I. EXECUTIVE SUMMARY

Problem Overview

Societal pressures make increasing demands upon the environment. Expansion of urban areas into natural landscapes along with the increased utilization of natural resources, require the control of environmental interactions that have developed over millennia. As a result, natural processes can be pushed out of balance. The hazard from wildfire exemplifies the dramatic effect that human occupation has had on the environment. In order to more intensely utilize landscapes and the resources they contain, wildfire has in the past been largely excluded from the environment. This control however has impacted the equilibrium between fire and vegetation. It has also indirectly affected other natural systems such as hydrology and wildlife interactions. In many areas affected by human influence, stands of live and dead vegetation have developed to unnatural levels. Now when wildfires occur, their intensity and the severity with which they affect landscapes are often extreme.

Western Tehama County, like much of Northern California, is at very high risk of experiencing catastrophic wildfires. Much of the Westside area is rural or in the wildland/urban interface between urban development and those lands used for ranching, timber production and open space. Over the past 90 years, many of these areas have developed high levels of fuel loading due to aggressive fire suppression by state and federal agencies as well as private landowners. These high fuel loads have increased the potential for large wildfires that could destroy millions of dollars worth of private and public property if they were to occur. The problem of hazardous fuel conditions continues to grow each year as more people move into and utilize the area's grasslands, oak woodlands, and chaparral. Greater recreational use of the Mendocino National Forest that lies at the westernmost edge of the county has also contributed to an increase in the threat of wildfire on Tehama County's public and private forest lands. The Tehama West Fire Plan has been developed as a means to describe current fire related issues within the county as well as to identify public and private assets at risk from wildfire and measures currently in place to protect these assets. The plan also develops, justifies, and prioritizes future long term and short term mitigation measures that are expected to provide increased fire protection within the county's Westside area. Finally, this document provides planning and background information necessary for local organizations to obtain grants and secure funding for future fuel reduction projects and other mitigation measures.

Process Overview

As a member of the Tehama-Glenn Fire Safe Council, the Tehama County Resource Conservation District (TCRCD) expressed concern about the increasing threat of wildland fire throughout Tehama

County attributable to both increasing volumes of wildland fuels as well as urban development. The Tehama County RCD was also cognizant of the increasing cost to fight wildfires as well as to plan, develop and conduct fire and fuels management projects. It was recognized that these cost increases are impacting the financial well being of local governments and having a negative impact on the continued implementation of this important resource protection work. To address the issue of increased financial burden, the TCRCD advocated a combined cost reduction and revenue generating approach to the problem.

In order to reduce the cost of planning and executing fire hazard reduction projects, an overarching bi-county fire planning framework was proposed which would incorporate the array of fire and fuels management plans, polices and projects being developed by stakeholders located throughout Glenn and Tehama Counties. Through the collaboration and cooperation required to develop a landscape scale planning document, it was felt that cost savings could be achieved in identifying problems, developing mitigation measures to solve these problems as well as in implementing mitigation projects. As an example, it was suspected that individual agency fire planning documents could be prepared that were smaller and more succinct if landscape scale issues discussed in broad countywide or regional plans were incorporated through reference. In addition, fire and land management entities having similar goals as identified in agency specific fire plans might identify opportunities to work together on similar issues in order to solve similar problems. It was also recognized that through yearly cataloging and updating of proposed, in process and completed fire related projects in a County level fire plan, stakeholders could identify similar work being conducted near their own projects. With this information collaborative opportunities in project design might be identified that take advantage of synergies between multiple projects.

Another tack that was identified to reduce the overall cost of fire and fuels management work is through the generation of revenue from wildland biomass material. Such revenues would not only offset project costs, but would generate economic activity and consequently tax dollars that could be utilized to conduct additional mitigation work. To this end, the TCRCD advocated a study that would develop information and ideas on how local businesses and organizations could utilize the large volume of vegetative material that would need to be removed from the county's wildland in order to achieve a significant reduction in fire threat and intenisty.

As a first step in attempting to solve the County's wildfire and fuels problem, the Tehama County Resource Conservation District submitted an application for federal grant assistance under the United States Forest Service's Economic Recovery, Economic Action National Fire and Community Protection Grants Program. In 2003 grant funding was approved by the Mendocino National Forest to prepare a fire plan which would focus on the Westside of Tehama County from Interstate 5 to the Mendocino County line and from the south fork of Cottonwood Creek to the Glenn County line. These grant funds were also used to subcontract the services of a forestry consultant to prepare a biomass study that would review currently available information on technologies available to utilize wildland vegetation for fuel or as raw material for manufacturing purposes. This study forms an attachment to the Tehama West Fire Plan document. The study would also be an attempt to discuss current initiatives that promote the utilization of biomass material.

Project Objective

In order to create a fire safe community within Western Tehama County, The Tehama West Fire Plan has as its primary objective, the identification, prioritization and linking of areas throughout the county that are in need of fire management improvements and fuels modification. To accomplish this, a planning document and GIS maps identify, catalog and describe the array of public and private assets at risk of wildland fire. Among the types of assets identified were established and recently developed communities, other inhabited structures, roads, fire protection infrastructure, power infrastructure, water quality, soils, timber lands and range lands among others. A similar process was completed in order to describe the local area's fire based ecosystems as well as identify those areas having hazardous fire safety and fuels conditions. Through the planning process, fire safety, fire management and fuels modification projects currently in place within the Westside area were identified, described, and cataloged. In order to improve the effectiveness of fire and fuels management efforts, gaps in protective measures were identified and additional project work proposed.

Another objective of this planning document and the process through which it was developed is to affirm the adequacy of local fire management planning efforts and the specific steps taken to implement the recommendations developed through the planning process. To accomplish this, the Tehama West Fire Plan was modeled after the California Fire Plan Workgroup's March 2004 version of the "Community Fire Plan Template", otherwise known as the Community Wildfire Protection Plan (CWPP). Through the utilization of the template, Tehama County's CWPP for the Westside area meets the compliance criteria for grant funding of fire hazard mitigation projects under the Federal Healthy

Forest Initiative and Healthy Forests Restoration Act (HFRA 2003) as well as the Federal Emergency Management Agency's (FEMA) Disaster Mitigation Act of 2000 (DMA 2000).

The Tehama West Fire Plan is a working document and as such, will need to be updated in order to maintain its usefulness. To accomplish this, a yearly review of changes in the Westside areas assets at risk, and wildfire protection infrastructure will be made by the members of the Tehama-Glenn Fire Safe Council and the staff of the Tehama County Resource Conservation District. Through this process of updating the plan's content, information about the Westside area's assets at risk and wildfire protection infrastructure will be kept current resulting in better decision making by both landowners and agency personnel. In addition, the plan provides background information about Western Tehama County that will be useful to local stakeholders in preparing site and agency specific fire plans, as well as grant applications for future fire management and fuels reduction projects.

Priority Projects Summary

Based upon the objectives of this study as well as input from stakeholders within Western Tehama County, the top priority of project work is the protection of residents and fire fighters as well as public and private property. To address these priorities, project work was ranked in significance as follows:

- Projects that provide immediate and direct impact on the threat and intensity of wildfires such as fuel breaks and fuel reduction projects

- Projects that result in improvements to fire fighting and fire protection infrastructure including access for fire fighting forces, egress of residents along with water storage and water delivery system upgrades

- Projects that involve regulatory matters such as changes in laws, ordinances and codes that relate to fire safety and fire management

- Projects that formally classify a number of small communities as officially recognized communities at risk and identify these communities' Wildland Urban Interface areas.

- Projects that entail planning endeavors such as development of a fire plan for Western Glenn County along with large scale fire plans for various local communities.

Acknowledgements

The Tehama County Resource Conservation District would like to thank the following agencies, organizations and individuals for their input and assistance into the preparation of the Tehama West Fire Plan:

- Bureau of Land Management/Redding Field Office
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- California Department of Forestry & Fire Protection, FRAP
- California Department of Fish and Game
- California State University, Chico
- Crane Mills
- Cottonwood Creek Watershed Fire Safe Council
- Cottonwood Creek Watershed Group
- Humboldt State University
- The Nature Conservancy
- Pacific Gas & Electric Company (PG&E)
- Sierra Pacific Industries (SPI)
- Sunflower Coordinated Resource Management Plan (SCRMP)
- Tehama County Planning Department
- Tehama County Assessor's Office
- Tehama County Public Works Department
- Tehama-Glenn Fire Safe Council
- United States Fish and Wildlife Service
- United States Forest Service,
    - Forest Supervisors Office Mendocino National Forest
    - Stonyford Ranger District Mendocino National Forest
    - Forest Supervisors Office Shasta Trinity National Forest
    - South Fork Management Unit Shasta Trinity National Forest
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- Western Shasta Resource Conservation District

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II. INTRODUCTION

Background

In the spring of 2000, the Tehama-Glenn Fire Safe Council (TGFSC) was formed to act as an advisory group on issues related to wildfire and fire safety in the Tehama County and Glenn County area. The group's main objective is to work with other established fiscal agents in obtaining funding for projects relating to fire management, fuel reduction, and fire prevention. The Council also acts as a conduit for information on fire issues as well as a forum for discussion about how to achieve relative fire safety in the bi-county area. Out of these discussions, a number of suggestions arose about specific project work that could achieve this goal. Significant among these suggestions, was the development of an overall framework for fire and fuels planning which would look at issues on a countywide basis. It was also determined that in order to developed information specific enough with which to develop fire management and fuels projects as well as garner stakeholder support, a countywide plan would need to be divided into geographic regions having similar landscapes, fuel conditions and management objectives. As a result, the members of the TGFSC decided to divide Tehama County into Westside and Eastside zones.

In 2002, the Tehama County Resource Conservation District (TCRCD) conducted a series of stakeholders meetings throughout the county's Westside to generate input on the environmental concerns of local residents. Through this process, it was revealed that high volumes of wildland fuels developing within the Westside area as well as increased risk of wildfire occurrence attributable to increased development in the area were of primary concern. The speed and intensity with which wildfires burned was also a significant community concern. The response of area residents regarding local fire hazards mirrored those concerns addressed in the California Fire Plan and the California Department of Forestry and Fire Protection's Tehama-Glenn Unit Plan. It was also noted that this portion of Tehama County is often characterized by unreliable water sources for fire fighting and numerous unmapped access roads. In addition it was observed that the area's assets at risk needed to be more thoroughly identified and mapped. Finally the Tehama-Glenn Unit plan noted that in general, communities located in Western Tehama County do not have a local communications strategy and for the most part do not have a system of formal evacuation routes or safety zones in case of a fire emergency.

The Tehama County RCD recognized that although grant funding is sometimes available for individual fuels reduction projects, vegetation management conducted at a level that would significantly impact fire behavior as well as improve the viability and health of Westside

ecosystems needed to be done on a landscape scale basis covering thousands of acres. In order to fund fuels reduction work on such a massive scale, the TCRCD concluded that a continuous supply of non-grant dollars needed to be generated by fuels reduction projects and applied to future fire and fuels management efforts. Given the large volume of biomass contained in the area's wildland fuels, the District decided to conduct a market analysis and feasibility study that would address the utilization of small diameter woody materials and other forms of biomass generated in connection with fuels related projects. The Tehama West Fire Plan Area Biomass Study was completed in tandem with the Tehama West Fire Plan and is incorporated into the planning document's appendix.

Process Overview and Methodology/Professional and Community Input Process

The Tehama West Fire Plan project was designed to allow the incorporation of significant community and professional input. At the project's outset, a Technical Advisory Committee (TAC) was established to provide guidance in the development of this project's scope of work. The group was also established to provide rigorous technical review of the planning results and project proposals. The Tehama West Fire Plan TAC consists of various stakeholders including agency personnel and other land managers along with individual landowners and representative from landowner organizations and watershed groups. Among the entities represented in the fire plan TAC were the United States Forest Service (Mendocino National Forest), Bureau of Land Management (Redding Field Office), U.S. Fish and Wildlife Service, USDA Natural Resource Conservation Service, California Department of Forestry and Fire Protection, California Department of Fish and Game, California State University-Chico, Crane Mills and the Sunflower CRMP. Several individual landowners participated in the Technical Advisory Committee as well. During the life of the project, two TAC meetings were held, one to establish the scope of work and a second to provide direction after initial findings had been developed.

In order to garner public input and support for the planning project, public meetings were held at two locations within the Fire Plan's project area.

Red Bluff March 21, 2005

Corning March 28, 2005

At these meetings, the plan, its objectives, methodologies and initial findings were introduced. The public was then asked for their input pertaining to hazardous fire conditions, assets at risk, and other concerns regarding wildfire in the county's Westside area. Other input from the stakeholder community included discussions at the bi-monthly meeting of the Tehama-Glenn Fire Safe Council,

conversations with staff and board members of the Tehama County Resource Conservation District. Finally, the project manager of the Tehama West Fire Plan was involved in drafting the Tehama County Disaster Mitigation Act of 2000 Plan fire hazard chapter. Through this participation, the requirements of DMA 2000 legislation were incorporated into the fire plan and the initial findings of the Tehama West Fire Plan affected the content of the County's DMA 2000 plan fire component.

Planning Methodology

The methodology used in the developing the Tehama West Fire Plan consisted of the following steps:

- Collect available information on the local environment, fire hazards, assets at risk, local fire policies and related issues, in written, digital and GIS formats. Included among the types of information collected were vegetative communities, topography, hydrology, fuel types, population centers, community infrastructure, and fire history. Also collected was information pertaining to fire related regulations as well as agency polices that impact land management and fire project implementation within Western Tehama County. This was accomplished through the following steps:

- Locate existing fuel reduction projects within the Westside area

- Obtain input from area landowners, land managers and other stakeholders

- Conduct field verification of fuel types, assets at risk, and project work related to fire management and fuels reduction efforts. Assess information and prepare fire and fuel hazard mitigation project work recommendations

- Develop maps that identify fuel types, assets at risk as well as project work planned, in process or in place throughout Western Tehama County

- Develop a strategic fire management and fuels reduction plan that identifies opportunities to improve current fire protection measures

- Analyze biomass utilization processing opportunities

- Develop a list of recommendations for fuel reduction and fire safe projects. Encourage ongoing maintenance of all projects in order to protect the network of fire protection infrastructure

This Fire Plan was developed using current fire management data obtained from the California Department of Forestry and Fire Protection, the U.S. Forest Service, the California Department of Forestry and Fire Protection's Fire & Resource Assessment Program along with other public and private organizations. Recommended fuel reduction project locations were developed from a combination of analyses using existing geographic information related to fire as well as from consultations with fire professionals of the CDF, USFS, BLM and the Tehama County Fire Department.

Fire and Fuel Risk Strategy and Mitigation Project Development Summary

Development of measures to reduce both wildfire risk and the impact of fire on local landscapes is a significant component of the Tehama West Fire Plan. These mitigation measures take a number of forms from very specific and localized, to broad based, countywide efforts. They also range from basic "on the ground" fuels manipulations to landscape scale planning efforts and changes to state and local laws that have a negative impact on fire hazard and fire safety conditions within Tehama County. The array of actions recommended to be taken in the near future can be categorized as follows:

- Fuels Manipulation

  This category of mitigation effort entails some form of vegetation management. Included are simple fuels reduction projects over large areas as well as the development of strategically located fuel breaks or mosaics of fuel densities that will significantly impact or compartmentalize potential wildfire.

- Improvements to Fire Protection and Fire Fighting Infrastructure

  These projects entail the development of new protective infrastructure or improvements to those already in place as means to positively impact fire behavior, fire hazards, and fire safety. Among this type of recommendation developed in the Tehama West Fire Plan is the construction or installation of water storage and delivery infrastructure such as ponds, off stream storage facilities, tanks and water delivery systems. Recommendations for improvements to currently in place facilities include plumbing improvements to community water systems, development of safety zones in already cleared or open areas, development and maintenance of unpaved roads, mapping of ranch roads and jeep trails as alternate access and

egress routes along with the elimination of inefficient intersections and other road conditions that lead to traffic congestion during an emergency.

- Coordination of Efforts

  Through the process of developing the Tehama West Fire Plan, a number of opportunities were identified where coordination among local stakeholders could result in both improved project work and cost savings. Among such suggestions was the recommendation that local land managers coordinate with both the Tehama County Road Department and the California Department of Transportation in order to conduct extensive fuels reduction efforts in the vicinity of roadside vegetation control work. Through such efforts, reciprocal benefits could accrue to all parties involved.

- Planning

  As a first step in better coordinating local efforts in the prevention of wildfire and the management of hazardous fire conditions, small scale planning is critical to success. Only through an awareness of the issues, assets, policies and projects affecting neighboring stakeholders as discussed in a thorough planning document, can various entities find commonality of interests and areas with which to collaborate. Examples of planning related efforts developed in this plan are proposals to create a Fire Plan for Eastern Tehama County and Western Glenn County as both these areas have an impact on the fire conditions and fire safety of Western Tehama County.

- Classification of Fire Hazard Areas

  Another benefit of the fire planning process is the development of information that can spotlight areas having an increased risk of wildfire impacts. Through the creation of the Tehama West Fire Plan, several urbanized areas within Western Tehama County have been identified as having an increased risk of wildfire and have been recommended for inclusion onto the Federal list of at risk communities. Specifically, it is recommended that Rancho Tehama and the community of Flournoy be submitted as new at-risk communities and recorded as such in the Federal Register. In addition, a proposal was recommended to develop a wildland urban interface area around High Flat Road which is rapidly becoming a rural community

- Changes in Policies, Ordinances and Laws

  The policies and laws of a community can have a significant impact on the fire hazard conditions faced by its residents. These directions for behavior can either promote fire safely or detract from it. As result, to assure that local policies and ordinances have a positive impact on fire safety, a number of initiatives have been developed in the Tehama West Fire Plan which would result in positive changes to Tehama County's building, zoning and land development codes. Among these is a recommendation for a major review of various County ordinances in order to assure that they promote wildfire safety and incorporate Fire Safe principles.

III. PLANNING AREA DESCRIPTION

Location/Geographic and Environmental Conditions

For the purposes of this planning document Western Tehama County includes the Sacramento-Lower Thomes and the Upper Elder-Upper Thomes Watersheds. These watersheds include those portions of Reeds, Red Bank, Coyote, Oat, Elder, Jewett, Burch, and Thomes Creeks and their tributaries, located between Interstate-5 and the crest of the cost range within Tehama County. The project area is surrounded by the watershed of the South Fork of Cottonwood Creek and Shasta County to the North, the Stony Creek watershed and Glenn County to the South, Mendocino County and Trinity County to the West and Interstate five to the east. These watersheds are located in the center of the CALFED Sacramento Valley Regional area. Sub-watershed units analyze in this fire planning document are shown in **Map 1**. The project area covers over 668,169 acres or approximately 7 percent of the CALFED Sacramento Valley Resource area and ranges in elevation from 400 feet at the valley floor to 5,800 feet at the crest of the Yolla Bolly Wilderness area. A list of USGS 7.5 Minute Quadrangles that cover the project area are shown in **Table 1.**

Map 1.
Sub-Watershed Units of the Tehama West Fire Plan Project Area

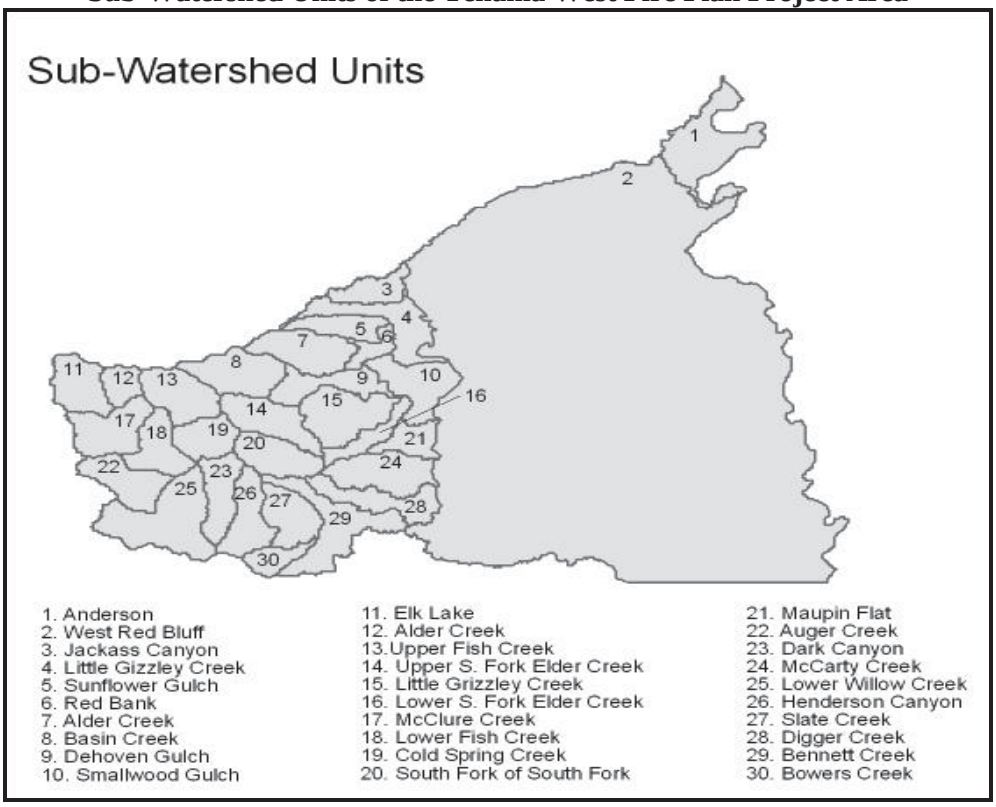


Table 1
USGS 7.5 Minute Quadrangle

Ball Mountain	Balls Ferry	Bend	Black Butte Dam
Blossom	Buck Rock	Cold Fork	Corning
Flournoy	Foster Island	Gerber	Hall Ridge
Heneleyville	Hooker	Kirkwood	Log Springs
Los Molinos	Lowrey	Mendocino Pass	Mitchell Gulch
Newville	Oxbow Bridge	Paskenta	Raglin Ridge
Red Bank	Red Bluff East	Red Bluff West	Riley Ridge
Sehorn Creek	South Yolla Bolly	Vina	West of Gerber

The primary ownership in the headwaters and uplands of the project area is the Mendocino National Forest, Shasta-Trinity National Forest, the Bureau of Land Management (Redding Area office) a commercial timberland owner (Crane Mills) and a number of ranchers. Ownership categories within the project area are shown in **Table 2.**

Table 2
Land Ownership In The Tehama West Fire Plan Project Area

Owner	Total Acres	Percent of Watershed
Bureau of Land Management	14,744	2.21%
California Department of Fish and Game	759	0.11%
California Department of Parks and Recreation	260	0.04%
Department of Defense	27	0.00%
State Lands Commission	49	0.01%
The Nature Conservancy	251	0.04%
U.S. Fish and Wildlife Service	2,767	0.41%
U.S. Forest Service*	98,231	14.70%
Subtotal Total Government Acres	**117,088**	**17.52%**
Crane-Mills Forest Produces	41,132	6.16%
Sierra Pacific Industries	1,008	0.15%
Unclassified Private Ownership	508,941	76.17%
Subtotal Other Acres	**551,081**	**82.48%**
Grand Total All Acres	**668,169**	**100.00%**
**Total includes 14,405 acres recently acquired from Pioneer Resources*		

TOPOGREAPHY/SOILS/ELEVATION

Steep slopes and silty, moderately to highly erosive soils characterize those found in Western Tehama County. In general the soils in the project area are sedimentary in origin, containing large quantities of silt, clay and gravels. In addition, when the area's soils are disturbed as is often the case after a wildfire, gullying is common. As a result of these events, large quantities of silt can be transported downstream by tributary stream flows and into the main stem of the Sacramento River affecting salmonid spawning and rearing areas. As a result of these factors, the California Department of Water Resources identified many of the Westside streams as significant sources of Sacramento River sediment in 1992. The average elevation of the watershed is approximately 1,000 feet above mean sea level (msl), with the lowest elevation of 150 feet msl at the Sacramento River, climbing steeply above 8,000 feet msl in the western mountains. South Yolla Bolly Mountain reaches the highest elevation in the watershed at 8,094 feet msl.

Hydrology

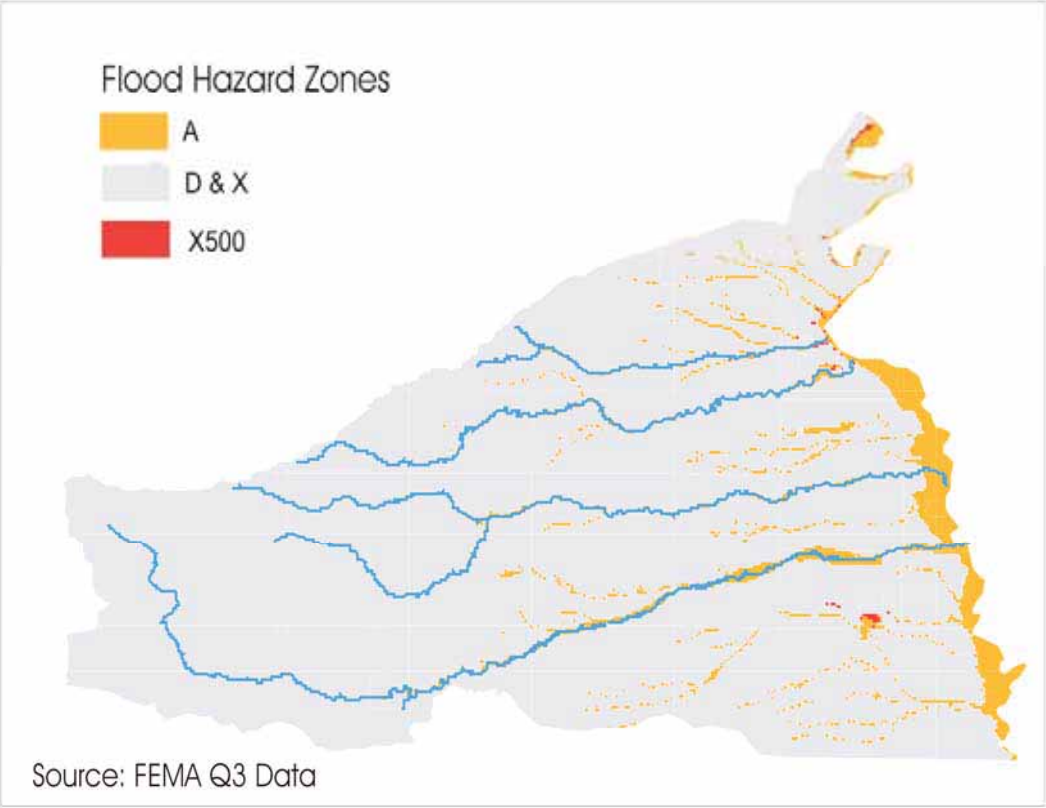
Major streams within the Tehama West Fire Plan project area include Reeds Creek, Red Bank Creek, Elder Creek and the largest, Thomes Creek. These streams have little if any drainage area with significant snow packs. Consequently, snowmelt and run-off have a minor role in yearly flow characteristics. As a result, these streams show rapid flow response to storm events and greatly fluctuating flow levels between storm periods and intervening dry spells. The "flashy" nature of stream flows also exacerbates the potential for inundation and flooding hazards within the low lying areas of stream channels as portrayed in **Map 2**. These fundamental characteristics are also a significant factor in Westside streams experiencing high summertime water temperatures; a lack of habitat heterogeneity; as well as the development of three distinct fishery zones within Red Bank Creek, Elder Creek, and Thomes Creek. The first of these zones is within the Coast Range canyons where streams are perennial and support a variety of native fish species. The second zone is where the streams reach the Sacramento Valley and become ephemeral in nature and have few if any fish present. In the third zone located near the Sacramento River, the three major river tributaries become seasonal habitat for a variety of species that spend most of their life in the River. The headwaters of Reeds Creek are within the lower elevations of the county's Western foothills and have no significant fish populations.

Reeds Creek

As indicted in **Map 3** Reeds Creek drains an area of about 74 square miles. The stream flows 22 linear miles from the 1,100 foot elevation level of the cost range foothills to the Sacramento River at the 253 foot elevation level. Principle tributaries to this significant west side stream are Brickyard Creek, Pine

Creek, Liza Creek, and Live Oak Creek. Blue oak woodlands, grasslands, live oak/riparian woodlands and cultivated lands occupy most of the drainage. The Red Bluff urban area occupies about 4% of the total watershed area. A number of local factors have been identified that contribute to the "flashy" nature of stream flows within the creek. Significant among these are:

Map 2
Flood Hazard Zones of the Tehama West Fire Plan Project Area



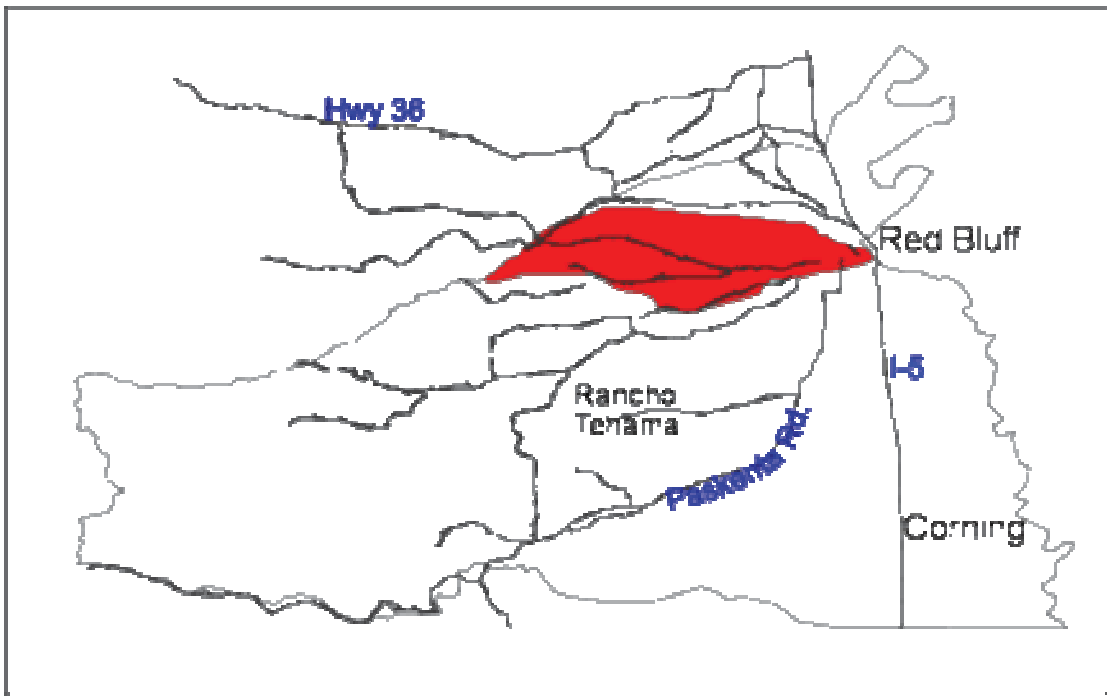
Zone A
The Zone A designation is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone D
The Zone D designation is used for areas where there are possible but undetermined flood hazards. In areas designated as Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available. The flood insurance rates for properties in Zone D are commensurate with the uncertainty of the flood risk.

Zones X
Zone X (along with Zone B and C) designates flood insurance rate zones that correspond to areas outside the 1-percent annual chance floodplain.

- Soils that have slow infiltration rates
- Long narrow sub-basins that quickly deposit flood flows into the main channel
- Development along the main stem of the creek that has impenetrable surfaces
- Dense vegetation congesting stream flows in the creek's main channel

Map 3
Reeds Creek Watershed Area

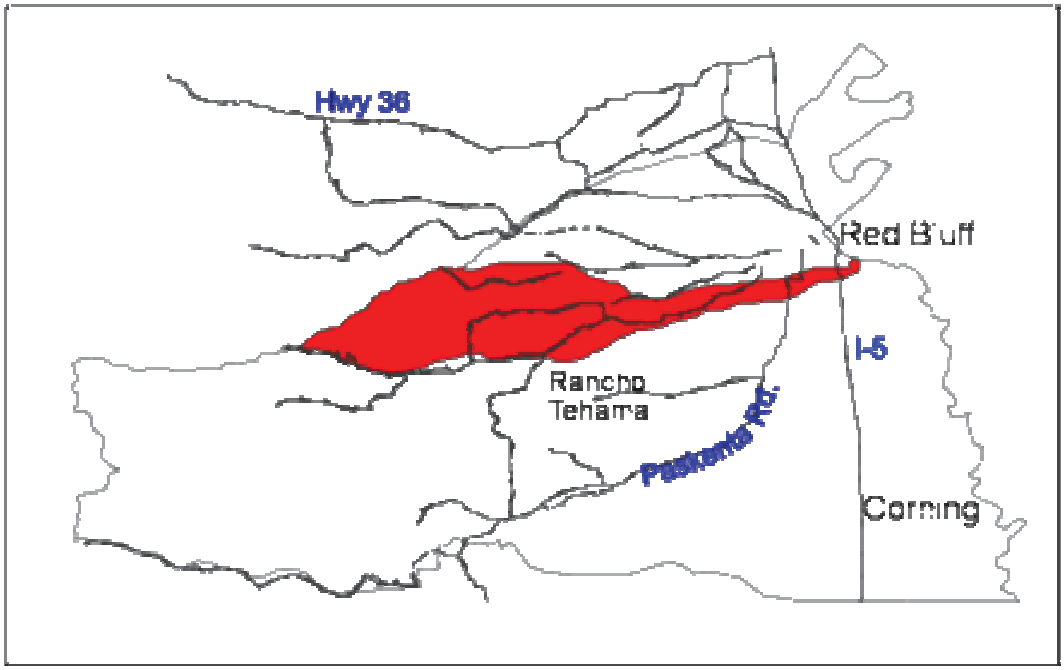


Red Bank Creek

Red Bank Creek originates in the interior coast range at an elevation of 5,600 feet and flows 26 miles in an easterly direction to the Sacramento River near Red Bluff at an elevation of 250 feet. After the creek leaves the steep timber and chaparral covered slopes of the coast range, the stream course traverses oak and grass covered foothills with steep to rolling topography. The soils in this portion of the watershed are generally acidic and gravely. About 16% of the watershed's soils are in capability classes I, II, III, IV while the remaining 84% are rated class VI and VII. Approximately 10 percent of the land is federally owned (USFS and BLM) with the remaining 90% in private ownership. **Map 4** provides a generalized portrayal of the Red Bank Creek watershed area.

In general gullying and stream bank erosion along with related water quality problems are primary concerns of many landowners, agency personnel and other watershed stakeholders. Within that portion of the Red Bank Creek watershed located within coniferous forests and chaparral lands, wildfire remains perhaps the most significant threat to both vegetation and soil stability. In addition, soil erosion problems occur along old roads and skid trails that were constructed many years ago within forested areas. Some of the main roads in the watershed area are subject to slips and washouts, which can contribute significant amounts of sediment to Red Bank Creek and its tributaries. Within the

Map 4
Red Bank Creek Watershed Area



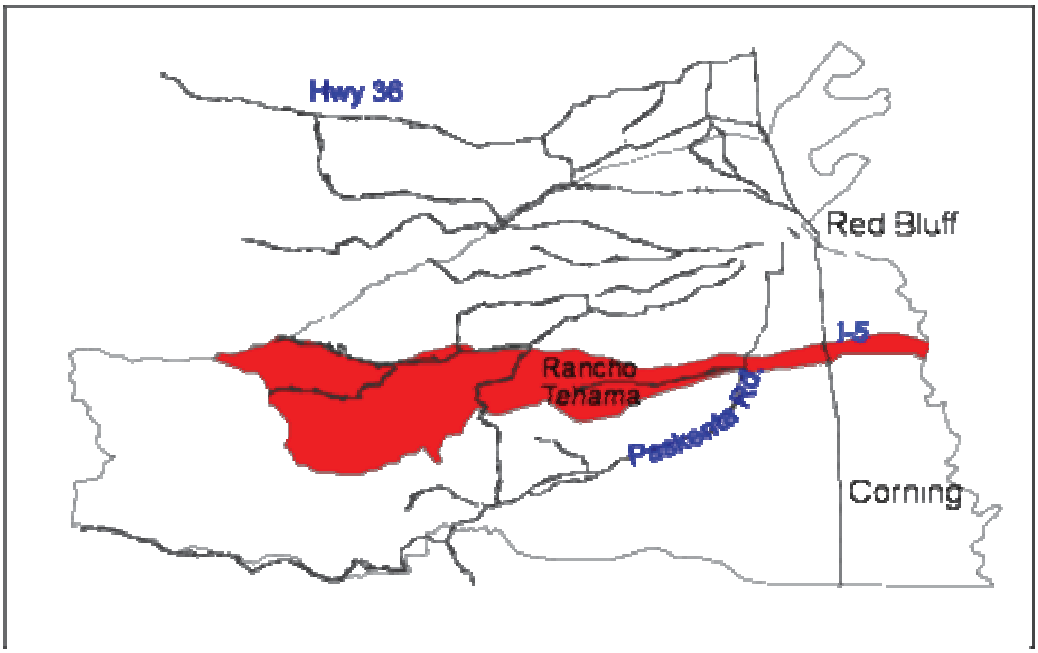
watershed's chaparral lands, it has been estimated that soil erosion rates after a high intensity fire can reach almost 60 tons per acre. If full brush canopies are in place, the yield is reduced to roughly 20 tons per acre on very steep slopes. Without prescribed burning, these chaparral lands lose vegetative diversity, forage value and adequate distribution of drinking water sources. As a result of these environmental losses, habitat potential and game populations can be reduced. Within the oak woodlands and grasslands located within the watersheds lower elevations, gullying occurs in drainage ways. This appears to be especially true within areas of class II and III soils. Finally, in portions of the lower watershed, dense thickets of brush that have not been impacted by wildland fire prevent herbaceous growth and deep soils are often infested with yellow star thistle.

Elder Creek

Elder Creek is an intermittent tributary that enters the Sacramento River 12 miles south of Red Bluff. The stream's watershed covers an area of approximately 142 square miles and contains mostly shale, mudstone, and fine sedimentary deposits that produce minimal amounts of gravel. Within the lower portion of the stream course, a flood-control levee system is in place, which directs and concentrates flows, resulting in increased sediment transport and degradation throughout the lower reaches. The upstream reach (approximately 20 miles from the valley floor) rapidly increases in elevation within a rugged canyon area that supports resident fish, but probably has limited value for steelhead. Elder

Creek flows past the community of Rancho Tehama, which has a population of just over 3000 residents and as a result, water quality, flooding and erosion are significant issues to area stakeholders. The Elder Creek Watershed is displayed on **Map 5**.

