4) Neighborhood assessments and training can both begin almost immediately (protocols will have to be developed). While infrastructure assessments should be completed within five years, training of neighborhood teams will be on-going for the life of the plan, since re-training will be required as populations change.

8.4 PRIORITIZATION PROCESS

8.4.1 Biological, Economic, Community, Safety

For community safety, the paramount needs are fuels reduction along evacuation routes and the establishment of safe zones.

The last major fire to begin in our District, the “49er” Fire, spread south and west, threatening Nevada City and Rough & Ready and doing extensive damage to homes and businesses in the Newtown Road area before extinguishment. Northerly winds typical of early fall, the height of the fire season, mean that any District fire threatens Nevada City and Grass Valley, beyond the threats to North San Juan and North Bloomfield. Fuels reduction, therefore, across the San Juan Ridge is the next priority, to protect District homes, businesses and the towns south of us.

Several small businesses employ local residents and are under proximate threat from dense understory and unmanaged forest. One such business, for example, RCD Engineering, employs over 20 residents and manufactures products for nation-wide distribution, yet is close to several parcels with high fuel densities. In addition, several large ranches conduct business in the District.

Fuels reduction is also essential to protect wildlife habitat. The south side of Shady Creek is a major migration route for Black-tailed Deer. The District is habitat for two rare or endangered species, Goshawks and Spotted Owls.

8.4.2 Resources Available, Project Readiness

CDF, the Fire Safe Council and District assessment and training personnel are available to begin immediately. Funding is the only prerequisite.

8.4.3 Project Prescription

Fuels reduction projects have been conducted extensively in the past in this District and local districts by CDF, the Fire Safe Council and local contractors. No special preparations are needed; this project, as funded, will fit into the on-going efforts of these agencies to reduce fire hazards.

8.4.4 Responsible Parties:

A citizen volunteer from the North San Juan Fire Protection District, either a member of the Board of Directors or from the community and approved by the Board, will serve as PROJECT COORDINATOR once the plan is approved.

Each Neighborhood Group will choose a responsible leader to coordinate the work of property owners in fuels reduction, facilities improvement and attendance at training sessions conducted by appropriately certified instructors. The District will provide all pertinent education materials and will initiate action in areas where fuels reduction or area assessment is needed but where no neighborhood group is formed.

Neighborhood assessment and training officers have not yet been identified, although a pool of qualified persons is readily available; assignments can be made quickly once the plan is approved and funding is available.

8.4.5 Agency Involvement

All of these agencies were involved in public review and revision of this plan. CDF was involved from its inception in the entire process. (See Sec. 4.3 for list.)

8.4.5.1 California Department of Forestry

CDF has provided extensive leadership and service in formulating this plan. Its continued assistance will be essential to coordinating work on shaded fuel breaks, supervising evacuation drills and planning for service to citizens in safe areas. Depending on community response, help my also be required from CDF in public education.

8.4.5.2 Fire Safe Council of Nevada County

The District has no organization, equipment or funding to coordinate fuels reduction. Extensive assistance from the Fire Safe Council of Nevada County or other agencies will be required to:

--obtain permission from property owners for fuels reduction along evacuation routes;

--assist with fuels reduction on parcels with 'very high' to 'high' (CDF data designations) fuel densities and maintenance of those parcels at proper fuel densities;

--coordinate, with CDF, the establishment and maintenance of shaded fuel breaks.

The Council has, however, been the major provider of services involving fuels reduction and the establishment of shaded fuel breaks in the District in the past. They have been informed of this plan and have already submitted an initial grant request for its first funding, pending its approval.

8.4.5.3 Bureau of Land Management

BLM properties comprise a large portion of lands in the District, and BLM provides major funding to current county fuels reduction programs. Beyond that assistance, however, it is essential that BLM provide funding for fuels reduction on BLM parcels:

-- to comply with the Nevada County General Plan Safety Element, and

-- to permit citizens safe access through or along BLM properties to identified evacuation routes, and

-- to maintain these properties, once desired fuel levels have been reached.

8.4.5.4 California State Department of Parks

Two major evacuation routes (Pleasant Valley Rd., Highway 49) traverse park properties. Park employees may need training to assist with evacuation in the event of a catastrophic fire.

8.4.5.5 U.S. Dep't. of Agriculture, Natural Resources Conservation Service

May provide assistance with fuels reduction through its "EQIP" program.

