

How to Protect your Property From a Catastrophic Wildfire



Photo courtesy of Orion Clemens - North San Juan Ridge.



This booklet has been made possible by
Proposition 204 grant funds to the
North San Juan Fire Protection District
Nevada County, California

“Nevada County is a high fire severity zone and it’s the law to have defensible space.”

This booklet will educate on what is defensible space, how to create it and provide alternatives to reducing fire danger on or around your property. This booklet is designed for both the small and large acreage owner, and homeowner groups.

The goal is to create not only fire safe property, but to establish a balance by reducing the fuel load for wildfires, protecting soil from erosion, improving air quality and watersheds, enhancing wildlife while maintaining aesthetics and preserving the natural beauty. This booklet will suggest different ways to achieve safety and conservation, while supporting the different needs of different landowners.



“Help fight the fire that may destroy your property and that of your community, by clearing flammable vegetation.”

Fire chief Boyd Johnson, North San Juan Fire Protection District



“Let animals be your groundskeepers”

Carol Hollingsworth, Grass Valley resident, uses goats for brush clearing



“Defensible space doesn’t mean bare ground. Consider the 3 R’s- Reduce, Remove and Replace vegetation.”

Lesa Osterholm, Manager of the Nevada County Resource Conservation District



“One of our neighbors told us about the Proposition 204 fuels reduction program funds that were available for forest and brush management. This program was being administered by the North San Juan Fire Protection District (NSJFPD) with the assistance of the USDA Natural Resources Service (NCRS). Our family applied for the program to treat 50 acres above Purdon Crossing which is a high use recreational area. We have always worried about the threat of fire originating from that area. After the first rains, the professional crew that we had contracted with, came in and hand removed the brush, thinned the overcrowded trees and trimmed the low hanging limbs. Not only does this enhance the visual impact, it strengthens the remaining vegetation, improves water quality and quantity of run off, and drastically reduces the fire danger.”

Crawford Bost to include family members Josie Bost, Heidi and Mike Wilcox



This booklet is dedicated to the memory of

Ed Yilek

His foresight and perseverance contributed to the educational grant for the residents of the North San Juan Ridge and surrounding area.

Defensible Space

What is defensible space? California law currently requires a 30 foot clearance (defensible space) around all structures. Defensible space is the area that lies between your house and an oncoming wildfire where the vegetation has been modified to reduce the threat of fire and which provides an opportunity for firefighters (and the homeowner) to safely defend a structure.

Researchers who have studied past wildfires found that homeowners on a level property have a much better chance of saving their homes if flammable vegetation is greatly reduced within 100 feet of all structures and if fire-resistant roofing is used.

This 100 foot clearance establishes a more effective defensible space than is currently required by California law. Examples of Defensible Spaces are green backyards, brush reduction and community greenbelts.

According to Forest Service studies, the chances of a home igniting during a wildfire is determined almost entirely on what happens within a hundred feet of the home.

The width of defensible space is greater on steep slopes. Structures located on steep slopes or at the tops of steep slopes require management of flammable vegetation up to 400 feet downslope and 200 feet to the sides and upslopes.

Defensible space doesn't have to mean bare ground. Bare ground would only create erosion problems and surely would not be very aesthetically pleasing to the landowner.

No plants are completely fire retardant. Avoid plants that have resinous, oily or waxy plant parts. Even the best fire resistant plants can become a fire hazard if not maintained. Any plant can burn during extreme fire conditions. However, there are plants that are harder to ignite, burn slower, produce less heat when burning and/or produce a shorter flame length.

Make sure your property address is clearly marked. Green reflectorized address signs work great and are very inexpensive.

<p>HOW DO I CHANGE THE VEGETATION ON MY PROPERTY TO REDUCE THE WILDFIRE THREAT?</p>	<p>THE THREE R's OF DEFENSIBLE SPACE</p>	
<p>The objective of defensible space is to reduce the wildfire threat to a home by changing the characteristics of the adjacent vegetation. Defensible space practices include:</p> <ul style="list-style-type: none"> • Increasing the moisture content of vegetation. • Decreasing the amount of flammable vegetation. • Shortening plant height. • Altering the arrangement of plants. <p>This is accomplished through the "Three R's of Defensible Space."</p>	<p>Removal</p>	<p>Remove hazardous brush, weeds and highly flammable vegetation for a minimum distance of 30-100 feet. Example, remove any tree that is dead or dying or any portion that extends within 10 feet of a chimney.</p>
	<p>Reduction</p>	<p>The removal of plant parts, such as branches or leaves, constitute reduction. Examples of reduction are pruning dead wood from a shrub, removing low tree branches, and mowing dried grass.</p>
	<p>Replacement</p>	<p>Substitution of hazardous vegetation with less flammable plants. For example, removal of a dense stand of flammable shrubs and replacing with an irrigated, well maintained landscape.</p>