Map 5
Elder Creek Watershed Area



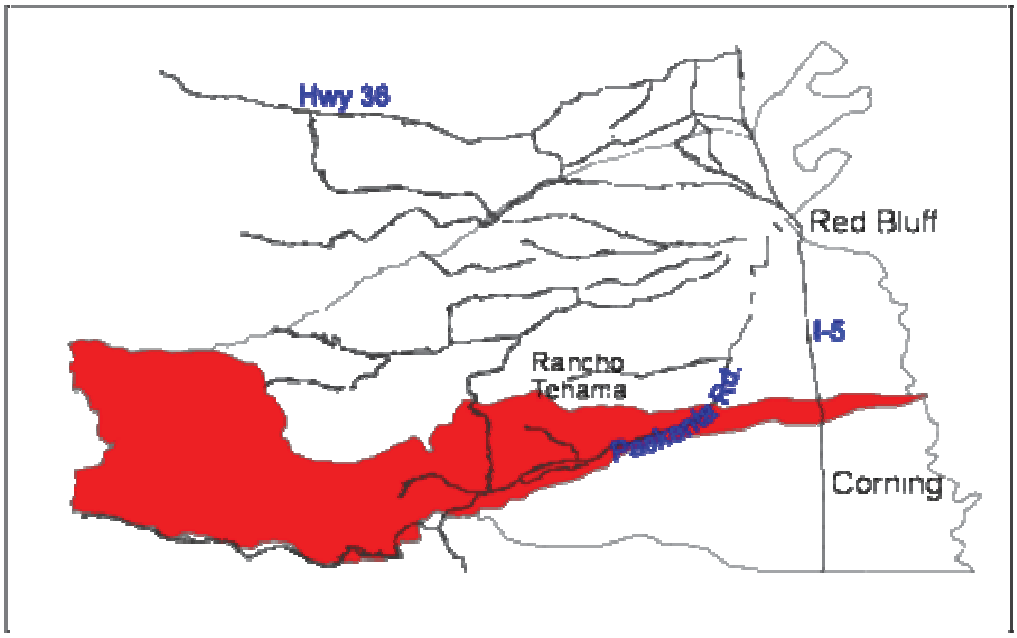
Thomes Creek

In terms of stream flows and watershed area, Thomes Creek is the largest tributary to the Sacramento River within Tehema County's Westside area. The headwaters of the creek begin on the east side of the Coast Range and flow for 70 miles along the County's southern boundary. The stream channel ranges in elevation from 6,300 to 750 feet above mean sea level at the point where it enters the Sacramento River near the town of Tehama. The watershed area **(Map 6)** encompasses approximately 188 square miles. The stream's mean annual run-off at its confluence with the Sacramento is about 200,000 acre-feet per year. The stream remains dry or intermittent below the U.S. Geological Survey gauge near Paskenta until fall when the first heavy rains occur. From the confluence with the Sacramento River to approximately seven miles upstream, the aquatic habitat is suitable for juvenile Chinook rearing during December to March. Thomes Creek provides spawning habitat for native fish such as the Sacramento pike minnow (*Ptychocheilus grandis*) and Sacramento sucker (*Catostomus occidentalis*). The stream's upper watershed is in relatively good condition having a well-developed riparian forest. The slopes throughout much of the watershed area are very steep and the soils are subject to high rates of erosion

and creep. This combination of slopes and soils as well as the array of resource and water quality values generated by Thomes Creek make it imperative that riparian and upland vegetation remain intact, protected from high intensity wildfire.

Map 6

Thomes Creek Watershed Area



VEGETATION

Vegetation patterns within Western Tehama County are closely correlated with elevation, aspect, slope, soils as well as human activities such as logging, grazing and fire use. Within the upper elevations of the project area, the landscape is dominated by conifer and conifer hardwood associations, which represent approximately 18% of the planning area. These forested landscapes gradually change into chemise-dominated chaparral along with a band of oak woodlands and grasslands further down slope. The vegetation elements as expressed within the fire planning area are shown in the General Vegetation Map **(Map 7)** of the fire plan project area. **Table 3** summarizes acreage totals for each vegetation type that are described below.

Conifer-Dominated Habitats

Wildfire suppression and commercial timber management have caused significant changes in the composition, density and mean tree size found within the Conifer dominated habitats of the Tehama West Fire Plan project area. The degree of change has not been well quantified as there is little data

pertaining to the area's forest stands prior to the period when fire suppression was well established. Anecdotal accounts and analyses of historical photos however, support a number of widely held notions regarding the impact of fire exclusion on the general structure and composition of Westside conifer forests. One common assumption is that fire exclusion has allowed conifer seedlings and saplings in the understory to grow into trees and as a result, much higher stand densities have developed than previously existed. With an increase in dead and green vegetation, fuel ladders have developed that can rapidly convert a low intensity ground fire into a high intensity crown fire. In addition, with the development of denser stand conditions, shade-tolerant species such as white-fir and incense cedar have been favored over shade-intolerant species such as pines and black oak, thus changing the vegetative composition and structure of these stands.

Red Fir

Conifer-dominated habitats extend over 122,000 acres of the Tehama West Fire Plan project area. Of this total, Red fir habitats exist on approximately 1,300 acres (less than one percent) of the project area. Most of these sites are found on the highest slopes of the Coast Range above 6,000 feet that tend to have open to moderately open forests with relatively scant undergrowth. As a result, wildfires are uncommon in these areas. The dominant species is red fir (*Abies magnifica*) with occasional specimens of mountain hemlock (*Tsuga heterophylla*) or white fir. Wet meadows are frequently associated with this habitat due to the occurrence of springs and glacial lakes or bogs.

White Fir

Slightly lower in elevation between 5,000' and 6,000' are found widespread areas of white fir type habitat. Almost two percent of the fire planning area or approximately (11,904 acres) consists of such landscapes. White fir (*Abies concolor*) is the dominant tree species but it may be mixed with red fir, sugar pine (*Pinus lambertiana*), and Jeffrey pine (*Pinus jeffreyii*). White fir stands, like those containing red fir, tend to be relatively open-grown habitats. Following fire exclusion policies however, occasionally dense understories of trees and saplings have developed, along with brush of various heights and densities. White-fir stands can also be associated with wet meadows or with narrow riparian stringers along headwater streams. Both Red-fir and White-fir stands often develop from wildfire-caused brush fields that these shade tolerant conifer species eventually overtopped.

Map 7
General Vegetation of the
Tehama West Fire Plan Project Area

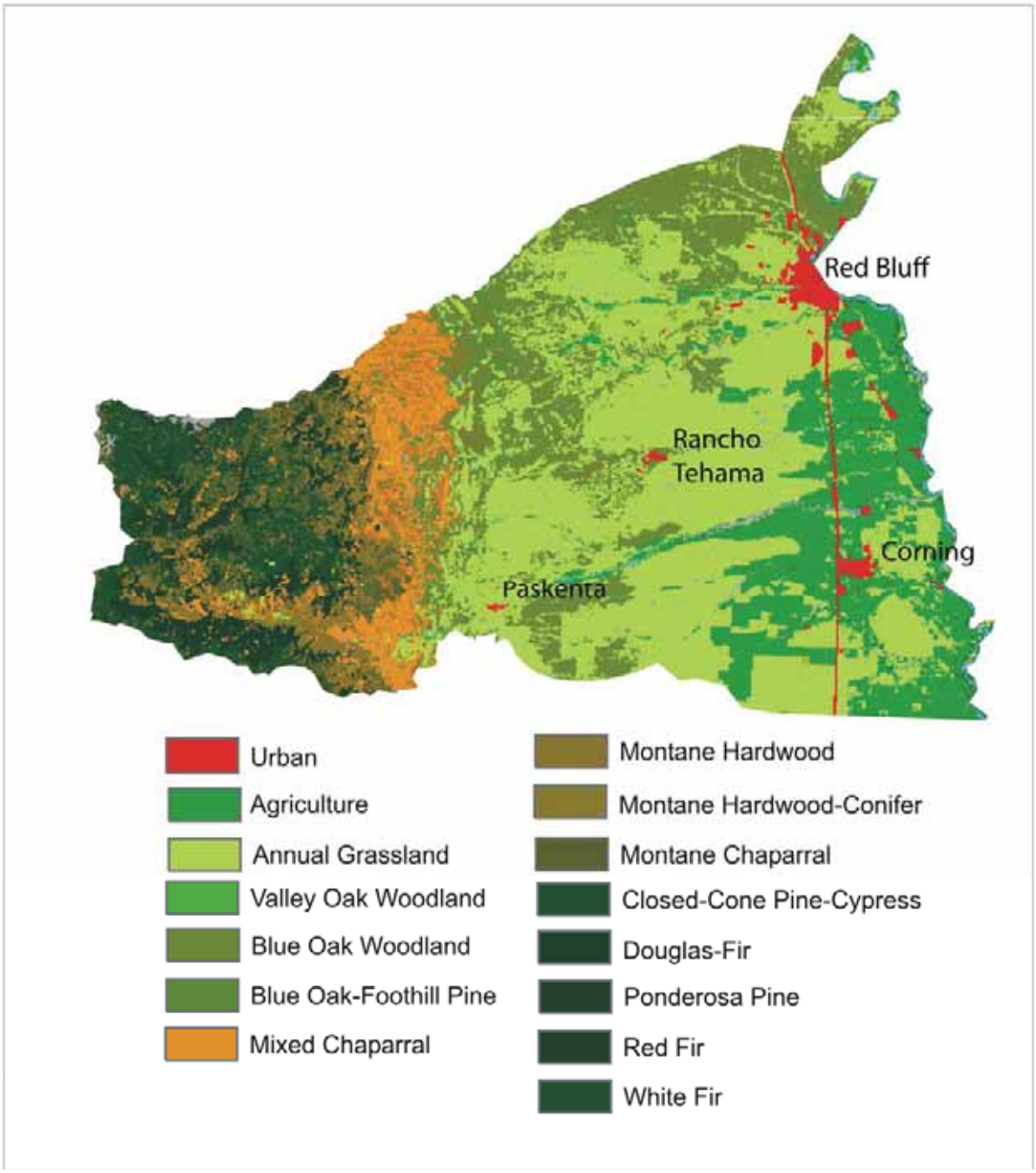


Table 3
Vegetation Types (Calveg WHR)
In The Tehama West Fire Plan Project Area Watershed

WHR Type	Acres	Percent of Tehama West Fire Plan Project Area
Conifer Dominated Habitats		
Red Fir	1,301	0.19%
White Fir	11,904	1.78%
Klamath Mixed Conifer	47,508	7.11%
Douglas Fir	38,293	5.73%
Ponderosa Pine	5,023	0.75%
Jeffery Pine	20	0.00%
Montane Hardwoods Confer	17,673	2.64%
Closed Cone Pine-Cyperess	725	0.11%
Total	**122,447**	18.33%
Hardwood Dominated Habitats		
Montane Hardwood	18,228	2.73%
Montane Riparian	83	0.01%
Blue Oak Foothill Pine	19,931	2.98%
Blue Oak Woodland	110,923	16.60%
Valley Oak Woodland	6,739	1.01%
Eucalyptus	7,746	1.16%
Total	**163,650**	24.49%
Shrub-Dominated Habitats		
Montane Chaparral	3,084	0.46%
Mixed Chaparral	31,632	4.73%
Chemise Redshank Chaparral	11,256	1.68%
Total	**45,972**	6.88%
Herbaceous- Dominated Habitats		
Wet Meadow	81	0.01%
Annual Grasslands	207,668	31.08%
Total	**207,749**	31.09%
Agriculture-Crop Dominated Habitats	**32,926**	4.93%
Urban Dominated Habitats	**3,596**	0.54%
Barren Habitats	**2,870**	0.43%
Water/Aquatic Habitats	**1,028**	0.15%
Unclassified Areas	**87,930**	13.16%
Grand Total	**668,168**	100.00%

Klamath Mixed Conifer

The most abundant conifer-dominated habitat in Tehama West Fire Plan area is the Klamath Mixed Conifer type, which occupies approximately 47,500 acres or about seven percent of the total planning area. Depending upon slope and aspect, this habitat type extends from approximately 5,000 feet downslope to approximately 2,500 feet elevation. It is comprised of a mixture of several conifers species, including ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudtosuga menziesii*), incense cedar (*Libocedrus decurrens*), white fir, and sugar pine, along with California black oak (*Quercus kelloggii*). This forest type is considered to be the most valuable for timber production and as a result is intensely managed for commercial conifer species. Originally, these mixed conifer stands were an open-grown forest type. Fire suppression and timber management has in many instances; resulted in dense stands with relatively high amounts of dead and down logs and litter. Small openings often have shrub and sub-tree species, including deer brush (*Ceanothus integerrimus)* and Nuttall's dogwood (*Cornus nuttallii*).

Closed-Cone Pine/Cypress

Closed-Cone/Cypress habitats are a rarity among the vegetation types within the project's planning area. Covering only about 725 acres, generally on south facing slopes between 3,000 and 1,000 feet, this habitat type is dominated by knobcone pine and chaparral stands and is dependent upon high severity fires to regenerate its vegetation. The serotinous cones, characteristics of the conifer species found within these habitats, hold seed tightly enclosed until heat pops them open. In addition these stands are relatively short-lived and tend to exist on harsh sites with poor soils. Heavy accumulations of shrub species can occur that are comprised of various manzanitas and other chaparral. In those areas where fire suppression has occurred over a long period of time, the Closed-Cone Pine/Cypress habitat tends to fade out as brush species replace areas having low tree reproduction.

Hardwood Dominated Habitats

Hardwood dominated habitats cover approximately 25 percent of the planning area or about 164,000 acres. Due to development pressures, current lack of regeneration, as well as susceptibility to wildfire during summer months, the oak woodlands portion of the fire planning area is at high risk to negative impacts.

Montane Hardwood

Montane hardwood habitats can normally be found within an elevation range between 3,000' and 1,000'. Dominant species within these habitats include Pacific madrone, California black oak, coast and interior live oak, as well as California bay laurel. Stands of this type are frequently found in shallow

and rocky soils. Chaparral species such as *Ceanothus* and manzanita often form a shrubby understory. This habitat exists on 18,228 acres or 3% of the total acers within the project area.

Blue Oak-Foothill Pine

Generally, Blue Oak and Foothill Pine Woodlands form the upper boundary of oak woodland habitats within the eastern foothills of the coast range in Tehama County. Blue oak and foothill pine typically comprise the overstory of this habitat, with blue oak usually most abundant along with scattered pockets of interior live oak. This habitat often occurs on rocky and thin-soiled slopes below 2,000 feet in elevation. The understory can have significant amounts of chaparral shrub species or annual grasslands. Stands dominated by foothill pine tend to lose their blue oak, which is intolerant of shade. Associated species are the coast live oak, valley oak, and California buckeye. Interior live oak sometimes dominates the overstory, especially in rocky areas and on north-facing slopes at higher elevations. At lower elevations, where blue oaks make up most of the canopy, the understory tends to be primarily annual grasses and forbs. At higher elevations where foothill pines sometimes comprise the canopy, the understory usually includes patches of shrubs in addition to the annual grasses and forbs. Over 19,000 acres (roughly 3%) of the Tehama West Fire Plan project area consists of this habitat type.

Blue Oak Woodlands

Blue Oak Woodland type habitats are the most abundant oak woodland in Tehama County and typically occur at lower elevations below 1,500 feet. Extending over almost 110,000 acres or roughly 16% of the planning area, Blue Oak Woodlands are the most common tree dominated habitat on the county's Westside. These woodlands are usually associated with shallow, rocky, infertile, well-drained soils from a variety of parent materials. Blue oaks are a relatively slow-growing, long-lived tree, well adapted to dry hilly terrain where the water table is usually unavailable. Generally, open-grown specimens dominate the Blue-Oak Woodland over an annual grass and forb understory. When Blue oaks occur on gentle slopes they often develop in large blocks with highly variable canopy coverage. On steeper slopes they occur in smaller patches interspersed with other habitats such as annual grasslands and chaparral. The patchy growing pattern of this species makes it especially susceptible to wildfire damage. At the present time, there is concern about regeneration of blue oaks across their range. This lack of regeneration along with the species susceptibility to wildlife makes Blue oak woodlands of particular concern to resource managers in Tehama County.

Valley Oak Woodlands

Valley oaks are among the tallest growing of all the state's oak species, often dominating the overstory in Valley Oak Woodland communities. Mature individuals of this species can reach heights of 115 feet

or more. The majority of these stands occur in the Sacramento Valley floor along natural drainages found on the eastside of the planning area. Stands with little or no grazing as well as those in riparian areas tend to develop a partial shrub layer of poison oak, toyon, wild grape, and coffeeberry. In other situations the tree cover is open-grown with an annual grass and forb understory. Over 6,700 acres or (roughly 1%) of the project area consists of this habitat type.

Shrub-Dominated Habitats

About eight percent or approximately 46,000 acres of the Tehama West Fire Plan project area consist of shrub communities. Three chaparral-dominated habitats constitute these shrub types and include: Montane chaparral, Mixed chaparral, and Chemise-redshank chaparral. These habitats are located between roughly 1000 feet to 3600 feet and tend to form dense canopies comprised of a relatively few plant species. Much of this vegetation is represented by almost single species stands of chemise interspersed with other shrubs, scrub oaks and gray pines. These plant communities are highly adapted to wildfire and depend upon frequent burns to maintain their productivity and biological diversity. As a result, species tend to reproduce quickly following a fire. Wildfire suppression has widened the time between fire events and as a result, chaparral stands may be older and more decadent than in the past leading to more intense fires than occurred prior to policies that promoted fire suppression. Wildlife species requiring younger and more palatable plant growth having higher amounts of protein and minerals, have likely been impacted by this change.

Generally Montane chaparral habitats exist at higher elevations and are often associated with conifer-dominated stands. Common shrub species include manzanita, chinquapin (*Chrysolepis* spp.), *Ceanothus*, and silk-tassels (*Garrya* spp.). Mixed chaparral stands are found at intermediate elevations at or near the lower limits of the chaparral zone and include several manzanita and Ceanothus species as well as birch-leafed mahogany (*Cercocarpus betuloides*). Chemise redshank chaparral habitats are found within the lowest of the chaparral habitats and are dominated by nearly pure stands of chamise (*Adenostoma fasciculatum*). Montane chaparral stands may represent the result of recent fires and ultimately may evolve into conifer stands. Mature chaparral-dominated habitats have little herbaceous growth, due to nearly total canopy cover by the shrub's foliage. These types are well adapted to periodic wildfires and respond by having both resprouting (e.g., chamise and some manzanitas) and rapid reseeding (some *Ceanothus* and some manzanita species). For several years following wildfire, when reduced shrub canopy cover allows sunlight on the soil, annual forbs growth can be very abundant, likely stemming from seed that persisted in the soil for long periods of time. These three

chaparral habitats cover approximately 46,000 acres or about six percent of the Tehama West Fire Plan project area.

Riparian Habitats

Several forms of riparian habitats are found within the project area. These streamside ecosystems are of particular environmental importance due to their impact on the temperature, timing, volume and water quality of stream flows. As a result, resource and land management agencies are concerned about protecting these habitats from the impacts of high intensity wildfires. Within the planning area, narrow corridors of streamside vegetation are comprised primarily of hardwoods that are regenerated by a disturbance such as fire or floods. With fewer wildfires occurring and the increased time between occurrences, the opportunity to reproduce has been changed, leading to larger, older trees along stream channels. The absence of frequent fire has also resulted in adjacent forest habitats becoming denser, tending to shade the sun-loving riparian species and constricting them more closely to the streamside borders.

Montane Riparian

Montane Riparian Habitats generally exist as narrow streamside buffers from 6,000 down to 2,500 feet in elevation. Primary overstory trees include black cottonwood (*Populus balsamifera ssp trichocarpa)* and white alder. Willows and dogwood form the major components of the habitat's understory. In many instances Montane Riparian habitat from very narrow swaths on either side of streams due to steep canyon slopes. Only 83 acres of this habitat has been identified within the project area.

Valley Foothill Riparian

As the major streams within the project area flow out of the Coast Range, the montane riparian habitat transitions into Valley Foothill Riparian habitats. Dominant tree species include Fremont cottonwood (Populus fremontii), California sycamore, while alder, and valley oak. Understory shrubs include wild grape, wild rose, California blackberry, poison oak, and willows. Lianas (hanging vines), particularly wild grape, are a common feature.

Herbaceous-Dominated Habitats

Annual Grasslands

Covering almost 208,000 acres, or about 30 percent of the project area, annual grasslands are one of the most common habitats found within the watersheds of Western Tehama County. These grass and forb dominated landscapes are generally made up of introduced annual grasses as well as native and introduced forbs that grow below 1000 feet. In a number of instances, open areas of annual grasslands contain scattered oaks. During the summer months, the grasslands on the valley floor and in the foothill areas become large fields of dead vegetative fuel that is prone to fast moving, low intensity wildfires.

The characteristics of fire in these open landscapes are exacerbated by the dominance of introduced annual species, which cure earlier in the spring than the naturally occurring perennial grass species originally found in abundance throughout Tehama County. In addition, frequent late spring winds, can rapidly spread fire fronts. Wildfire suppression, grazing by livestock, along with the introduction of aggressive grasses and forbs have all been responsible for greatly affecting the structure and composition of the area's grasslands.

Water/Aquatic Habitats

Perennial and seasonal aquatic habitats exist within about 1000 acres of Tehama County's West side. Perennial aquatic habitats are those existing in reservoirs and ponds. Emergent vegetation, such as tules are typical. Seasonal aquatic habitats include vernal pools, which have water during the wet season and quickly dry in the spring. The vernal pools and marshes are sensitive botanical resources that have limited distribution in Tehama County. Marshes tend to be very effective at filtering water of sediment and contaminants, and are therefore valuable for water quality. The vernal pools are well known for providing habitat for rare plant and animal species. Livestock grazing as well as the regular introduction of fire that removes invasives has maintained much of this sensitive habitat and its exotic annual grass species that impact the hydrologic regimes in these annually produced pools. At the same time, these environmental impacts aid in the maintenance of native grasses and forbs.

Threatened and Endangered Species

The United States Congress passed the Federal Endangered Species Act (FESA) in 1973 with the goal of protecting species that were endangered or threatened with extinction. The State of California enacted a similar law, the California Endangered Species Act (CESA) in 1984. Both sets of regulations have processes by which species are nominated and reviewed for suitability of inclusion onto a list of threatened or endangered species. The State of California also maintains the "Species of Special Concern" list of animal species that are not included under CESA but potentially could be at-risk. Any project such as fuels reduction or other types of vegetation management that could affect the habitat of individual species on any of these lists requires assessments, permits, and mitigation. In addition, the California Native Plant Society (CNPS) maintains a list of species that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. **Table 4** lists the rare, threatened and endangered plants known to occur in the fire plan project area. Of the 28 species shown, 11 (39 percent) are known to be strongly associated with serpentine soils, six (21 percent) live only in vernal pools, and two are found in marshes and other wetlands. In total, 19 of 28 rare plant species

Table 4
Habitat Types Within the Tehama West Watershed
Harboring Rare Plant Species

Habitat	Number of Species
Vernal Pools	**3**
Other Wetlands	**2**
Riparian Habitats (foothill and montain)	**8**
River or stream-associated	**2**
Forest	**2**
Grassland	**4**
Miscellaneous/varied	**2**

(68 percent) exist in habitats that are represented in only a very small percent of the Westside's watershed area and in the case of wetlands are examples of habitats that have been greatly reduced through historical development.

Demographics

At the present time, the Tehama West Fire Plan project area remains largely rural in nature. The planning area skirts the western boarder of Red Bluff, Proberta, El Camino, and Corning. Further west lie the small rural communities of Rancho Tehama, Paskenta, Flournoy, and Henleyville along with scattered rural developments and small ranches. With a land area of 1,044 square miles (668,168 acres) and a population of approximately 4,000 residents, the average population density of the project area is roughly 3.8 persons per square mile.

Land Use and Development Trends

Development and land use within Western Tehama County are currently in a period of flux. Traditionally, land use in the Westside area consisted of ranching, private timber production, watershed management, mining and very low-density rural residential development. In addition, the Federal Reserve Act of 1891 created the National Forest system to preserve timberlands and other areas in the public domain and prevent them from passing out of public possession. The Mendocino National Forest was established in 1907 and occupies approximately 12% (116,160 acres) of the Fire Plan's project area. The Shasta Trinity National Forest was established in 1905 and covers a small portion of the

county's northwest corner. Another 18,057 of the County's Westside lands are managed by a number of federal and state land management agencies for an array of resource and environmental considerations.

At the present time, a significant portion of the Westside area is experiencing more intensive urban development in the form of small ranches, ranchettes and rural communities. In addition, the western urban fringe of the county's larger communities such as Red Bluff and Corning continue to expand their interface area into what were once farming and grazing areas. Topographic features, vegetative fuels, and severe weather potential raise the threat of wildfire impacts on structures within these areas. Preventative measures are available and some are in place that aid firefighters in the suppression of structural fires occurring in wildland areas. Significant among these are roofing, defensible space, and fire prevention. At the present time, less than 10% of structures within Tehama County have untreated wood-shake roofs and most of these are found at the urban interface within the Wilcox and Surrey

Photo 1
Indications of future development. Recently installed electrical and telephone service equipment near High Flat and the South Fork of Elder Creek. Numerous areas throughout Western Tehama County face increased urbanization and intensity of use on lands that were once open spaces and grazing lands.

Village areas near the city of Red Bluff. Greater than 90% of the homes in the County have class B roofs or greater. During a wildfire event, wood-shake roofs create a greater risk of structure ignitability, fire damage, structure loss, and hampered fire suppression. This is attributable to increased exposure to fire embers, radiated heat, and surface fire spread. In addition, fire suppression efforts in such situations can also be hampered by high water consumption often required to suppress structural fires involving wood shake roofs.

IV. Assets at Risk from Wildfire

Community Infrastructure within the Tehama West Fire Plan Project Area

Roads

Roads are an essential part of fire safety, fire management and fuels reduction planning. These linear features provide access to communities, homes and wildlands as well as escape route in the event of wildfire or other disaster. In addition, roads of all types provide a defensible space from which firefighters can conduct direct attack on wildfires as well as a strategic location for roadside fuel breaks. For the purposes of this plan, significant roads within the Tehama West Fire Plan project area have been classified into two groups: main roads such as freeways, state highways, and county arterial roads and secondary roads which include local routes, major and minor collector routes along with local roads. These significant routes are listed in **Table 5** and displayed on **Map 8**.

In addition to these developed roads, the Westside area contains many minor roads and primitive jeep trails that access public and private forest and ranch lands. Many of these however, are unmapped, gated, locked and therefore do not provide reliable access into or out of the immediate area. This network of transportation routes could provide a framework for both emergency evacuation routes as well a system of linear fuel breaks that both protect large areas of wildlands as well as link scattered fuel reduction projects located throughout the Westside area. Unfortunately these same roads also provide an extensive area through which sources of ignition can create fire starts. As shown on **Map 9,** the networks of roads throughout Western Tehama County often pass through areas containing hazardous fuels, creating a significant threat of ignition. Consequently, special attention must be paid to these high hazard areas in terms of reducing fuels.

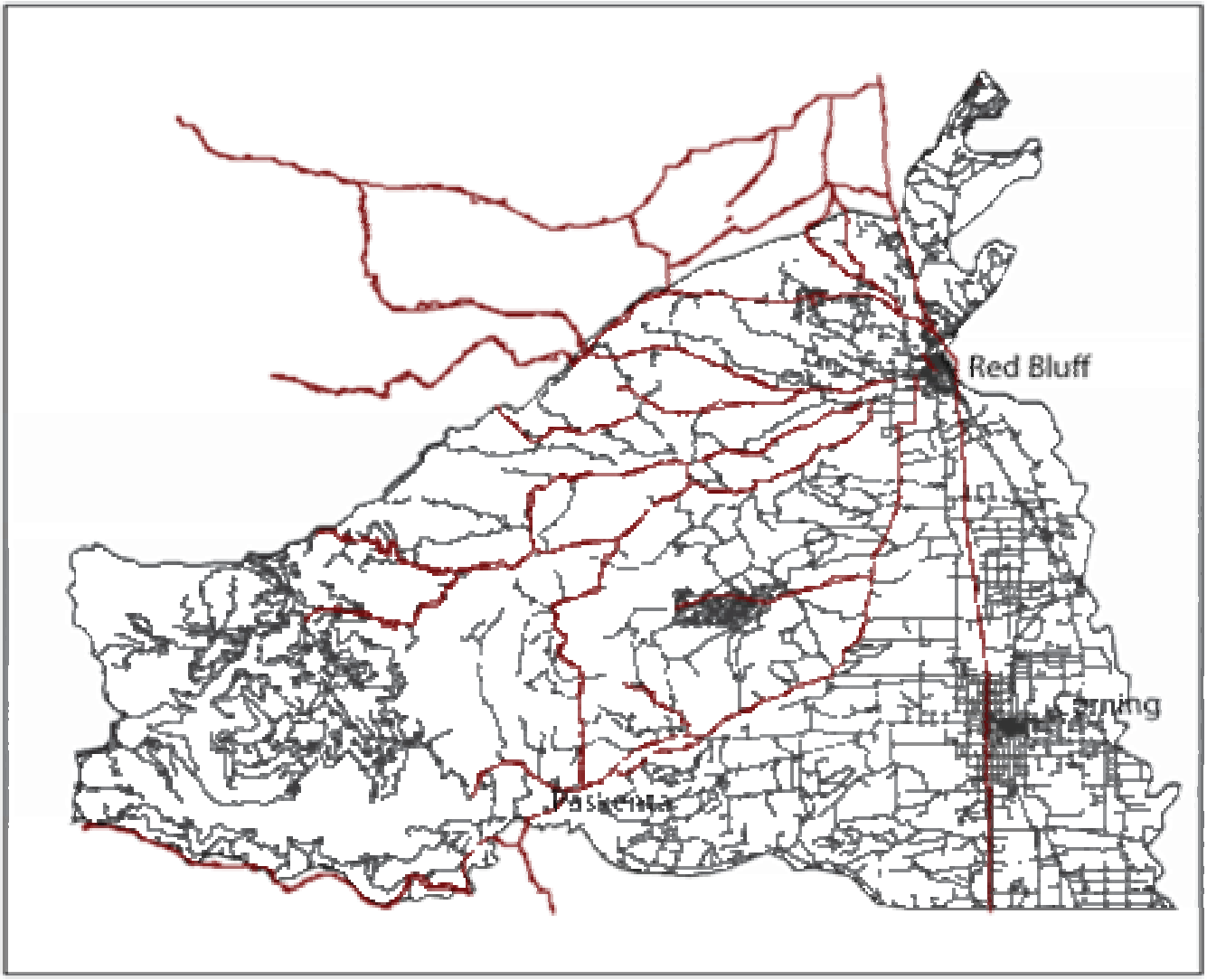
Business and Commercial Development

The economy of Western Tehama County is based largely upon cattle grazing and other forms of animal husbandry such as breeding, feedlot operations and hobby ranches. Several specialized agricultural operations are in the area as well. Fire in the area's grasslands and oak woodlands have the potential to damage or destroy these facilities if fire response and fuels management efforts are ineffective.

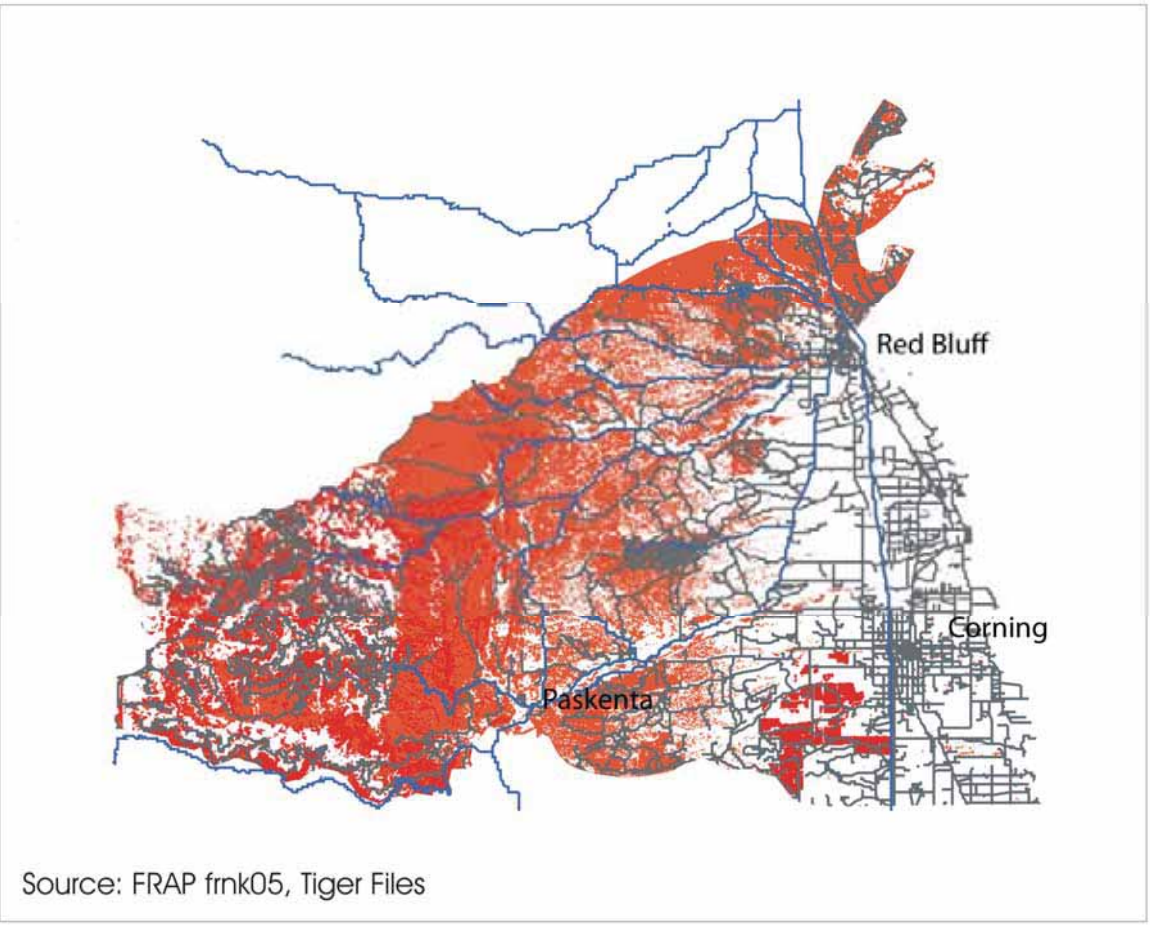
Table 5
Major Roads within the Tehama West Fire Plan Project Area

Road Name	Road Type
State Route 36	State Highway
Interstate 5	Interstate Freeway
Balis Bell Rd.	Local
Basler Rd	Local
Benson Rd.	Local
Bowman Rd.	Arterial
Cannon Rd.	Minor Collector
Colyear Springs Rd	Local
Hooker Creek Rd	Major collector
Lowrey Rd	Minor Collector
Johnson Rd.	Local
Matloc Loop Rd.	Local
McCoy Rd.	Major Collector
Newville.	Major Collector/Minor Collector/Local
Osborne Rd	Local
Pine Creek Rd.	
Paskenta Rd.	Major Collector
Pettyjohn Rd.	Local
Rancho Tehama Rd.	Major Collector
Raglin Ridge	Local
Red Bank Rd.	Major Collector
Reeds Creek Rd	Minor Collector
Ridge Rd	Local
Round Valley Rd.	Minor Collector/Local
Toomes Camp Rd.	Local
Vestal Rd.	Local
Weston Road	Local

Map 8
Major Transportation Routes Within the
Tehama West Fire Plan Project Area



Map 9
Proximity of County Roads to Areas of Significant Fire Threat



Cultural Resources

Various communities found within the Tehama West Fire Plan area contain an array of cultural resources that are shared by local residents. Among these are community buildings, swim facilities and parks. Also of significance is the Paskenta Indian Reservation located on Round Valley Road east of Paskenta. The area contains housing, cultural and sacred facilities utilized by local reservations residents. In addition, Western Tehama County contains both historic and prehistoric cultural resources that could be impacted, damaged or destroyed by wildfire or fire management activities if effective mitigation measures are not implemented.

Air Quality

During the County's fire season in late spring, summer and fall, smoke dispensing winds are often absent and an inversion layer above the Sacramento Valley is present much of the time. As a result, the often large volumes of smoke generated in connection with wildfires within the County's lower elevations can be trapped and drift toward developed areas containing an array of sensitive sites such as hospitals, schools, rest homes and other facilities. Among the impacts caused by drifting smoke are soiling of property, public nuisance, visibility loss and related traffic safety issues. In order to reduce the impact of wildfire on air quality, it is critically important to reduce the threat of uncontrolled fires through a combination of fire safety, fire management, and reduction of hazardous fuels in a manner which allows the controlled release of smoke emissions.

Overview of Tehama County Fire Protection Organizations

Fire Fighting responsibilities in Tehama County are divided into a number of organizational units whose responsibilities are described below. Those fire fighting units dealing primarily with fires within Western Tehama County's wildlands and wildland/urban interface areas are listed in **Table 6.**

Table 6
Summary of Fire Facilities Within Western Tehama County

Department	Station Name	Address	City
CDF/TCFC	Baker	14800 Bowman Rd	Cottonwood
CDF/TCFC	Bowman	18355 Bowman Rd	Cottonwood
CDF/TCFC	Corning	988 Colusa St	Corning
CDF/TCFC	El Camino	9580 Hwy 99W	Proberta
CDF/TCFC	Paskenta	P.O. Box 211	Paskenta
CDF/TCFC	Red Bank	15905 Red Bank Rd	Red Bluff
CDF/TCFC	Red Bluff	604 Antelope Blvd	Red Bluff
USFS	Paskenta	Paskenta Rd	Paskenta
USFS	Log Springs	Log Springs Ridge	Tehama County
USFS	Cold Springs	Cold Springs Ridge	Tehama County

City of Red Bluff Fire Department

Primary responsibility is for the City of Red Bluff and rural areas immediately adjacent to city limits. The Department operates one fire station.

City of Corning Fire Department
Primary responsibility is for the City of Corning and areas immediately adjacent to the city limits. The Department operates one fire station.

Tehama County Fire Department
Primary responsibility is for Tehama County's Local Response Area. The Department operates seven fire stations within the Tehama West Fire Plan project area. One of these (Bowman Station), shares facilities with the California Department of Forestry and Fire Protection.

Gerber Fire Protection District
Volunteers from the Gerber community run the Gerber station. It is a separate entity from the Tehama County Fire Department and is dispatched by the Tehama-Glenn Unit of the California Department of Forestry and Fire Protection District.