8.4.5.6 U.S. Forest Service

Much of the District is part of the Tahoe National Forest. Federal fuels reduction programs will significantly affect the safety of District citizens.

8.5 Possible Actions

8.5.1 Vegetation Management/Fuel Modification Projects

All fuels management will be done in accordance with Goal FP-10.11 of the Nevada County General Plan Safety Element.

8.5.1.1 Thinning and Brushing

Thinning and brushing will be used by parcel owners in very high and high fuel density areas where roads or driveways provide close access; the slash will be piled for chipping by property owners and chipped by the Fire Safe Council or other agency.

Thinning and brushing will also be done along major evacuation routes, the work and slash chipping to be done by the Fire Safe Council or other agency.

Neighborhood Groups will also use thinning and brushing as recommended by this plan to improve residential safety or to provide safer access to evacuation routes. The work will be done by neighborhood members; slash chipping will be done by the Fire Safe Council or other agency.

8.5.1.2 Prescribed Burning

In some 'very high' and 'high' fuel density areas inaccessible to chipping equipment, controlled burns may be necessary. Such burns would be conducted in conformity with Air District Burn Permits issued by the Northern Sierra Air Quality Management District and any permits required by the statutory fire agency in charge.

8.5.1.3 Industrial Resource Management

Siller Brothers plan no logging operations on their own holdings in the District for over 20 years. Sierra Pacific Industries, a timber harvesting concern, has no holdings within the District boundaries but does in areas contiguous with the District, as does Tahoe National Forest. Siskon mining lands are currently on the market for sale. We will work with these or any industrial concerns, as appropriate, to achieve the goals of this plan.

8.5.1.4 Slash/Biomass Disposal

Debris removal from evacuation routes, Neighborhood Group thinning/brushing projects and brush and ladder fuel removal in 'very high' and 'high' fuel density areas accessible to roads and driveways will be done with assistance from the Fire Safe Council, private parties or other agency.

8.5.1.5 Forest Products Utilization

In cases where fuels reduction projects involve felling of large trees with commercial value, the Fire Safe Council will provide the logging service under prior agreement with the land owners for appropriate compensation.

8.5.2 Infrastructure Improvements

8.5.2.1 Water Supply

Water supplies suitable for firefighting currently available are identified on maps in the county GIS system, available to all fire apparatus on a laptop computer. This plan calls for additional on-site assessment of the 70 square miles of the District in small neighborhoods. These assessments are likely to lead to the identification of neighborhoods where water supplies are inadequate and to grant requests to fund or assist with the installation of ponds, reserve water tanks or small hydrant systems.

8.5.2.2 Roads/Access

Ladder fuels and brush will be removed along several roads (Sec. 8.2.) Most roads in the District are privately constructed and maintained. Safe access for emergency vehicles over culverts, bridges and through forested areas during a fire is, for the most part, unknown. The scope of this problem and the District's size require that we assess small areas in person, using trained staff—one reason behind this plan's proposal for Neighborhood Assessments. Once infrastructure needs are identified, neighborhood teams will resolve the issues using private funds for private property or grant assistance for major or neighborhood evacuation routes.

8.5.3 Emergency Response

8.5.3.1 Fire Protection Response/Readiness

The clearing of major and neighborhood evacuation routes and the assessment and improvement of neighborhoods proposed here will both contribute to improved fire protection response.

8.5.3.2 Equipment

NSJFPD has two water tenders and compressed air foam capabilities on its other apparatus. CDF provides both water-bearing helicopters and air tankers with fire suppression chemicals during fire season. The Nevada County General Plan Safety Element Goal FP 10.7 calls for research of a system of strategically located fire protection water supplies, which would be essential in some areas of the District to resupply water tenders. An additional tender may also be necessary for the District to maintain its ISO rating.

8.5.3.3 Firefighter and Public Training, Certification and Qualification

Both NSJFPD and CDF meet or exceed current training standards; NSJFPD volunteers participate in over fifty training and re-certification sessions annually. This plan calls for public training by certified trainers (NSJFPD and CDF) provided on a neighborhood basis. This plan would extend C.E.R.T. training (already done in some areas) to all volunteering neighborhoods, in addition to providing training in property protection and mutual assistance during emergencies.