DEFENSIBLE SPACE DISTANCES*			
	Distance from House		
Percent Slope	Uphill**	Sides**	Downhill**
Level to 20%	100 feet	100 feet	100 feet
21% to 40%	150 feet	150 feet	200 feet
41% to 60%	200 feet	200 feet	400 feet

* Adapted from *Wildland Home Fire Risk Meter*, Simmerman and Fischer, 1990.
 ** Refers to direction of slope from the structure.



Before



After

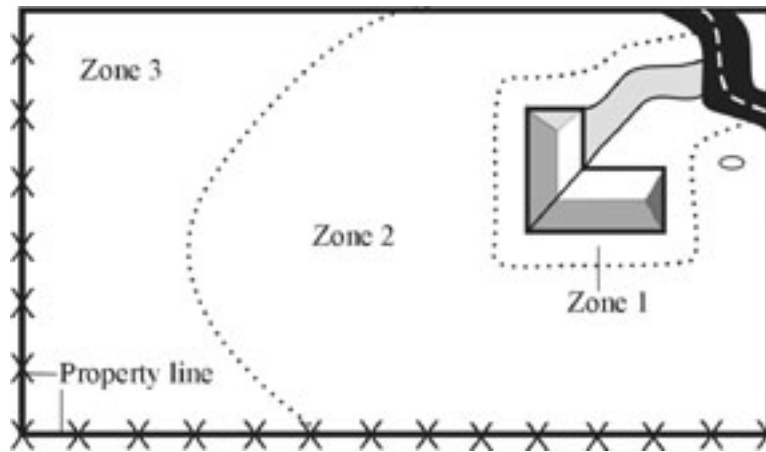
Creating Wildfire-Defensible Zones

Creating an effective defensible space involves developing a series of management zones in which different methods are used. See diagram for a general view of the relationships among these management zones. Develop defensible space around each building on your property to include detached garages, storage buildings, barns and other structures in your plan.

Zone 1 is the area of maximum modification and treatment. It consists of an area of 30 feet around the structure in which all flammable vegetation is removed. This 30 feet is measured from the outside edge of the structure.

Roads and driveways should be well maintained, cleared of trees and brush to permit safe access to your property. Fire engines require 15 feet of vertical clearance.

Ideally, remove all trees from Zone 1 to reduce fire hazards. If you do keep a tree, consider it part of the structure and extend the distance of the entire defensible space accordingly. Isolate the tree from any other surrounding trees. Prune it to at least 10 feet above the ground. Remove any branches that interfere with the roof or are within 10 feet of the chimney. Remove all “ladder fuels” from beneath the tree. Ladder fuels are vegetation with vertical continuity that allows fire to burn from ground level up into the branches and crowns of trees. Ladder fuels are potentially very hazardous but are easy to mitigate.



Property showing the three fire-defensible zones around a home or other structure.

Zone 2 is an area of fuel reduction. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend about 100 feet from the structure. Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing homesite safety and the aesthetics of the property.

Limit the number of dead trees (snags) retained in this area. Wildlife needs only one or two snags per acre. Be sure any snags left for wildlife cannot fall onto the house or block access to roads or driveways.

Stack firewood and woodpiles uphill or on the same elevation as the structure but at least 30 feet away. Clear and keep away flammable vegetation within 10 feet of these woodpiles. Do not stack wood against your house or on or under your deck, even in winter. Many homes have burned from a woodpile that ignited as the fire passed.