California Department of Forestry & Fire Protection
The California Department of Forestry and Fire Protection is responsible for controlling wildland fires on 283,778 acres of State Responsibility Areas (SRA's) lands throughout Tehama County and has fiscal responsibility over an additional 10,767 acres of SRA lands, which are directly protected by the United States Forest Service. California Public Resources Code 4125 establishes that local and federal agencies have primary responsibility for fire prevention and suppression in all County areas not classified as SRA. Every 5 years, the CDF reissues maps identifying the boundaries of the SRA with any modifications approved by the Board of Forestry. In addition to the stations within the County that the CDF either operates or is responsible for, other fire fighting resources are available in neighboring counties including aerial attack bases.

Historic catastrophic losses of structures in the wildland urban interface have resulted in an array of laws and regulations to protect the public. On a yearly basis, each Battalion of the Tehama-Glenn Unit performs LE38 inspections of clearance around structures (Public Resource Code 4291), in order to aid residents in understanding and complying with the regulations that affect the impact of wildfire events. Tehama County Ordinance 1537 includes Chapter 9.14, known as the "Tehama County Fire Safe Regulations", that went into effect after October 1, 1991. The Fire Safe Regulations constitute the basic wildland fire protection standards of the California Board of Forestry. These regulations have been prepared and adopted for the purpose of establishing minimum wildfire protection standards in conjunction with building construction and development in Tehama County. Items identified include basic road access, signing and building numbering, private water supply reserves for emergency fire

use, and vegetation modification. Fire department personnel attend stakeholder meetings, to aid the public with information and possible resources to utilize for fuel management projects in high priority/fire hazard areas.

The Tehama County Fire Prevention and Education Officer (TCFPEO) plays a key role in the placement and construction of building projects. During plot plan and project plan review, building site placement is considered. Design recommendations and special mitigation requirements are established for structures that do not have adequate vegetation clearance. The TCFPEO works cooperatively with the Tehama County Sheriffs Office and the Office of Emergency Services to develop documents for public reference in the form of Fire Prevention Calendars and Multi-Hazard Emergency Evacuation Plans. The calendars prompt homeowners about upcoming fire season conditions as well as provide information on how to prepare their homes and property for a wildfire event. The Multi-Hazard Emergency Evacuation Plan for the communities of Tehama County provides a detailed checklist for conducting pre-incident preparation as well as proper procedures to follow during an emergency. These plans were developed by the TCFPEO to address the critical needs of fire department and law enforcement personnel during emergencies such as wildland fires, hazardous material leaks, floods, other natural disasters and homeland security emergencies. In addition the Tehama County Fire Prevention and Education Officer was involved in drafting the fire chapter of the County's Disaster Mitigation Act of 2000 (DMA 2000) Multi-Hazard Plan and continues to provide input into the document's impact on fire related issues. The DMA 2000 Plan is required by the Federal Emergency Management Agency in order for local agencies to apply for pre-disaster mitigation funds.

California Department of Forestry and Fire Protection/California Department of Corrections Salt Creek Conservation Camp

The California Department of Forestry and Fire Protection and the California Department of Corrections operate this minimum-security facility jointly. The camp provides inmate fire crews, which can be dispatched throughout the county as well as the entire state. At the present time, the camp has one wildland engine, a bulldozer and various pieces of service and transportation equipment.

California Department of Corrections Alder Springs Conservation Camp

The California Department of Corrections operates, the Alder Springs Conservation Camp located at Alder Junction, which lies approximately 30 miles south of the Salt Creek Camp and roughly 20 miles east of the Elk Creek community.

United States Forest Service

The Mendocino National Forest manages the majority of lands within the westernmost portion of the Tehama West Fire Plan project area. The primary responsibility of this agency is for the control and suppression of wildland fires (*not structural fires*) on federal land. Within Western Tehama County, the United States Forest Service operates three fire stations (Paskenta, Log Springs and Cold Springs). Forest Service crews and equipment are also available at stations located within the Mendocino National Forest boundaries in Glenn, Mendocino, Colusa and Lake Counties. In addition, the agency has access to substantial fire fighting personnel and equipment throughout the region utilizing operating agreements established between the National Forests.

Bureau of Land Management

The United States Department of Interior's Bureau of Land Management oversees the management and operation of 23,300 acres within its Yolla Bolly Fire Management Unit located within Western Tehama County. At the present time, either the United States Forest Service or the California Department of Forestry and Fire Protection conduct all fire suppression operations on these lands. In the event of a wildfire, BLM fire management and fuels personnel would serve as duty officers and agency representatives to an interagency team. In addition, a number of local BLM staff has Red Cards, which allow them to join fire suppression forces if needed.

Interagency Approach to Fire Fighting In Tehama County

Wildland fires ignore civil boundaries. Consequently, it is necessary for cities, counties, special districts, as well as state and federal agencies to work together in order to minimize the adverse impacts of wildfires. All Tehama County fire fighting organizations are coordinated through automatic mutual aid agreements to assist one another as needed. This interagency array of fire fighting forces is dispatched by the Tehama-Glenn Emergency Command Center (TGECC) in Red Bluff according to a Standard Response Plan (SRP). The TGECC will dispatch fire engines, other emergency equipment and personnel from the closest resources available to fill the requirements of the SRP regardless of jurisdiction.

Through early detection, fire lookouts play a crucial role in preventing small fires from becoming large catastrophic wildfires. During the 2004 fire season, three lookouts were operational within the vicinity of the Tehama West Fire Plan project area and manned by either US Forest Service or California Department of forestry and Fire Protection Personnel. These lookout facilities are listed in **Table 7.**

Table 7
Lookout Facilities Servicing the Tehama West Fire Plan Area

Lookout Name	Managing Agency	Location
Anthony Peak	USFS	Mendocino County
Pattymocus	CDF	Tehama County
Tomhead	USFS	Trinity

Community ISO Rating
As a means to standardize the rating of communities in terms of their ability to protect homes and other structures from fire, the ISO (Insurance Service Office) system was developed by the fire fighting and fire insurance communities. The ISO system rates among other fire protection criteria:

- Fire protection level of service or lack of service in terms of proximity to paid fire fighting personnel
- Level and quality of emergency communications systems
- Quality and capacity of community emergency water delivery systems

The 10 point rating system (1 best and 10 worst) is often used by insurers in order to determine the availability and rate of fire insurance policies. **Table 8** below lists the current ISO ratings of the major communities within the Tehama West Fire plan area.

Table 8
ISO Ratings for Major Communities
Within the Tehama West Fire Plan Project Area

Community	ISO Rating	Zone	Rational for Rating
Dibble Creek	9	2	No community fire protection water system
Henlyville	9	9	No community fire protection water system
Ridgeway	9	6	No community fire protection water system
Flournoy	10	9	No community fire protection water system/ community is farther than 10 miles from a fire station with paid fire fighting personnel
Paskenta	10	1	No community fire protection water system/ community is farther than 10 miles from a fire station with paid fire fighting personnel
Rancho Tehama Reserve	10	9	No community fire protection water system/ community is farther than 10 miles from a fire station with paid fire fighting personnel

V. FIRE RISK ENVIRONMENT

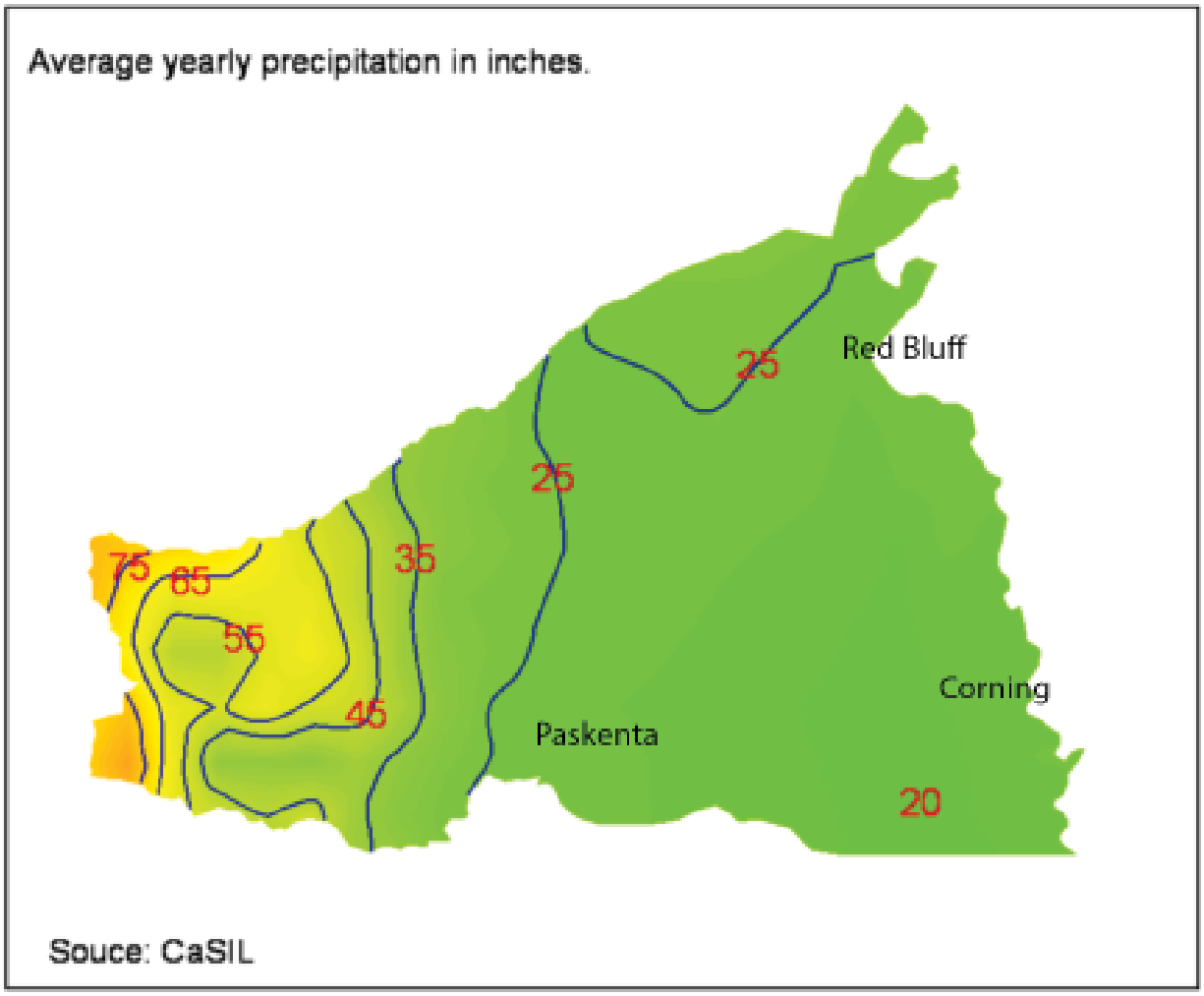
Fire Behavior, A Combination of Weather, Topography and Fuels

The three major components of the wildland fire environment are fuels, weather, and topography. Local weather conditions such as wind direction, wind speed, precipitation and humidity are important in predicting how a fire will behave. Within the lower elevations of the Tehama West Fire Plan project area, winds blow from the north during the early part of summer and from the south during the latter part of the summer season. Within Tehama County's western foothills, winds trend up canyons and along hillsides during early morning hours and down slope in the late afternoon and evening. In the valley, wind patterns push wildfire in a northerly or southerly direction while in foothill areas, winds trend in a westerly direction. The average wind speed in the Westside area has been determined to be between approximately 1.1 to 4.8 miles per hour. During the fire season (June-October), daily temperatures within the project area are usually in excess of 90° Fahrenheit and relative humidity is typically less than 30%. The majority area's precipitation occurs between October and April. **Map 10** is a generalization of the precipitation patterns within the Tehama West Fire Plan project area.

Topography can affect the direction and rate of fire spread. Topographic factors important to fire behavior are elevation, as well as the aspect, steepness and shape of slopes. When fire crews are considering fire suppression methods, topography is always critical in determining the safest and most effective plan of attack. When accessible, ridge lines are very important features from which to conduct fire suppression activities and can be a strategic area to conduct fuels management activities.

Of the three components to fire threat, fuel is only factor that can be controlled. Fuel characteristics that influence fire behavior are fuel moisture; fuel loading, size, compactness, horizontal and vertical continuity as well as chemical content. Fuel moisture is the amount of water in vegetative fuel and is expressed as a percentage of its oven dry weight. Fuel loading is defined as the oven dry weight of fuels in a given area, usually expressed in bone dries tons. A bone dry ton is 2000 pounds of vegetation when rated at 0% moisture content. Fuel size refers to the dimension of fuels, and compactness refers to the spacing between fuel particles. Continuity is defined as the proximity of fuels to each other, vertically or horizontally which governs a fire's capability to sustain itself. Chemical content in fuels such as oils or other flammable compounds can either retard or increase the rate of combustion. All of these factors will influence the amount of heat delivered, the duration, flame length and rate of spread of a particular fire and should be considered prior to developing fire prevention projects or initiating fire suppression activities.

Map 10
Generalized Precipitation Patterns



One of the primary goals developed for this fire planning project is to identify areas of high fuel loading. Fuels have been classified into four groups – grasses, brush, timber, and slash. The differences in fire behavior among these groups are basically related to the fuel load and its distribution among the fuel diameter-size classes. In 1972, Forest Service fire scientists developed 13 mathematical fire behavior models or Fuel Models in order to predict fire behavior. These Fuel Models represent the types of fuel most likely to support a wildfire within the Westside fire planning area and are displayed in **Table 9.** The fuel models were designed to estimate fire behavior during severe fire hazard

Table 9
Fuel Model Types

Fuel Model	Fuel Complex
	Grass and Grass Dominated
1	Short Grass (1 foot)
2	Timber (grass and understory)
3	Tall Grass (2.5 feet)
	Chaparral and Shrub Fields
4	Chaparral (6 feet)
5	Brush (2 Feet)
6	Dormant Brush, Hardwood Slash
7	Southern Rough
	Timber Litter
8	Closed Timber Litter
9	Hardwood Litter
10	Timber (Litter and understory
	Slash
11	Light Logging Slash
12	Medium Logging Slash
13	Heavy Logging Slash

conditions when wildfires pose greater control problems and have the potential to severely impact natural resources. Fuel models are tools to help the user realistically estimate fire behavior. The criteria for choosing a fuel model includes the assumption that fire burns in the fuel stratum best conditioned to support the fire. This means that situations will occur where one fuel model will represent the rate of spread most accurately, while another best depicts fire intensity. In other situations, two different fuel conditions may exist, so the spread of fire across the area must be weighed by the fraction of the area occupied by each fuel type.

Fire Ecology and Fire History

Tehama County's Fire Shaped Ecosystems

Fire has been an integral force within many Northern California ecosystems since the Pleistocene. From the mixed conifer forests of the Coast Range, to the chaparral lands of the county's inland foothills, fire is in some instances the dominate factor controlling ecological change within many local landscapes. In addition to renewing vegetation and recycling nutrients from live and dead plant material in the form of ash, the numerous low intensity burns of the past are suspected to have been a major factor in the environmental determination of plant structure and distribution as well as the composition of vegetative communities. Natural fire regimes are also suspected to be a catalyst for the reorganization of vegetation during periods of dramatic climate change.

Chaparral found in abundance within Tehama County's western foothills and uplands is one of the area's largest fire dependent ecosystems. Within an elevation belt ranging between 500 to 5000 feet, fire has historically swept through these vast stands of sclerophyll vegetation, on a roughly 20 to 30 year basis removing old, decadent plants material with low vegetative and forage production. As a result of wildfire impacts, these chaparral ecosystems are frequently returned to an earlier stage of seral development. Repeated fires reduce the competition of dominant brush species which can, if not controlled, develop into single species stands that can attain heights of 10 feet or more. Chemise is particularly well adapted to fire having developed an ability to produce root sprouts after burning. Fire improves these brush stands as forage for large mammals by replacing woody unpalatable vegetation of low nutrient value with new, more palatable root sprouts having somewhat higher nutritional value. The newly opened crowns of these brush fields allow more sunlight to reach the soil resulting in the production of grasses, forbs as well as those plants that develop from fire germinated seeds. Surface water is more readily available through a reduction of plant transpiration. In addition, the removal of dominant brush species by fire or other means often results in more complex plant communities. Among the varieties of brush species that develop in the Westside area's fire based ecosystem after a wildfire event are Toyon, Deer Brush, Red Bud, Common Manzanita and Chaparral Whitethorn.

The mixed confer forests found in the county's costal mountains are another example of ecosystems that have been shaped largely by fire. Tree ring studies and charcoal analysis indicate that fires passed through many of these stands every 6 to 32 years. Prior to the early 20th century, the frequency of these low intensity blazes provided a mechanism for thinning of the forest's understory which prevented the development of extensive forested areas containing dense, slow growing, even aged stands which often result after high intensity wildfires. Instead, early accounts of Northern California forests describe a patch work of dense thickets containing trees and brush as well as more open, park like stands. These low impact fires also provided a suitable bed for pine seeds that normally do not germinate successfully in heavy forest litter. Without fire, species such as White-fir, Douglas fir, and Incense cedar, crowd out less competitive, shade intolerant young pines, consequently changing the vegetative composition of these forests. In addition, without continuous low intensity fires that clear forest stands, rapidly growing brush species compete with seedlings of timber species, reducing their rate of survival. Overcrowding also tends to weaken large pines, making them susceptible to insect attack. Reduction of forest fuels prevents the development of more intense fires that can damage and kill seedlings and young trees, greatly reducing the amount of regeneration in the undestory. A reduction of young

understory vegetation also removes developing ladder fuels with which ground fires can move into forest crowns. Once this occurs, wildfires fires can spread quickly and become much more intense.

Grasses, forbs as well as perennial and annual herbs dominate the grassland communities of the County's Westside area. Within these ecosystems, plant density and air temperatures are normally high enough to carry regularly occurring, fast moving, low intensity fires which have become a major factor of change within this biotic community. A major impact of wildfire in grassland ecosystems is its affect on the distribution and form of individual plants as well as the composition of the entire vegetative community. Grassland fires also impact the population and distribution of birds rodents, insects and ungulates, which inhabit these environments. As with other fire-based ecosystems, the exclusion of naturally occulting wildfire within grasslands can have significant and often negative impacts on these landscapes. Intense, widespread wildfires can significantly reduce naturally occurring mulch and reduce the depth of humus in the organic layer of grassland soils, resulting in a reduction of grasses and forb species.

Disruption in the naturally occurring cycle of fire within grasslands can also lead to an increase in the occurrence of tree and shrub species particularly in those grasslands immediately adjacent to woodlands and open forests. A single blaze passing thought an interface area between these two plant communities can stimulate germination of seeds from brush species that require heat to initiate growth response. Once this occurs, the removal of grassy material prepares an appropriate bed for newly germinated seeds. Subsequent suppression of wildfire then allows these woody species to take full advantage of moisture and nutrients while the grass and forbs species redevelop into a competitive plant community. Finally, non-native invasive species and noxious weeds that are ill adapted to frequent fires have an opportunity to become established, increase in numbers, and spread throughout an ecosystem threatening plant diversity and forage values. These invasives can also adversely impact native vegetative communities by altering patterns of nutrient recycling, hydrologic processes, and the intensity of fire.

Many of the species considered to be invasive within Western Tehama County are annuals that are entirely dependent upon seed production for yearly propagation. In addition, a large number of these plants remain green and produce viable seed long after native perennial species have matured and cured. As a result, frequent fires have the opportunity to kill these invasives prior to seed germination thus reducing seed counts and the potential for future development. Invasive plant pests are defined by law, regulation, and technical organizations. Weed control methods include physical control (e.g.,

burning, hand pulling), chemical control (e.g., selective or non-selective herbicides), and biological control (e.g., insects that eat the pest). The use of fire to control invasives particularly starthistle and medusahead has been used throughout the fire plan area to varying degrees of success.

Human-Wildland Interactions
Within Tehama West Fire Plan Project Area
The Wildland Urban Interface & Communities at Risk

Throughout Western Tehama County and California as a whole, the development of communities adjacent to and within the state's wildlands have experienced dramatic growth and have taken a number of forms. In addition to the simple expansion of the urban fringe, rural subdivisions located far from urban centers as well as homes and small ranches built on individual parcels, have developed from lot splits which create residential densities that approach those of urban areas. These scattered areas of development are often created without many of the infrastructure components and fire safety features that are integral to fire protection. Significant among these deficiencies are access to two lane roads for escape and ingress of fire fighting equipment; water supply systems with the capacity to provide adequate fire protection as well as parks and other large areas of cleared space as are often found within and at the perimeter of urban subdivisions. Mobile homes are often used as residences on these small parcels and create additional structural fire hazards. Not only is this type of residence more susceptible to flash fire, but is also much easier to establish without adequate vegetation removal.

Within Tehama County's Westside, the conversion of wild areas into urban and residential uses is currently taking place largely within the county's grasslands and oak woodlands. A limited amount of rural development is also occurring within the area's forested wildlands. In terms of wildfire threat, these areas of rural development have been described as a point where the fuel feeding a wildfire changes from natural (wildland) to man made fuel such as structures, crops and urban debris. This intermingling of wildland and man made fuel is often referred to as the "wildland-urban interface/intermix and has made the control of wildland fires more difficult and costly. It has also dramatically increased the danger and potential destruction caused by wildfire.

During a large wildfire event, widely scattered development requires fire fighting forces to disperse in order to protect numerous isolated structures. As a result, manpower and other resources necessary to initiate attack on a fire front cannot be organized, allowing fires to spread and build in intensity much more rapidly. In addition, this dispersal of development makes rescue and evacuation efforts during such emergencies more difficult, dangerous, and time consuming. Of equal importance is that scattered urban development patterns make the efficient used of prescribed burning on a landscape scale more expensive and risky. Smoke from prescribed burns can damage homes and fire escapes in more densely

populated landscapes can destroy residential developments thus increasing the cost of liability clams made against land management entities.

In an attempt to improve this situation, Federal fire managers authorized State Foresters to determine which communities adjacent to Federal lands were exposed to a significant threat from wildland fire originating on public property. The California Department of Forestry and Fire Protection undertook the task of generating a state list of at-risk communities which in the case of California included developed areas located away from the immediate vicinity of National Forests and Bureau of Land Management properties. In developing the California list, the CDF assessed all areas of the state regardless of ownership. Three main factors were used to determine fire threats to wildland urban interface areas within the state:

- Fuel hazards ranking (ranking vegetation types by their potential fire behavior during a wildfire).
- Assessing the probability of fire (the annual likelihood that a large damaging wildfire would occur within a particular vegetation type).
- Assessing Housing densities in wildland urban interface areas (areas of intermingled wildland fuels and urban environmental that are in the vicinity of fire threats).

Out of this statewide assessment, a list of 1,283 fire threatened communities was developed**.** Of these threatened communities, 843 were found to be adjacent to federal lands. **Table 10** lists the officially recognized communities within the Tehama West Fire Plan project area. The Hazard Level Code shown on there designates a community's fire threat level with 3 indicating the highest level of threat.

The History of Fire and Fuels Management in Western Tehama County

With the creation of the United States Forest Service in the early 20th century and the California Department of Forestry and Fire Protection in 1905, a state and national infrastructure was created to prevent and suppress all wildfires within Western Tehama County. As of 1905, statewide efforts had established full suppression of wildfires throughout Tehama County and the rest of the north state. Fire suppression success was defined in terms of an overall decline in the number and size of wildfires. At the same time, it was becoming apparent that when wildfires did occur, they were often more intense,

Table 10
Officially Recognized Communities at Risk Within Western Tehama County

Community Number	Community Name	Federal Threat	Hazard Level
85	Bend	F	2
257	Corning		3
283	Dairyville		2
656	Los Molinos	F	2
920	Red Bluff	F	3
1204	Wilcox	F	2
835	Paskenta	F	3

resulting in large areas of severe vegetation destruction **(Table 11).** The increase in fire occurrence and intensity was becoming particularly acute in forested areas where large expanses containing substantial amounts of debris, brush, and dense thickets of small timber had developed as result of logging and other resource extraction activities. The occurrence and intensity of wildfire was also found to be increasing in open wildlands where naturally occurring fires were being extinguished without exception in order to protect man made resources and maintain vegetative cover in watersheds.

Table 11
Historic Fire Acreages by Decade

Decade	Fire Events	Acres
1900	**1**	**948**
1920s	**7**	**59,518**
1930s	**12**	**61,254**
1940s	**32**	**59,914**
1950s	**18**	**13,234**
1960s	**12**	**5,758**
1970s	**8**	**103,188**
1980	**11**	**12,023**
1990	**17**	**12,892**
2000	**14**	**10,484**
Total	**132**	**339,213**

Source: CDF Fire Resource and Assessment Program

Overview of the Fire Policies, Planning Efforts and Program Initiatives that Impact Fire and Fuels Management Within the Tehama West Fire Plan Project Area

An array of policies and plans direct the management of fire and fuels within the Tehama West Fire Plan project area. At the same time, an array of programs have been developed at the federal, state and local level to translate these polices into impacts on fire threatened communities and landscapes. These

are described below starting with the broadest expressions of how to improve the currently negative impact that fire has the nation's wildlands and the communities found within them.

Federal Wildland Fire Management Policy & Program Review

The 1995 Federal Wildland Fire Management Policy and Program Review revised an array of federal policies and procedures pertaining to the suppression and use of fire. The act was an attempt to change the federal outlook on the roll of wildfire within the environment as well as to better control and utilized this natural phenomenon in order to achieve positive impacts on the nation's landscapes. The policies in the act direct federal wildland fire agencies to achieve a balance between fire suppression and fuels management in order to sustain healthy forests, especially those in fire-adapted ecosystems. The 1995 review began a process that redirected some dollars allocated for wildland fire suppression to a more proactive fuels management program. Modest increases in budget allocations and an accompanying target of acres to be treated, dictated that the primary treatment method for hazardous fuels reduction would be prescribed fire.

Western National Forest – A Cohesive Strategy

In April 1999, the US General Accounting Office (GAO) issued a report to the subcommittee on Forests and Forest Health, the Committee on Resources, and the House of Representative entitled, "Western National Forest - A Cohesive Strategy is needed to Address Catastrophic Wildfire Threats". This report recognized that while the Forest Service in the previous decade had attempted to reduce the threat of catastrophic wildland fire, through the use of timber sales and understory tree removal prescriptions, the agency had failed to make significant progress in reducing the number and severity of large wildfires. The GAO report recognized that accumulation vegetation having little or no commercial value was a critical component in fueling destructive wildfires.

National Fire Plan

During the 2000 fire season, wildfires burned millions of acres throughout the United States. These fires dramatically illustrated the threat to human lives and development. In response to these catastrophic fires, President Clinton requested the Secretaries of Agriculture and Interior to submit by September 8, 2000, a report, *Managing the Impact of Wildfires on Communities and the Environment, A Report in Response to the Wildfires of 2000*. This report, its accompanying budget request, Congressional direction for substantial new appropriations for wildland fire management, action plans and agency strategy have collectively become known as the National Fire Plan (NFP). The NFP was created as a cooperative, long term effort of the United States Forest Service, Bureau of Land Management and the National Association of State Foresters, to protect communities and restore

ecological health on Federal lands. A major component of the National Fire Plan was funding for projects designed to reduce fire risks to communities. The NFP provided the foundation and momentum for the Healthy Forest Initiative of 2002 and the Healthy Forest Restoration Act of 2003. The NFP contains five key areas to which funding will be channeled:

- Firefighting Resources. Increases the level of funding for suppression resources to the Most Efficient Levels (MEL) based on the values at risk and the cost of staffing a fire suppression force to protect them;

- Rehabilitation and Restoration. The plan establishes the formation of Burned Area Emergency Rehabilitation (BARE) teams that respond to large and damaging wildfires by identifying emergency projects to protect life, property and key ecosystem components caused by wildfire;

- Hazardous Fuel Reduction. Working with area cooperators, projects are identified and implemented to reduce potential wildfire damage;

- Community Assistance. The NFP directs federal wildland fire managers to work with communities to reduce hazardous fuels, increase local employment with jobs in restoration and fuel reduction projects, provide defensible space information, volunteer and rural firefighting assistance and economic action programs.

- Accountability. Establishes a tracking system to monitor progress of acres treated and monies spent.

In addition, the National Fire Plan (NFP) focuses funding and technical assistance to those communities most at risk from the impacts of wildlfire by both establishing a Federal definition of at risk communities as well as a process for designating these threatened urban areas. At risk communities are considered to be the most impacted by wildland fire and thus become priory areas for Federal fire fighting and fire management resources. Originally these communities were considered to be those that were located immediately adjacent to Federal lands. Over various iterations of the National Fire Plan, the definition of an at-risk community has been broadened to include all communities where structures and other forms of urban development meet (interface) or mingle (intermix) with undeveloped wildlands and their associated vegetative fuel.

The enabling legislation of the National Fire Plan establishes development densities of at risk interface communities at three or more structures per acre. Alternatively these areas are defined as those having 250 or more people per square mile. These at risk areas must have shared municipal services such as electricity and receive fire protection by a local government fire department. The legislation goes on to define intermix communities as those developed

areas where human development is scattered throughout a much larger natural landscape and where there is no clear boundary between the two. Development densities within intermix areas range from sites where structure are simply very close together to those locations where there is only one structure per 40 acres. An alternative definition specifies 28 to 250 people per square mile in areas where fire protection districts funded by various taxing authorities provide structural and wildland fire protection. In addition, National Fire Plan provisions attempt to address the issue of large scattered communities with significant areas of undeveloped wildland or open space areas that are surrounded by urban environments. In these "occluded communities" wildlands and there associated fuels are surrounded by relatively intense urban development.

In evaluating the fire hazard to each of the above types of development scenarios, the NFP specifies various factors of analysis that must utilized in identifying at risk communities. Among these are fire behavior potential, values at risk, as well as fire and public safety infrastructure. Since the original version of the National Fire Plan was prepared, the definition of Wildland-Urban Interface areas has expanded to include all urban areas that intermix or interface with wildlands containing contiguous vegetation, not just those managed by the Federal Government. Also, Interface areas now consist of at least 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area (made up of one or more contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as an interface area. Finally, the minimum density has been changed to one structure per 40 acres (16 ha). In intermix areas, wildland vegetation is continuous, more than 50 percent vegetation and contain more than 1 house per 16 ha.

Finally, the National Fire Plan recognizes that in order to reduce threats from wildfire, rural communities must buffer core urban areas from wildland fire through gradual manipulation and reductions of fuel volumes at their outer edges. At the present time, these interface areas are inhabited zones within 1.5 mi of wildland vegetation, roughly the distance that firebrands can be carried from a wildland fire to the roof of a house. It captures the idea that even those homes not sited within the forest are at risk of being burned in a wildland fire. As defined in the NFP the Wildland Urban Interface (WUI) is buffer zone which extends 1 ½ mile out into private or public wildlands from areas that have residences, commercial buildings or administrative sites with facilities.

These WUI areas consists of an inner ¼ mile wide buffer (the defense zone) and an outer 1 1/4 mile buffer (the threat zone). The actual boundaries of wildland urban interface zones are determined locally, based on the actual distribution of structures and communities adjacent to or intermixed with local wildlands. Strategic landscape features, such as roads, changes in fuels types, and topography can all be used in delineating the physical boundary of the WUI. Within these zones fuel reduction treatments are designed to protect communities from wildland fires as well as minimize the spread of fires that might originate in urban areas on to wildland areas. The management objective in the wildland urban intermix zone is to enhance fire suppression capabilities by modifying fire behavior inside the zone and providing a safe and effective area for possible future fire suppression activities.

10 Year Comprehensive Strategy

In August 2001, the 10-Year Comprehensive Strategy was released. The Western Governors Association, the National Association of State Foresters, National Association of Counties, the Intertribal Timber Council and the Secretaries of the Interior and Agriculture joined to endorse A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy. The 10-Year Comprehensive Strategy refined the framework of the NFP and established implementation outcome expectations, performance measures, and implementation tasks for the four goals of the 10-year Comprehensive Strategy which include:

- Improved Fire Prevention and Suppression
- Reduced Hazardous Fuels
- Restored Fire-Adapted Ecosystems
- Promotion of Community Assistance

Healthy Forest Initiative

In August 2002, the Bush administration, announced the Healthy Forest Initiative (HFI). The HFI is in response to federal agencies concerned with administrative procedures that delay the preparation and implementation of hazardous fuel reduction project in critical areas and impede the implementation of the NFP. The HFI expedites the administrative procedures for certain hazardous fuel reduction projects by issuing new categorical exclusion categories that reduces lengthy environmental and sociological documentation. The new categorical exclusions require both USFS, Department of the Interior (DOI), and the Bureau of Land Management (BLM) to participate in a public collaboration process with State and local governments, Tribes, landowners and other interested persons and community-based groups in order to identify new project areas and treatments.

Healthy Forest Restoration Act

The Healthy Forest Restoration Act of 2003 (HFRA) contains a variety of provisions to expedite hazardous fuel reduction and forest restoration projects on specific types of Federal land that are at risk of wildland fire or insect and disease epidemic. The Federal Register of August 17, 2001 provides the latest listing of communities at-risk of wildfire in the vicinity of Federal lands. Additional communities may have been added since this listing based on later evaluations. The HFRA encourages Federal agencies to involve State and local governments and citizens when developing plans and projects for vegetation treatment on Federal and adjacent non-Federal lands. The HFRA includes provisions to:

- Establish WUI's of ½ mile around at-risk communities or within 1½ miles when mitigating circumstances exist, such as sustained steep slope or geographic features aiding in creating a firebreak. Hazard reduction treatments are given priority within these WUI's;
- Establish WUI's adjacent to evacuation routes for at-risk communities;
- Expedite NEPA review of hazardous fuel reduction projects in WUI's on Federal lands;
- Encourage biomass removal and utilization from public and private lands; and
- Require using at least 50% of the dollars allocated to HFRA projects to protect communities at risk of wildfire.

The enactment of the HFRA gives new impetus for communities to engage in forest planning. The legislation includes the first meaningful statutory incentives for the USFS and the BLM to give consideration to the priorities of local at-risk communities as the agencies develop and implement forest management and hazardous fuel reduction projects. In order for an at-risk community to take full advantage of this new opportunity, it must first prepare a Community Wildfire Protection Plan.

Standards and Guidelines for Management of Habitat for Late Succesion and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl and the Forest-Wide Late Succesional Reserve Assessment

Since the 1970s, controversy has surrounded federal management of old growth forests in the Pacific Northwest. Many of the arguments have focused on the extent, condition and management of spotted owl, marbled murrelet and anadromous fish habitat as well as other species that are closely associated with biologically diverse late successional, old growth, and other special status forest areas found within 25 million acres of federally managed lands in Northwest California, Oregon and Washington. Numerous lawsuits and resultant injunctions have significantly impacted timber harvesting and other

land management activities within these mature forest lands managed by the United States Forest Service and the Bureau of Land Management and which include a portion of the Tehama West Fire Plan project area. They have also impacted the regulatory framework utilized by the United States Fish and Wildlife Service, National Marine Fisheries Service and the Environmental Protection Agency. In order to move beyond legal impasse, the Secretaries of Agriculture and the Interior worked cooperatively on a strategy that would establish a number of principles which would lead to a stable and sustainable supply of timber as well as meet the conservation obligations for these species. Out of these cooperative efforts was developed the "Standards and Guidelines for Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl" which established a network of Late Successional Reserves (LSRs) and a number of other special classification of forest and riparian habitats within this region.

Mendocino National Forest Wide Late Succesional Reserve Assessment

A significant requirement of the Standards and Guidelines is to prepare an assessment at the National Forest level which will guide the development of management strategies for each Late Succesional Reserves before these habitats are manipulated. To accomplish this, staff of the Mendocino National Forest prepared the "Forest Wide Late Succesional Reserve Assessment" for all LSR's within the forest to a 100 acre minimum size. The document provides direction to forest management personnel in their attempts to protect and enhance conditions of LSR ecosystems which serve as the habitat for dependent species such as the Northern Spotted Owl. Significant among the provisions found in the assessment process is the development of protective measures that reduce the risk of large scale disturbances such as catastrophic wildfires.

Within that portion of the Tehama West Fire Plan project area located inside the boundaries of the Mendocino National Forest are 65,803 acres included in the Buttermilk Late Successional Reserve along with a number of 100 acre LSR areas managed for similar purposes. In order to preserve these old growth stands, the the Mendocino Forest LSR assessment document emphasizes the need for their protection from uncontrolled, high intensity wildfire that can destroys old growth forest resources and that require the utilization of high impact suppression equipment and techniques. To accomplish this, the goal was established to limit the size of all fires occurring within the LSR reserve area. It was determined however, that some low intensity fires may be allowed to burn under prescribed conditions if they improve old growth forest resources found within the LSR. Finally, the assessment process established the need for watershed analysis that will provide information required to determine the

amount of coarse woody debris that needs to be retained in streams when applying prescribed fire techniques.

Federal Emergency Management Agency
Disaster Mitigation Act of 2000 Multi-Hazard Mitigation Plan

The Disaster Mitigation Act of 2000 (DMA 2000) is an attempt by the federal government to reduce the vulnerability of states, tribes and local governments to natural hazards and potential natural disasters. The DMA 2000 act is also an attempt to improve the cost effectiveness of disaster assistance funds by improving communities' ability to withstand natural disasters and to efficiently respond to them when they occur. To accomplish this, The Federal Emergency Management Agency will fund an array of pre-disaster mitigation projects if communities can demonstrate that they have a plan in place that recognizes what the potential local disasters are and how the community will prepare for and respond to their impacts. This process closely follows the structure and intent of the Community Wildfire Protection Plan template. As a result, through the preparation of the Tehama West Fire Plan, the requirements of the DMA 2000 multi-hazard plan wildfire component are fulfilled.