8.5.3.4 Defensible Polygons See next section.

8.5.3.5 Fuel Breaks (Shaded, Strategic, DFPZs)

This plan would add each Major Evacuation Route as a primary shaded fuel break cleared to the same standards as the Expanded North Columbia Break. Each Neighborhood Evacuation Route will become a 170-foot-wide fuel break, effectively dividing the most populated areas of the Ridge into zones more easily defended against wildfire. The geographical position of the San Juan Ridge immediately north of the more heavily populated communities of Nevada City and Grass Valley vastly increases the value of these fuel breaks in protecting those areas against the historically more dangerous wildfires, those driven by northerly winds. In addition, several areas of sparse vegetation (areas of the Ananda community, several gold-rush era hydraulic diggings) form natural DFPZs and are identified as Safe Zones (see Sec. 8.1.)

8.5.4 Defensible Space

Available literature explaining defensible space has been used extensively in community training and information; it will be used in education efforts for this plan. In addition, the Neighborhood Assessments done for this plan will make specific recommendations regarding defensible space.

8.5.5 Evacuation Plan

Evacuation is a central part of this plan. Removal of brush and ladder fuels from evacuation routes is the first priority listed for implementation and a central component of the neighborhood assessment and training proposed.

8.5.5.1 Emergency Communication System/Neighborhood Teams

The Nevada County Office of Emergency Preparedness and the District have agreed to use the county's Rapid Notification System for routine department matters until personnel are familiar with its operation. This system will inform residents, either by Region or Neighborhood, of any evacuation. In addition, the District has established an emergency "hot line" with personnel responsible for updating its time-stamped recording to inform residents of the status of any emergency or of the need to evacuate.

Neighborhood Training called for in this plan will include evacuation training and the provision of alternate escape routes wherever possible.

8.5.5.2. Safety Zones

Several Safety Zones are called for in this plan. See Sec. 8.2.

8.5.5.3 Escape Routes

See Sec. 8.1 for Major and Neighborhood Escape route explanation.

Some alternate escape routes for residents are blocked by fallen trees and vegetation or cross private property and are blocked by gates; some road easements have fallen into disuse and are similarly blocked. Neighborhood Assessments called for in this plan will identify such situations and resolve them with assistance from the County or through the necessary fuels elimination.

8.5.5.4 Shelter-In-Place Procedure

Training in shelter-in-place procedures will be done in Neighborhood Training sessions and implemented through the emergency communication systems identified in 8.5.5.1 above.

8.5.6 Education

Education is a major component of this plan. The plan calls for its implementation in two ways:

- -- provided by certified instructors to Neighborhoods, on a voluntary basis, including American Red Cross C.E.R.T. training, and
- -- provided in community meetings and through educational literature, the District web site, and new resident education done when mitigation fees are paid for new construction.

8.5.7 Fire Safe Councils: Process, Stakeholders, Resources

Discussed in Sec. 8.4.2.3

8.5.8 Fire Safe Consultations

The NSJFPD, Nevada County and CDF have resources to provide advice to citizens to promote public safety and code compliance. In addition, Neighborhood Assessments called for in this plan will provide further information through on-site observations by trained firefighters.

8.5.9 Senior/Disabled Assistance

Evacuation of elderly, disabled or remotely-located citizens during a wildfire follows a program instituted and maintained by the American Red Cross. Upon decision of the Incident Commander to evacuate, the plan is implemented by the Nevada County Sheriff's department. Data showing names, addresses, phone numbers and types of disabilities or special needs (ambulance, special vehicle, equipment) of the elderly and disabled are available in deputies' vehicles on CD-ROM, readable on laptop computers. The discs are updated at six month intervals and distributed to the Sheriff's Department and to local fire departments. Forms to update this information are distributed regularly by the Western Nevada County Chapter of the Red Cross and are available at the North San Juan Fire Protection District office on Tyler Foote Rd. The forms will also be distributed at public meetings held to discuss the draft of this

community fire plan and will be distributed to Neighborhood Groups during training sessions as needed.

8.6 WATERSHED PROTECTION

No grading is anticipated as part of this plan; if any becomes necessary, it will be done in accordance with county regulations. Sensitive soils and grading in sensitive areas where erosion could be problematic will be avoided. All work will be done to comply with state and local regulations and to protect secondary and tertiary water sources as well as to prevent erosion of tailings or soils from former mining operations.