How to Create Defensible Space

- By Hand - hand thinning, pruning, piling, raking and burning
- Mechanical Methods - equipment used for removal of brush and thinning of trees
- Livestock Grazing - reduction and control of grasses and brush
- Herbicide Applications - applications to reduce and control growth of weeds and brush
- Irrigation - “green areas” and pastures

BY HAND

Hand Cutting, Pile & Burn

The hand cutting, piling and eventual burning of the piles of vegetative material is one of the most common treatments used to reduce excessive vegetative fuels. Because no specialized equipment is used, this treatment has the major advantage of the property owner being able to do this work with little direct expense involved. For project areas between one acre and five acres in size, hand cutting and piling would normally be the method to consider first. Contractors are available for those property owners who are unable to do this handwork. Burning of the piles can only occur on “burn days” as regulated by the Northern Sierra Air Quality District and the California Department of Forestry and Fire Protection.

Most likely you will need loppers, gloves, safety glasses and a chain saw. Hand removal works great for smaller areas. You can use loppers to trim limited amounts of brush, berry bushes and tree branches. You will need a chain saw for smaller tree pruning, thinning and removal. If you have never used a chainsaw before, contact your local saw shop for safety tips. There are even local safety classes available.

Before you remove all your unwanted brush on your property, remember that small amounts of brush create food, habitat for wildlife, buffers for streams and ponds, and/or natural fences for your property. Thinning thick areas of berry bushes and brush by creating pathways into it will allow wildlife better access for eating and nesting areas.

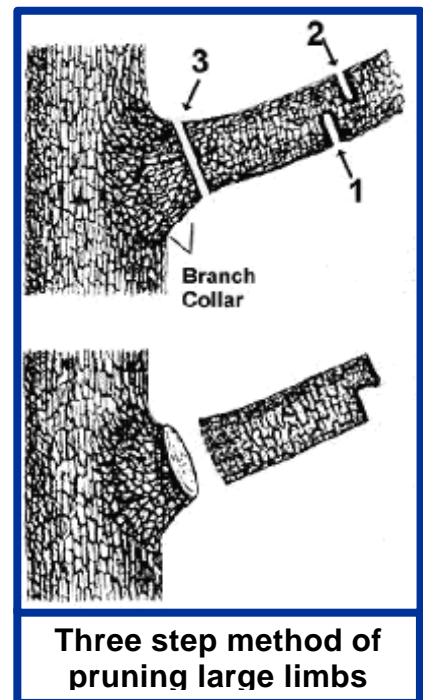
Pruning

Pruning can involve both dead and live limbs. If the ground and ladder fuels have been removed, prune limbs up to 10 feet above the ground. If you are pruning for future timber quality for commercial harvesting

purposes, pruning can occur up to 18 feet above the ground. Most pruning is done with a pruning saw, with or without a long handle, or a gas powered pruning saw.

When pruning, trim branches as close to the trunk or bole as possible without cutting into the branch collar. This is

necessary to keep the tree healthy and minimize the chance of infection through the limb wound. For pine trees, only prune in late fall or winter to minimize the chance of bark beetle activity.



Thinning

Timber stands in this area are dominated by overstocked, dense stands of small trees (primarily incense-cedar, white fir, and ponderosa pine). These dense young stands need to be thinned to remove ladder fuels from under crowns of older trees, and to reduce competition for nutrients and moisture. This will improve tree vigor and longevity of the larger, remaining old growth trees.

The purpose of thinning for fuels reduction is to increase the distance between tree crowns in order to reduce the chance that fire will spread between them, and/or to remove ladder fuels to reduce the possibility that a ground fire will transition to a crown fire. Thinning can be done by hand or using a wide variety of equipment.

Thin trees and large shrubs so there is at least 10 feet between crowns. Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree. On steep slopes, allow more space between tree crowns. (See Figure 2 for minimum recommended spacing for trees on steep slopes.) Remove all ladder fuels from under these remaining trees. Carefully prune trees to a height of at least 10 feet.

Burning

Please use a safe method for burning piles. For Burn Information, ALWAYS call first and make sure it is a burn day, and whether a burn permit is needed. Even if it is a permissible burn day, if the weather is windy in your area, you should wait until a better day to burn. **Do not burn poison oak!**

<u>Burn Day Information for Nevada County</u>	
South County	530-268-1023
Grass Valley/Nevada City	530-274-7928
Truckee	530-582-1027
Downieville	530-289-3552
Sierraville	530-994-3561
Northern Sierra Air Quality Office	530-274-9360
Complaint Hotline	530-274-9364

Equipment necessary for burning a pile is a shovel and/or pitch fork, water hose and/or water buckets and a telephone nearby.