California Fire Plan

The California Fire Plan was prepared by the State Board of Forestry and the California Department of Forestry and Fire Protection. The plan provides a framework to assist communities in funding, development and implementation of Fire Safe plans and Defensible Fuel Profile Zones (DFPZ). The overall goal of the California Fire Plan is to reduce total costs and losses from wildland fire by protecting assets through pre-fire management activities and increasing initial attack success. The California Fire Plan has five strategic objectives:

- Create wildfire protection zones that reduce the fire risks to citizens and fire fighters
- Assess all wildlands throughout the State, including all SRAs. Assessments will include an analysis of all wildland fire service providers – federal, state, local government, and private. The analysis will identify high risk/ high value areas, and determine who is responsible, who is responding, and who is paying for wildland fire emergencies
- Identify and analyze key policy issues and develop recommendations for changes in public policy. Analysis will include alternatives to reduce total costs and losses by increasing fire protection system effectiveness
- Create a strong fiscal policy focus, and to monitor the wildland fire protection system in fiscal terms. This will include all public and private expenditures and economic losses
- Translate the analyses into public policies

Agency and Resource Management Entity Fire Planning Efforts

In addition to the polices developed in the broad strategic plans such as the National Fire Plan, DMA Multi-Hazard Mitigation Plan and the California Fire Plan, various agencies and resource management entities have prepared fire plans for specific areas or particular resources. These planning endeavors generally take the form of:

- Resource management plans which includes a discussion of fire and its impact on specific resources

- Agency fire management plans which address fire organization logistical issues as well as the implementation of fire polices developed in broader resource planning documents

The content of such plans and their impact to the fire environments and fire protection efforts of Western Tehama County are discussed below:

Mendocino National Forest Land and Resource Management Plan (LRMP)

This forest wide resource plan discusses management objectives and issues for all resource areas including fire within the 911,855* federal acres and 168,116* privately managed acres within the boundaries of the Mendocino National Forest. Among its objectives, the LRMP establishes an array of goals for the forest which lead to desired conditions within the forest up to 50 years in the future. A number of these goals relate directly to the management and use of fire within the forest's various ecosystems.

Air Quality

The LRMP establishes the goal of maintaining a level of air quality which meets or exceeds State and Federal air quality standards. In order to maintain this goal, National Forest officialswill control emission sources through a combination of coordinating with regulatory agencies and properly timing prescribed fires. A goal has also been established that prescribed burning will meet or exceed standards for total suspended particulates. Through the use of properly executed prescribed burns and other fuel treatments, there is expected to be a reduction in the number of days that wildfires create emissions that exceed visibility and particulate standards.

** Acreage figures are as of fiscal year 2005 and reflect significant land exchanges that have occurred on the Mendocino National Forest since the release of the 1995 Land Resource Management Plan*

Chaparral

Chaparral stands will be managed in manner that increases the potential range, wildlife, recreation, and watershed benefits with which these lands are capable of producing. Management will also focus on reducing the risk of large costly wildfires within chaparral landscapes. To significantly impact the age class and thus the flammability of chaparral stands, Forest personnel will conduct a program of prescribed burns which are expected to total approximately 5,350 acres annually. The goal of these burns is to break-up continuous stands of old growth chaparral into a mosaic of successional stages having different types and levels of resource values.

Diversity

The LRMP establishes a goal of maintaining or improving plant and animal diversity in order to support viable populations of both native and desirable non-native species. Species age class diversity is expected to increase as a result of chaparral and timber habitats being brought under management through fire and other methods of vegetation manipulation.

Fire and Fuels

The overall fire and fuels goals of the Mendocino Forests LRMP is to maintain a cost effective detection, prevention, suppression and fuels management program which supports other forest-wide resource programs. In addition, the proposed fuels management program is expected to reduce the number, size and intensity of wildfires even with an expected significant increase in forest use within the near future.

Forest Health

A significant portion of the Mendocino National Forest resource plan's goal of improving forest health in an array of ecosystems will be advanced through the managed use of prescribed fire and managed wildfire. In addition to reducing wildfire threat, the use of prescribed fire is expected to prevent and control insect infestations and disease through the sanitation of infected timber stands. The use of fire is also expected to aid in thinning overstocked stands and therefore reduce competition for available moisture, sunlight, and soil nutrients. In addition various prescribed fire techniques could be used to aid in the eradication of Class A noxious weeds which pose a threat to the viability of various habitats throughout the forest.

Heritage Resources

One of the primary goals in managing the Forest's heritage resources is the long term physical protection from loss and damage. Through the development and implementation of properly

executed burns and other fuels reduction techniques, heritage resources are identified and adequately protected from the affects of high intensity wildfires which often occur in the absence of an adequate fuels management program

Research Natural Areas

The LRMP tasks Mendocino National Forest personnel with an obligation to manage both exiting and recommended Research Natural Areas in order to *"…preserve the specific botanical elements represented."* There is however, a potential for these ecosystems to be lost if unnatural high intensity fires occur. As a result, the Mendocino National Forest's fire and fuels management program will aid in the protection of these specific habitats from all but naturally occurring low intensity fires.

Riparian and Aquatic Ecosystems

The overall goal of the Forests Riparian and Aquatic Ecosystems management objectives are to maintain and improve the ecological health of riparian and aquatic ecosystems. In addition to limitations on the activities that can be conducted in these aquatic ecosystems, protection will be maintained through the exclusion of high intensity fires which have the potential to reduce canopy and streamside vegetation and thus dramatically change water quality and conditions. As a result, the fire management programs proposed in the LRMP is expected to provide additional positive impact on these ecosystems.

Soils and Geology

The LRMP's goal of maintaining or improving long-term soil productivity and slope stability is expected to be positively impacted by various activities, such as prescribed burning, that reduce the threat of high intensity wildfires which can denude entire landscapes and lead to mass erosion and slope slippage.

Special Interest Areas

Like the other goals of the Mendocino Forest LRMP, the resources found in special interest scenic, geological, botanical, zoological, paleontological, archaeological, areas can be protected through the control of high intensity wildfires.

Threatened Endangered and Sensitive Plants

In order to protect threatened, endangered and sensitive plants as well as to provide favorable habitat conditions for their increased populations, the threat of damaging high intenisty wildfires must be reduced. The fire and fuels management program developed for the

Mendocino National Forest attempts to address this issue through the development of natural fire regimes which require the judicious use of prescribed fire and managed wildfire.

Timber and Other Forest Resources

To accomplish the goal of providing timber and other forest products on a sustained basis, Forest personnel have been tasked with the responsibility to re-establish and regenerate burned timbers stands, manage timber production areas more intensively and prevent high intensity fires that can destroy these forest resources.

Visual Resources

The primary objective of the LRMP in managing fire and fuels for visual resources is to maintain visual esthetics through the control of unplanned wildfires, particularly along key travel routes. In addition, the plan calls for the large scale incorporation of fire into chaparral type vegetation as a means to create textural variety on brush covered slopes.

Watersheds and Water Quality

The primary goal of the Mendocino Forest LRMP watershed and water quality component is to:

> *"Maintain and improve watershed conditions to maintain stream channel function and stability, and to provide water of sufficient quality and quantity to meet or exceed expected beneficial use requirements."*

The LRMP estimates that the overall condition of the watersheds within the Mendocino National Forest boundaries will improve as a result of significant reductions in physically impactive activities. Significant among these impacts are large uncontrolled wildfires which are expected to be reduced though carefully planned and controlled prescribed fires.

Wilderness

Under the Forest's current land use planning criteria, the Yolla Bolly-Middle Eel Wilderness and Snow Mountain Wilderness areas are to be protected and enhanced at a level of intenisty that is in keeping with the Wilderness Act. To accomplish this, the LRMP establishes a role for both managed and unmanaged wildfire in the future management and maintenance of these wilderness landscapes.

Wildlife and Fish

Among the Mendocino Forest LRMP's Wildlife and Fish resource goals is the maintenance and improvement of diverse, high quality habitats needed to support viable populations of native and desired non-native species. The plan recognizes that changes in vegetation attributable to natural process such as naturally occurring wildfire and man made impacts such as uncontrolled

wildfire will ultimately impact and alter existing patterns of wildlife habitat and populations. In addition, anadromous fisheries habitat is expected to show continuous improvement as a result of positive watershed management practices including the reduction of high intensity fires.

Forest-wide Standards and Guidelines

In conjunction with the preparation of the Mendocino National Forest Land Resource Management Plan, an array of standards and guidelines were established that provide tangible management direction in accomplishing the policy objectives established in this planning document. These standards and guidelines assure that the Mendocino National Forest LRMP is implemented in conformance with Forest Service regional management direction as well as the legal requirements of various environmental laws such as the Clean Water Act, the Clean Air Act and Endangered Species act among others. A number of these implementing guidelines apply directly to the management and use of fire or indirectly in terms how other resources are managed in relationship to fire. Due to the size of the Forest, fire management and fire related decisions made within its boundaries can have a significant impact on public and private land management outside the Forest. The following is list of standards and guidelines that directly or indirectly relate to fire and fuels management policies established in the LRMP.

Air Quality: Manage National Forest activities to maintain air quality at a level that meets or exceeds State and/or local government regulations.

Conduct prescribed fire activity only on burn days unless variances are obtained from appropriate Air Pollution Control Boards.

Coordinate prescribed burning activities with affected groups and agencies.

Conduct prescribed burning outside of the Yolla Bolly-Middle Eel Wilderness so that Air Quality Resource Values (AQRVs) within the Wilderness are not adversely affected. Adverse impact assessments will be conducted following the recommendations contained in the document entitled *'Guidelines for Evaluating Air Pollution Impacts on Class One Wilderness areas in California.'*

Diversity: Determine the specific arrangement of vegetative types and serial stages (in terms of size, distribution, and location) within each management area, necessary to meet management indicator species needs, as defined in the wildlife habitat models.

Establish management zones around meadows and annual grasslands of not less than 50 feet. Within these zones, emphasize maintenance or enhancement of horizontal and vertical structural vegetative diversity, and special habitat components such as snags, down logs and hardwoods. Management of habitat within these areas should be primarily for the benefit of wildlife and native plant communities.

Facilities and Transportation: Provide and maintain those facilities necessary for the protection, use, safety, and efficient management of Forest resources and programs.

Designate sites to be used as water drafting locations during project level analysis or as a part of road maintenance. Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat and passage.

Fire and Fuels: Provide for protection from wildfire through timely detection and suppression response with appropriate forces, such that cost plus net resource loss due to wildfire is minimized. All wildfires will be contained, confined, or controlled in accordance with specific management area direction.

Utilize the appropriate suppression response (i.e., confine, contain, or control) for naturally occurring unplanned ignitions outside Wilderness Areas.

Design fuel treatment and fire suppression strategies, practices, and activities to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuels management activities could be damaging to long-term ecosystem function.

Limit the size of all fires within riparian reserves, when watershed and/or landscape analysis, or province-level plans are completed and approved, some natural fires may be allowed to burn under prescribed conditions. Rapidly extinguishing smoldering coarse woody debris and duff should be considered to preserve these ecosystem elements. In Riparian Reserves, water drafting sites should be located and managed to minimize adverse effects on riparian habitat and water quality as consistent with Aquatic Conservation Strategy objectives.

Treat fuels to reduce the potential rate of spread and fire intensity so the planned initial attack organization can meet initial attack objectives.

Integrate multi-resource management objectives into fire hazard reduction efforts. Design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

Emphasize fuels treatment efforts for fire hazard reduction purposes in the following areas:

Natural Fuels:

- continuous, mature brush stands of more than 150 acres adjacent to or within areas of urban interface, resource investments, or high fire hazards;
- continuous, mature brush stands more than 25 years old;
- continuous, mature brush stands with dead-to-live ratios greater than 35%.
- forested areas with excessive accumulations of natural fuels.

Activity Fuels:

- in zones of urban interface or other high fire hazard areas;
- where treatment is necessary before initiating other multi-resource management projects, e.g., reforestation.

Encourage cooperative agreements with other agencies and organizations to provide cost efficient and effective fire prevention, fire detection, fuels management, and fire suppression programs. Cooperate with local landowners and local, state, and federal agencies in preparing and implementing coordinated resource plans.

Consider the particular needs for the specific vegetative communities and sensitive plants where prescribed burning is used as a vegetation management tool. Vary or adjust the

frequency, intensity, and timing of prescribed burning proposals as necessary to protect specific vegetation types, botanical diversity, and the viability of sensitive plant species.

Heritage Resources: Whenever heritage properties might be affected by an activity, protect the properties or resource sites until they are evaluated. Follow the procedures for assessing and treating any effects and maintain the integrity and values of eligible properties, to the extent possible, as outlined in the Advisory Council on Historic Preservation's regulations.

Coordinate forest, management practices with concerned local Native Americans to ensure that such practices do not unduly impede access to traditional food, medicine, and basketry resources located through the forest. Continue efforts to contact knowledgeable individuals who can assist in the identification of sites of traditional importance and protect sites of traditional importance as provided for under the American Indian Religious Freedom Act of 1978.

Soils and Geology: Protect long-term soil productivity in controlled burn prescriptions through the use of "Mendocino National Forest Guidelines for Prescribed Burning of Chemise/Chaparral", and by meeting aquatic conservation strategy objectives.

Threatened, Endangered, and Sensitive (TES) Plants (including Bryophytes, Fungi, and Lichen): Manage sensitive plants to ensure that species do not become threatened or endangered because of Forest Service action.

Incorporate site specific requirements for maintaining botanical diversity and the viability of TES plant species known to occur in the area into planning and design of proposed fire rehabilitation and revegetation activities, as well as any other activities which have the potential to affect botanical diversity of the viable TES plants.

Survey and Manage, within all land allocations, for some species of bryophytes, vascular plants, fungi, and lichens.

> *…Acquire information on these known sites, and make this information available to project planners. Use this information in the design or modification of activities. In most cases, the appropriate action will be to protect relatively small sites on the order of tens of acres. For some species, including some vascular plants, the appropriate action will include using specific management treatments such as prescribed fire. For rare and endemic fungus species, areas of 160 acres should be temporarily withdrawn*

from ground disturbing activities around known Sites until those sites can be thoroughly surveyed and site specific measures prescribed…

Minimize intensive burning, unless appropriate for certain specific habitats, communities or stand conditions. Plan prescribed fires to minimize the consumption of litter and coarse woody debris. Minimize soil and litter disturbance resulting from yarding and operating heavy equipment Reduce the intensity and frequency of site treatments. Soil compaction, and removal or disturbance of humus layers and coarse woody debris may impact populations of fungi.

Wildlife and Fish (including Arthropods and mollusks): Mollusks and Arthropods: Minimize intensive burning, unless appropriate for certain specific habitats, communities or stand conditions. Plan prescribed fires to minimize the consumption of litter and coarse woody debris. Minimize soil and litter disturbance resulting from yarding and operating heavy equipment. Reduce the intensity and frequency of site treatments. Soil compaction, and removal or disturbance of humus layers and coarse woody debris may impact populations of arthropods and other litter dwelling organisms

Mendocino National Forest Fire Management Plan

On a yearly basis, fire management staff of the Mendocino National Forest prepares a forest-wide fire plan which describes the elements, objectives, strategies, and resource considerations of the forest's fire program. This planning document provides a course of action for the Mendocino National Forest's fire and fuels management program in order to achieve the resource management goals and objectives developed in the forest's Land Resource Management Plan. In addition, the fire plan translates strategic LRMP direction into specific fire and fuels tactical options for each of the forest's fire management units. The fire planning document also describes the annual fire program that has been determined to most efficiently meet the forest's fire management direction in terms of fire organization, facilities, equipment, staffing needs, activities, timing, location and related costs. In addition, the plan aids the Mendocino Forest in complying with the requirement that each national forest with burnable vegetation subject to wildfire review, revise, and approve a Fire management plan by February 1. In addition to implementing fire related goals within National Forest boundaries, the Mendocino Forest fire plan establishes a number of goals that address fire and fuels management issues in the interface area between private and National Forest lands. In broad terms, the following criteria are used in developing and evaluating fuels projects:

- Communities at Risk
- Municipal Watersheds
- Threatened and endangered species

More specifically, the following polices have been established for evaluating fire and fuels management projects both within the National Forest and on those lands adjacent to it's boundaries.

- Fire fighter and public safety is the first priority in every fire management activity.
- The role of wildfire as an essential ecological process and natural change agent will be incorporated into the planning process.
- Fire Management programs and activities support land resource management plans and their importance.
- Fire management programs and activities are economically viable, based upon values to be protected.
- Fire management programs must be based upon the best available science.
- Fire management activities incorporate public health and environmental quality considerations.
- Federal, Tribal, State and local interagency coordination and cooperation are essential.
- Standardization of polices and procedures among Federal agencies is an ongoing objective.
- Conduct fire management planning, preparedness, suppression, monitoring, research and fire use on an interagency basis.
- Integrate fire management planning with other types of forest planning whenever possible.
- Encourage property owners to take an active role in establishing and maintaining their own fire prevention and safety measures in the wildland/urban interface.

- Provide technical and financial assistance to State, Tribal, and local cooperators for fire management planning and activities in the wildland/urban interface through Cooperative Fire Protection programs.

- Assess, analyze and plan for fire prevention and protection in conjunction with other Federal, Tribal, State, County, and local government entities as well as with community and citizens groups

- Encourage and participate in partnerships with citizens or community centered approaches to manage fire risks and hazards in wildland/urban interface areas

- Integrate wildland/urban interface considerations in land management planning as well as in program project plans

- Implement fuel modification projects to mitigate fire hazards

Bureau of Land Management Redding Resource Management Plan

In June 1993, the Bureau of Land Management's Redding Field Office prepared a fifteen year strategic plan for the agency's Redding Resource area. The planning process and the regulating document provide a strategy as to how and where the agency will administer public lands under its jurisdiction within the Redding Resource Area. This administrative unit of the BLM consists of more than 1000 scattered parcels totaling 247,500 acres located within Siskiyou, Shasta, Trinity, Tehama and Butte counties. A portion of this land base is located within the Bureau's Yolla Bolly Management Area which includes a portion of the Tehama West Fire Plan project area. Based upon public input, the management plan focused on four key issues.

Land Tenure Adjustment

This issue focuses on the donation, trade or outright sale of BLM properties that are isolated, have little access and contain low resource value in order to obtain other properties near larger consolidated tracts of Bureau lands that have greater access and resource value.

Recreation Management

The focus of this issue is to determine what mixture of recreation activities on Bureau lands should encourage or discouraged.

Access

The primary concern of this issue is to determine where access rights should be acquired by the Federal government for the general public in order to expand utilization and management of BLM parcels.

Forest Management

The emphasis of this issue is for the agency to make a determination as to which parcels in the Redding Management Area should be managed for commercial timber production as well as to establish revised timber sale quantities off these lands.

Of these four issues, Land Tenure Adjustment, Access and Forest Management are the planning concerns most directly related to the management of fire and wildland fuels on BLM lands. At the present time, poor access makes it difficult for Bureau personnel or those of cooperating fire agencies to access lands under BLM control. As a result, fire orientating on these lands have a greater opportunity to escape onto adjoining private lands. Consequently, there is a direct correlation between land tenure, access issues and the successful control of wildfire on these public lands. In addition, the 1993 Land Management Plan established that all fires occurring within Bureau lands will be suppressed. At the same time it was determined that improved connectivity of federally managed lands will result in better attainment of this goal.

Bureau of Land Management Redding Field Office Fire Plan

In order to implement the fire related goals of the Redding Resource Area Land Management Plan, the Bureau of Land Management completed the preparation of the 2004 Fire Management Plan. This more specialized planning document identifies the direction for fire and fuels management within the Redding Resource Area. The plan also identifies and integrates all wildland fire management guidance, direction and activities required to implement national fire policy. Specifically, the Fire Management Plan develops and recommends strategies for:

- Wildland Fire Suppression
- Wildland Fire Use
- Prescribed Fire

- Non Fire Fuels Treatments

- Emergency Stabilization and Rehabilitation

Community Assistance/Protection

Within the Yolla Bolly Management area, a number of local objectives and recommendations have been established for the BLM's fire and fuels management program. Most important among these is the protection of the public, fire fighters, private property and public infrastructure. More specifically, the plan establishes the goal of providing 100% protection of values at risk from wildfire. The plan also establishes a goal of full protection for those at risk communities located adjacent to BLM parcels a number of which are located in the Tehama West Fire Plan Area. Finally, the BLM fire plan recommends the utilization of natural and human made barriers such as roads, trails, rock outcroppings and riparian areas during wild fire suppression. As a means to obtain these goals, the Redding Area Fire Management Plan recommends burning between 10,000 and 15,000 acres of wildlands per decade using both controlled natural wildfire as well as prescribed burns.

Community Wildfire Protection Plans

The process of developing a Community Wildfire Protection Plan (CWPP) such as the Tehama West Fire Plan is a collaborative effort by citizens and agency personnel to identify and describe the wildfire situation of communities located within those wildlands that are impacted, or have the potential to be significantly impacted by wildfire. This broad look at a community's wildfire situation includes a description of the area's fire ecology as well as the interrelationships and impacts that occur between fire dominated ecosystems and human occupation of these landscapes. More specifically, community fire plans identify and describe natural and man made assets at risk of wildfire found in the local area as well as infastructure in place to protect them. This infrastructure is then analyzed in order to determine its effectiveness in protecting local at risk assets and improvements are developed to increase the usefulness of these protective measures.

Community Wildfire Protection Plans are the citizens' opportunity to replace broad regional and national fire plans with local plans that meet the concerns and needs of the immediate community. Under current planning requirements for CWPPs, the at-risk community determines and defines the boundaries of the wildland urban interface which protects the citizens and development found within a community. The use of the community as the determiner of the WUI protection area supersede the default distance limitations of 1½ miles from the community as specified in the Healthy Forest

Restoration Act of 2003. This community plan is not constrained by standards and guidelines such as canopy closure, tree size limitations and basal area retention standards. In addition, the plan is not subject to the legal challenges that frequently encumber federal land management plans. Significantly, those communities with wildfire protection plans receive priority for funding of fire and fuels management project's as well as those projects that improve fire safety. Some of the significant components found in many CWPPs include:

- Identification of at-risk communities within or adjacent to wildlands that are risk of impact by large-scale wildland fire
- Identification of federal and non-federal areas suitable for hazardous fuel reduction treatments that will result in the protection of identified at risk communities
- Prioritization of fuel reduction treatments
- Recommendations as to appropriate types and methods of fuel reduction treatments to be applied on both federal and non-federal land
- Recommendation of measures that will reduce structural ignitability throughout identified at risk communities
- Development of a fire plan within a context of collaborative agreements and in consultation with interested parties and federal land management agencies having management responsibilities within the vicinity of identified at risk communities

Tehama-Glenn Fire Safe Council

The Tehama-Glenn Fire Safe Council (TGFSC) is an advisory group formed in the spring of 2000. The goal of the council is to develop awareness of wildfire issues facing public and private land managers within Tehama County. To accomplish this, the TGFSC has established two primary objectives:

- Provide a forum for sharing information and coordinating fire management and fuels reduction efforts among people involved in land and fire management in the Tehama County and Glenn County area.
- Provide a forum between public agencies and private organizations that share a common goal in wildfire prevention and catastrophic losses. The TCFSC has a vision that through the expertise, technical and financial resources, as well as the communication within this group, that natural and man-made resource within the county can be protected through a collaborative effort.

The group consists of representatives from the United States Forest Service, the United States Bureau of Land Management, the U.S. Fish and Wildlife Service, National Park Service, California Department of

Forestry and Fire Protection, California Department of Fish and Game, Tehama County Air Pollution Control, Tehama County Planning Department, Tehama County Public Works Department, Glenn County Planning Department, Glenn County Public Works Department, The Nature Conservancy, Denny Land And Cattle Company, Sierra Pacific Industries, Collins Pine Company, Crane Mills and the Quincy Library Group. Private landowner representation is generally provided through local watershed conservancies or other landowner groups. Among those providing significant contributions to the Tehama-Glenn Fire Safe Council are the Cottonwood Creek Watershed Group, The Deer Creek Watershed Conservancy, Battle Creek Watershed Conservancy, Mill Creek Conservancy and the Sunflower CRMP. In addition to its participation as a member of the fire council, the Tehama County Resource Conservation District contributes a paid staff member to coordinate council activities as well as to provide planning and GIS services.

Due to the rural nature of Tehama County, the TGFSC focuses primarily on fire management, fuel reduction, and fire prevention issues associated with wildlands and urban-interface areas on a landscape basis. Among these area-wide issues are:

- Smoke management and self regulation
- Coordination on prescribed burning.
- Coordination on wildfire incidents
- Public education
- Fire prevention education
- Fire training for land mangers
- Prescribed and emergency response fire capacity.
- Rehabilitation after wildfire incidents
- Fuel break and vegetation treatment projects
- Monitoring of regulations
- Funding for projects

During the winter of 2005, the Tehama Glenn Fire Safe Council began implementation of the Tehama County Fire Plan which when completed, will coordinate and integrate the array of fire planning and mitigation efforts taking place throughout Tehama County. It is expected that through improved coordination of policies, planning efforts and project work, the effectiveness and cost efficiency of fire and fuels management projects can be improved. The planning document will divide the County into Eastside and Westside regions in an attempt to address issues that impact areas having similar fire

histories, fuels composition as well as similar ownership and development patterns. The Tehama West Fire Plan will become the Westside component of the Tehama County Fire Plan and into which the details of agency plans and projects will be incorporated. The planning document will also meet the requirements of the Federal Healthy Forest Initiative, as well as the compliance criteria of the Disaster Mitigation Act of 2000, the National Fire Plan and the California Fire Plan. As a result, local land management entities will be able to apply for federal and state funding for fire and fuels management projects throughout those portions of Tehama County addressed in the County Fire Plan.

Fire Prevention Regulations and Enforcement

The laws and regulations concerning fire prevention on private land in Tehama County are enforced primarily by the CDF and Tehama County. Pertinent sections of the California Public Resource Code are found in **Appendix B**, applicable portions of California Government Code 51182 are shown in **Appendix C** and those portions of Title 14 California Code of Regulation (14 CCR) applicable to fire safety and wildfire are shown under **Appendix D**.

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VI. Mitigation Strategies
For the Tehama West Fire Plan Area

Desired Future Conditions

The problems facing Western Tehama County in connection with the threat of damaging wildlife is multifaceted. In addition to endangering the lives of citizens, fire fighters and property, these blazes threaten the economy and natural resources of the Westside area and the County as a whole. In addition, efforts to protect the residents and resources of the area come at considerable public expense. In order to reduce the occurrence and negative impacts of wildfire, solutions to the problem must be multifaceted as well.

Fuels Reduction

Among the array of solutions required to improve fire safety and reduce the impact of wildfire within Western Tehama County, the management of wildland fuels are expected to have the most immediate impact. To achieve positive results, area fuels must be reduced in large quantities over an extended area. In addition, these reductions in hazardous fuels must also be completed in a strategic manner which addresses the most dangerous situations first. Retuning natural fire regimes that maintain only low intensity blazes throughout the county would be desirable however; current development within the west side area prevents the widespread reincorporation of naturally occurring wildfire back into the County's landscapes. A combination of methods utilizing fire, mechanical treatments and chemicals as control mechanisms will be required in order to maintain a fire safe environment within the confines of urban development. Of equal importance is the establishment of financing mechanisms to maintain fuel breaks and other fuel maintenance projects once these have been completed. Currently, grant funding is used extensively to develop fire control and fuels reduction projects. These sources can sometimes be unreliable in providing long term funding for upkeep of these infrastructure improvemnts. Financing mechanisms such as property tax assessments, line items in the County's Public Works Department budget, user fees and others financing mechanisms might all be considered in order to provide reliable permanent funding of these important public works projects.

Planning

In order to efficiently and effectively utilize limited public and private financial resources committed to fire related issues, those entities involved in fire and fuels management efforts must where possible, work collaboratively in developing polices and goals as well as completing project work. Though the coordination of local, countywide and regional efforts, synergies between various stakeholder efforts might be identified that would improve the end results of adjacent project work and thus provide greater

protection of local resources for fewer project dollars. In order to identify those issues and areas which are of common interest to an array of stakeholders, regional planning is essential. To this end, completion of the Tehama County Fire Plan utilizing the CDFs Tehama–Glenn Unit Fire Plan would be invaluable. Through use of the bi-county unit fire plan as the Tehama County fire planning document, small scale countywide issues could be identified and discussed in detail once. Those broad issues that are pertinent to the more narrowly focused Western Tehama County and Eastern Tehama County plans could be address through reference to the countywide plan. As a result, the more detailed small scale fire planning documents could be made much shorter and more succinct as they would only discuss in detail, local issues, problems and mitigation efforts. More importantly, through the process of incorporating the detailed area-wide plans into the countywide document, numerous opportunities to collaborate on project work might be identified. In addition, similar policy goals might be identified between agencies which could prevent duplication of efforts in achieving similar goals.

Designation of at Risk Communities and Interface Areas

In order to focus necessary resources on communities with extended interface areas at significant risk of wildfire, special attention must be drawn to these local situations. National level designations for areas at elevated risk from wildfire are available which provide special consideration for funding used to complete project work and other measures that protect residents and resources. In order to adequately protect all communities within Tehama County including throes not currently recognized as being at significant risk from wildfire; special effort needs to be initiated to identify all such areas at an elevated risk of wildfire impact. Consequently, one of the primary goals developed in the fire planning process for the Tehama West Fire Plan is the identification of all communities and interface lands at significant risk of wildfire.

Infrastructure Improvements

Reducing or manipulating wildland fuels alone, will not provide the residents or landscapes of Tehama County adequate protection from the negative effects of uncontrolled wildfire. Even in situations where vegetation has been treated, reduced levels of fuels often exist that can initiate and promote wildland fires. In addition, non-vegetative fuels in many locations can promote fires that are of an equivalent threat to public safety. In order to increase fire protection and fire safety within the County's rural areas, improvements to fire fighting infrastructure and those public works utilized during wildfire events are needed. Significant among these efforts are the installation, improvement and maintenance of water delivery facilities and community fire breaks. Public works improvements related to fire safety and fire management include road surface improvements, road maintenance along with road construction and extensions. Improvements in traffic flow and traffic control that result from

reconfiguration of intersections are another example of public works projects that can greatly increase public safety during wildfire events and other emergencies.

Codes, Laws and Regulations

In addition to project work that impacts the fire based landscapes of Tehama County, changes in the behavior by public and private stakeholders is necessary in order to increase public safety and decrease the impact of wildland fire on communities. Significant regulatory changes that could improve the County's current wildfire situation are those that require personal responsibility of property owners and land developers to design projects in a fire safe manner and that would incorporate fire safe land use principles, technologies and building materials to reduce wildfire threats. Among specific improvements would be the elimination of deadend roads that terminate at driveways with turning areas insufficient for fire service vehicles. At a landscape scale, county zoning regulations need to incorporate environmental realties that make certain locations as susceptible to wildfire as those areas located along earthquake faults and flood plains.

Environmental Benefits of Fire and Fuels Management Initiatives

In addition to reducing the negative impacts of wildfire, one of the goals of this fire plan is to improve the natural systems within the county that have developed within fire based landscapes. Among the environmental benefits expected to result from the implementation of recommendations developed in this planning process are increased stream flows and ground water yields, the development of more natural low seral stage ecosystems, improved forage and the protection of lands whose primary purpose is for the production of environmental resources including recreational opportunities.

Planning Units

In order to develop useful information on fire conditions, assets at risk, fire and fuels management projects currently in place as well as gaps in these protective measures, the Tehama West Fire Plan project area was divided into California Department of Forestry and Fire Protection Zones. These zones divide public and private lands within the state's fire management responsibility area (State Responsibility Areas or SRA) according to common factors that affect fire behavior and fire protection. Among these factors are wildfire fuel types, topography, access, water supplies, assets at risk and fire history. In most instances zones incorporate portions of several CDF Battalions. In the event of a wildfire incident, deployment of fire fighting forces would be based upon proximity of the nearest fire fighting personnel regardless of agency jurisdiction. CDF Zones 1, 2, 6 and 9 are found within the Tehama West Fire Plan project area. **Map 11** shows the location of these Zones.

Lands managed under federal authority (Federal Response Area or FRA West) consist of those properties within the Mendocino National Forest along with the Shasta Trinity National Forest and are considered separate planning units. Lands on the valley floor, outside of state and federal responsibly areas but still within the fire plan's project area were not considered in this document's analysis. Though the utilization of these fire safety zones, fire management planning takes place in an organized manner and provides a format for documenting fire protection practices that affect assets at risk, fire management, and fire risk. Basic characteristics of the four zones within the Tehama West Fire Plan area are summarized in the **Table 12** below:

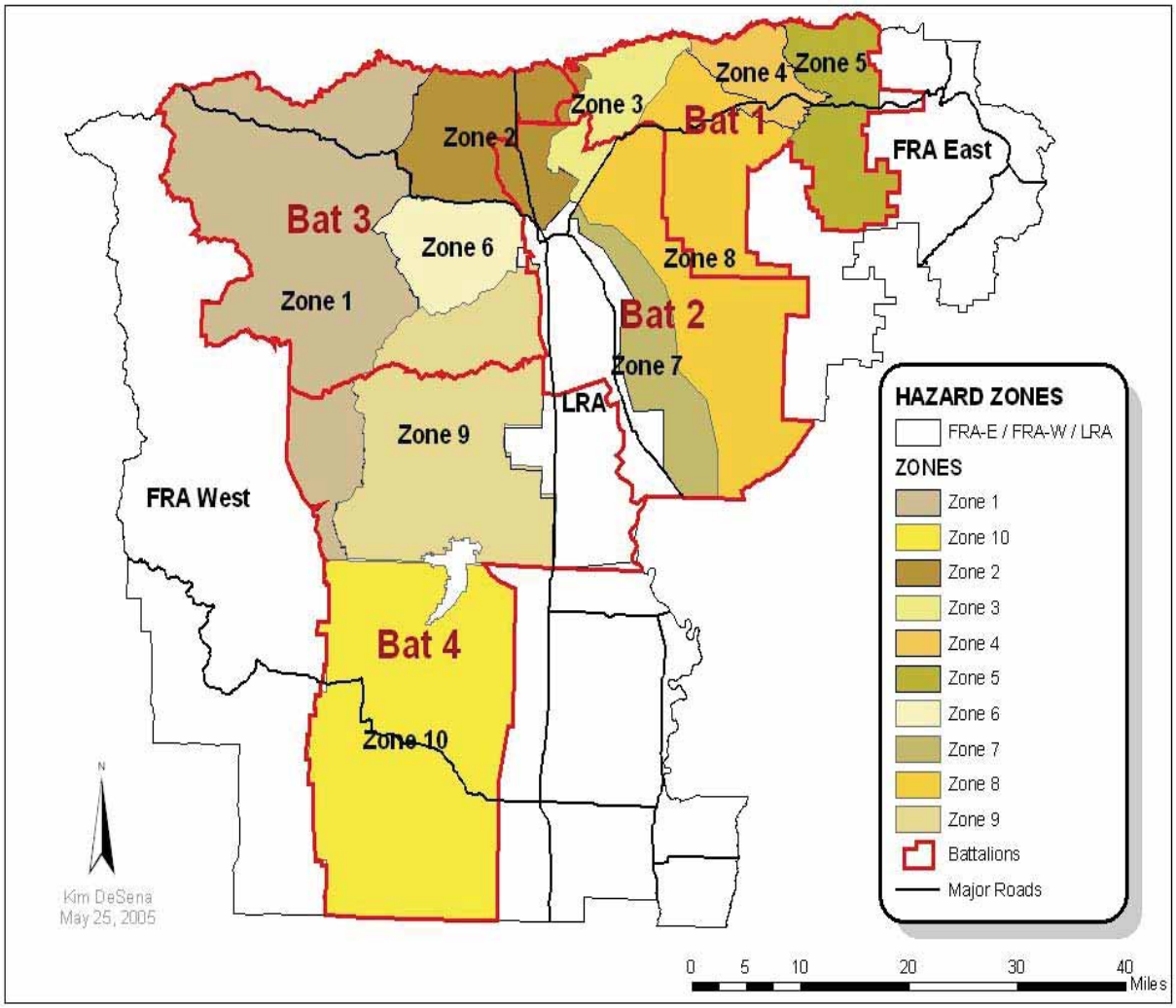
Each zone has a number of unique objectives that are specific to the landscapes and land uses found there. In addition, these Zones share a number of common objectives that are fundamental to fire prevention and fire management throughout Western Tehama County including:

- Implementation of the California Department of Forestry and Fire Protection's Vegetation Management Program (VMP).
- Determining special treatment areas within each Zone
- Working with the Tehama County Public Works Department and the California Department of Transportation to reduce or modify roadside fuel hazards
- Enforcing annual burn bands
- Conducting fire prevention programs at area schools
- Implementing public fire prevention programs in areas without significant public participation and adding additional prevention programs in those areas with rudimentary levels of public participation
- Increasing law enforcement focus on equipment violations and equipment use
- Increasing law enforcement focus on debris burning, playing with fire and arson
- Implementing an agricultural and construction equipment inspection program

- Conducting Red Flag patrols and establishing public contacts

- Implementing power line right of way inspections

Map 11
California Department of Forestry and Fire Protection
Zones within Tehama County



Tehama Glenn Unit ~ Battalions and Zones

Table 12
Characteristics of CDF Zones

Zone	CDF Battalion	Fuels	Topography	Access	Water Supply	Level Of Service	Primary Assets
1.Red Bank, R-Ranch	3 4	Oak - Woodland Chaparral Brush	Rolling to steep hills	Poor: mostly rugged, difficult	Poor; steep drainages, seasonal ponds and streams	3 fire stations 1 conservation camp	Communities, ranches, Rangeland and ag. lands
2.Bowman, Dibble Creek, Lake CA, Wilcox	2 3	Grass rangeland, oak woodland, brush	Rolling to steep hills	Moderate to Poor some rugged terrain	Moderate: water sources range from adequate to poor	3 fire stations	Homes, ranches, Structures, rangelands, watersheds
6.Live Oak, West Red Bluff	3	Grass rangeland, oak woodland brush	Rolling hills	Good (moderate in western portion of zone)	Variable poor to good	2 fire stations	Rural homes, ranches rangelands
9.Flournoy, Paskenta Rancho Tehama	3 4	Grass rangeland, Oak woodland, Brush	Rolling hills	Moderate	Variable poor to moderate	2 fire stations	Communities, rural homes, ranches, rangelands

Area Wide Fire and Fuels Management Initiatives
That Impact the Tehama West Fire Plan Project Area

A number of programs and projects that impact fire and fuels management are implemented on a Countywide or regional basis that includes that portion of Tehama County within the Tehama West Fire Plan project area. These small scale projects are described below:

CDF Vegetation Management Program

Project Type:

Shaded Fuel break Development

Road Side Clearing

Prescribed Burning

Fire Safe Education

Status:

In Progress – A completion date is not applicable for this ongoing program

Funding:

Cost Share between CDF and Property Owners

Project Administrator or Manager:

CDF

Cooperators:

Property Owners

Comments: The VMP is a cost-sharing program between private landowners and the CDF that focuses on the use of prescribed fire and mechanical means, in order to reduce fire-prone vegetation on SRA lands. The CDF has responsibility for 283,778 acres of Tehama County SRA lands and fiscal responsibility for an additional 10,767 acres, which is directly protected by the USFS. The VMP allows private landowners to enter into a contract with CDF to use prescribed fire and other means to accomplish a combination of fire protection and resource management goals. Implementation of VMP projects is by local CDF Units. The fuel reduction projects that will be completed first are those that are identified through the CDF's Fire Plan and considered to be of most value to the unit. Through the VMP about 40,000 acres are treated each year in California. **Table 13** below summarizes the VMP projects completed in Tehama County since 1971.