8.7 PERMITTING, EXEMPTIONS

Efforts to obtain permission from property owners or the permits from county, air quality board or other officials will begin upon approval and funding of this plan.

8.8 PRIORITIZED ACTIONS, IMPLEMENTATION TIMELINE

8.8.1 Short Term (< 1 year)

--EDUCATION/COMMUNITY EDUCATION PROGRAM

Timeline: Short Term; implementation can begin almost immediately.

8.8.2 Medium Term (1-10 years)

--EVACUATION ROUTES, SAFE ZONES

Timeline: Short to Medium Term; completed within five years.

--FUEL LOAD REDUCTION

A sustainable plan will be in effect to reduce all ‘very high’ and ‘high’ density fuel areas to moderate or low density (CDF Nevada County data) and to maintain these fuel load levels. Thinning, brushing, burning, logging, chipping and prescribed burning will be used to reduce fuel loads in the District by at least 25% and to maintain the lower levels in compliance with the Nevada County General Plan Safety Element Goal FP10.11. Work will be performed by property owners and private contractors, with assistance from the North San Juan Fire Protection District, CDF and the Fire Safe Council of Nevada County or other agencies.

8.8.3 Long Term (10+ years)

--NEIGHBORHOOD ASSESSMENT AND TRAINING

Timeline: Long Term; from year one through 10+ years and on-going for the life of this plan as retraining/recertification are needed.

--FUEL LOAD REDUCTION

A sustainable plan will require us to maintain manageable levels of fuel load. This will be on-going for the life of this plan.

8.9 Monitoring and Evaluation

The Community Fire Plan Committee will review this Plan every five years, as required by the Disaster Mitigation Act of 2000, and recommend any changes to the District Board.

The Community Fire Plan Committee will evaluate data gathered annually (a. through d. below) to determine whether the Fire Plan needs to be updated. The Committee will consider broadly

1. Were the mitigation measures implemented as planned?
2. What went right and what went wrong?
3. Are there opportunities for improvement?
4. Were objectives met?
5. How did this project affect residents' attitudes and behavior regarding fire danger and hazardous fuels?
6. Did the Plan place undue burdens on participants, thereby reducing community involvement?

and specifically

1. Status of evacuation routes and safe zones identified in the Action Plan
2. Number of private acres treated
3. Number of publicly-managed acres treated
4. Number of private and public acres maintained after initial treatment in order to determine what updates need to be made to the Action Plan

9. SUMMARY AND CONCLUSIONS

9.1 ANALYSIS AND FINDINGS

Action items were developed using three primary methods:

a) Consulting topographical maps of the District showing fuels density, ignition and fire history, slope and aspect, developed parcels, population densities, water sources and roads;

b) Discussion among committee members and with CDF and District officers;

c) Suggestions from stakeholders and the public.

The action items include: fuels reduction; creation of major and neighborhood evacuation routes and safe areas; assessment of fire and safety-related infrastructure by neighborhoods, the assessments done by trained personnel; training of citizens by neighborhoods in personal safety, first aid, fire defense and evacuation, the training done by certified instructors; establishment of remote water sources for firefighting; consideration of additional mobile water sources for firefighting; assistance to neighborhoods in infrastructure improvement through grant requests.

9.2 PLAN UPDATE PROCESS

9.2.1 Community Survey

The Committee will determine the effectiveness of the NSJFPD Community Fire Plan during the five-year period by surveying the community and asking questions such as:

1. Are you familiar with or have you read about the NSJFPD Community Fire Plan?
2. Has reading about the Fire Plan heightened your awareness of wildfire hazards on the Ridge?
3. Has knowledge of the Fire Plan caused you to participate in neighborhood meetings to discuss local resources, evacuation routes, etc.?
4. Have you done any fuel reduction work on your property after learning about the NSJFPD Community Fire Plan? If so, what motivated you to do this work? If not, why?

9.2.2 Public Meetings

Public meetings will be held to encourage citizens to take an active role in the continued development of the Community Fire Plan by helping to identify needs, strategies and solutions to wildfire risk. These meetings will also inform citizens about proposed changes to the Fire Plan. The Committee will evaluate what it has learns from the above process to update the NSJFPD Community Fire Plan.