The safest way to burn is to begin with a 4 feet by 4 feet pile, and clearing all debris and vegetation within 10 feet. Add material to the burn pile as it burns. Let the flames die down before adding more material. Do not use gasoline or diesel to ignite the pile. Make sure material is dry and make small, tight piles. If material is wet, it will smolder and smoke out your neighbor. This is a No-No. An adult must be present the entire time the pile is burning and should not leave the area until the fire is dead out.

Piling

Material removed by hand can be piled away from structures on your property for wildlife brush piles. These can provide great habitat for small animals and birds. The piles will decompose naturally. Although hand removal can be labor intensive, it is usually less of an impact on the soil and ecosystem. The material can also be chipped or burned. If piling for burning, limit your piles to 4 feet by 4 feet.

Chipping (on site)

For smaller properties or smaller project areas that are close to roads, chipping of vegetative fuels may be a good option. This treatment has the added benefits of returning the vegetative material back to the ground where it can act as a soil amendment or provide erosion control over the surface of the soil. The major disadvantage of using a chipper is in the fact that the chipper is a large piece of equipment that is limited to roads or very flat areas adjacent to roads and material must be brought to the chipper. This limitation makes this treatment best where fuel reduction is needed along road edges or on accessible property. The major advantage of this treatment is that it can be done any time of the year without consideration of fire escape risks, permits or smoke.

Your local community has free chipping services. Call the Nevada County Fire Safe Council for information, 530-470-9193. Chipping allows you to reduce your trimmings to material for landscaping, erosion control and reducing unwanted re-growth of weeds and brush. Chipping also eliminates burning and helps improve air quality. Do not leave piles or chips against or under trees as they will attract insects, and could lead to beetle infestation and death of some trees.

Composting

Composting is easy to do, it gets rid of leaves and recycles organic material to create wonderful soil to use again. Visit the Nevada County composting website at www.nevadacountyrecycles.com.

MECHANICAL METHODS

Mechanical methods include all methods of modifying the fuels profile except for fire use applications, chemical treatments and livestock grazing. Mechanical treatments include: biomass removal, biomass thinning, rearrangement, chipping, piling, and mastication.

Tractor Pile and Burn

Tractor piling and the eventual burning of the piles is much faster and more efficient than hand cutting and piling and results in a longer lasting fuel reduction treatment. Most of the brush roots are removed with the clearing operation. When a tractor is used, a brush rake attachment should generally be used to pile brush and debris to reduce the amount of dirt in the piles. An experienced and careful tractor operator can pile brush with minimal dirt getting into the brush pile. Excessive dirt will reduce the ability of the brush to burn completely. Excessive slopes can be a limitation to tractor clearing.



Photo courtesy of Mountain Clearing & Brushing, Inc.

Burning of these large piles can only be done on “burn” days as regulated by the Northern Sierra Air Quality District and the California Department of Forestry and Fire Protection. Alternatives to burning the piles would be either burying the piles or hauling the piles away. Both of these options could probably be done by the equipment contractor hired to do the piling. The burying option is mentioned due to its occasional use for reducing slash on timber operations. It is probably not a desirable treatment on smaller properties or near residences. This treatment requires the use of a tractor for digging holes and covering the vegetative material. While this treatment could be considered as having the added benefit of returning the vegetative material to the soil, decaying or composting processes could result in future sink

holes or ground unsuitable for future construction. The hauling away of the piles to the dump is only suited for smaller amounts of material from lots and small parcels.

Mastication

This treatment is relatively new technology and is done with a very specialized piece of heavy equipment that essentially grinds vegetative material down close to or into the dirt. This is a one step operation that effectively eliminates vegetative fuels on a wide variety of topography in a rapid manner. Like chipping, mastication provides the added benefit of returning the vegetative material back to the ground where it can act as a soil amendment or provide erosion control over the surface of the soil. Mastication can be done any

time of the year without permits. Due to move-in/move-out cost of equipment, this method can be expensive for small landowners (10 acres or less). This can be overcome by increasing the project size by the addition of several adjacent property owners.

Mastication is generally used on dense areas of small, live fuels such as brush and small diameter trees. Mastication is the breaking of fuels into small pieces and (usually) leaving them on the forest floor. It is a very effective tool for thinning trees and brush in plantations. This equipment is an excellent tool for maintenance of fuelbreaks. Mastication mimics understory burning to one extent, and thus can be an effective replacement for prescribed burn in areas where fire is not safe to use.