Table 13
Department of Forestry and Fire Protection
Vegetation Management Program Project Data
1979 to 2005

AREA	Acres	AGENCY	UNIT_ID	PROJ_NAME	YEAR
3,502,593.09	865.51	CDF	TGU	RONEY	1979
	865.51				
5,653,831.63	1,397.09	CDF	TGU	RONEY	1981
	1,397.09				
4,444,650.54	1,098.30	CDF	TGU	BRUSHY	1983
2,011,327.38	497.01	CDF	TGU	PARTCH	1983
2,110,799.30	521.59	CDF	TGU	PARTCH	1983
4,295,446.82	1,061.43	CDF	TGU	PLUM CREEK	1983
	3,178.33				
1,841,528.90	455.05	CDF	TGU	A & K (MEYERS)	1984
8,427,206.33	2,082.41	CDF	TGU	BRUSHY	1984
10,660,683.02	2,634.31	CDF	TGU	BRUSHY	1984
	5,171.77				
674,542.24	166.68	CDF	TGU	KEENAN	1985
17,882.94	4.42	CDF	TGU	RANCHO RIO FRIO	1985
449,640.03	111.11	CDF	TGU	RANCHO RIO FRIO	1985
	282.21				
1,773,882.81	438.34	CDF	TGU	BURROWS	1986
8,217,228.86	2,030.52	CDF	TGU	CAMERON	1986
8,217,229.12	2,030.52	CDF	TGU	CAMERON	1986
	4,499.38				
61,410.49	15.17	CDF	TGU	RANCHO RIO FRIO	1987
648,663.28	160.29	CDF	TGU	RIO FRIO	1987
1,401,130.35	346.23	CDF	TGU	STORER	1987
129,999.37	32.12	CDF	TGU	VANTRESS	1987
381,277.42	94.22	CDF	TGU	VANTRESS	1987
	648.03				
28,755,507.16	7,105.64	CDF	TGU	BRUSHY MTN.	1988
1,260,829.75	311.56	CDF	TGU	COX	1988
7,275,934.90	1,797.92	CDF	TGU	GRAPEVINE	1988
	9,215.12				
1,074,797.10	265.59	CDF	TGU	RANCHO RIO FRIO	1989
1,082,828.57	267.57	CDF	BTU	ROSEBURG	1989
506,533.93	125.17	CDF	TGU	VANTRESS	1989
	658.33				

15,944,067.58	3,939.87	CDF	SHU	BALD	1990
5,261,913.41	1,300.25	CDF	BTU	COHASSET	1990
1,302,836.28	321.94	CDF	TGU	GIOVANETTI	1990
1,307,679.04	323.13	CDF	BTU	ROUND VALLEY	1990
1,113,330.83	275.11	CDF	TGU	SUNFLOWER	1990
	6,160.30				
847,423.66	209.40	CDF	TGU	GIOVANETTI	1991
3,261,025.38	805.82	CDF	TGU	NATURE CONSERV.	1991
4,064,753.55	1,004.42	CDF	BTU	ROSEBURG 91	1991
	2,019.64				
920,388.66	227.43	CDF	TGU	P G & E	1992
	227.43				
18,120.95	4.48	USF	MNF	Grindstone Type Conversion	2003
41,171.60	10.17	USF	MNF	Grindstone Type Conversion	2003
94,829.91	23.43	USF	MNF	Grindstone Type Conversion	2003
97,356.02	24.06	USF	MNF	Grindstone Type Conversion	2003
179,416.04	44.33	USF	MNF	Grindstone Type Conversion	2003
215,110.07	53.15	USF	MNF	Grindstone Type Conversion	2003
229,020.45	56.59	USF	MNF	Grindstone Type Conversion	2003
197,457.23	48.79	CDF	BTU	SPI VMP BURN	2003
	265.02				
11,978.53	2.96	USF	MNF	Grindstone Brush (GS)	2004
14,113.29	3.49	USF	MNF	Grindstone Brush (GS)	2004
17,062.21	4.22	USF	MNF	Grindstone Brush (GS)	2004
20,284.98	5.01	USF	MNF	Grindstone Brush (GS)	2004
25,007.45	6.18	USF	MNF	Grindstone Brush (GS)	2004
27,525.34	6.80	USF	MNF	Grindstone Brush (GS)	2004
41,201.98	10.18	USF	MNF	Grindstone Brush (GS)	2004
734,758.73	181.56	USF	MNF	Grindstone Brush (GS)	2004
1,278,958.81	316.04	USF	MNF	Grindstone Brush (GS)	2004
5,707,017.62	1,410.23	USF	MNF	Grindstone Brush (GS)	2004
56,828.94	14.04	USF	MNF	Valentine Ridge	2004
341,304.72	84.34	USF	MNF	Valentine Ridge	2004
	2,045.05				
3,459,048.51	854.75	CDF	TGU	Little Wildcat	2005
3,457,836.19	854.45	CDF	TGU	Little Wildcat 2	2005
	1,709.20				
Grand Total	38,342.41				

California Department of Forestry and Fire Protection
Tehama-Glenn Unit Fire Management Plan

Project Type:

Planning Document

Risk Assessment

Project Inventory

Status:

Ongoing, the document is updated on a yearly basis.

Funding:

• Agency Budget item

Project Administrator or Manager:

• CDF Tehama-Glenn Unit Pre-Fire Engineer

Cooperators:

- CDF Tehama-Glenn Unit Staff
- Tehama-Glenn Fire Safe Council
- Tehama County Resource Conservation District

Comments: The overall goal of the Tehama-Glenn Unit Plan is to identify public and private assets at risk from wildfire throughout the Tehama County/Glenn County area. With this information, stakeholders can design solutions and carry out projects to protect local at risk assets from wildfire. The plan also provides the Tehama-Glenn Fire Safe Council and the CDF an opportunity to jointly prioritize pre-fire projects in order to more efficiently and effectively utilize limited public funds allocated for wildfire related mitigation projects. These planning efforts are expected to support the land use and safety elements of both the Tehama County and Glenn County general plans by incorporating appropriate portions of the California Fire Plan so that each county's fire plan supports the state plan. Finally, the document's discussion of fire fighting infrastructure is expected to result in improved efficiency of the bi- county area's fire protection capabilities through the development of specific directed solutions.

Tehama County Resource Conservation District/Tehama Glenn Fire Safe Council
Tehama East Fire Plan

Project Type:

- Planning Document
- Risk Assessment
- Project Inventory

Status:

In early 2005, the Tehama County Resource Conservation District was awarded $30,000 in Bureau of Land Management funding through the California Fire Safe Council Clearinghouse in order to prepare the Tehama East Fire Plan which includes portions of CDF Zone 2 among others. During the summer of 2005, another $43,000 of Tehama County Resource Advisory Committee funding was provided to complete the project's original scope of work. Project work is expected to begin by mid October 2005.

Funding:

Bureau of Land Management with in kind match contributions from the Tehama County Resource Conservation District and members of the Tehama-Glenn Fire Safe Council. Additional funding was provided through the Tehama County Resource Advisory Committee.

Project Administrator or Manager:

- Tehama County Resource Conservation District

Cooperators:

- Tehama County RAC
- Bureau of Land Management
- Tehama County Resource Conservation District
- Area Ranchers
- Battle Creek Watershed Conservancy
- Mill Creek Conservancy
- Deer Creek Watershed Conservancy
- The Nature Conservancy
- Sierra Pacific Industries
- Collins Pine

- Pacific Gas and Electric
- California Department of Forestry & Fire Protection
- California Department of Fish and Game
- Tehama County Public Works Department
- Tehama County Planning Department
- United States Forest Service
- U.S. Fish and Wildlife Service
- Natural Resource Conservation Service

Comments: Although the plan's project area generally covers the eastside of the Sacramento River, a portion of CDF Zone 2 extends to the Westside of the Sacramento River, encompassing the Bowman District, Dibble Creek, Lake California and Wilcox areas of Western Tehama County. The full spectrum of fire management issues occur in this portion of Tehama County. In the northern foothills, reduced fire frequencies have resulted in excessive fuel loading within foothill chaparral and blue oak woodlands and now threaten the communities mentioned above. Two of these Westside communities, Bowman and Wilcox, are formally recognized as a federal at risk communities.

The Tehama East Fire Plan was developed with the following goals:

- Complete a Community Fire Plan covering 500,000 acres of grasslands, chaparral, oak woodlands, and streamside forest in eastern Tehama and Shasta Counties. The planning process will follow the California Fire Alliance template for preparing a Community Wildfire Protection Plan. The Tehama East Fire Plan will also incorporate the planning requirements established in the provisions of the DMA 2000 act. The plan will also incorporate an array of innovative ideas from local, smaller-scale planning efforts;

- Develop unified wildfire response strategies among stakeholders through a wildfire risk assessment based on maps delineating natural fire management units and access routes as well as an accompanying database listing assets at risk and landowner contact information by fire management unit;

- Improve efficiency in the use of fire management resources between partners with common goals by outlining collaborative efforts among partners.

Once completed, the planning document and risks assessment process is expected to result in the following outcomes:

- Improved Fire Regime Condition Class: This outcome is expected to occur as stakeholders implement prescribed fire and other fuels treatment identified in the community fire plan. In addition, new projects will be developed which will improve wildfire protection and management within the planning area.

- Reduced hazardous fuels and associated fire risk: This outcome is expected to be attained as an Increased number of acres—including fuel breaks around communities at risk—are treated for hazardous fuels and associated fire risks.

- Fewer community assets destroyed in wildfires: The achievement of this outcome is tied to an improved wildfire response plan, reduced hazardous fuels, and improved Fire Regime Condition Class. This will be tracked via CDF data on wildfire incidents.

- Improved long-term sustainability of watershed function: This outcome will be achieved when environmental characteristics such as rates of erosion and invasion of non-native species are reduced. Non-native species frequency is being monitoring by partners involved in rangeland management.

Zone Descriptions, Zone Projects and Project Participants

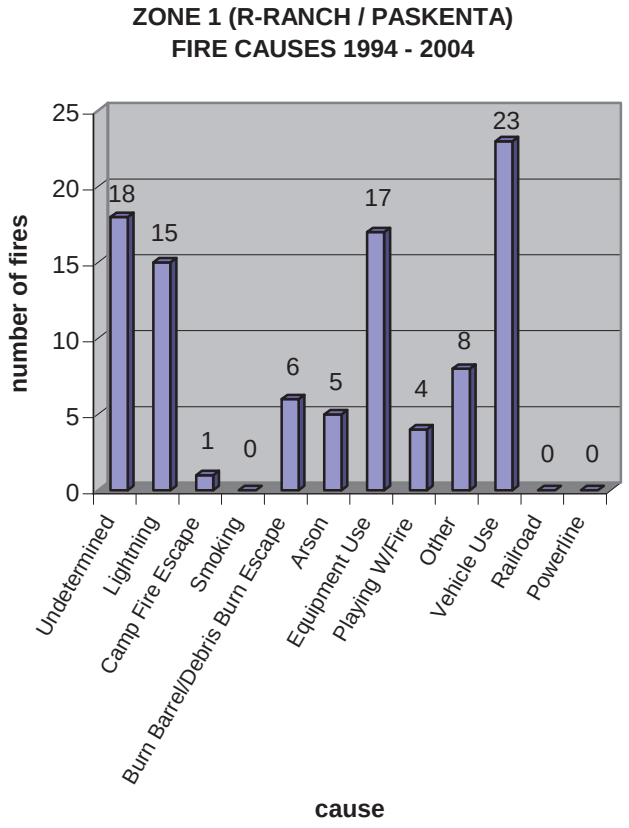
Zone 1 (Paskenta, Red Bank R-Ranch)

Zone 1 encompasses much of western Tehama County and includes the communities of Paskenta and R-Ranch along with the Red Bank District. Besides residences and urban infrastructure, fires in this Zone threaten timberlands, rural ranches and agricultural land. Grassy fuels at lower elevations present the primary fire threat within this zone. These fuels are often located where the threat of human caused ignition is greatest such is in developed areas and along major roads. In addition, these “flashy” fuels ignite easily and carry fire rapidly. The other vegetation types in the area that affect fire danger include blue oak and live oak-woodlands along with mixed chaparral brush.

As shown in **Chart 1** below, between 1994 and 2004, the leading causes of wildfire in Zone 1 was vehicle and equipment use. Zone 1 is particularly affected by severe weather because high winds carry

fire quickly through the predominantly grass and brush covered lands. Much of the area is difficult to access with fire equipment.

Chart 1



Sunflower CRMP (SCRMP)

Project Type:

- Fuel Breaks
- Prescribed Burns
- Water Development
- Monitoring Activities

Status:

On going, project work is in development, in process or completed

Funding:

Cost Share between state and federal agencies as well as educational institutions. These include:

- The United States Forest Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- Natural Resources Conservation Service
- California Department of Forestry and Fire Protection
- California Department of Fish and Game
- California Department of Water Resources
- Tehama County Resource Conservation District (TCRCD),
- Tehama County Resource Advisory Committee (RAC)
- Humboldt State University
- Chico State University
- Shasta College

Project Administrator or Manager:

CRMP Coordinator and Agency Staff

Cooperators:

The funding entities also provide technical and other assistance

Objectives:

- Reduce fuel loads and fire hazards.

- Develop and improve water sources to be used for fire control, wildlife, and livestock.

- Extend the base flow of perennial streams within the CRMP boundary.

- Create and improve wildlife habitat through “low serial stage” ecosystems that have significant biodiversity.

- Establish and maintain fire trails and fuel breaks.

- Develop habitat for threatened and endangered species under the protection of Safe Harbor agreements with the USF&WS.

- Develop a program of environmental monitoring in order to evaluate and quantify the success of environmental projects.

- Provide educational opportunities and a demonstration area for members of the public who want to be good stewards of the land.

Comments

The Sunflower CRMP is an active participant in an array of fuel reduction efforts within CDF Zone 1. The CRMP project area encompasses approximately 72,000 acres of which roughly 57,600 acres are privately held. In order to accomplish the organization's goals relating to fire and fuels management, twenty-two miles of inter-connected fuel breaks (800 acres) will be completed over the next two years through a combination of ball and chaining techniques as well as broadcast burns which will be conducted on 2,000 acres within the CRMP boundary. In addition, during 2005 the SCRMP will purchase 1,000 head of meat goats and hair sheep which will be tended by full-time herders. The goal of this unique project is to impact fire and previously mechanically treated areas while at the same time providing an economic return to landowners. During the 2002-03 period, two springs were developed and one 7 ac/ft reservoir was completed to provide for fire protection and wildlife habitat water sources. Over the next several years, the SCRMP, will install three ponds and improve habitat and water yield around 8 to 10 springs. As a result, abundant supplies of water will be made available for game and non-game wildlife, fire suppression, and pre-suppression activities.

In order to insure that fuels management efforts improve local landscapes, several types of monitoring programs are in place to develop base-line data and to determine the impact of brush treatments on game and non-game species, water quality and general environmental enhancement. Monitoring techniques include:

- Pre- and post-photo monitoring at five locations.

- Macro-invertebrate monitoring of Red Bank Creek which is the major tributary in the SCRMP project area.

- Maximum flow and base flow of Red Bank Creek.

- Sixteen sites are in process of being established to monitor neotrophic birds and other avian species using tape recorders following the California Department of Fish and Game protocol.

- A long-term 20-mile transect is being established to determine Blacktail Deer

response to impacted areas. The California Department of Fish and Games' Deer Monitoring protocol is being followed.

- Red-Legged Frog and Yellow-Legged Frog Inventory and Research are being conducted on a number of streams in the SCRMP project area.

R-Ranch Tank Installation

Project Type

Water Tank Installation

Status

Completed

Funding

BLM/California Fire Safe Council Clearinghouse

Project Administrator or Manager

- Cottonwood Creek Watershed Group/Cottonwood Creek Fire Safe Council

Cooperators

- Bureau of Land Management
- United States Forest

Comments

This project entails the installation of two 5000 gallon water tanks within the R-Ranch development located within the grass and oak woodlands of Northwestern California.

Annual Maintenance / Improvement of Pellows Road

CDF dozer and grader efforts, prior to fire season, result in improved access for fire fighting forces when conducting offensive and defensive wildfire tactics and strategies. This project is completed every year in May or June by CDF Tehama-Glenn Unit Heavy Equipment Operators.

Eagle Peak Lookout

Annual maintenance and improvement of the Eagle Peak Lookout access road is completed every year in May by CDF Tehama-Glenn Unit Heavy Equipment Operators, prior to fire season.

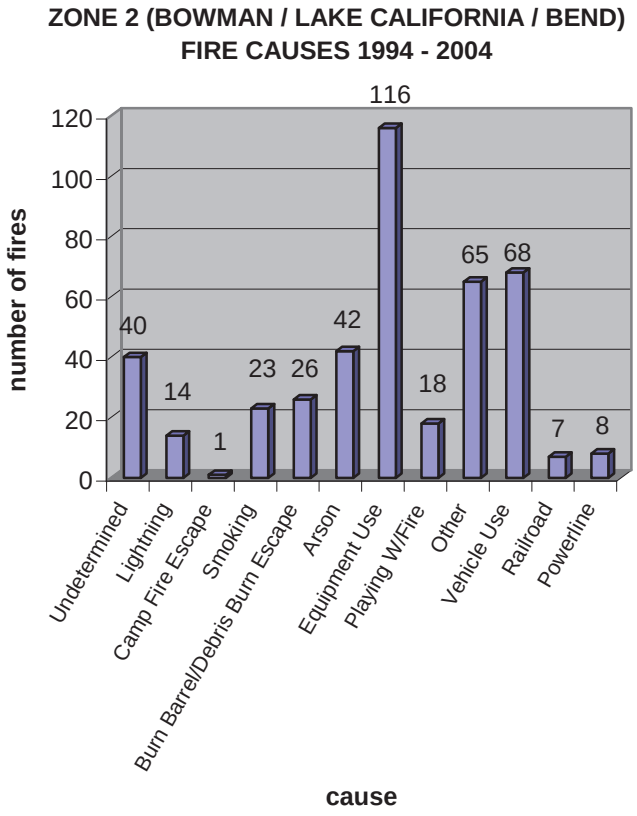
Fire Inspections

Random fire inspections are performed on residences in the Tehama County area, in order to determine whether defensible space has been established around structures.

Zone 2 Bowman, Dibble Creek, Lake California, and Wilcox)

Zone 2 encompasses the northern valley floor of Tehama County and includes the Lake California development and the rural communities of Bowman, Wilcox and Dibble Creek. Most undeveloped land in the area is used for livestock grazing. Three vegetation types are present in the Zone including grassland, chaparral, and oak-woodland. Grasses are the major fire risk. Expanding human population in this zone is accompanied by an increasing threat of fires along the wildland urban interface. Activity along roads (e.g. equipment use, vehicle exhaust, and smoking) has been the leading cause of vegetation fires from 1994 to 2004. Fires in grasslands may spread quickly into inaccessible areas. **Chart 2** below shows the major causes of wildfire within the Zone area.

Chart 2



Objectives

- Identify locations for fuel breaks
- Work with Cal Trans and Public Works on roadside fuel modification
- Develop fire protection water supply infrastructure
- Determine initial attack capabilities at the Bowman Station
- Conduct residential fire safe inspections in Bowman, Quail Ridge, Dibble Creek Wilcox areas

Lake California Fuels Reduction

Project Type

Fuels reduction through various techniques

Status

In process

Funding

Lake California Homeowners Association

Project Administrator or Manager

- Lake California Homeowners Association
- California Department of Corrections

Cooperators

- Lake California Homeowners Association
- California Department of Corrections
- California Department of Forestry and Fire Protection

Comments

Lake California is an expanding housing development located on 6,500 acres in northern Tehama County just west of the Sacramento River. The development contains 535 homes and 30 duplexes, which, together, house 1,500 residents. Since 1993, the Lake California Homeowners Association has been contracting with the California Department of Corrections and the Tehama-Glenn Unit of the California Department of Forestry and Fire Protection to complete fuel reduction projects. The current project area currently totals 1,900 acres and is expanding. Projects work generally consists of inmate crews cutting, stacking, chipping and burning vegetative fuel.

Lake California Multi-Hazard Emergency Evacuation Plan

Project Type

Hazard and evacuation plan

Status

Completed

Funding

California Department of Forestry and Fire Protection

Project Administrator or Manager

California Department of Forestry and Fire Protection

Project Type

Fuels reduction through various techniques

Status

In process

Project Administrator or Manager

California Department of Forestry and Fire Protection

Cooperators

- California Department of Forestry and Fire Protection
- Lake California Homeowners Association

Comments

The plan consists of pre-fire, fire safety, and evacuation components. The planning document provides residence of the Lake California area with measures to take in order to prepare for wildland fires. The plan describes how to make rural homes fire safe in terms of design, construction methods and materials, as well as landscaping techniques. In addition, information is provided on what to do if a wildfire occurs. Finally, the streets within the Lake California development have been divided into 5 zones based upon topography and location to nearby shelter areas. Each zone is shown on a street map of the development and directions are provided to the appropriate shelter area. Instructions are given on how to safely evacuate to shelter areas. The California Department of Forestry and Fire Protection

expect to use the Lake California Multi-Hazard Emergency Evacuation Plan as a model for similar plans developed throughout Tehama and Glenn Counties.

California Highway Patrol Cottonwood Scales Fuel Break

Project Type

Fuel Break

Status

Initial fuel break created, maintenance is on-going

Funding

- California Highway Patrol
- California Department of Transportation

Project Administrator or Manager

California Highway Patrol

Cooperators

- California Highway Patrol
- California Department of Transportation
- California Department of Forestry and Fire Protection

Comments

Handline constructed around the north bound CHP Scales prevents fires starting in the scale area from spreading to adjacent private properties and wildlands. The project is approximately 1 mile in length. Costs are covered under an exchange of services. The project is done annually.

Highway 36 West Fuel Break

Project Type

Fuel Break

Status

Initial fuel break created

Funding

BLM/Sacramento Regional Foundation

Project Administrator or Manager

Cottonwood Creek Watershed Group

Cooperators

- BLM
- USFS
- California Department of Transportation
- California Department of Forestry and Fire Protection

Comments

This fuel break project is located within the Cal Trans' right-of-way along both sides of Highway 36 near the community of Platena. The goal of the project work is to reduce the risk of ignitions originating along the highway right of way, from spreading into adjacent grasslands, oak woodlands and chaparral.

I-5 Fuel Break

Project Type

Fuel Break

Status

Initial fuel break created, maintenance is on-going

Funding

California Department of Transportation

Project Administrator or Manager

California Department of Transportation

Cooperators

- California Department of Transportation
- California Department of Forestry and Fire Protection

Comments

This fuel break project is located within the Cal Trans' right-of-way along both sides of Interstate 5 between Red Bluff and Cottonwood. A 6 ½ mile long 6' to 8'handline is cut in the grass annually in order to prevent fires starting within the I-5 right-of-way from spreading into adjacent grasslands and oak woodlands. If fire escape occurred, homes and ranchlands near the freeway would be threatened. The project is sponsored by the CDF Tehama-Glenn Unit and is a joint project with the Ishi and Salt Creek Conservation Camps. Project costs are incurred by the Tehama-Glenn Unit and the Camps.

Quail Ridge Water Storage Project

Project Type

Water Tank Installation

Status

Tank installation completed and the installation of second tank proposed.

Funding

BLM/Cottonwood Creek Fire Safe Council

Project Administrator or Manager

Cottonwood Creek Fire Safe Council

Cooperators

- BLM
- Cottonwood Creek Watershed Group

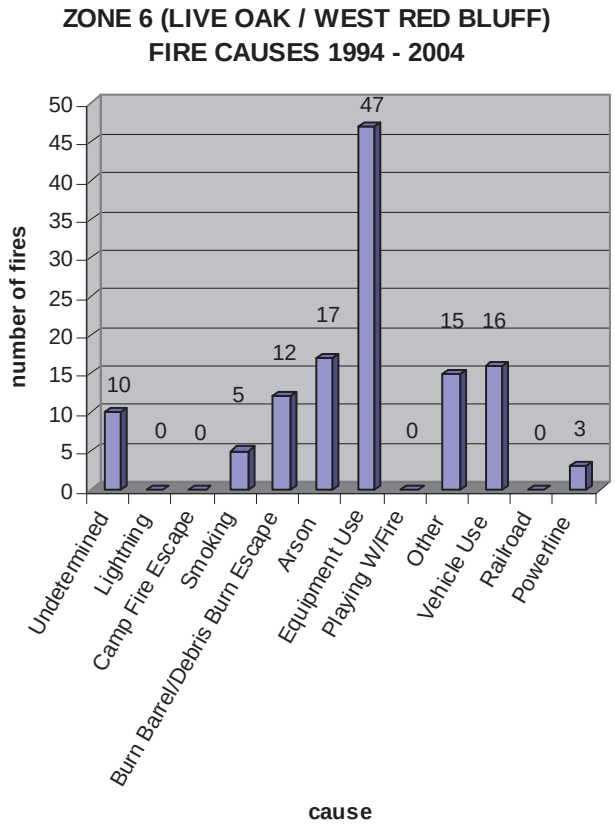
Comments

This water tank installation project provides 5000 gallons of fire protection water to the residents of the Quail Ridge development located in the grasslands and oak woodlands of Northern Tehama County. A proposal has been developed to locate a site and install up to four more tanks over the next several years.

Zone 6 Live Oak and West Red Bluff

Zone 6 is located in central Tehama County. Human population is concentrated in the eastern part of the zone which is adjacent to the city of Red Bluff. There are many rural ranch houses and ranchetts in the area. These developments and the rangelands surrounding them are considered to be the primary assets at risk of fire. Equipment use, arson and other human activities are a significant cause of fire in the Zone. **Chart 3** graphically portrays the area's sources of ignition.

Chart 3



Objectives

- Conduct residential fire safe inspections in target areas
- Determine initial attack capabilities at the Red Bank Station
- Conduct residential fire safe inspections in West Red Bluff

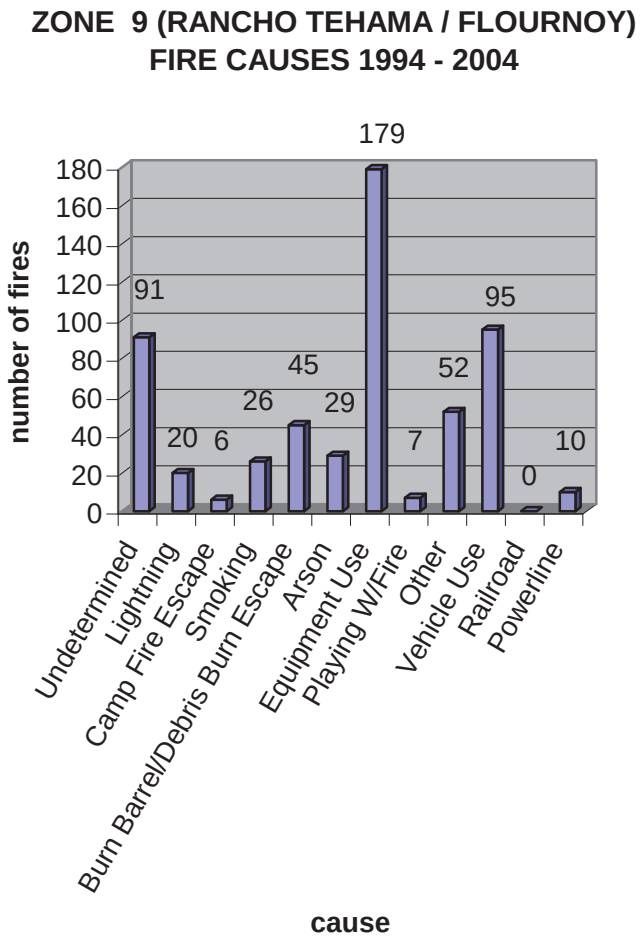
At the present time, a majority of the fire and fuels management efforts within Zone 6 consist of CDF home inspections in undeveloped areas as well as those lands adjacent to the city of Red Bluff. In

addition, the Tehama-Glenn Unit of the California Department of Forestry and Fire Protection is in the process of assessing the initial attack capabilities of the Departments Red Bank station.

Zone 9 (Flournoy, Henleyville and Rancho Tehama)

Zone 9 encompasses much of the southern portion of Tehama County and includes the residential communities of Flournoy and Rancho Tehama. Vegetation is a mixture of grassland, chaparral and woodland. Grasses are the major carrier of fire. Zone 9 has the second highest occurrence of fires during the period from 1990 to 2001.High winds in the Zone can spread fires rapidly. As shown in **Chart 4,** approximately one-third of the fires in the area were caused by equipment use. Arson, vehicle exhaust and smoking were also significant fire causes.

Chart 4



Objectives

- Design fuel breaks
- Work with Public Works to modify roadside fuel loading
- Continue to improve Rancho Tehama area's water supply source
- Continue focused residential inspections in Rancho Tehama area
- Design a focused fire prevention program for the Rancho Tehama community
- Review effectiveness of initial attack capabilities at Paskenta Station
- Continue to assist the Tehama County Resource Conservation District in developing the Tehama West Fire Plan
- Work with the Black Butte Recreation Area in connection with their fire prevention and education training programs

Rancho Tehama Water Tanks

Project Type

Installation of Water Tanks

Status

Partially completed, tanks were installed between 2001 and 2004 and additional tank locations are currently being identified

Funding

Unknown at this time

Project Administrator or Manager

Unknown at this time

Cooperators

California Department of Forestry and Fire Protection

Comments

Zone 9 in which the Rancho Tehama community is located, has limited water sources and water storing facilities available for use when wildfires occur. The Rancho Tehama Water Tank project entails the

installation of cisterns in which water for fire fighting can be stored. Two tanks were completed in 2001 and a 10,000 gallon water tank was installed in the Rancho Tehama Community in 2004.

Fire Inspections

Project Type

Property Inspections

Status

On going, inspections made yearly throughout the area

Funding

California Department of Forestry and Fire Protection budge item

Project Administrator or Manager

California Department of Forestry and Fire Protection

Cooperators

California Department of Forestry and Fire Protection

Comments

CDF personnel perform random fire inspections in order to determine if a 100 foot defensible space has been established around homes and other structures.

Red Bluff Farms Inspections

Project Type

Property Inspection

Status

On going inspections made yearly throughout the area

Funding

California Department of Forestry and Fire Protection budge item

Project Administrator or Manager

- Red Bluff Farms
- California Department of Forestry and Fire Protection

Cooperators

- California Department of Forestry and Fire Protection

Comments

CDF performs inspections on Red Bluff Farms' equipment to ensure fire-safe compliance. In addition the operation has established graded fuel breaks around the boundaries of Eucalyptus groves in order to provide a fuel break in case of fire in or around the immediate area. Grading is completed yearly in May to prepare for the upcoming fire season. The CDF inspection includes a review of grading operations to insure its completion and adequacy.

Federal Response Area West (FRA)

Federal Response Area West consists of federal lands managed by the Mendocino and Shasta Trinity National Forests. Within the Tehama West Fire Plan project area, FRA West lands are exclusively within the boundaries of the Mendocino National Forest. Portions of these lands are protected from wildfire through cooperative response agreements with the California Department of Forestry and Fire Protection. Under this agreement, the fire fighting agency having available equipment and manpower closest to a wildfire incident will respond. In addition, some federal lands are protected on a permanent basis utilizing CDF fire fighting resources and some non-federal land adjacent to the National Forest is protected by Forest Service resources.

Salt Log Chaparral Burning

The Mendocino National Forest is conducting prescribed burns within chaparral ecosystems on Hardin Ridge, Shepard Ridge, Self Ridge, McGill Ridge, and Sanhedrin Ridge. The goal of the project is to reduce fuels, maintain firebreaks, and improve wildlife habitat. Project work began in 2002. At the present time, 2,500 acres of the project area has been affected by prescribed fire and anther 2,500 acres is in the planning stage

Grindstone Chaparral Project

The goal of this ongoing project is to conduct heli-torch and landscape burns, type conversions and fuel break maintenance on 2,000 acres of chaparral stands within Grindstone Creek Canyon. Project work is being completed in both Tehama and Glenn County.

Valentine Ridge Fuel Break

This 275 acre fuel break was completed in 2004 and was developed through a combination of ball and chain and heli-tourch burning techniques

Type Conversion Maintenance

2,700 acres of converted brush fields are being maintained on a yearly basis through prescribed fire. As of 2005 1,544 acres of the total project area have been treated.

Oak Ridge Wildlife Burn

Currently in the planning stage, this 4,000 acre wildlife improvement and fuels project will entail chaparral burning, along with timber stand thinning and underburning. The project is expected to be funded by the Turkey Federation as well as federal fuels management funds. Project work will be conducted incrementally and will take approximately 10 years to complete.

Local Responsibility Area

In addition to lands within Tehama County under direct state fire protection responsibility and those protected through intergovernmental agreements established between the State of California and Federal fire fighting agencies; portions of the County particularly in the valley regions closet to the Sacramento River, are classified as Local Responsibility Areas (LRA). Within these LRAs, fire protection is provided by the County Fire Department, other local fire fighting entities, or through the California Department of Forestry and Fire Protection via contract. At the present time, fuels reduction efforts within the local LRA are limited to wildlands and other areas, along the Sacramento River.

Rio Vista Tract

A 23 acre prescribed burn has been planned by the United States Fish and Wildlife Service for the Rio Vista Tract of the Sacramento River National Wildlife Refuge located just South of Woodson Bridge State Park. The primary goal of this project is to reduce hazardous fuels and non native invasive species. Project planning occurred in 2004 and project execution is expected to occur in 2005 or 2006.

Project Area Fire and Fuels Situation

CDF provides fire and other resource information to the public through its Fire Resource Assessment Program (FRAP). California Public Resource Code 4789 requires the California Department of Forestry and Fire Protection to periodically assess California's forest and rangeland resources. The Fire and Resource Assessment Program of CDF performs this assessment in cooperation with federal, state and local agencies, public and private organizations, and California's academic research community. A number of FRAP data layers were used to describe graphically, the fire environment within the Tehama West Fire Plan project area. They were also used to identify potential locations of fire management, fire safety and fuels reduction projects within this project's planning area.

Surface Fuels

Surface fuels **(Map 12)** are generally described as vegetative materials near the ground through which fire will spread. These fuels include downed woody material such dead branches, logs, and other loose surface litter on the soil surface, along with living plants such as grasses, shrubs, tree seedlings and forbs. The amount, size and moisture content of surface fuel types determine how fast a fire spreads, how hot it burns and how high its flames reach. CDF has developed surface fuels data by translating vegetation data from a variety of sources into several fuel characteristic models used to predict fire behavior. The fuel models are based on vegetation attributes, such as cover type, vegetation type, size and crown closure, as well as other factors, such as slope, aspect, elevation and topography. Annual fire perimeter data is used to update fuel model characteristics based on "time since last burned," to account for both initial changes in fuels resulting from fuel consumption by the fire and for vegetation re-growth.

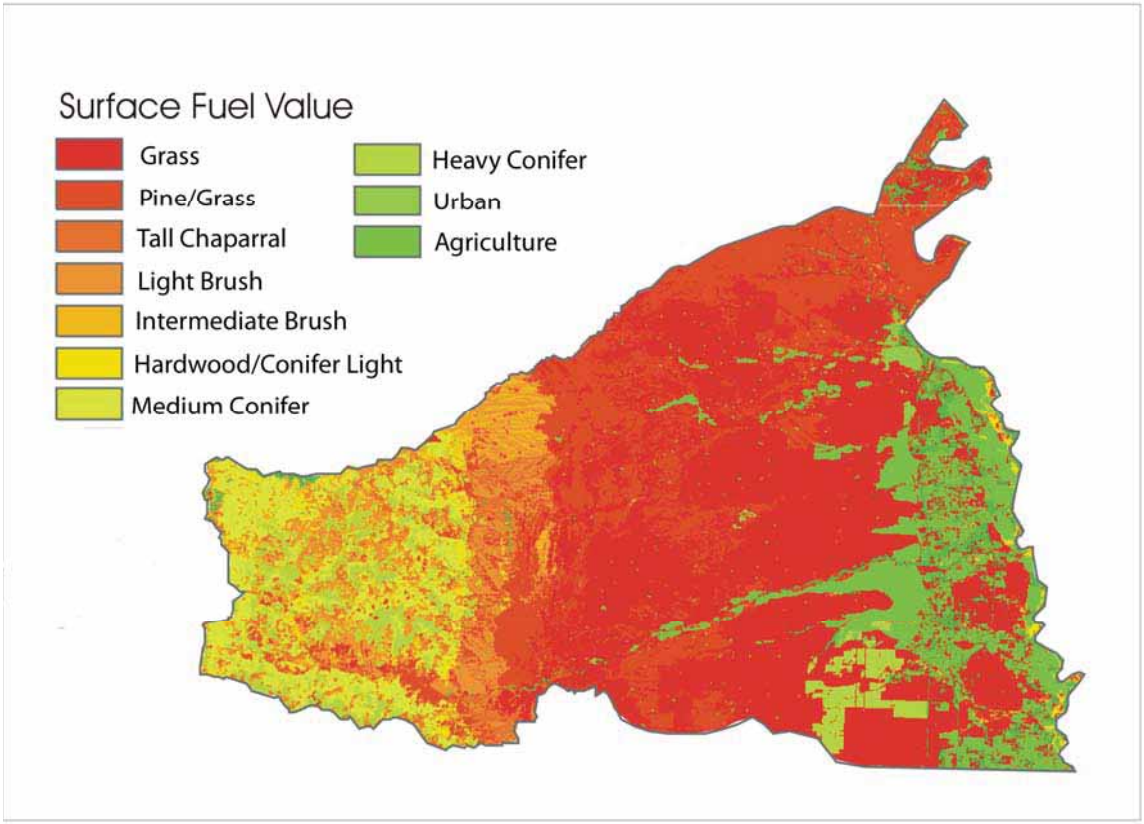
Fuel Rank

CDF has developed a Fuel Rank assessment methodology which assigns ranks based on expected fire behavior for unique combinations of topography and vegetative fuels under a given severe weather condition (wind speed, humidity, and temperature). The procedure makes an initial assessment of rank based on an assigned fuel model and slope. The ranks were assigned according to the rate of spread and

heat per unit associated with each unique fuel model-slope combination. These ranks were then placed into the categories of Moderate, High and Very High.