9.2.3 Incorporation into Local Jurisdictional Plans

The updated NSJFPD Community Fire Plan will be presented to the Board of Directors of NSJFPD for discussion and adoption. Copies will be provided to local agencies involved in planning or implementing the fire plan (CDF, BLM, Forest Service, Fire Safe Council, identified neighborhood groups). An information copy will be sent to the County Board of Supervisors.

9.3 NEXT STEPS

--A Community Fire Plan Director will be appointed by the Board to oversee implementation of the plan and to assume leadership of the Community Fire Plan Committee.

--The membership of the Community Fire Plan Committee may be reconstituted, depending on the wishes of current members regarding their continued service.

Pending Board approval of such requests, grant requests will be made:

--for Proposition 40 funds with the help of the Fire Safe Council;

--for Proposition 50 funds through the Yuba Watershed Council;

--for F.E.M.A. funds through the Federal government;

--for funds from other sources as they become available.

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FUELS AND EXPECTED FIRE BEHAVIOR, NORTH SAN JUAN FIRE PROTECTION DISTRICT

Hazardous Fuels

Fuel loadings in the District are mostly moderate to high (Table x). The greatest concentrations are in dense conifer forest (35% model 10) and tall chaparral (11% model 4) or brush (21% model 6). These fuel types characterize the surface fuels.

In forested types, crown fuels are primarily moderate to high due to high vertical and horizontal continuity. Canopy base heights are most often less than 3 to 5 feet and canopy bulk densities most often exceed 0.2 kg/m^3. Where canopies are higher off the ground, such as in mid-aged or older pine stands, there is often a tall layer of shrubs below, increasing the likelihood of crown fire.

Table x. Distribution of fuel types across the District. Data from the state database: *Surface Fuels Maps & Data* http://frap.cdf.ca.gov/data/fire_data/fuels/fuelsfr.html

Fuel model	Description	Acres	percent
1	grass	878	1
2	pine/grass	11,358	12
4	tall chaparral	10,014	11
5	medium-light brush	10,807	12
6	heavy brush	19,093	21
8	hardwood/conifer light	966	1
9	hardwood/conifer medium	1,840	2
10	conifer heavy	32,295	35
28	urban	934	1
98	water	737	1
99	rock barren	2,569	3

Expected Fire Behavior

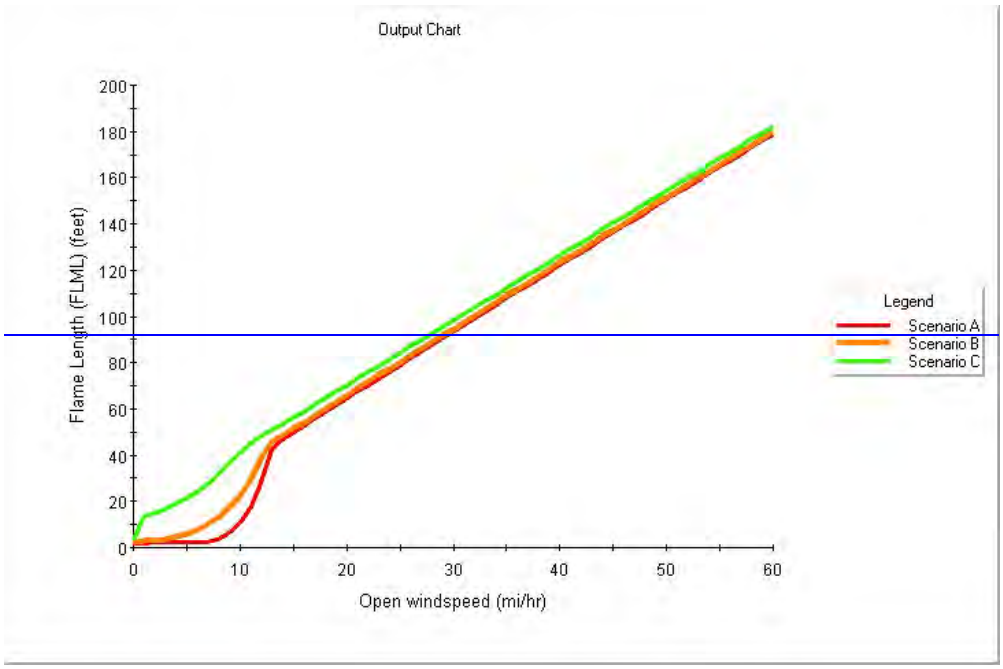
Fire behavior during conditions of high or very high fire weather will be active with high rates of spread and flame lengths often exceeding those allowing for direct attack with hand tools (>4'). In the dominant fuel types (shrub and heavy conifer forest), flame lengths will exceed 12' on steeper slopes or

with winds greater than 20 miles/hour. In forested fuels, proportion of the canopy that will be consumed will be high.