Once limited to slopes less than 30 percent for safety reasons, some modern mastication machines have capabilities of operating safely on steeper slopes up to 51 percent. Since mastication does not kill the root systems of target sprouting shrubs and hardwood trees, these plants typically sprout rapidly

following mastication treatment. This method of treatment has severe limitations on rocky sites.

Firewood production continues to be a valid business in Nevada County with values currently averaging \$200 per cord for oak. However, if brush and small diameter vegetation is the main fire hazard, the firewood option will offer little help to the property owner. If firewood harvesting is a valid option for your property, a substantial amount of smaller limbs, branches and leaves will probably remain that will require further treatment (probably piling and burning).

If you are receiving a value for any harvested tree from your property, you should check with the CDF to make sure you do not need to get a Timber Harvest Plan (THP) or an Exemption to a THP. If you cut firewood for your own use, permits are not required.

LIVESTOCK GRAZING

Let animals be your grounds keepers

The grazing method involves the use of animals to control the composition and rate of growth of brush and grasses. Livestock will graze grasses, weeds and brush. Enjoy your livestock and allow them to forage naturally on the land. All livestock must be fenced and there are many ways to achieve this.

Electrical fencing is available for temporary fencing and allows for livestock movement from one area to the next. Electrical fencing can be either solar powered or plugged into electrical outlets. Contact the Nevada County Resource Conservation District or the local Agriculture Extension Office for more information on livestock grazing procedures and principals.



Goats

Goats are the best all-around “grounds keepers.” Goats can be managed to either reduce or eliminate brush, low tree limbs, blackberries, manzanita, poison oak and weeds. They will also eat grasses and clovers. Goats are an under-utilized resource on most small farms. Many people choose mechanical or chemical means to treat unwanted weeds and brush which is a short term solution, but will have little impact on any re-growth. Goats offer an alternative because they prefer brush and weeds, and will continue to graze out any re-growth. Goats can be combined with sheep, cattle or horses. There are local businesses that you can contract with for using goats for brush removal. They will manage the whole process for you, including the fencing issues. Goats need to be protected from coyotes and other predators.



Cattle and Sheep

Cattle are suited for larger, range areas. Rangeland may need brush removed to reduce the fuel load for wildfires and restore good grazing grasses for livestock. After removing brush and thinning trees in forested areas, grasses will re-establish themselves for wildlife and livestock grazing. Cattle and sheep prefer grasses but will browse on brush and trees. Cattle and sheep need good fencing and equipment for handling.



Horses

Horses are selective grazers and prefer grasses over forbs. They will graze some areas down to the ground and leave other areas standing. It is a good practice to follow up grazing with either cattle, sheep or goats for more uniform grazing and to reduce weeds and brush. This will also break up the specie-specific parasite cycle.

Remember the “grazing rule of thumb,” and always use the 12" : 4" rule for all livestock. Put animals on the grass when it is 12" or taller and remove livestock when the grass is grazed down to 4" in height. Grass needs this minimum height to maintain root structure and re-growth.

HERBICIDE APPLICATIONS

Hazardous vegetation can be reduced by killing vegetation or reducing its growth through chemical treatment. Herbicides do not in themselves remove any vegetation which might be considered a fire hazard. This treatment is primarily used for maintenance of areas that have been previously cleared of heavy vegetative fuels. The use of chemicals may be a cost-effective way of preventing unwanted trees and /or shrubs from resprouting, or creating firebreaks, or fuelbreaks, or for eliminating unwanted weeds in areas of landscaping.

Two classes of chemicals are used to create and maintain firebreaks: pre-emergent chemicals, which inhibit germination, and post-emergent chemicals, which kill plants once they have germinated. Although these chemicals are effective in the short run, removal of all existing vegetation often leads to invasion by weedy exotics resistant to herbicides.

The periodic application of herbicides will effectively prevent the regrowth of vegetation. The initial application of herbicides should be done shortly after the removal of the heavy fuel because the cutting and/or burning of many plant species actually accelerates vegetative regrowth. The use of many herbicides commercially or over large areas requires a permit and a license for application.

Prior to any application you should contact the County Agricultural Commissioner for the latest regulations and requirements regarding herbicide use. *Be careful not to allow run off to a stream or pond, and do not apply when wildlife will be eating the fruit or berries.*



IRRIGATION

There are several ways to maintain a defensible space on your property with green areas through efficient, water saving irrigation practices.