Map 12

Surface Fuels Within the Tehama West Fire Plan Area



Fire Threat

Fire Threat is a combination of fire frequency or the likelihood that a given area will burn as well as potential fire behavior. These two factors are combined to create four threat classes ranging from moderate to extreme. Fire threat can also be used to estimate the potential for impacts on various assets and values susceptible to wildfire. Impacts are more likely to occur and/or be of increased severity for higher threat classes. CDF calculated a numerical index of fire threat based on the combination of fuel rank and fire rotation class. A 1-3 ranking of fuel rank was summed with the 1-3 ranking from rotation class to develop a threat index ranging from two to six. This threat index is then grouped into four threat

classes. Areas that do not support wildland fuels (e.g. open water, agriculture lands, etc.) were omitted from the calculation; however areas of very large urban centers were left in but received a moderate threat value.

Condition Class

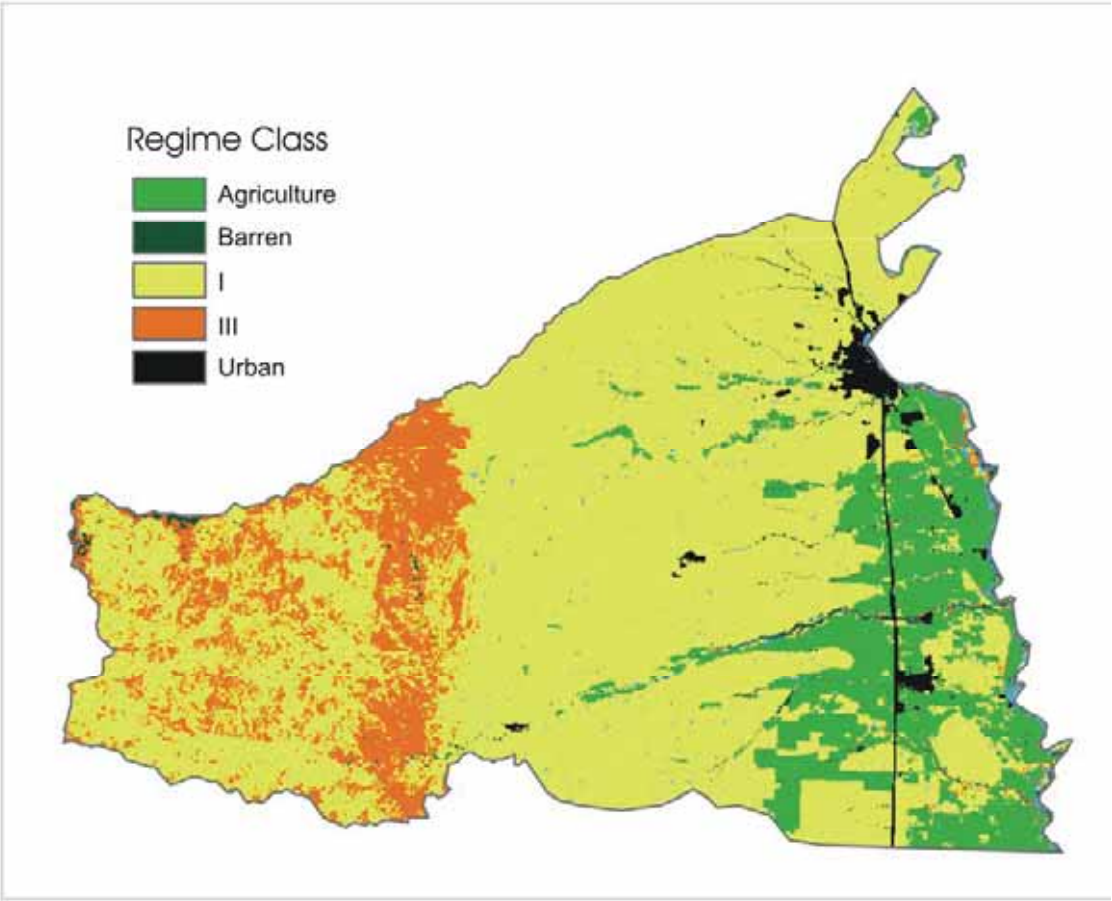
Condition class refers to the general deviation of an ecosystem from its pre-settlement or natural fire regime. It can be viewed as a measure of sensitivity to fire damage, or a measure of fire-related risk to ecosystem health. Classes are assigned based on current vegetation type and structure, an understanding of its pre-settlement fire regime, and current conditions regarding expected fire frequency and potential fire behavior. The conceptual basis for assigning condition classes is that for fire-adapted ecosystems, much of their ecological structure and processes are driven by fire, and disruption of fire regimes leads to many alterations to the ecosystem including, changes in plant composition and structure, uncharacteristic fire behavior and other disturbance agents (pests), altered hydrologic processes and increased smoke production. Condition Class 1 is associated with low level disruption of fire regime, and consequently low risk to loss or damage to the ecosystem. Condition Class 2 indicates some degree of departure from natural fire regimes, with some loss and change in elements and processes within the ecosystem. Condition class 3 is highly divergent from natural regime conditions, and represents the highest level of risk of loss.

Fire Regime

Fire regime refers to the pattern and variability of fire occurrence and its effect on vegetation. A simple statewide fire regime classification system provides an approximate idea of the range in fire frequency and severity as it existed before European settlement. This classification is based on a similar classification system developed in conjunction with the Coarse-Scale Condition Class assessment done for the National Fire Plan, modified from the USFS National Fire Plan Condition Class Assessment. This classification, while highly generalized, can illustrate only coarse differences in fire regimes. Changes in fire regime throughout Western Tehama County are displayed on **Map 13** below.

Map 13

Fire Regimes Within the Tehama West Fire Plan Area



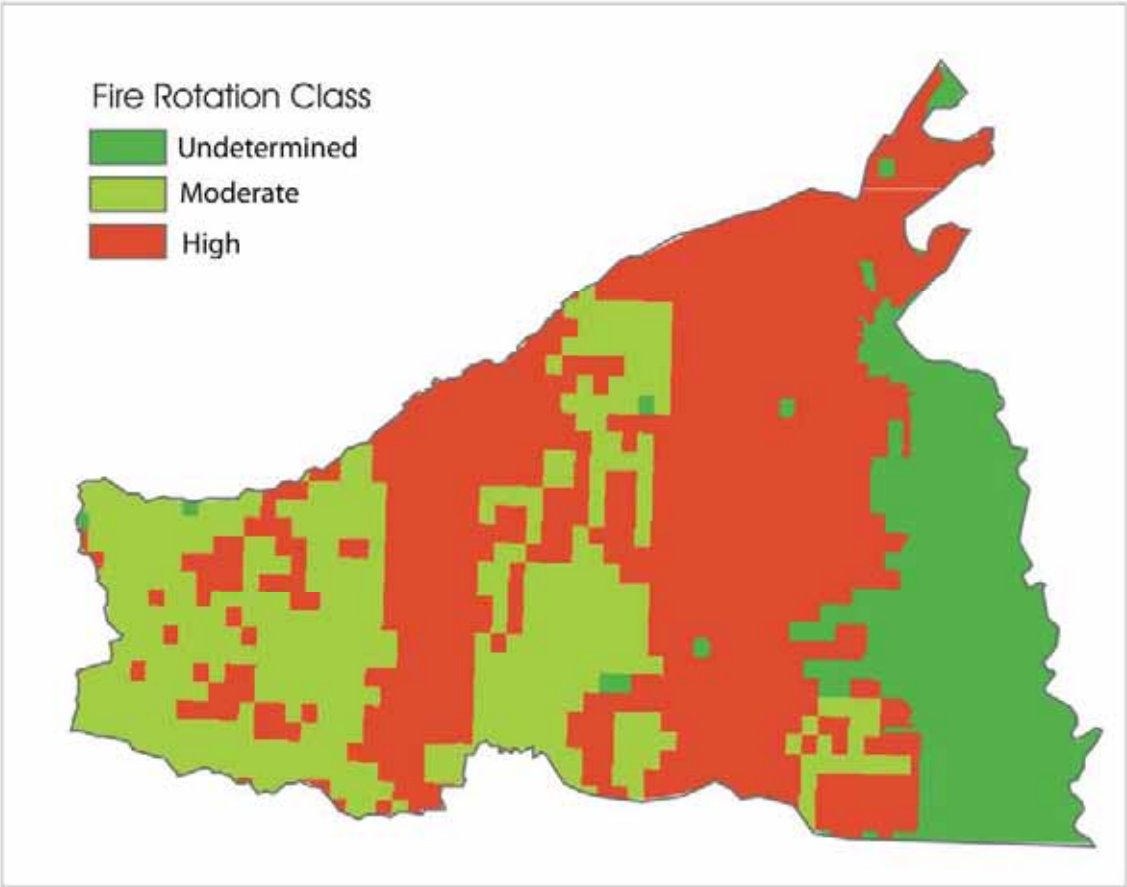
Fire Rotation Interval Class

Fire Rotation Interval Class **(Map 14)** is calculated from fifty years of fire history on land areas grouped into "strata" based on fire environment conditions. These strata are defined by climate, vegetation, and land ownership. The Fire Rotation Interval is the number of years it would take for past fires to burn an area equivalent to the area of a given stratum. Fire Rotation Interval for a given stratum is calculated by dividing total area of the stratum by the annual number of acres burned. Finally, Fire

Rotation Intervals are grouped into classes. The larger Fire Rotation Intervals correspond to less frequent burning. In contrast, the higher the fire rotation class, the more frequent fire is found in that stratum.

Map 14

Fire Rotation Classes Within the Tehama West Fire Plan Area



Proposed Fire Risk Mitigation Strategies By Zone

In order to implement the fire protection, fire management and fuels reduction goals established for the Tehama West Fire Plan, a number of projects have been developed through the collaboration of area stakeholders including land owners, land managers, agency personal and the Tehama County Resource Conservation District. Among these projects are those that are simply proposed for funding or in the early stages of design. Others are in process or completed and yet can be expanded, redesigned, or continued in order to improve the fire safety, fire management and fuels situation within Western

Tehama County. These projects are either small scale and cover the entire Tehama West Planning area or site specific and address localized fire issues. Regardless of spatial extent the following goals direct the design and implementation of project work.

- Projects provide a method to assess the potential for linking with other fire and fuels management efforts in order to maximize the efficiency and cost effectiveness of project work

- The project selection process gives the highest priority to those projects which provide maximum linkage and continuity with other wildfire related efforts, thus assuring greater positive impacts on fire conditions within Western Tehama County

- A mechanism is provided in all fuels modification projects which assure that project work is continually maintained and adequately conducted through self financing

- Projects maximize the responsibility of individual landowners to protect their own properties from wildfire

The projects proposed in this plan generally fall into three categories; organizational improvements, infrastructure development/improvements and fuels reduction/vegetation manipulation. Projects in the organizational category included improvements in the structure and organization of those entities that provide fire protection services. It also includes organizational improvements in non-government entities that develop, promote and advocate for changes in the human environment that impact fire related issues. This type of organization would include Fire Safe Councils watershed groups and other community advocacy organizations. Infrastructure projects include construction and improvement of those manmade structures that provided fire safety and fire control. Fuels reduction and vegetation manipulation are efforts that attempt to impact the current arrangement and composition of vegetatation and man made fuels at a single location or throughout an entire landscape. Among the techniques often used to manipulate the volume and arrangement of vegetative fuels include:

<u>Shaded Fuelbreaks</u>

This form of vegetative fuel modification involves the thinning of forest crowns as well as the reduction of surface and ladder fuels. Perhaps most importantly, these manipulations of

vegetation maintain themselves as crown cover is retained that is sufficient enough to effectively shade out scrubs and other vegetation that grows in the forest understory.

Defensible Fuel Profile Zone (DFPZ)

Defensible Fuel Profile Zones are strategically located liner fuel reduction treatments and fire protection areas that are generally constructed ¼ mile wide along significant public and private roads as well as strategic ridge tops. DFPZs are also developed so that they traverse communities, watersheds or other areas of special concern. Within the DFPZ, hazardous surface, ladder and canopy fuels are mechanically treated to levels that are less overstock and closer to historical stocking levels. These developed features allow fire fighters to quickly, safely, and effectively attack and suppress oncoming wildfire. The linear nature of the DFPZ network allows the development of connectivity between fire protection and fuel reduction projects on adjoining properties throughout a watershed. As a result, more extensive and effective fire protection can be developed than can be achieved through the creation of numerous unconnected fire related projects. Among the benefits of the DFPZ include:

- Protection to communities, forest resources, watersheds and wildlife
- Addresses excessive fuel loadings and overstocked timber stands at an appropriate scale and pace
- Provides an opportunity for adjoining land owners to extend fuel reductions projects and thus increase the protective capabilities of project work.
- DFPZ locations are know and can be incorporated into fire protection plans at the county level
- DFPZ are an effective means to reduce roadside fire ignitions

Roadside Clearings

Roadside clearings generally follow paved roads that are important for emergency evacuation, firefighting access and as a fuelbreak development. These projects will vary in width and in the degree of vegetation clearing based upon landowner cooperation, fuel density, and fire threat.

Often, a 25 to 50 foot width is established from the road edge as a minimum objective for this type of project. The general prescription for a roadside clearing would be to remove all concentrations of brush and smaller trees (less than 8") away from the road edge. Larger trees are normally spaced to the maximum extent allowed by the property owner and pruned to at least 10 feet from the soil surface.

Environmental Review

This section of the Fire Plan discusses the environmental review protocol pertinent to future project work generated through the Tehama West Fire Plan process. Except for low impact projects, it is anticipated that fuel reduction efforts conducted by area stakeholders will require minimum environmental review process that will include an assessment of potential project impacts relative to the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA) and the Migratory Bird Treaty Act (MBTA). As part of this effort, area stakeholders should conduct a review through the California Natural Diversity Data Base (CNDDB) to verify findings of Special Status Species within a project area, and conduct a literature search of existing information available through the local archaeological clearinghouse (California State University Chico) in order to determine the presence of any archaeological or historic resources within a fuel reduction project site.

If through this review process a particular Special Status plant or animal species is found or an archaeological or historic resource is discovered at a project site, mitigation would be required that would likely include delaying work to another period of the year or physically working around the particular species or cultural resource. Low impact projects, such as chipping, hand piling and burning around homes, would normally be exempt from environmental review due to the past disturbances resulting from home construction. In all cases, work should stop and a plant or animal survey conduced if a special status species is found during project work. An archeological site survey should be conducted if a possible cultural site is discovered.

National Environmental Policy Act (NEPA)

Since January 1, 1970, Federal agencies such as the United States Forest Service and Bureau of Land Management have been directed by the United States Congress to carry out regulations, policies and programs in accordance with the National Environmental Policy Act (NEPA). As specified in 42 U.S.C 4322; 40 C.F.R. 1500.2. the act requires projects financed through Federal grant funding as well as those occurring on Federal lands to have some level of environmental review completed prior to execution of project work. As a result, some of the projects currently in process or recommended for

implementation in this planning document would be subject to the NEPA process. The parameters of this review would be dictated by Federal agencies at the time a grant is solicited. At a minimum this review would include an assessment of the potential impacts of project work in the context of the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA) and the Migratory Bird Treaty Act (MBTA).

California Environmental Quality Act (CEQA)

The California Environmental Quality Act is a set of laws designed to develop and maintain a high quality environment and prevent environmental damage. CEQA applies to decisions by state and local governmental agencies that carry out or approve projects that have the potential for causing significant environmental effects. Fire Safe Councils and watershed groups are not governmental agencies with powers granted by the State Legislature or by a local legislative body consequently, their decisions are not subject to CEQA. If however, an activity sponsored by such non governmental organizations needs approval, financing, or efforts directly undertaken by a state or local public agency, the agency would need to address CEQA compliance with its actions. CEQA compliance responsibility is determined by the state or local public agency in collaboration with the applicant organization and would take the form of a CEQA Exemption, Negative Declaration or on rare occasions, an Environmental Impact Report:

CEQA Exemptions

After a fuel reduction activity has been determined to be a "project" subject to CEQA review, the lead public agency involved in the activity determines if the project is exempt under CEQA guidelines. The project may be exempt if it falls into one of the following categories:

Statutory Exemption: This exemption applies to activities specifically identified by the legislature as being exempt from CEQA review and includes burning permits and Air District permits for smoke management.

Categorical Exemption: This form of exemption would apply to projects that have no possible significant effect on the environment and includes minor alterations to land (Article 19, Sec. 15304). This Section specifically exempts fuel reduction activities within 30 feet (or 100 feet if authorized by a local fire protection authority) of a structure.

Negative Declarations

After a fuel reduction activity has been determined to be a "project" subject to CEQA review and it has been determined that an exemption is not applicable, the lead public agency may choose to prepare a

Negative Declaration if environmental impacts are considered insignificant. This is a written statement based on an Environmental Checklist that describes the reasons that a proposed project will not have a significant effect on the environment and therefore does not require the preparation of an Environmental Impact Report. The Negative Declaration requires a public comment period of 20 days. A Mitigated Negative Declaration may be required if some impacts are deemed significant but can be resolved in the Environmental Checklist and not in an Environmental Impact Report.

Environmental Impact Reports (EIR)

*L*arge fuel reduction projects with impacts that cannot be fully addressed in a Negative Declaration must comply with CEQA requirements through the preparation of an Environmental Impact Report. EIRs can be lengthy and expensive and generally involve an analysis of impacts to biological resources, hydrology, air quality, traffic, geology/soils, aesthetics, cultural resources, cumulative impacts and impacts to other resources as identified through the EIR Process. Mitigation measures are developed during the EIR process in order to address impacts created by the projects implementation. Public review and comments are important elements of an EIR. Fuel reduction projects conducted by small landowners generally do not require planning documents subject to CEQA review, unless the project includes removal of timber for commercial sale or involves CDF or other California public agency administration and/or support. Large property owners or groups of small property owners such as timber companies, utility companies, ranches, and subdivisions may request the support of the CDF in conducting fuel reduction projects through the CDF's VMP Program. Resources made available through the VMP program, include information on environmental resources in the area that have the potential for being impacted by the project, advice on fuel treatment methods, stand-by fire suppression equipment and manpower, along with hand labor for cutting, piling and burning. CEQA documentation is generally required for each VMP project and is done by the CDF through the preparation of an Environmental Checklist and a Negative Declaration. All CEQA documentation prepared for projects that have received federal funding must be reviewed to ensure the documentation meets the intent of NEPA.

Timber Harvest Plans (THP)

Fuel reduction projects in stands of timber may involve the removal of timber or solid wood forest products that land owners may sell in the open market to recover the costs of fuel reduction work, or sold for profit. Projects may include the creation of fireline that remove all timber and vegetation, or "shaded fuelbreaks" where understory vegetation and some dominant trees are removed to create areas of discontinuous fuels. These projects would involve the use of heavy equipment to remove the timber and transport it out of the forest. Impacts associated with timber harvest operations would be addressed

in a THP. These plans must be prepared by a Registered Professional Forester (RPF), and must comply with the Rules and Regulations of the California Forest Practice Rules as they apply to THP's. The purpose of the Forest Practice Rules is to implement the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 in a manner consistent with other laws including among others, the Timberland Productivity Act of 1982, CEQA, the Porter Cologne Water Quality Act, and the California Endangered Species Act. The provisions of these rules must be followed by an RPF in preparing THPs, and by the CDF Director of Forestry in reviewing such plans. The THP process substitutes for the EIR process under CEQA because the timber harvesting regulatory program has been certified pursuant to PRC Section 21080.5. If the CDF or the Director of Forestry believes that there are significant adverse environmental impacts not covered in existing rules, matters are referred to the Board of Forestry as specified in these rules.

The sale of commercial timber that has been harvested during a fuel reduction project can support future fuel reduction needs through establishment of a trust fund. Monies obtained through the sale of the timber can be used for the future maintenance of a fuelbreak or for the control of understory vegetation over time. This may be a viable tool for some communities in which many small landowners are involved with a fuelbreak that extends across their land. Fuel reduction projects that remove trees on private and state timberlands may be exempt from THP requirements under an Exemption process of the California Forest Practice Rules. The cutting and removal of trees in compliance with sections 4290 and 4291, which eliminates the vertical continuity of vegetative fuels and the horizontal continuity of tree crowns, is covered under the THP exemption process. An exemption form must be completed and submitted to the Director of CDF prior to commencement of operations. Forms can be obtained from CDF.

Project Prioritization

The array of projects proposed in this planning document have been arranged in terms of those landscape scale projects that apply equally to the entire Tehama West Fire Plan project area and those that are specific to a CDF Zone or a community. In attempting to prioritize project work developed in the planning process, public and fire fighter safety was first and foremost in importance. Those projects that provided immediate and effective protection to residents and fire fighters as well as public and private property ranked highest. These included fuel breaks, fuel reductions and other fuel manipulation projects that reduce the severity and spread of wildfire events. Second were those projects that aided in the control of wildfire such as fire fighting infrastructure improvements including water tank installations and water delivery infrastructure development. Finally, those projects that were long term and less immediate in nature such as organizational improvements, planning projects and the

development of community input were included on the list of proposed projects. The following set of proposed area wide and Zone Specific projects have been arranged according to this set of priorities.

Area-Wide Planning Efforts Within Western Tehama County That Encompass All Zones

Fire Hazard Reduction Coordination with the
Tehama County Public Works Department

Public road and highway agencies are responsible for maintaining roads and highway rights-of-way in a safe condition. This includes fuel reductions in areas with increase wildfire risk. When properly maintained, these linear features can provide effective and cost efficient fire protection over large areas. It is recommended that future fire hazard reduction projects within the vicinity of County maintained roads be coordinated between the road maintenance unit of the Tehama County Public Works Departments and those conducting fuel and vegetation management projects. Through the collaboration of these entities, project work can be linked over large distances through the use of rural roads and as a result, increased fire protection benefits can accrue to area stakeholders.

Fire Hazard Reduction Coordination with PG&E

PG&E is required by law to maintain certain clearances on rights-of-way for its primary and secondary power transmission lines. It is recommended that future fire hazard reduction projects be coordinated with PG&E as a way to share costs and enhance project work.

Shaded Fuelbreak Maintenance

Vegetation fuel hazard reduction work requires a continuing maintenance program once projects have been completed. New brush will quickly return from sprouts or seed if not controlled. Herbicides, prescribed burning, mastication and grazing are some of the methods that can be used for control. It is very important that a maintenance program begin within the first two to three years after the initial projects are completed in order to control the flush of re-growth stimulated by the disturbances generated by the original project. These maintenance programs would then need to be repeated on a routine basis. It is recommended that follow-up maintenance projects be initiated in a timely manner after the completion of each fuel hazard reduction project.

With public funding for such maintenance projects in short supply, the Tehama-Glenn Fire Safe Council should work with the Tehama County Resource Conservation District, the Glenn County Resource Conservation District along with both the Tehama and Glenn County Boards of Supervisors in pursuing county property tax assessments in those communities that are protected using publicly

funded fuels management projects. Not only would this result in those communities who utilize the protective measures paying for their upkeep, but would assure adequate funds are available for the maintenance of this public infrastructure.

Development of Sufficient Water Storage, Handling and Delivery Systems throughout Western Tehama County

Portions of Western Tehama County contain rural communities that lack sufficient water storage, handling and delivery capacity available for fighting wildfire. As a result rural homes can be put at risk if wildfire disrupts electrical service and water cannot be generated on site. The following is a list of communities that currently have either no fire water capacity or insufficient capacity for its population and must consequently depend on either tanker supplied water or that drafted from surface sources during wildfire events. 10,000 gallon tanks are recommended in communities that have a single urban core where the majority of homes and other structures are located. 5,000 gallon tanks are recommended in disbursed communities covering large areas. In these situations, it is equally important to have both adequate supplies of water and supplies that are readily available from various locations throughout the community. **Table 14** shows the location and tank storage needs for a number of communities within the fire plan project area.

Table 14
Tank Location and Size Requirements
For Areas in Need of Additional Fire Fighting Water Sources

Location	Storage Needs
High Flat Road	4-5,000 gallon and
Rancho Tehama	2-5,000 gallon and 2-10,000 gallon tanks
Heneleyville	(1 10,000 gallon Tank)
Flournoy	(1 10,000 gallon Tank)

Collaborative efforts between the Tehama-Glenn Fire Safe Council, The California Department of Forestry and Fire Protection, the Tehama County Resource Conservation District as well as the Tehama County Planning Department, Tehama County Public Works Department, local community groups and

individual citizens, should be established in order to explore options available to increase water storage capacity and delivery systems for fire fighting water. This group of stakeholders should also pursue community and grant funding to finance these improvements to local fire fighting infrastructure. In addition, consideration should be given to increasing the water flow and storage capacity requirements found in the county's zoning regulations.

Review of Tehama County Building, Land Development and Zoning Codes

In order to reduce structural ignitability, the Tehama County building and land development codes should be reviewed in order to determine if all current building and land development standards incorporate fire safe standards. Among possible changes are updated regulations and standards for new construction as well as building retrofits in order to make them less prone to loss from a wildfire attributable to embers, radiated heat, or surface fire spread. Specific suggestions for code changes are discussed below:

Fire Hydrants and Residential Fire Sprinklers.

A number of fire officials in Tehama County are of the opinion that lack of sufficient fire protection infrastructures primarily community water systems is a major factor in fire suppression success. Shortcomings in fire protection infrastructure, particularly community water systems, within rural communities are also felt to be a significant factor in current levels of property loss and expense in fighting wildland fires in the County's interface communities. More specifically, numerous suggestions have been made that center on new standards for subdivisions which would require the installation of hydrants and/or residential fire sprinklers.

Tehama County Ordinance 1537

Since 1992, Ordinance 1537 which is part of Tehama County Code 9.14, has been an effective tool in creating fire safe developments throughout Tehama County. Among its provisions, the ordinance requires two entrances and exits for subdivisions; minimum driveway standards; posting of address numbers; and mandated vegetation clearance. The ordinance is now 13 years old and may be in need of revision.

County Land Division Standards

The County's Land Division Standards are 34 years old and are considered by numerous fire professionals to be in considerable need of revision and updating.

Preparation of Development Standards

The county does not currently have a Development Standard in the form of a matrix that specifies the basic quality, quantity, and types of improvements required for subdivisions and lot splits. The creation of such a Development Standards matrix would not only allow the incorporation of fire safe features into basic development requirements, but would reduce uncertainty among builders as to what standards affect specific types of development.

Incorporate Fire Safe Principles into County Land Use and Zoning Ordinances

The Tehama County Planning Department should consider making a review of its Land Use and Zoning ordinances in order to assure that these codes adequately, efficiently and effectively promote fire safety as well as structure survival in the event of catastrophic wildfire. Among zoning issues that can impact the safety of rural residents are:

- Rural residential zoning that take into consideration the expected density and number of homes in addition to parcel size when requiring fire protection measures.

- Rural Residential zoning that takes into consideration, natural fuel loadings and topographic features that can make a site more susceptible to wildfire threat. As an example, building sites on steep slopes in the chaparral belt of western Tehama County.

- Reassessment of work loads and response times of current fire facilities when analyzing requests for zone changes to higher density development.

Tehama County General Plan Safety Element Update

The Safety Element of the General Plan is one of the basic guiding documents for the Tehama County Fire Department. At the present time, the entire County General Plan is being revised and it is of critical importance that fire safe principals be incorporated into the provisions of the County Plan's Safety Element.

Elimination of Wood Shake Roofs Within the Portions Of Tehama County Classified as a High Fire Threat

Efforts should be made to eliminate all wood shake roofs within the areas of Tehama County classified as having a high fire threat. Throughout the county, shake roofs have been identified as a significant cause of home loss in wildfires. Presently homeowners in Tehama County are allowed to replace up to 50% (as repair) of an existing roof per year. As a result, the use of wood shakes continues in both new

construction and roof replacements. Research show that homes with non-combustible roofs and clearance of at least 30-60 feet have a 95% chance of survival in a wildfire. In order to promote this effort, the Tehama-Glenn Fire Safe Council should work with the County building department in educating residents in the importance of replacing shake roofs. In addition, County officials should consider the following changes in building regulations and polices:

- Establish a reduced or no-fee permit for the replacement of shake roofs
- Required replacement of shake roofs upon sale of a home
- Financial assistance program for wood shake roof replacement among qualifying low income homeowners and first time home buyers

Develop County Incentives for Fire Safe Landscaping

In addition to constructing homes and other structures that are capable of surviving catastrophic wildfire events, the Tehama County Building Department should review building and development codes in order to assure that all landscaping requirements are fire safe. Consideration should also be given to exploring an array of incentives to induce homeowners and other rural property owners to utilize fire safe landscaping techniques and plant materials. Finally, through cooperation between the Tehama County Building Department and the California Department to Forestry and Fire Protection, consideration should be given to developing a program of uniform and consistent inspections in order to maintain homeowner compliance with Public Resources Code 4291 which establishes minimum standards for open space around structures

Public Outreach and Fire Safe Education

The residents of Tehama County have already benefited from the public outreach and public information efforts of the Tehama–Glenn Fire Safe Council and its member organizations. These efforts have included fire safety and fire ecology articles published in local media and collaboration with the Tehama County Resource Conservation District in conducting education workshops and distributing of wildfire safety information at community meetings. In addition, TGFSC members have participated in Wildfire Awareness Week programs. With the exception of labor hours contributed by agency personnel and publicly funded watershed coordinators, these outreach and education projects have been accomplished at little or no public expense.

In order to increase public awareness of fire hazards as well as the need for continued fire management and fuels reduction project work, the TGFSC should further develop its program of public education and outreach. These increased efforts by the local Fire Safe Council could be supported by the current outreach programs of the Tehama County Resource Conservation District. Specific topics for public presentation might include:

- Fire safe education workshops for developers, realtors, contractors, home builders, and building inspectors. Specific topics might include methods to ensure structural and landscaping survival following a wildfire as well as the impacts of environmental features on the development of fire safe home sites. Educate citizens about their roll in preventing wildfires as well as how to prepare for the inevitable occurrence of wildfire events.

- Fire education workshops that inform the public about new open space requirements, fire safe building materials, and the roll of fire in maintaining fire safe landscapes within Tehama County. Such public education opportunities could also be used to educate homeowners, ranchers and other residents about current changes in open space requirements.

- Inform the public about new and on going efforts to manage wildfire and wildland fuels as well as the need for their input in the fire planning process.

Finally, Western Shasta Resource Conservation District and the Shasta County Fire Safe Council have an active fire education program which includes a fire trailer that displays fire safe materials and from

which fire education talks are presented. The Tehama-Glenn Fire Safe Council should explore cost sharing of educational resources available thought the WSRCD, with the Cottonwood Creek Watershed Fire Safe Council.

Preparation of a Western Glenn County Fire Plan

At the present time, there is limited stakeholder involvement in developing coordinated strategies to reduce wildfire impacts within Western Glenn County. This area just south of the Tehama West Fire Plan Project area has a similar wildland fuel situation and as a result poses a threat to those lands north of the Glenn County line. In addition, the western portion of Glenn County contains several small communities that face a significant threat from wildland fire. Included are Elk Creek (recognized as a state and federal community at risk) Chrome, Newville and the developed areas surrounding Black

Butte Reservoir. One expected outcome of such a fire plan would be the creation of wildland urban interface areas around Chrome, Newville and Black Butte Lake. Other developed areas within Western Glenn County wildland urban interface area could also avail themselves of the benefits that such recognition brings.

Creation of a Tehama County-wide Fire Plan

The Tehama-Glenn Fire Safe Council should pursue the creation of a countywide fire plan which would incorporate the array of planning documents, polices and projects which currently impact the effects of wildfire on a countywide basis. Consideration could be given to utilizing the California Department of Forestry and Fire Protection's Tehama-Glenn Unit Fire plan as the umbrella document with which this Tehama West Fire Plan along with the proposed Tehama East Fire Plan and Western Glenn County Fire Plan would become component parts. These Eastside and Westside planning documents would incorporate the array of agency and private land management fire plans that are in effect throughout the county along with the individual project plans developed by public and private land management entities.

Support of Tehama County Fire Districts and Departments

It is recommended that the Tehama-Glenn Fire Safe Council and the Tehama County Resource Conservation District explore ways to assist the various County fire districts and departments in the area of grant funding for fire fighting assets and training.

Formal Classification of Westside Communities as Federal Communities at Risk

The 10-Year Comprehensive Strategy Implementation Plan prepared jointly by the Secretaries of Agriculture and Interior in May of 2002, created a mandate that the United States Department of Agriculture and Department of Interior work with state Governors on a long-term strategy to deal with the wildland fire and fuels situation as well as the urgent need for habitat restoration and rehabilitation after wildfire. To this end attention was focused on areas adjacent to federal lands that were within the wildland urban interface. More specifically, this partnership between the federal government and states was tasked with the responsibility of creating *"…broad, nationally compatible standards for identifying and prioritizing communities' at risk…*" In identifying these communities, agency officials were to remain cognizant of three basic tenets:

- Include all lands and all ownerships.
- Use a collaborative process that is consistent with the complexity of land ownership patterns, resource management issues, and the number of interested stakeholders.
- Set priorities through project evaluation, not by ranking communities.

An initial step in the classification process was the establishment of a formal definition for "Urban Wildland Interface Community". On January 4, 2001 the Federal Resister published an initial definition of interface areas in order to focus fire protection and fire reductions efforts on those communities within at risk areas. According to the official federal definition, Urban Wildland Interface communities are those lands where "*…humans and their development meet or intermix with wildland fuel.''* Further, the federal definition establishes three categories of communities that meet this description of which categories 1 and 2, are of special importance to federal officials.

Category 1. Interface Community

The Interface Community exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.

Category 2. Intermix Community

The Intermix Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28–250 people per square mile.

Category 3. Occluded Community

The Occluded Community generally exists in a situation, often within a city, where structures abut an island of wildland fuels (e.g., park or open space). There is a clear line of demarcation between structures and wildland fuels. The development density for an occluded community is usually similar to those found in the interface community, but the occluded area is usually less

than 1,000 acres in size. Fire protection is normally provided by local government fire departments.

In addition to the spatial relationship between urban development and areas containing wildland fuels, a number of fire behavior and urban development criteria were converted to factors that needed to be considered when making a determination that a community was at risk of wildfire threat. The January 4, 2001 Federal Register described these significant factors through example, by describing situations of decreasing severity on there impact to landscapes.

Risk Factor 1: Fire Behavior Potential

Situation 1: In these communities, continuous fuels are in close proximity to structures. The composition of surrounding fuels is conducive to crown fires or high intensity surface fires. There are steep slopes, predominantly south aspects, dense fuels, heavy duff, prevailing wind exposure and/or ladder fuels that reduce fire fighting effectiveness. There is a history of large fires and/or high fire occurrence.

Situation 2: In these communities, there are moderate slopes, broken moderate fuels, and some ladder fuels. The composition of surrounding fuels is conducive to torching and spotting. These conditions may lead to moderate fire fighting effectiveness. There is a history of some large fires and/or moderate fire occurrence.

Situation 3: In these communities, grass and/or sparse fuels surround structures. There is infrequent wind exposure, flat terrain with little slope and/or predominantly a north aspect. There is no large fire history and/or low fire occurrence. Fire fighting generally is highly effective.

Risk Factor 2: Values At Risk

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

Situation 2: This situation represents an intermix or occluded setting, with scattered areas of high-density homes, summer homes, youth camps, or camp grounds that are less than a mile apart. This situation would cover the presence of lands at risk that are described under State designations such as impaired watersheds, or scenic by-ways. There is a risk of erosion or flooding in the community if vegetation burns.

Risk Factor 3: Infrastructure

Situation 1: In these communities, there are narrow dead end roads, steep grades, one way in and/or out routes, and minimal fire fighting capacity, no fire hydrants, no surface water, no pressure water systems, and no emergency operations group and no evacuation plan in an area surrounded by a fire-conducive landscape.

Situation 2: In these communities, there are limited access routes, moderate grades, limited water supply, and limited fire fighting capability in an area surrounded by scattered fire conducive landscape.

Situation 3: In these communities, there are multiple entrances and exits that are well equipped for fire trucks, wide loop roads, fire hydrants, open water sources (pools, creeks, and lakes), an active emergency operations group, and an evacuation plan in place in an area surrounded by a fireproof landscape. The Secretaries will work collaboratively with States, Tribes, local communities, and other interested parties to develop a ranking process to focus fuel reduction activities by identifying communities most at risk.

Since its initial publication, the federal list of at-risk communities has expanded to include all lands in the vicinity of wildland fuels, not just those adjacent to federally managed lands. As a result, the initial list 843 communities increased to 1,283. In addition, the California State Forester has assigned the role of maintaining the current list of at-risk communities to the California Fire Alliance (CFA) which has recently developed a process whereby communities can be added or removed from the formal designation as an at-risk community.

Development of Volunteer Fire Safety Inspectors

With the current influx of newly arrived residents to the County's Westside area, the ability of government fire agencies to inspect structures for required vegetation clearance and other fire safe features is being impacted. In order to assure that all newly constructed buildings as well as older structures are properly inspected, it is recommended that a volunteer group of inspectors be trained in

the provisions of the California Public Resources Code and other regulations pertaining to fire safe development. Such a group of inspectors could assure that all newly constructed and older buildings are properly inspected. In addition, the volunteer nature of such an organization could significantly reduce the financial impact on local agencies in attaining full county-wide compliance with state and local fire safety requirements. A well organized model for such a program is operated by the Butte County Fire Safe Council.

Zone Specific Planning Efforts Within Western Tehama County

Zone 1 - Paskenta, Red Bank, R Ranch

Construction of an Access Road from Pettyjohn Road to State Route 36

At the present time, a lack of access to the R-Ranch development as well as the area between Pettyjohn Road and State Route 36 hinders the effectiveness and timeliness with which firefighting forces can respond to emergency calls. To improve the response time of emergency personnel, it is suggested that a road be constructed between Rancho Rio Frito and Pettyjohn Road. The proposed route would continue through R-Ranch and out to Highway 36W. In addition to providing multiple access points into the R-Ranch community, a road extension could be utilized as a fuel break and staging point for initial attack on fires occurring within that portion of Tehama County.

Classification of High Flat Road as a Wildland Urban Interface Area

The High Flat Road/Dream Valley Road area of Western Tehema County lies in a valley along the South Fork of Elder Creek **(Map 15)**. A considerable amount of residential construction has taken place along both sides of High Flat Road within the lowlands near Elder Creek and on the hilltops above. The area lies approximately 4 miles from lands managed by the Mendocino National Forest. In addition parcels managed by the Bureau of Land Management and the State of California are scattered throughout the vicinity. Grass and heavy brush within portions of the area create hazardous fuel conditions and the current level of development places numerous residents at risk. This situation is described in the Federal definition of Wildland Urban Interface (WUI) as reported in the Federal Register of January 4, 2001.

> *"The Intermix Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28-250 people per square mile."*

In addition, an evaluation of the risk factors used in establishing these interface areas including fire behavior potential, values at risk, and infrastructure indicate that the residents and urban development in the vicinity of High Flat Road are at a significant risk from wildfire.