http://www.nccfire.com/Word%20Files/Casc_Shores_Evac.pdf

Table x. Predicted fire behavior using NEXUS. Input conditions were chosen to reflect hot, dry, summer days or windy, fall days with dry or north or east winds. *Key assumptions were: 1-, 10- and 100-hour fuel moistures of 3, 4 and 5% respectively; foliar moisture of 100%, canopy bulk densities for shrubs of 0.8 kg/m^3, and for forests of 0.25 kg/m^3; canopy base height of 3 feet.*

Figure 28. Predicted flame lengths in heavy conifer fuel type. Predicted fire behavior using NEXUS. Input conditions were chosen to reflect hot, dry, summer days or windy, fall days with dry or north or east winds. *Key assumptions were: 1-, 10- and 100-hour fuel moistures of 3, 4 and 5% respectively; foliar moisture of 100%, canopy bulk densities for shrubs of 0.8 kg/m^3, and for forests of 0.25 kg/m^3; canopy base height of 3 feet.*



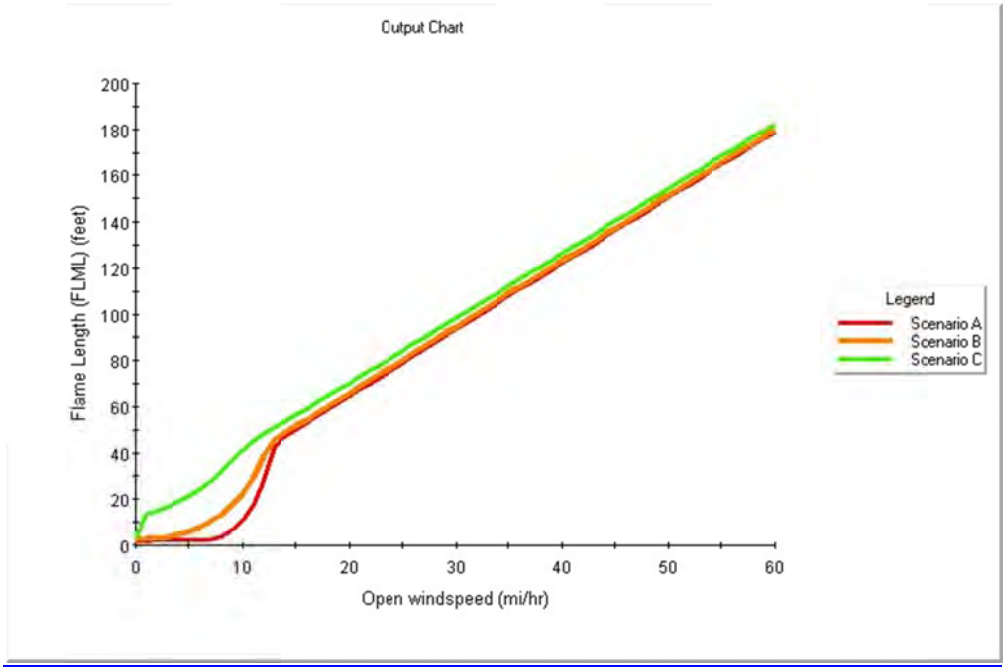

Output Chart
Flame Length (FLML) (feet)
200
180
160
140
120
100
80
60
40
20
0
0
10
20
30
40
50
60
Open windspeed (mi/hr)
Legend
Scenario A
Scenario B
Scenario C

Figure 28. Predicted crown consumption in heavy conifer fuel type. Predicted fire behavior using NEXUS. Input conditions were chosen to reflect hot, dry, summer days or windy, fall days with dry or north or east winds. *Key assumptions were: 1-, 10- and 100-hour fuel moistures of 3, 4 and 5% respectively; foliar moisture of 100%, canopy bulk densities for shrubs of 0.8 kg/m^3, and for forests of 0.25 kg/m^3; canopy base height of 3 feet.*