- Drip Irrigation- allows you to directly water the desirable plants, not the weeds and therefore; keeping unwanted growth to a minimum.
- Plant Lawns - use sprinkler irrigation and maintain beautiful, green areas.
- Irrigated Pastures - provides low, green growth and forage for livestock.

Contact your local seed supplier or the Nevada County Resource Conservation District for recommendations for lawn and pasture mixes. The local irrigation supply store might even assist you in designing the best system for your property.



Fuel and Fire Breaks

Fuel breaks and firebreaks can be created by all the methods discussed. In some cases, a bulldozer may be needed to create a fire break down to the dirt. Many times a large parcel owner will create a fire break around his property. Homeowner groups and communities are working together to protect their areas in case of catastrophic wildfires.

Fuel break - A fuelbreak is "a strategically located wide block, or strip, on which a cover of dense, heavy, or flammable vegetation that has been permanently changed to one of lower fuel volume or reduced flammability" (Green 1977).

Shaded Fuel Break - A shaded fuel break in a forest or wooded area where trees are pruned up to 20 feet, and the intermediate shrubs, brush and dead fuels are removed, and replaced with grasses and forbs.

Fire Break - An existing barrier or one constructed before a fire occurs, from which all of the flammable materials are removed. A fire break is designed to stop or check a creeping or running fires. Many times a fire break is created by a grader or dozer, and is minimum of 20 feet wide.

In Summary

Defensible space is *Not* an option, but a requirement and there are many ways to achieve it. Remember, what you do or don't do on your property can affect not only your family and home, but the whole community. Be conservation minded, be firesafe and enjoy our diverse and beautiful natural resources of Nevada County.

Community Outreach Programs and Contacts

When a fire breaks out, the best thing to do is call **911**. Call 530-477-5761 if you are calling from a cell phone!

OUTREACH PROGRAMS

California Forest Stewardship Program

800-738-TREE <http://ceres.ca.gov/foreststeward>

The California Forest Stewardship Program is designed to encourage good stewardship of private forestland. The program provides technical and financial assistance to influence positive changes to forestland management, assists communities in solving common watershed problems, and helps landowners.

USDA Natural Resource (NRCS)

530-272-3417 www.ca.nrcs.usda.gov

Provides cost share programs for improving rangeland and forest health and reducing the fuel load for a catastrophic wildfire. There is an Environmental Quality Incentive Program (EQIP) and others through the-USDA Natural Resource office in Grass Valley.

Nevada County Resource Conservation District (NCRCD)

530-272-3417 www.carcd.org

Provides free technical assistance to landowners, workshops, soils survey information, rental of the no-till drill and lots of free literature.

Fire Safe Council of Nevada County Fire Safe (FSCNC)

530-470-9193 www.firesafecouncilnevco.com

The NCFSC provides free chipping services to neighborhood groups who provide a Neighborhood Coordinator. In addition to the chipping program, the NCFSC has a Senior and Disabled Assistance Program to create and maintain defensible space.



CONTACTS

American Red Cross 530-272-3265

Bureau of Land Management 916-985-4474

Nevada County Master Gardeners 530-273-4563

Nevada County Ag Commissioner 530-273-2648

PG&E - Electric Outages 800-743-5002

Tahoe National Forest, US Forest Service . . 530-265-4531

UC Cooperative Extension Ag Services 530-273-4563

Northern Sierra Air Quality Management District:

Grass Valley Office 530-274-9360

Truckee Field Office 530-550-7872

Emergency Complaint 24 Hour Hotline 530-274-9364

Fire Districts:

Higgins Area Fire Protection District 530-268-0844

Nevada County Consolidated Fire District . . . 530-273-3158

North San Juan Fire District 530-292-9159

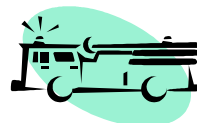
Ophir Hill Fire Protection District 530-273-8351

Peardale-Chicago Park Fire District 530-273-2503

Penn Valley Fire Protection District 530-432-2630

Rough & Ready Fire Protection District 530-432-1140

Truckee Fire Protection District 530-582-7850



Burn Day Information for Nevada County:

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Grass Valley/Nevada City 530-274-7928

Truckee 530-582-1027

Downieville 530-289-3552

Sierraville 530-994-3561



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