Map 15

Area Map of High Flat/Dream Valley Road Area of Zone 1

(highlighted parcels are those reported by to contain structures)

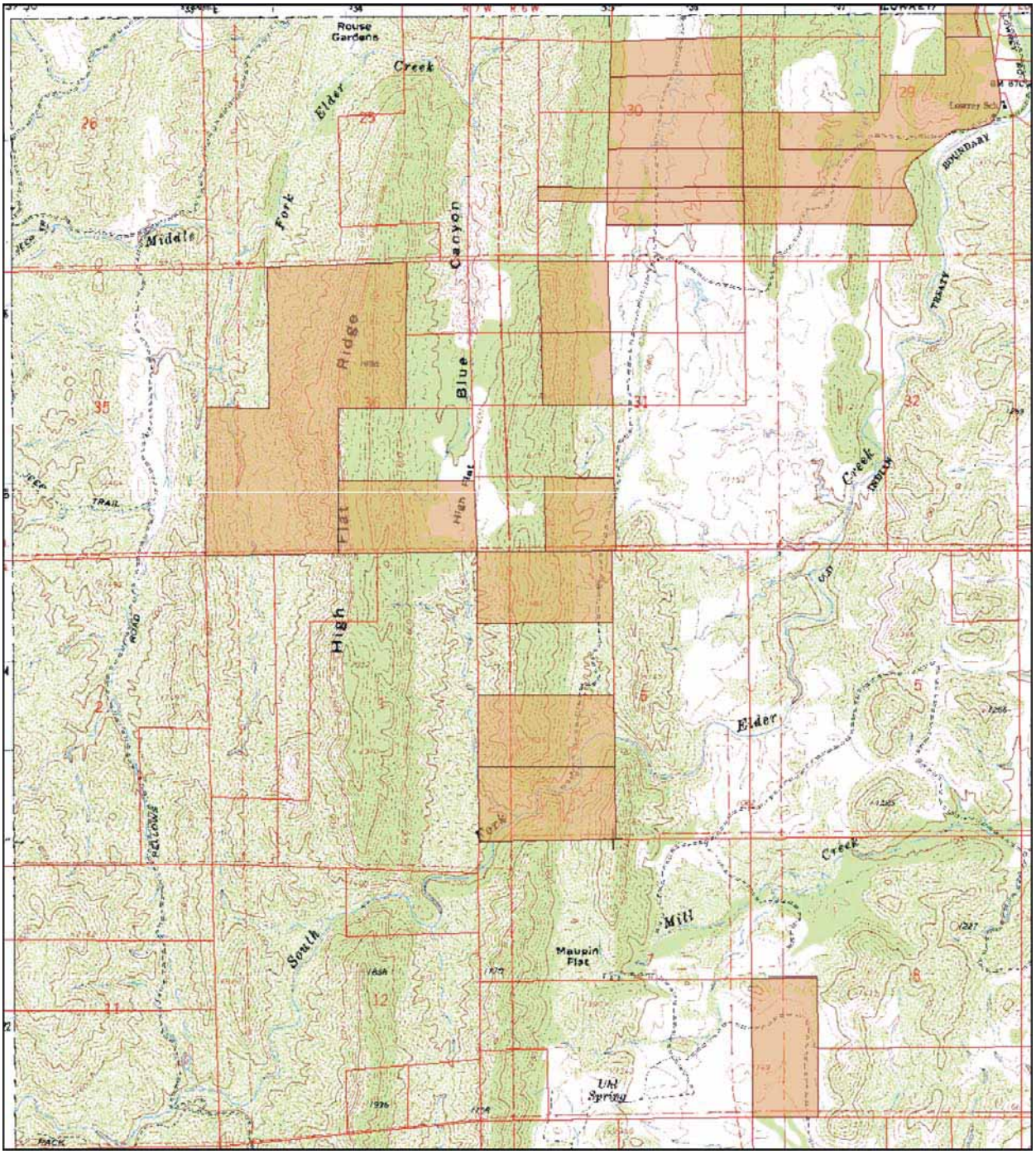


Photo 2
Homes and other structures at the foot of a hillside in the High Flat Area of Western Tehama County. This area, once largely ranch lands is becoming more urbanized with homes and small ranches

Photo 3
Homes and outbuildings constructed on a hilltop in the High Flat area. Without fuels reduction or a fuel break, fire originating down slope can rapidly travel upslope and threaten structures.

Fire Behavior Potential: Steep slopes along both sides of High Flat Road and Dream Valley Road threaten hillside homes with rapidly advancing upslope fire fronts. Steep topography also limits evacuation of residents out of the area and access by fire fighting personnel and equipment into the area. A significant portion of the fuels in low lying areas consists largely of grass and small shrubs while upland areas have a denser shrub component along with scattered oaks and Grey pine. Many of the area's fuels are flashy in nature resulting in rapid fire spread with only a minor amount of wind.

Values at Risk: Development within the High Flat Road/Dream Valley Road area includes scattered homes, ranches and significant out-buildings that are in some instances less than a mile apart. In addition, the hydrologic characteristics of Elder Creek often result in flash flooding and significant erosion. This situation would be exacerbated if hillside vegetation were denuded by catastrophic wildfire.

Infrastructure: At the present time, the county maintained portion of High Flat Road terminates about 3.5 miles from its intersection with Lowrey Road/Dream Valley Road. Although ranch roads beyond the terminus of this main route leads back to Lowrey Road, they are for the most part steep, unimproved and winding. Some of these routes are unmapped which could result in confusion and delay among fire fighting personnel attempting to access the area from the south. In addition, the area lacks designated fire fighting infrastructure such as hydrants, pressurized water systems and community water tanks. Surface water in Elder Creek is scarce during dry periods and no water retention structures have been installed along any portion of the stream course. Finally, the area has no community group to coordinate emergency communications among residents or a formal community evacuation plan/ evacuation route. Once a formal Wildland Urban Interface boundary has been established for the High Flat area, a number of specific mitigation efforts are required in order to improve the hazardous fire conditions found within this portion of Tehama County. The following are an array of initiatives that have been developed in order to reduce the threat of wildfire and improve the safety of both residents and fire fighters when wildfire events occur.

Pellows Road Improvement and Maintenance

Pellows Road is an unpaved route between Colyear Springs Road to the north and Thomes Camp Road to the south. This road provides secondary access to the High Flat area as well as to lands along the eastern boundary of the Mendocino National Forest. In addition, Pellows Road acts as a fuel break to low intensity grass fires that can occur in the area but not to high intensity blazes occurring within chaparral vegetation. If the route were widened, it would provide greater protection to lands on either side in the event of wildfire. Yearly spot grading and vegetation clearing would reduce the chance of fire being carried across the road and would assure that fire fighting equipment could utilize the entire route for access to remote areas adjacent to National Forest lands.

Mapping of Secondary Ranch Roads
and Development of a Community Evacuation Plan

A number of ranch roads are located throughout the High Flat area and could be used for both access of remote areas by fire personnel and to provide egress for area traffic during a significant wildfire event. In addition gates across these routes would require the installation of combination locks in order to allow all community members the ability to open them in the event of a fire. Finally route maps would need to be developed and issued to fire fighting personnel and residents in order to expedite emergency response and escape. Once mapping was completed, the route information could be utilized to create an emergency evacuation plan as well as the establishment of safety zones to be used in the event that fire prevented access to Lowrey Road or Pellows Road.

Improvements in Fire Fighting Infrastructure

As previously mentioned, surface sources of fire fighting water are limited and storage facilities are non-existent. The installation of 10,000 gallon water storage tanks fitted with high volume valves could installed as tanker fills. Similar water storage facilities have been developed in the Quail Ridge area of Northwestern Tehama County at a relatively low cost. In addition, the opportunity to create off stream ponds adjacent to Elder Creek should be explored. These facilities could be designed to store high stream flows during the winter months in order to increase water drafting opportunities for tankers and other fire fighting equipment during low flow periods in the late spring, summer and fall.

Development of a Community Group

An effective, low cost fire protection measure would be the development of a community Fire Council group responsible for emergency communications, evacuation and development of local mitigation measures. Such a group could be developed under the umbrella of the Tehama-Glenn Fire Safe Council and thus utilize the expertise and access to grant funding available through the larger bi-county Fire Safe Council organization. Similar groups have been developed in Shasta County and Butte County with considerable success.

Zone 2 - Bowman, Dibble Creek, Lake California, and Wilcox

(No significant fire or fuels management projects have been identified in Zone 2)

Zone 6 - Live Oak, West Red Bluff

Extension of Pine Creek Road to State Route 36W

During development of the Tehama West Fire Plan, a number of residents in the Pine Creek Road area made the observation that this route does not currently connect Reeds Creek Road with State Route 36 West. As a result, area residents and fire fighters have only one way in and out in the event of wildfire which could result in delays or gridlock in the event of a traffic accident. In addition the closest fire station is at the community of Dibble Creek. With Pine Creek Road currently inaccessible to State Route 36, fire response crews must travel east to Baker Road and then travel west along Reeds Creek Road in order to access homes and properties along Pine Creek Road which can significantly increased response times.

Zone 9 - Flournoy, Henleyville, Rancho Tehama

Formal Classification of Flournoy and Rancho Tehama
As Federally Listed Communities-At-Risk

At the present time Rancho Tehama and Flournoy, two communities within Zone 9, remain excluded from the current list of at-risk communities and thus ineligible for specific state and federal fire management funding programs. Although small in population when compared with the valley communities of Red Bluff and Corning, these urban areas contain residential, commercial and public structures. The criteria and rationale for classifying both these urban areas as communities-at-risk and adding them to the formal list of California at-risk communities are described below.

Rancho Tehama Community Description

Rancho Tehama has a population of approximately 1,406 and covers an area of 21.5 square miles. The community is located about 15 miles from the Mendocino National Forest boundary as well as lands managed by the Bureau of Land Management. The local area is within that portion of Tehama County having fuels consisting of annual grasslands, blue oak woodlands as well as areas of blue oak and foothill pine. A wildland urban interface area has been established around the Rancho Tehama community boundaries. This urban area interfaces with large expanses of wildlands containing grasslands, dense stands of oak and heavy accumulations of brush. During wet years, the grass component of this vegetation can develop into a significant fire hazard. At the community's urban fringe, low intensity development such as ranchettes and small ranches intermix with these wildlands fuels. In addition, portions of the urban area, particularly near the community airport occlude significant

stands of brush and grasslands. This vegetation represents a fire threat located inside the community's boundaries. Finally, Rancho Tehama has a volunteer fire department that utilizes a local fire station, and two fire fighting vehicles. Additional fire fighting resources are available through a mutual service agreement with the California Department of Forestry and Fire Protection and the United States Forest Service. The community does not have pressurized water service infrastructure, however, two 10,000 gallon water tanks and an overhead tanker fill are available in the event of a fire emergency. In addition, a site along Elder Creek in the western portion of the community has been identified for a proposed dam and fire protection pond. A number of abandoned pond sites are available for retrofitting in order to incorporate necessary water distribution plumbing.

Photo 4
Example of the Oak-Grey pine woodlands found throughout much of the Rancho Tehama community. If improperly maintained, this combination of grass and tree species can pose a significant threat to homeowners. Lot development, landscaping and building techniques used in the area need to incorporate fire safe considerations.

Photo 5
The development of this lot with a mobile home shows a number of deficiencies. While grass fuels have been maintained, embers from even a low intensity fire have the potential to travel into tree crowns, possibly igniting them. In addition, gutters need to be cleaned regularly in order to prevent build-up of leaves and other debris.

Photo 6
Portions of the Rancho Tehama Community contain dense stands of Grey Pine and brush such as Manzanita and Buck Brush. These species are often found in draws and drainages where shading occurs during some part of the day.

Photo 7
Open grassland on shallow slopes within the western portion of Rancho Tehama. These sites generally have low fuel loadings consisting of flashy fuels. Areas such as these not only provide relatively safe sites for homes, but if properly developed, could provide safety zones where residents could gather during a wildfire emergency.

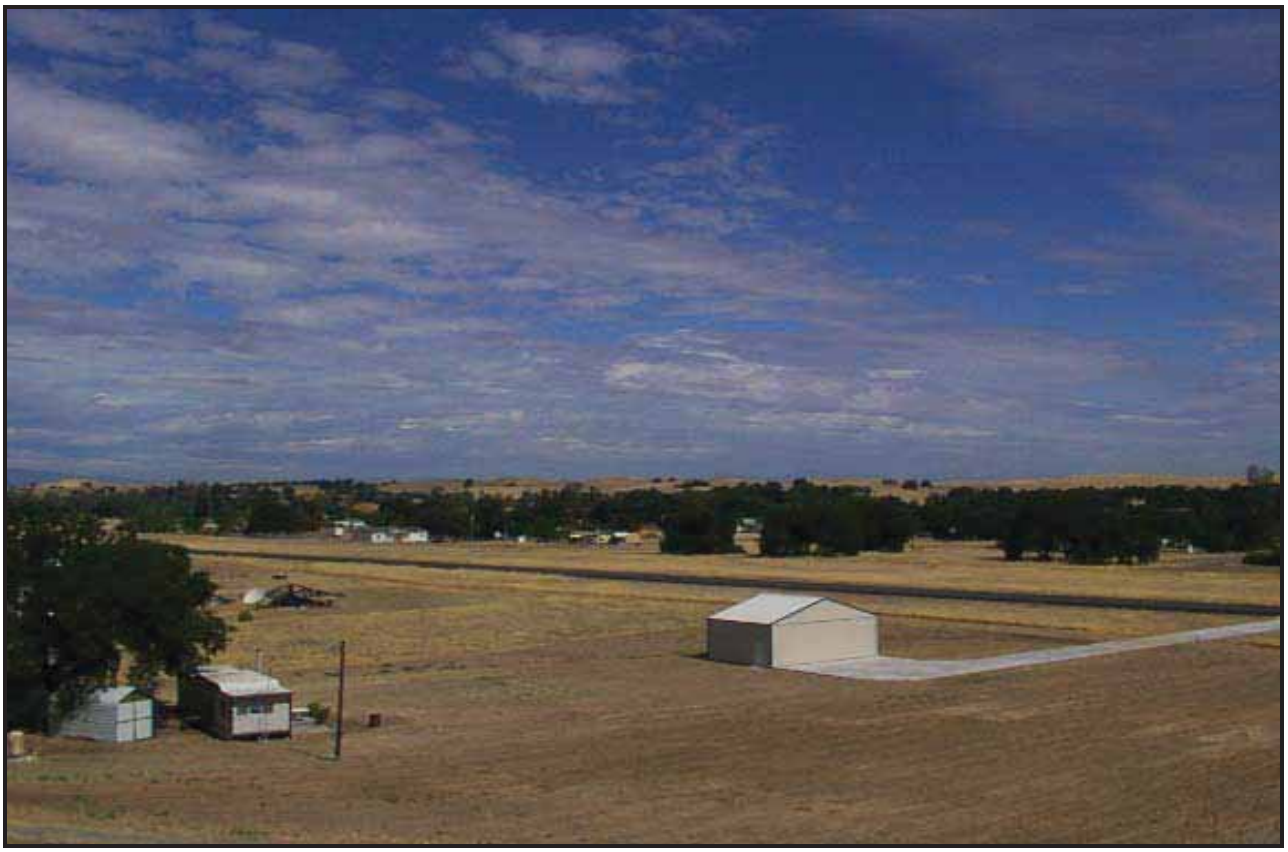


Photo 8
Open space at the Rancho Tehama Airport. The requirements for safe flight operations have resulted in the development of a very fire safe environment. For the most part, airport structures have been constructed of fire safe materials, away from trees and brush. In addition, grassy fuels have been maintained in a low condition. At the time this photograph was taken, grass fuels in the area would at best support only a very low intensity fire. In addition, there are numerous access points to these facilities allowing fast and efficient access by fire fighters and other emergency personnel and equipment. Given these factors, the Rancho Tehama community airport could provide a large safety zone that would be accessible for many residents located over a large portion of the development.

Flournoy Community Description

The Flournoy community has a population of approximately 300 residents and consists of a small urban center as well as homes and small ranches scattered over approximately 1 square mile. As a result, the area has characteristics of both interface and intermix development. Fire service is provided through a mutual aid agreement with the California Department of Forestry and Fire Protection and the United States Forest Service both of which have significant facilities in Paskenta which is roughly 6 miles to the west. The community is located about 12 miles from lands managed by the Mendocino National Forest and the Bureau of Land Management. The area surrounding Flournoy is located in a portion of

Tehama County that has fuel types consisting of annual grasslands and patches of Blue Oak woodlands. Although not formally classified as a Community at Risk by federal authorities, Flournoy's spatial arrangement consisting of both scattered development less than a mile apart as well as clustered structures such as homes, a store and municipal infrastructure, meet the federal definition of an intermix community.

In terms of potential fire behavior, the area surrounding Flournoy's urban core consists of flashy grass fuels that after a particularly wet growing season can become very high. The topography of the area is flat to gently rolling. As result, the threat of intense fire attributable to slope is reduced however, the open grasslands surrounding the community often experience wind events that can quickly increase wildfire spread. In addition, the area's fire history is one of numerous small and large blazes which indicate a considerable threat from grass fires. Flournoy has a single route (Paskenta Road) north and south. The community's proximity on the east and southeast to the Thomes Creek stream channel along with its having no westerly routes could effectively prevent escape by residents as well as timely response by fire fighting personnel. Finally, the scattered nature of development in the area along with the presence of outlying schools and other public infrastructure warrant consideration of establishing a wider Wildland Urban Interface area as defined by the United States Forest Service and the Bureau of land Management.

Photo 9
View of Flournoy's central area. Within this portion of the community are several commercial establishments, homes and public service facilities The Thomes Creek stream channel is to the right (east). The grassy fuels in the foreground are similar to those found on the north, south and west sides of town.

Photo 10
Close up of grassy fuels found in the vicinity of Flournoy. Fuel loadings within this vegetation type can change dramatically from year to year depending upon precipitation. In addition, the open landscapes surrounding the Flournoy community can quickly increase the rate of spread and intensity of grass fires. Given the yearly variability in fuel loading, fuel reductions and fuel breaks must be maintained on a yearly basis. On shallow slopes, protective measures can entail simply grading or mowing of grasses and forbs.

Rancho Tehama Community Fire Safe Plans

Rancho Tehama consists of an array of population densities, fuels conditions and environmental characteristics. The Tehama West Fire Plan describes the fire and fuels conditions of Western Tehama County on a landscape basis and is not detailed enough to address wildfire and fuels conditions at the scale of a rural community or subdivision. In addition, the significant number of residents living in the area it is suspected, would have an array of fire related issues that concerned them as well as suggestions for there mitigation that must be represented in any community fire plan. As a result, it is recommended that a large-scale fire plan be developed specifically for Rancho Tehama and the immediately surrounding area. With extensive community input, tactical fuel breaks, road clearances, evacuation routes and safe areas could be developed in a detailed community fire safe plan which would be incorporated into the Tehama West Fire Plan document as an appendix at a later date.

Installation of Piping on 10,000 Gallon Water Tank at Yolo Court

At the present time a 10,000 gallon water tank is located near Yolo Court on the west side of the Rancho Tehama area. Currently, the tank has no piping to a down slope fire hydrant and as a result,

cannot be use other than to fill fire equipment parked immediately next to it. This proposed project would entail the plumbing of an outlet line to a fire hydrant located at the corner of Yolo Court and Humboldt Drive as well as the installation of a high volume fill spout on the tank itself. With these improvements, rapid dispersal of water could be accomplished both at the tank as well as down slope at the hydrant.

Proposed Rancho Tehama Water Impoundment Sites

The Rancho Tehama community has two sites along Elder Creek, one between Humboldt Drive and Rancho Tehama Road and another near Park Terrace (**See Map 16**) which has been considered as possible locations for the construction of water retention ponds that could be used during the fire season. The construction of water impoundments would require seismic studies as well as fisheries investigations to determine what, if any impacts, such obstructions might have on potential anadromous species within Elder Creek. A feasibility and cost/benefit study could be prepared which would determine if such a structure would be possible from a regulatory stand point and if the cost of the facility provided enough community protection to warrant the expense.

Reconstruction of Glove Lake Dam and Repair of Adjacent Well and Pump Equipment

The dam at Glove Lake, near the intersection of Stagecoach Road and Oak Ridge Road, was breached and washed out a number of years ago. In addition, a well and pump located at the site that was once used to charge a hydrant at the intersection, is in disrepair. It is recommended that a study be conducted in order to determine the feasibility and cost effectiveness of reconstructing Glove Lake dam as well as reconstructing and retrofitting the pump and well facility as a means to provide adequate water pressure to the adjacent hydrant.

Installation of Pump at the Yuba Road Water Tank

The water tank at the top of Yuba Road has no pump supply and the piping from the tank to a hydrant near the foot of Yuba Road is unable to withstand the head pressure when the valves are opened. The tank, once filled by a water truck, could be used as a ready source of water supply to a pumper. The Rancho Tehama Association should consider obtaining cost estimates for the installation of a pump and plumbing infrastructure sufficient to supply adequate water supply to the hydrant on Yuba Road.

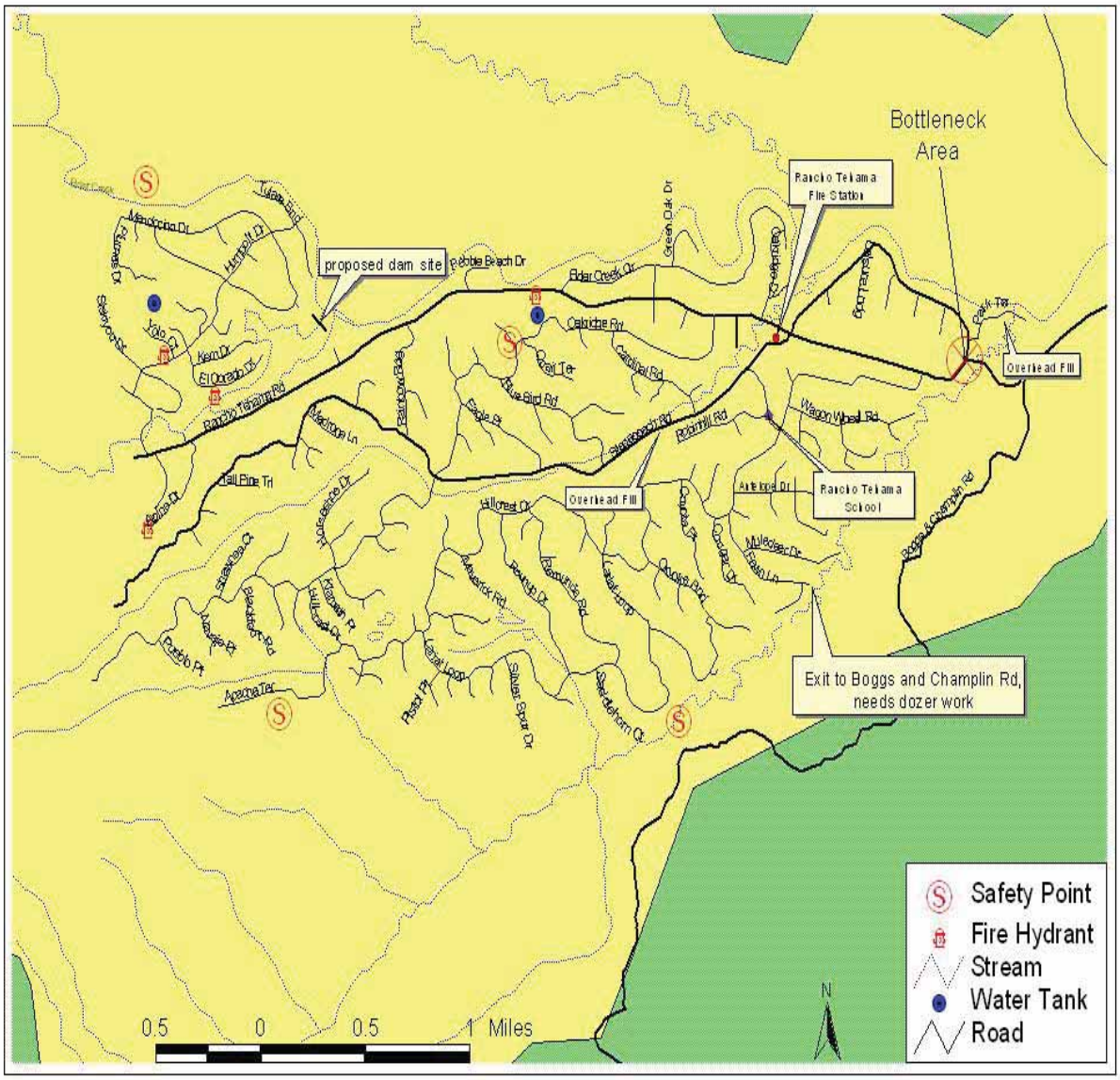
Repair of Pump and Piping Systems at Beaver Lake

Beaver lake, located between Wagon Wheel Road and Hillcrest, is not a regularly maintained water body. At the present time, it has a pump and piping system that hasn't operated since a fire destroyed

the hydrant and switchbox. The RTA should consider obtaining cost estimates for the installation of a new pump and piping system at Beaver Lake

Map 16

Street and Fire Fighting Infrastructure Map of Rancho Tehama



Assessment of the Boot, Border and Mule Containments

At the present time, there is no current assessment of the condition and operability of water supply infrastructure at the Boot, Border and Mule Containments. At a minimum, Rancho Tehama Association personnel should inspect these facilities. If repairs are needed, cost estimates should be obtained for repair and retrofitting of water delivery infrastructure.

Formal Establishment of Safety Zones

Throughout the Rancho Tehama Community are relatively flat and open locations that have been established as unofficial safety zones (**see Map 16**). These include a site along Oakridge Road, between Quail Terrace and Blue Bird Road; on the south side of Apache Terrace near its terminus; on the north side of Elder Creek adjacent to Mendocino Drive; on Lariat Loop just south east of its intersection with Ramuda Road and between Rancho Tehama Road and Stagecoach road near Leisure Landing. Since these sites are on private property, the ability to make significant improvements is limited unless condemnation proceedings are implemented. In lieu of such action however, these locations could be placed on the current evacuation maps developed by the California Department of Forestry and Fire Protection

Traffic Congestion at Street Intersections

A significant traffic bottleneck is found at the intersection of Stagecoach Coach Road and Rancho Tehama Road **(See Map 16).** At this location, these two major east west arteries out of Rancho Tehama merge onto a single easterly exit. In the event of a large wildland fire within the community's boundaries, gridlock could occur, stifling attempts by residents to leave and fire personnel from entering. Also of significance is the lack of north-south exits out of the urban area, which exacerbates traffic problems in the event of an emergency. To mitigate these shortcomings in the community's road network, individual residents, community groups, the Tehama-Glenn Fire Safe Council and the Tehama County Resource Conservation District could consider lobbying the Tehama County Public Works Department for funds to:

- Extend Rancho Tehama Road west so that that it intersects Lowrey Road thus providing an alternate route out of the Rancho Tehama Community in the event of a large wildfire or other emergency.

- Construct a new alignment for Stagecoach Road which would allow direct access to Boggs and Champlin Road and thus a southerly escape route out of the community.

- Extend Lariat Loop south so that it intersects with Boggs and Champlin Road and thus provide yet another route out of the Rancho Tehama area.

- Extend Tulare Road to Gallatin Road which would provide a second westerly escape route out of the Rancho Tehama community.

- Extend Fawn Lane near the community's southern limit to Boggs and Champlain Road.

- Replace the Humboldt Bridge in order to assure residents within the most northwest corner of the community access to Rancho Tehama Road and an escape route out of the community.

Rancho Tehama Community Fire-Safe Council

A number of rural communities in Northern California have established community level Fire-Safe Councils under the auspices of a county or regional fire council. These groups consist of local residents as well as fire and land management agency personnel with responsibilities in the immediate area. Through focused efforts, these stakeholder groups develop specific solutions to there immediate problems. Such community efforts have ranged from the simple and cost free such as community watch groups and phone trees, to major chipping, fuels reduction and fuel break projects. Given the array of specific fire and fuels related issues found within the Rancho Tehama community, such a forum could effectively utilized detailed local environmental knowledge in improving the ability of local residents to get there problems solved in an efficient and cost effective manner. Also by maintaining a relationship with the Tehama-Glenn Fire Safe Council, such a group would have greater access to an array of technical assistance, grant funding opportunities and county-wide support for their fire management endeavors. Finally, as a volunteer organization, community Fire Safe Councils are a low cost or no cost means of achieving local objectives.

Photo 11
Easterly view of the intersection at Stagecoach Coach Road and Rancho Tehama Road. Rancho Tehama Road is the only significant egress route out of the Rancho Tehama Community and most residents would use this intersection in order to leave the area on Rancho Tehama Road or Boggs and Champlain Road. If an accident or gridlock occurred at this uncontrolled intersection, both egress by residents and ingress by outside emergency personnel could be deterred or halted.

Photo 12
Westerly view of the intersection at Stagecoach Coach Road and Rancho Tehama Road. Commercial establishments are located immediately to the right and left of the intersection

Photo 13
Southwesterly view of the intersection connecting Rancho Tehama Road and Boggs and Champlin Road. In order for the residents of the Rancho Tehama community to access this southerly route out of the area, they must pass through the intersection of Stagecoach Road and Rancho Tehama Road. In order to improve the ability of residents to evacuate the community, additional access to Boggs and Champlin Road needs to be developed along the south boundaries of Rancho Tehama

Photo 14
Northeasterly view of the intersection connecting Rancho Tehama Road and Boggs and Champlain Road. The intersection of Rancho Tehama Road and Stagecoach road is roughly ½ mile to the west (left). Paskenta Road, Interstate 5 and Highway 99W are to the east (right) approximately 12 miles away.

VII. Summary and Conclusions

Analysis and Findings

In establishing priorities for fire and fuels management projects to be completed within Western Tehama County, the lives of area stakeholders and fire fighters as well as public and private property were first and foremost in consideration. Those projects that provided immediate and direct impact on the threat and intensity of wildfire were given the highest priority. Among these critically important projects were those that entailed fuels reduction and infrastructure improvements, particularly those involving access for fire fighting forces and egress of residents. In addition, water storage and delivery projects were considered of equal importance. Projects of somewhat less urgency were those involving regulatory matters such as changes in laws, ordinances and codes that related to fire safety and fire management. Projects considered important but not urgent were initiatives to formally classify a number of small communities as officially recognized communities at risk as well as the development of Wildland Urban Interface areas. Finally, planning initiatives were considered to be the least time critical. From this prioritization process the following broad action items were developed by the Tehama County Resource Conservation District with extensive input from area stakeholders many of whom are identified in the plans Executive Summary.

- Tehama-Glenn Fire Safe Council develops a list of all currently unfunded fire and fuels management projects.

- Tehama-Glenn Fire Safe Council with assistance from the Tehama County Resource Conservation District and the Tehama County RAC identify possible sources of public and private funding for unfunded projects. Funding is expected to be in the form of public and private grants, self funding through the sale of biomass product, as well as the assessment of fees, taxes or other revenue sources. Proceeds from such funding could be used to finance both the initial completion of project work as well as the permanent maintenance of infrastructure improvements.

- Tehama Glenn Fire Safe Council in conjunction with the California Department of Forestry and Fire Protection and County regulatory agencies establish a work group to review those local

ordinances that impact fire safety and development within the fire prone areas throughout Tehama County

- Coordinator of the Tehama-Glenn Fire Safe Council works with United States Forest Service and Bureau of Land Management personnel to establish formal recognition of communities at risk within Western Tehama County as well as the creation of sufficient Wildland Urban Interface areas.

- Coordinator of the Tehama-Glenn Fire Safe Council works with local community groups within the Tehama West Fire Plan area to explore local interest in developing community fire safe groups which would operate as either committees of the Tehama-Glenn Fire Safe Council or as independent councils under the auspices of the California Fire Safe Council. Among the communities within which this assessment would be made are Rancho Tehama, the Paskenta-Flournoy-Henleyville area, and the Paskenta Band of Nomalaki located in Paskenta. Other groups may be identified during the initial phase of these discussions

- Coordinator of the Tehama-Glenn Fire Safe Council works with members of the Glenn and Colusa County Board of Supervisors along with public and private stakeholders to explore the potential of creating a Fire Safe Council group within these two counties. Such a group would be established as either a separate Fire Safe Council or as a working group of the current Tehama-Glenn Fire Safe Council

- Coordinator of the Tehama-Glenn Fire Safe Council works with members of the Glenn County Resource Conservation District, the Glenn County Board of Supervisors and their local stake holders to explore local interest in preparing a Fire Plan for Western Glenn County as well as the use of the Tehama-Glenn Unit plan as the Glenn County Fire Plan document.

Plan Update Process

The overall goal of fire and fuels management for Tehama County is to develop countywide coordination of fire management related projects and policies. Once completed, the Tehama West Fire Plan and Tehama East Fire Plan documents and maps will be incorporated either by reference or directly into the Tehama-Glenn Unit Fire Plan which is updated annually. On a yearly basis, the coordinator of the Tehama-Glenn Fire Safe Council will work with the CDF's Tehama-Glenn Unit Pre-Fire Engineer in order to update the unit fire plan document's list of projects as well as identify newly

developed projects throughout Tehama County. Members of the TGFSC will be canvassed for input regarding changes to federal, state and local policies, laws and ordnances pertaining to fire safety, fire management and fuels reduction projects.

Next Steps

In order to efficiently and effectively initiate the efforts described in this planning document the Coordinator of the Tehama-Glenn Fire Safe Council will immediately begin to work with the members of the Tehama-Glenn Fire Safe Council to identify unfunded project work within Western Tehama County. The Coordinator will also discuss with the Tehama County Resource Conservation District, the possibility of their assistance in identifying funding sources for project work. Finally, the TGFSC Coordinator will begin working with the CDF Tehama-Glenn Unit Pre-Fire engineer and the Tehama--Glenn Fire Safe Council in order to establish a process to officially incorporate the Tehama West Fire Plan into the Tehama-Glenn Unit plan. CDF unit staff will then establish formal procedures to update project work as well as stakeholder policies related to fire and fuels management. This effort is expected to be completed by December 31 of each year.

VIII. REFERENCES

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IX. APPENDICES

Appendix A
Major Stakeholders

Zone 1 - Paskenta, Red Bank, R Ranch
Sunflower Coordinated Resource Management Plan 12250 Colyear Springs Road
Coordinator: Bill Borrows Red Bluff, CA 96080
Email: sunflowercrmp@msn.com (530) 529-1535
Fax (530) 529-1515

Reeds – Red Bank Landowners Group 2 Sutter Street, Suite D
Tehama County Resources Conservation District Red Bluff, CA 96080
Vicky Dawley (530) 527-3013 ext. 3
Email: vicky.dawley@ca.nacdnet.org FAX (530) 527-7451

Cottonwood Creek Watershed Group P.O. Box 1198
Coordinator: Vieva Swearingen 3233 Brush Street
Email: ccwg@shasta.com Cottonwood, CA 96022
http://www.cottonwoodcofc.org/ccwg/ccwg.htm (530) 347-6637
FAX (530) 226-9622

Cottonwood Creek Watershed Fire Safe Council P.O. Box 1198
Coordinator: Vieva Swearingen 3233 Brush Street
Email: ccwg@shasta.com Cottonwood, CA 96022
(530) 347-6637
FAX (530) 347-6346

ZONE 2 - Bowman, Dibble Creek, Lake California, and Wilcox
Cottonwood Creek Watershed Group P.O. Box 1198
Coordinator: Vieva Swearingen 3233 Brush Street
Email: ccwg@shasta.com Cottonwood, CA 96022
http://www.cottonwoodcofc.org/ccwg/ccwg.htm (530) 347-6637
FAX (530) 226-9622

Cottonwood Creek Watershed Fire Safe Council P.O. Box 1198
Coordinator: Vieva Swearingen 3233 Brush Street
Email: ccwg@shasta.com Cottonwood, CA 96022
(530) 347-6637
FAX (530) 347-6346

ZONE 6 - Live Oak, West Red Bluff
Reeds – Red Bank Landowners Group 2 Sutter Street, Suite D
Tehama County Resource Conservation District Red Bluff, CA 96080
Vicky Dawley (530) 527-3013 ext. 3
Email: vicky-dawley@ca.nacdnet.org FAX (530) 527-7451

ZONE 9 - Flourney, Rancho Tehama

Tehama County Resource Conservation District 2 Sutter Street, Suite D
Vicky Dawley Red Bluff, CA 96080
Email: vicky-dawley@ca.nacdnet.org (530) 527-3013 ext. 3
FAX (530) 527-7451

Appendix B
Public Resource Code

The laws and regulations concerning fire prevention on private land in Tehama County are enforced primarily by the California Department of Forestry and Fire Protection and County authorities. The following list provides a summary of the major laws and regulations currently in force within Tehama County pertaining to fire prevention and fire safety.

PRC 4291 – Defensible Space Any person that owns, leases, controls, operates, or maintains any building or structure in, upon, or adjoining any mountainous area or forest-covered lands, brush-covered lands, or grass-covered lands, or any land which is covered with flammable material, shall at all times do all of the following:

(a) Maintain around and adjacent to such building or structure a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimens of trees, ornamental shrubbery, or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(b) Maintain around and adjacent to any such building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth which is located from 30 feet to 100 feet from such building or structure or to the property line, whichever is nearer, as may be required by the director if he finds that, because of extra hazardous conditions, a firebreak of only 30 feet around such building or structure is not sufficient to provide reasonable fire safety. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(c) Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.

(d) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

(e) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

(f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that s attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than one-half inch in size.

(g) Except as provided in Section 18930 of the Health and Safety Code, the director may adopt regulations exempting structures with exteriors constructed entirely of nonflammable materials, or conditioned upon the contents and composition of same, he may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding said structures. No such exemption or variance shall apply unless and until the occupant thereof, or if there be no occupant, then the owner thereof, files with the department, in such form as the director shall prescribe, a written consent to the inspection of the interior and contents of such structure to ascertain whether the provisions hereof and the regulations adopted hereunder are complied with at all times.

At the present time, the California Department of Forestry and Fire Protection along with the State Fire Marshall's office is finalizing implementation of changes to PRC-4291. Significant changes to this section of the Public Resources Code include:

- Increasing the minimum defensible space clearance requirement from 30' to 100'

- Providing for state law, or local ordinance, rule or regulation to specify requirements of clearances greater than 100'

- Allowing insurance companies to require home and commercial building owners to maintain fire breaks greater than 100'

The proposed amended text to PRC 4291 is shown below in italics.

> ***4291***. *A person that owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material, shall at all times do all of the following:*
> *(a) Maintain around and adjacent to the building or structure a*

firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side of the building or structure or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimens of trees, ornamental shrubbery, or similar plants that are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(b) Maintain around and adjacent to the building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation or combustible growth that is located within 100 feet from the building or structure or to the property line or at a greater distance if required by state law, or local ordinance, rule or regulation. This section does not prevent an insurance company that insures a building or structure from requiring the owner of the building or structure to maintain a firebreak of more than 100 feet around the building or structure. Grass and other vegetation located more than 30 feet from the building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(c) Remove that portion of any tree that extends within 10 feet of the outlet of a chimney or stovepipe.

(d) Maintain any tree adjacent to or overhanging a building free of dead or dying wood.

(e) Maintain the roof of a structure free of leaves, needles, or other dead vegetative growth.

(f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to a fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than one-half inch in size.

(g) Prior to constructing a new building or structure or rebuilding a building or structure damaged by a fire in such an area, the construction or rebuilding of which requires a building permit,

the owner shall obtain a certification from the local building official that the dwelling or structure, as proposed to be built, complies with all applicable state and local building standards, including those described in subdivision (b) of Section 51189 of the Government ***Code****, and shall provide a copy of the certification, upon request, to the insurer providing course of construction insurance coverage for the building or structure. Upon completion of the construction or rebuilding, the owner shall obtain from the local building official, a copy of the final inspection report that demonstrates that the dwelling or structure was constructed in compliance with all applicable state and local building standards, including those described in subdivision (b) of Section 51189 of the Government* ***Code****, and shall provide a copy of the report, upon request, to the property insurance carrier that insures the dwelling or structure.*

(h) Except as provided in Section 18930 of the Health and Safety ***Code****, the director may adopt regulations exempting structures with exteriors constructed entirely of nonflammable materials, or conditioned upon the contents and composition of same, he or she may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding those structures.*

No exemption or variance shall apply unless and until the occupant thereof, or if there is not an occupant, the owner thereof, files with the department, in a form as the director shall prescribe, a written consent to the inspection of the interior and contents of the structure to ascertain whether this section and the regulations adopted under this section are complied with at all times.

(i) The director may authorize the removal of vegetation that is not consistent with the standards of this section. The director may prescribe a procedure for the removal of that vegetation and make the expense a lien upon the building, structure, or grounds, in the same manner that is applicable to a legislative body under Section 51186 of the Government ***Code****.*

(j) As used in this section, "person" means a private individual, organization, partnership, limited liability company, or corporation.

***4291**.1. (a) Notwithstanding Section 4021, a violation of Section **4291** is an infraction punishable by a fine of not less than one hundred dollars ($100), nor more than five hundred dollars ($500). If a person is convicted of a second violation of Section **4291** within five years, that person shall be punished by a fine of not less than two hundred fifty dollars ($250), nor more than five hundred dollars ($500). If a person is convicted of a third violation of Section **4291** within five years, that person is guilty of a misdemeanor and shall be punished by a fine of not less than five hundred dollars ($500). If a person is convicted of a third violation of Section **4291** within five years, the department may perform or contract for the performance of work necessary to comply with Section **4291** and may bill the person convicted for the costs incurred, in which case the person convicted, upon payment of those costs, shall not be required to pay the fine. If a person convicted of a violation of Section **4291** is granted probation, the court shall impose as a term or condition of probation, in addition to any other term or condition of probation, that the person pay at least the minimum fine prescribed in this section.*

*(b) If a person convicted of a violation of Section **4291** produces in court verification prior to imposition of a fine by the court, that the condition resulting in the citation no longer exists, the court may reduce the fine imposed for the violation of Section **4291** to fifty dollars ($50).*

4292 - Power lines. Except as otherwise provided in Section 4296, any person that owns, controls, operates, or maintains any electrical transmission or distribution line upon any mountainous land, or forestcovered land, brush-covered land, or grass-covered land shall, during such times and in such areas as are determined to be necessary by the director or the agency which has primary responsibility for fire protection of such areas, maintain around and adjacent to any pole or tower which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole, a firebreak which consists of a clearing of not less than 10 feet in each direction from the outer circumference of such pole or

tower. This section does not, however, apply to any line which is used exclusively as telephone, telegraph, telephone or telegraph messenger call, fire or alarm line, or other line which is classed as a communication circuit by the Public Utilities Commission. The director or the agency which has primary fire protection responsibility for the protection of such areas may permit exceptions from the requirements of this section which are based upon the specific circumstances involved.

4293. Except as otherwise provided in Sections 4294 to 4296, inclusive, any person that owns, controls, operates, or maintains any electrical transmission or distribution line upon any mountainous land, or in forest-covered land, brush-covered land, or grass-covered land shall, during such times and in such areas as are determined to be necessary by the director or the agency which has primary responsibility for the fire protection of such areas, maintain a clearance of the respective distances which are specified in this section in all directions between all vegetation and all conductors which are carrying electric current:

(a) For any line which is operating at 2,400 or more volts, but less than 72,000 volts, four feet.

(b) For any line which is operating at 72,000 or more volts, but less than 110,000 volts, six feet.

(c) For any line which is operating at 110,000 or more volts, 10 feet.

In every case, such distance shall be sufficiently great to furnish the required clearance at any position of the wire, or conductor when the adjacent air temperature is 120 degrees Fahrenheit, or less. Dead trees, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which may contact the line from the side or may fall on the line shall be felled, cut, or trimmed so as to remove such hazard. The director or the agency which has primary responsibility for the fire protection of such areas may permit exceptions from the requirements of this section which are based upon the specific circumstances involved.

4294. A clearing to obtain line clearance is not required if self-supporting aerial cable is used. Forked trees, leaning trees, and any other growth which may fall across the line and break it shall, however, be removed.

4295. A person is not required by Section 4292 or 4293 to maintain any clearing on any land if such person does not have the legal right to maintain such clearing, nor do such sections require any person to enter upon or to damage property which is owned by any other person without the consent of the owner of the property.

4296. Sections 4292 and 4293 do not apply if the transmission or distribution line voltage is 750 volts or less.

4296.5 - Railroads. (a) Any person or corporation operating a railroad on forest, brush, or grass-covered land shall, if ordered by the director or the agency having primary responsibility for fire protection of the area, destroy, remove, or modify so as not to be flammable any vegetation or other flammable material defined by regulation of the director to be a fire hazard on the railroad right-of-way. The director shall adopt regulations establishing fire prevention hazard reduction standards for broad geographic areas by fuel type, slope, and potential for ignition from hot or flaming exhaust, carbon particles, hot metal, burning signal devices, burning tobacco, and other similar potential sources of ignition.

(b) The order to destroy, removes, ormodify vegetation or other flammable material shall specify the location of the hazard to be destroyed, removed, or modified within the right-of-way, the width of the hazard which shall not exceed the width of the right-of-way, and the time within which compliance with the order is required.

(c) The director or the agency having primary responsibility for fire protection of the area shall allow a reasonable period of time for compliance with an order to destroy, remove, or modify vegetation or other flammable material.

4297. Upon the showing of the director that the unrestricted use of any grass-covered land, grain covered land, brush-covered land, or forest-covered land is, in the judgment of the director, a menace to life or property due to conditions tending to cause or allow the rapid spread of fires which may occur on such lands or because of the inaccessible character of such lands, the Governor through the director, may, by a proclamation, which declares such condition and designates the area to which, and the period during which the proclamation shall apply, require that such area be closed to hunting and fishing and to entry by any person except a person that is within one of the following classes:

(a) Owners and lessees of land in the area.

(b) Bona fide residents in the area.

(c) Persons engaged in some bona fide business, trade, occupation, or calling in the area and persons employed by them in connection with such business, trade, occupation, or calling.

(d) Authorized agents or employees of a public utility entering such area for the purpose of operating or maintaining public utility works or equipment within the area.

(e) Members of any organized firefighting force.

(f) Any federal, state or local officer in the performance of his duties.

(g) Persons traveling on public roads or highways through the area.

4298 - Fire Closures. The proclamation by the Governor shall be released to the wire news services in the state, and shall be published at least once in a newspaper of general circulation in each county which contains any lands covered by the proclamation. Notice of closure shall also be posted on trails or roads entering the area covered by the proclamation. The closure shall be effective upon issuance of the proclamation by the Governor. Each notice shall clearly set forth the area to be subject to closure and the effective date of such closure. The closure shall remain in full force and effect until the Governor shall by order terminate it. The notice of such termination shall follow the same procedure by which such closure was affected. The order of termination shall be effected upon issuance.

4299. Any person who violates Section 4297 or 4298 is guilty of a misdemeanor and shall be punished by a fine of not less than fifty dollars ($50) nor more than one thousand dollars ($1,000) or by imprisonment in the county jail for not less than 10 days nor more than 90 days or both such fine and imprisonment. All state and county law enforcement officers shall enforce orders of closure.

4475 – Prescribed Fire. The director, with the approval of the Director of General Services, may enter into a contract for prescribed burning with (1) the owner or any other person who has legal control of any property or (2) any public agency with regulatory or natural resource management authority over any property which is included within any wildland for any of the following purposes, or any combination thereof:

(a) Prevention of high-intensity wildland fires through reduction of the volume and continuity of wildland fuels or removal of unwanted, unused, or deteriorated structures that are fire hazards by burning such fuels or structures.

(b) Watershed management.

(c) Range improvement.

(d) Vegetation management.

(e) Forest improvement.

(f) Wildlife habitat improvement.

No contract may be entered into pursuant to this section unless the director determines that the public benefits estimated to be derived from the prescribed burning pursuant to the contract will be equal to or greater than the foreseeable damage that could result from the prescribed burning.

4475.1. The director, with the approval of the Director of General Services, may enter into a master agreement with federal land management agencies to conduct joint prescribed burning operations on wildlands and federal lands where these operations serve the public interest and are beneficial to the state. This master agreement shall be known as the Interagency Agreement for Cooperative Use of Prescribed Fire and shall establish guidelines for the cooperative management of joint prescribed burning operations. The master agreement shall require the completion of a project agreement for each individual prescribed burn which shall include the following:

(a) A list of all participants.

(b) A joint prescribed burn plan.

(c) A display of the project costs to be assumed by each participant.

(d) A summary of the benefits to be received by each participant.

(e) An apportionment of suppression cost to each participant in the event a wildfire escapes from the project.

Project costs to be assumed by each agency or cooperator shall be based on the benefits received by each participant. The apportionment of suppression cost shall be based on the following:

(1) The benefits received by each participant.

(2) The amount at risk of each participant.

(3) The cost to produce the desired benefits received by each participant.

(4) The total acreage included by each participant.

4475.5. (A) The state may assume a proportionate share of the costs of site preparation and prescribed burning conducted pursuant to this article on wildlands other than wildlands under the jurisdiction of the federal government. The state's share of those costs shall bear the same ratio to the total costs of the operation as the public benefits bear to all public and private benefits to be derived from the prescribed burning operation, as estimated and determined by the director. The state's share of the costs may exceed 90 percent of the total costs of the operation only if the director determines that no direct private economic benefits will accrue or will be utilized by a person that owns or controls any property under contract pursuant to Section 4475.

(b) The board shall adopt regulations establishing standards to be used by the director in determining the state's share of such costs and in determining whether, pursuant to Section 4475, the public benefits of a prescribed burning operation will equal or exceed the foreseeable damage there from

(c) The determination of public and private benefits pursuant to this section shall reflect any substantial benefit to be derived from accomplishing any of the purposes specified in Section 4475 and the prevention of degradation of air quality.

(d) All or part of such costs to be borne by the person contracting with the department may be met by the value of materials, services, or equipment furnished by that person directly, or furnished by that person pursuant to an agreement with a private consultant or contractor, or furnished by a combination of both means, that are determined by the department to be suitable for the preparation for, and the conduct of, the prescribed burning operation.

4476. Any contract which is entered into pursuant to this article shall do all of the following:

(a) Vest in the director the final authority to determine the time during which wild land fuel and structural fire hazards may be burned to minimize the risk of escape of a fire set in a prescribed burning operation and to facilitate maintenance of air quality.

(b) Clearly state the obligation of each party to the contract to provide, maintain, and repair equipment and indicate the number of each type of equipment to be provided and the duration of its availability.

(c) Designate an officer of the department as the fire boss with final authority to approve and amend the plan and formula applicable to the prescribed burning operation, to determine that the site has been prepared and the crew and equipment are ready to commence the operation, and to supervise the work assignments of departmental employees and all personnel furnished by the person contracting with the department until the prescribed burning is completed and all fire is declared to be out.

(d) Specify the duties of, and the precautions taken by, the person contracting with the department and any personnel furnished by that person.

(e) Provide that any personnel furnished by a person contracting with the department to assist in any aspect of site preparation or prescribed burning shall be an agent of that person for all purposes of worker compensation. However, any volunteer recruited or used by the department to suppress a wild land fire originating or spreading from a prescribed burning operation is an employee of the department for all purposes of worker compensation.

(f) Specify the value assigned to the materials, services, or equipment furnished by the person contracting with the department in lieu of payment of all or part of that person's share of the actual costs.

(g) Specify the total costs of the prescribed burning operation and the pro rata share thereof for each party to the contract. Any person contracting with the department shall, prior to the commencement of any work by the department, place on deposit in an interest-bearing escrow or trust account with a California-licensed financial institution an amount equal to that person's pro rata share of the costs, less the value of materials, services, or equipment specified pursuant to subdivision (e). Interest earned on the account shall accrue to the depositor and may be separately disbursed from the principal amount upon request of the depositor. Disbursement of funds on deposit in the trust or escrow account shall be authorized by the depositor within 15 days after completion, to the depositor's satisfaction, of all work specified in the contract to be done by the department.

(h) Provide that the department may, in its discretion, purchase a third party liability policy of insurance which provides coverage against loss resulting from a wild land fire sustained by any person or public agency, including the federal government. The amount of the policy, if purchased, shall be determined by the director. The policy shall name the person contracting with the department and the department as joint policyholders. The premium shall be included as a cost prorated as provided in subdivision (g). A 60 certificate of insurance, if purchased, covering each policy shall be attached to or become a part of the contract. If the department elects not to purchase insurance, the department shall agree to indemnify and hold harmless the person or public agency contracting with the department with respect to liability arising out of performance of the contract.

4477. If the amount of moneys due the state is not paid as provided in subdivision (e) of Section 4476, such amount shall become a lien upon the property.

(a) Notice of the lien shall be recorded by the department in the office of the county recorder of the county in which the property is situated within one year.

(b) An action to foreclose the lien shall be commenced by the Attorney General in the name of the people of the State of California within six months after the lien is filed and recorded.

(c)When the property is sold, enough of the proceeds to satisfy the lien and the costs of the foreclosure shall be paid to the state and the surplus, if any, shall be paid to the owner of the property.

4478. All moneys received by the department pursuant to this article shall be credited to the department's current support appropriation as a reimbursement.

4479. Liability for any costs incurred by the department in suppressing any wildland fire originating or spreading from a prescribed burning operation conducted pursuant to a contract entered into pursuant to this article shall be governed by subdivision (b)of Section 13009 of the Health and Safety Code.

4480. In any area of the state where there are substantially more requests for prescribed burning operations pursuant to this article than can be conducted directly by the department in a single fiscal year, the director may, with the approval of the Director of Finance, enter into an agreement with private consultants or contractors or with other public agencies for furnishing all or a part of the state's share of the responsibility for planning the operation, preparing the site, and conducting the prescribed

burning. The private consultant or contractor or other public agency, and the work assignments of its employees, shall be supervised by the fire boss, as provided in subdivision (c) of Section 4476. No agreement may be entered into pursuant to this section unless the director determines that it will enable the prescribed burning operation to be conducted at a cost equal to, or less than, the cost that would otherwise be incurred by the state.

Appendix C
California Government Code 51182

51182. (a) Any person who owns, leases, controls, operates, or maintains any occupied dwelling or occupied structure in, upon, or adjoining any mountainous area, forest-covered land, brush-covered land, grass-covered land, or any land that is covered with flammable material, which area or land is within a very high fire hazard severity zone designated by the local agency pursuant to Section 51179, shall at all times do all of the following:

(1) Maintain around and adjacent to the occupied dwelling or occupied structure a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This paragraph does not apply to single specimens of trees, ornamental shrubbery, or similar plants that are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any dwelling or structure.

(2) Maintain around and adjacent to the occupied dwelling or occupied structure additional fire protection or firebreaks made by removing all brush, flammable vegetation, or combustible growth that is located within 100 feet from the occupied dwelling or occupied structure or to the property line, or at a greater distance if required by state law, or local ordinance, rule, or regulation. This section does not prevent an insurance company that insures an occupied dwelling or occupied structure from requiring the owner of the dwelling or structure to maintain a firebreak of more than 100 feet around the dwelling or structure if a hazardous condition warrants such a firebreak of a greater distance. Grass and other vegetation located more than 30 feet from the dwelling or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(3) Remove that portion of any tree that extends within 10 feet of the outlet of any chimney or stovepipe.

(4) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

(5) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

(6) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed and installed in accordance with the California Building Standards Code**.**

(7) Prior to constructing a new dwelling or structure that will be occupied or rebuilding an occupied dwelling or occupied structure damaged by a fire in such zone, the construction or rebuilding of which requires a building permit, the owner shall obtain a certification from the local building official that the dwelling or structure, as proposed to be built, complies with all applicable state and local building standards, including those described in subdivision (b) of Section 51189, and shall provide a copy of the certification, upon request, to the insurer providing course of construction insurance coverage for the building or structure. Upon completion of the construction or rebuilding, the owner shall obtain from the local building official, a copy of the final inspection report that demonstrates that the dwelling or structure was constructed in compliance with all applicable state and local building standards, including those described in subdivision (b) of Section 51189, and shall provide a copy of the report, upon request, to the property insurance carrier that insures the dwelling or structure. (b) A person is not required under this section to maintain any clearing on any land if that person does not have the legal right to maintain the clearing, nor is any person required to enter upon or to damage property that is owned by any other person without the consent of the owner of the property.

Appendix D
Title 14 California Code of Regulation (14 CCR)

Section 1270 - SRA Fire Safe Regulations - Title

These regulations shall be known as the "SRA Fire Safe Regulations," and shall constitute the basic wildland fire protection standards of the California Board of Forestry.

Section 1270.01 - Purpose

These regulations have been prepared and adopted for the purpose of establishing minimum wildfire protection standards in conjunction with building, construction and developments in SRA. A local jurisdiction may petition the Board for certification pursuant to Section 1270.03. Where Board certification has not been granted, these regulations shall become effective September 1, 1991. The future design and construction of structures, subdivisions and developments in state responsibility area (SRA) shall provide for basic emergency access and perimeter wildfire protection measures as specified in the following articles. These measures shall provide for emergency access; signing and building numbering; private water supply reserves for emergency fire use; and vegetation modification. The fire protection standards which follow shall specify the minimums for such measures.

Section 1270.02 - Scope

These regulations do not apply to existing structures, roads, streets and private lanes or facilities. These regulations shall apply as appropriate to all construction within SRA approved after January 1, 1991. Affected activities include but are not limited to:

(a) permitting or approval of new parcels, excluding lot line adjustments as specified in Government Code (GC) Section 66412(d),

(b) application for a building permit for new construction, not relating to an existing structure,

(c) application for a use permit,

(d) the siting of manufactured homes (manufactured homes are as defined by the National Fire Protection Association, National Fire Code, Section 501A, Standard for Fire Safety Criteria for Manufactured Home Installations, Sites and Communities, Chapter 1, Section 1-2, Definitions, page 4, 1987 edition and Health and Safety Code Sections 18007, 18008, and 19971).

(e) road construction, including construction of a road that does not currently exist, or extension of an existing road.

Section 1270.03 - Local Ordinances

Nothing contained in these regulations shall be considered as abrogating the provisions of any ordinance, rule or regulations of any state or local jurisdiction providing such ordinance, rule, regulation or general plan element is equal to or more stringent than these minimum standards. The Board may certify local ordinances as equaling or exceeding these regulations when they provide the same practical effect.

Section 1270.04 - Provisions for Application of These Regulations

This subchapter shall be applied as follows:

(a) Local jurisdictions shall provide the Director with notice of applications for building permits, tentative parcel maps, tentative maps, and use permits for construction or development within SRA.

(b) The Director shall review and make fire protection recommendations on applicable construction or development permits or maps provided by the local jurisdiction.

(c) The local jurisdiction shall ensure that the applicable sections of this subchapter become a condition of approval of any applicable construction or development permit or map.

Section 1270.05 - Inspection Authority

(a) Inspection shall be made pursuant to Section 1270.06 by:

(1) The Director, or

(2) local jurisdictions that have assumed state fire protection responsibility on SRA lands, or

(3) local jurisdictions where these regulations have been implemented through that jurisdiction's building permit or subdivision approval process.

(b) Reports of violations shall be provided to the CDF Ranger Unit headquarters that administers SRA fire protection in that county.

Section 1270.06 - Inspections

The inspection authority may inspect for compliance with these regulations. When inspections are conducted, they should occur prior to: the issuance of the use permit; certificate of occupancy; the recordation of the parcel map or final map; the filing of a notice of completion; or the final inspection of any project or building permit.

Section 1270.07 - Exceptions to Standards

Upon request by the applicant, exceptions to standards within this subchapter and mitigated practices may be allowed by the inspection authority, where the exception provides the same overall practical effect as these regulations towards providing defensible space.

Section 1270.08 - Requests for Exceptions

Requests for an exception shall be made in writing to the inspection authority by the applicant or the applicant's authorized representative. The request shall state the specific section(s) for which an exception is requested, material facts supporting the contention of the applicant, the details of the exception or mitigating measure proposed, and a map showing the proposed location and siting of the exception or mitigation measure.

Section 1270.09 - Appeals

Where an exception is not granted by the inspection authority, the applicant may appeal such denial to the local jurisdiction. The local jurisdiction may establish or utilize an appeal process consistent with existing local building or planning department appeal processes. Before the local jurisdiction makes a determination on an appeal, the inspection authority shall be consulted and shall provide to that local jurisdiction documentation outlining the effects of the requested exception on wildland fire protection. If an appeal is granted, the local jurisdiction shall make findings that the decision meets the intent of providing defensible space consistent with these regulations. Such findings shall include a statement of reasons for the decision. A written copy of these findings shall be provided to the CDF Ranger Unit headquarters that administers SRA fire protection in that county.

Section 1271.00 – Definitions

Accessory building: Any building used as an accessory to residential, commercial, recreational, industrial, or educational purposes as defined in the California Building Code.

Agriculture: Land used for agricultural purposes as defined in a local jurisdiction's zoning ordinances.

Building: Any structure used or intended for supporting or sheltering any use or occupancy that is defined in the California Building Code. For the purposes of this subchapter, building includes mobile homes and manufactured homes, churches, and day care facilities.

CDF: California Department of Forestry and Fire Protection.

Dead-end road: A road that has only one point of vehicular ingress/egress, including cul-de-sacs and looped roads.

Defensible space: The area within the perimeter of a parcel, development, neighborhood or community where basic wildland fire protection practices and measures are implemented, providing the key point of defense from an approaching wildfire or defense against encroaching wildfires or escaping structure fires. The perimeter as used in this regulation is the area encompassing the parcel or parcels proposed for construction and/or development, excluding the physical structure itself. The area is characterized by the establishment and maintenance of emergency vehicle access, emergency water reserves, street names and building identification, and fuel modification measures.

Development: As defined in Section 66418.1 of the California Government Code.

Director: Director of the Department of Forestry and Fire Protection or his/her designee.

Driveway: A vehicular access that serves no more than two buildings, with no more than 3 dwelling units on a single parcel, and any number of accessory buildings.

Dwelling unit: Any building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooking and/or sanitation for not more than one family.

Exception: An alternative to the specified standard requested by the applicant that may be necessary due to health, safety, environmental conditions, physical site limitations or other limiting conditions such as recorded historical sites, that provides mitigation of the problem.

Fire valve: see hydrant.

Fuel modification area: An area where the volume of flammable vegetation has been reduced, providing reduced fire intensity and duration.

Greenbelt: A facility or land-use, designed for a use other than fire protection, which will slow or resist the spread of a wildfire. Includes parking lots, irrigated or landscaped areas, golf courses, parks, playgrounds, maintained vineyards, orchards or annual crops that do not cure in the field.

Hammerhead/T: A roadway that provides a "T" shaped, three-point turnaround space for emergency equipment, being no narrower than the road that serves it.

Hydrant: A valved connection on a water supply/storage system, having at least one 2 1/2 inch outlet, with male American National Fire Hose Screw Threads (NH) used to supply fire apparatus and hoses with water.

Local Jurisdiction: Any county, city/county agency or department, or any locally authorized district that issues or approves building permits, use permits, tentative maps or tentative parcel maps, or has authority to regulate development and construction activity.

Occupancy: The purpose for which a building, or part thereof, is used or intended to be used.

One-way road: A minimum of one traffic lane width designed for traffic flow in one direction only.

Roads, streets, private lanes: Vehicular access to more than one parcel; access to any industrial or commercial occupancy; or vehicular access to a single parcel with more than two buildings or four or more dwelling units.

Roadway: Any surface designed, improved, or ordinarily used for vehicle travel.

Roadway structures: Bridges, culverts, and other appurtenant structures that supplement the roadway bed or shoulders.

Same Practical Effect: As used in this subchapter, means an exception or alternative with the capability of applying accepted wildland fire suppression strategies and tactics, and provisions for fire fighter safety, including:

(a) access for emergency wildland fire equipment,

(b) safe civilian evacuation,

(c) signing that avoids delays in emergency equipment response,

(d) available and accessible water to effectively attack wildfire or defend a structure from wildfire, and

(e) fuel modification sufficient for civilian and fire fighter safety.

Shoulder: Roadbed or surface adjacent to the traffic lane.

State Board of Forestry (SBOF): A nine-member board, appointed by the Governor, which is responsible for developing the general forest policy of the state, for determining
the guidance policies of the Department of Forestry and Fire Protection, and for representing the state's interest in federal land in California.

State Responsibility Area (SRA): As defined in Public Resources Code Sections 4126-4127; and the California Code of Regulations, title 14, Division 1.5, Chapter 7, Article 1, Sections 1220-1220.5.

Structure: That which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

Subdivision: As defined in Section 66424 of the Government Code.

Traffic lane: The portion of a roadway that provides a single line of vehicle travel.

Turnaround: A roadway, unobstructed by parking, which allows for a safe opposite change of direction for emergency equipment. Design of such area may be a hammerhead/T or terminus bulb.

Turnouts: A widening in a roadway to allow vehicles to pass.

Vertical clearance: The minimum specified height of a bridge or overhead projection above the roadway.

Wildfire: As defined in Public Resources Code Sections 4103 and 4104.

Section 1272.00 - Maintenance of Defensible Space Measures

To ensure continued maintenance of properties in conformance with these standards and measures and to assure continued availability, access, and utilization of the defensible space provided for in these standards during a wildfire, provisions for annual maintenance shall be included in the development plans and/or shall be provided as a condition of the permit, parcel or map approval.

Section 1273.00 - Emergency Access - Intent

Road and street networks, whether public or private, unless exempted under Section 1270.02(e), shall provide for safe access for emergency wildland fire equipment and civilian evacuation concurrently, and shall provide unobstructed traffic circulation during a wildfire emergency consistent with Sections 1273.00 through 1273.11.

Section 1273.01 - Road Width

All roads shall be constructed to provide a minimum of two nine-foot traffic lanes providing two-way traffic flow, unless other standards are provided in this article, or additional requirements are mandated by local jurisdictions or local subdivision requirements.

Section 1273.02 - Roadway Surface

The surface shall provide unobstructed access to conventional drive vehicles, including sedans and fire engines. Surfaces should be established in conformance with local ordinances, and be capable of supporting a 40,000 pound load.

Section 1273.03 - Roadway Grades

The grade for all roads, streets, private lanes and driveways shall not exceed 16 percent.

Section 1273.04 - Roadway Radius

(a) No roadway shall have a horizontal inside radius of curvature of less than 50 feet and additional surface width of 4 feet shall be added to curves of 50-100 feet radius; 2 feet to those from 100-200 feet.

(b) The length of vertical curves in roadways, exclusive of gutters, ditches, and drainage structures designed to hold or divert water, shall be not less than 100 feet.

Section 1273.05 - Roadway Turnarounds

Turnarounds are required on driveways and dead-end roads as specified in this article. The minimum turning radius for a turnaround shall be 40 feet from the center line of the road. If a hammerhead/T is used, the top of the "T" shall be a minimum of 60 feet in length.

Section 1273.06 - Roadway Turnouts

Turnouts shall be a minimum of 10 feet wide and 30 feet long with a minimum 25 foot taper on each end.

Section 1273.07 - Roadway Structures

(a) All driveway, road, street, and private lane roadway structures shall be constructed to carry at least the maximum load and provide the minimum vertical clearance as required by Vehicle Code Sections 35550, 35750, and 35250.

(b) Appropriate signing, including but not limited to weight or vertical clearance limitations, one-way road or single land conditions, shall reflect the capability of each bridge.

(c) A bridge with only one traffic lane may be authorized by the local jurisdiction; however, it shall provide for unobstructed visibility from one end to the other and turnouts at both ends.

Section 1273.08 - One-way Roads

All one-way roads shall be constructed to provide a minimum of one 10-foot traffic lane. The local jurisdiction may approve one-way roads. All one-way roads shall connect to a two-lane roadway at both ends, and shall provide access to an area currently zoned for no more than 10 dwelling units. In no case shall it exceed 2640 feet in length. A turnout shall be placed and constructed at approximately the midpoint of each one-way road.

Section 1273.09 - Dead-End Roads

(a) The maximum length of a dead-end road, including all dead-end roads accessed from the dead-end road, shall not exceed the following cumulative lengths, regardless of the number of parcels served:

- parcels zoned for less than one acre - 800 feet
- parcels zoned for 1 acre to 4.99 acres - 1320 feet
- parcels zoned for 5 acres to 19.99 acres - 2640 feet
- parcels zoned for 20 acres or larger - 5280 feet

All lengths shall be measured from the edge of the roadway surface at the intersection that begins the road to the end of the road surface at its farthest point. Where a dead-end road crosses areas of differing zoned parcel sizes, requiring different length limits, the shortest allowable length shall apply.

(b) Where parcels are zoned 5 acres or larger, turnarounds shall be provided at a maximum of 1320 foot intervals.

(c) Each dead-end road shall have a turnaround constructed at its terminus.

Section 1273.10 -Driveways

All driveways shall provide a minimum 10 foot traffic lane and unobstructed vertical clearance of 15 feet along its entire length.

(a) Driveways exceeding 150 feet in length, but less than 800 feet in length, shall provide a turnout near the midpoint of the driveway. Where the driveway exceeds 800 feet, turnouts shall be provided no more than 400 feet apart.

(b) A turnaround shall be provided at all buildings sites on driveways over 300 feet in length, and shall be within 50 feet of the building.

Section 1273.11 - Gate Entrances

(a) Gate entrances shall be at least two feet wider than the width of the traffic lane(s) serving that gate.

(b) All gates providing access from a road to a driveway shall be located at least 30 feet from the roadway and shall open to allow a vehicle to stop without obstructing traffic on that road.

(c) Where a one-way road with a single traffic lane provides access to a gated entrance, a 40 foot turning radius shall be used.

Section 1274.00 - Signing and Building Numbering – Intent

To facilitate locating a fire and to avoid delays in response, all newly constructed or approved roads, street, and buildings shall be designated by names or numbers, posted on signs clearly visible and legible from the roadway. This section shall not restrict the size of letters or numbers appearing on street signs for other purposes.

Section 1274.01 - Size of Letters, Numbers and Symbols for Street and Road Signs

Size of letters, numbers, and symbols for street and road signs shall be a minimum 3 inch letter height, 3/8 inch stroke, reflectorized, contrasting with the background color of the sign.

Section 1274.02 - Visibility and Legibility of Street and Road Signs

Street and road signs shall be visible and legible from both directions of vehicle travel for a distance of at least 100 feet.

Section 1274.03 - Height of Street and Road Signs

Height of street and road signs shall be uniform county wide, and meet the visibility and legibility standards of this article.

Section 1274.04 - Names and Numbers on Street and Road Signs

Newly constructed or approved public and private roads and streets must be identified by name or number through a consistent county-wide system that provides for sequenced or patterned numbering and/or non-duplicating naming within each county. All signs shall be mounted and oriented in a uniform manner. This section does not require any entity to rename or renumber existing roads or streets, nor shall a roadway providing access only to a single commercial or industrial occupancy require naming or numbering.

Section 1274.05 - Intersecting Roads, Streets and Private Lanes

Signs required by this article identifying intersecting roads, streets and private lanes shall be placed at the intersection of those roads, streets, and/or private lanes.

Section 1274.06 - Signs Identifying Traffic Access Limitations

A sign identifying traffic access or flow limitations, including but not limited to weight or vertical clearance limitations, dead-end road, one-way road or single lane conditions, shall be placed: (a) at the intersection preceding the traffic access limitation, and (b) no more than 100 feet before such traffic access limitation.

Section 1274.07 - Installation of Road, Street and Private Lane Signs

Road, street and private lane signs required by this article shall be installed prior to final acceptance by the local jurisdiction of road improvements.

Section 1274.08 - Addresses for Buildings

All buildings shall be issued an address by the local jurisdiction which conforms to that jurisdiction's overall address system. Accessory buildings will not be required to have a separate address; however, each dwelling unit within a building shall be separately identified.

Section 1274.09 - Size of Letters, Numbers and Symbols for Addresses

Size of letters, numbers and symbols for addresses shall be a minimum 3 inch letter height, 3/8 inch stroke, reflectorized, contrasting with the background color of the sign.

Section 1274.10 - Installation, Location and Visibility of Addresses

(a) All buildings shall have a permanently posted address, which shall be placed at each driveway entrance and visible from both directions of travel along the road. In all cases, the address shall be posted at the beginning of construction and shall be maintained thereafter, and the address shall be visible and legible for the road on which the address is located.

(b) Address signs along on-way roads shall be visible from both the intended direction of travel and the opposite direction.

(c) Where multiple addresses are required at a single driveway, they shall be mounted on a single post.

(d) Where a roadway provides access solely to a single commercial or industrial business, the address sign shall be placed at the nearest road intersection providing access to that site.

Section 1275.00 - Emergency Water Standards - Intent

Emergency water for wildfire protection shall be available and accessible in quantities and locations specified in the statute and these regulations, in order to attack a wildfire or defend property from a wildfire. Such emergency water may be provided in a fire agency mobile water tender, or naturally occurring or man-made containment structure, as long as the specified quantity is immediately available.

Section 1275.01 - Application

The provisions of this article shall apply when new parcels are approved by a local jurisdiction. The emergency water system shall be available on-site prior to the completion of road construction, where a community water system is approved, or prior to the completion of building construction, where an individual system is approved.

Section 1275.10 - General Standards

Water systems that meet or exceed the standards specified in Public Utilities Commission of California (PUC) revised General Order # 103, Adopted June 12, 1956 (Corrected September 7, 1983, Decision 83-09-001), Section VIII Fire Protection Standards and other applicable sections relating to fire protection water delivery systems, static water systems equaling or exceeding the National Fire Protection Association (NFPA) Standard 123.1, "Standard on Water Supplies for Suburban and Rural

Fire Fighting," 1989 Edition, or mobile water systems that meet the Insurance Services Office (ISO) Rural Class 8, 2nd

Edition 3-80, standard shall be accepted as meeting the requirements of this article. These documents are available at CDF Ranger Unit Headquarters. Nothing in this article prohibits the combined storage of emergency wildfire and structural firefighting water supplies unless so prohibited by local ordinance or specified by the local fire agency. Where freeze protection is required by local jurisdictions, such protection measures shall be provided.

Section 1275.15 - Hydrant/Fire Valve

(a) The hydrant or fire valve shall be 18 inches above grade, 8 feet from flammable vegetation, no closer than 4 feet nor farther than 12 feet from a roadway, and in a location where fire apparatus using it will not block the roadway. The hydrant serving any building shall:

(1) be not less than 50 feet nor more than 1/2 mile by road from the building it is to serve, and

(2) be located at a turnout or turnaround, along the driveway to that building or along the road that intersects with that driveway.

(b) The hydrant head shall be brass with 2 1/2 inch National Hose male thread with cap for pressure and gravity flow systems and 4 1/2 inch draft systems. Such hydrants shall be wet or dry barrel as required by the delivery system. They shall have suitable crash protection as required by the local jurisdiction.

Section 1275.20 - Signing of Water Sources

Each hydrant/fire valve or access to water shall be identified as follows:

(a) if located along a driveway, a reflectorized blue marker, with a minimum dimension of 3 inches shall be located on the driveway address sign and mounted on a fire retardant post, or

(b) if located along a street or road,

(1) a reflectorized blue marker, with a minimum dimension of 3 inches, shall be mounted on a fire retardant post. The sign post shall be within 3 feet of said hydrant/fire valve, with the sign no less than 3 feet nor greater than 5 feet above ground, in a horizontal position and visible from the driveway, or

(2) as specified in the State Fire Marshal's Guidelines for Fire Hydrant Markings Along State Highways and Freeways, May 1988.

Section 1276.00 - Fuel Modification Standards – Intent

To reduce the intensity of a wildfire by reducing the volume and density of flammable vegetation, the strategic siting of fuel modification and greenbelts shall provide

(a) increased safety for emergency fire equipment and evacuating civilians; and
(b) a point of attack or defense from a wildfire.

Section 1276.01 - Setback for Structure Defensible Space

(a) All parcels 1 acre and larger shall provide a minimum 30 foot setback for buildings and accessory buildings from all property lines and/or the center of a road.
(b) For parcels less than 1 acre, local jurisdictions shall provide for the same practical effect.

Section 1276.02 - Disposal of Flammable Vegetation and Fuels

Disposal, including chipping, burying, burning or removal to a landfill site approved by the local jurisdiction, of flammable vegetation and fuels caused by site development and construction, road and driveway construction, and fuel modification shall be completed prior to completion of road construction or final inspection of a building permit.

Section 1276.03 - Greenbelts

Subdivisions and other developments, which propose greenbelts as a part of the development plan, shall locate said greenbelts strategically, as a separation between wildland fuels and structures. The locations shall be approved by the inspection authority.

Section 1280 - Fire Hazard Severity Zones

The fire hazard severity zones and the rating reflecting the degree of severity of fire hazard that is expected to prevail in those zones, shall be designated by the Director and delineated on a series of maps on file in the Sacramento Office of the Department of Forestry, 1416 Ninth Street, Room 1653-10. The maps are entitled "Maps of Fire Hazard Severity Zones in the State Responsibility Area of California," dated August 1984.

Section 1295 - Order Format

An order to destroy, remove or modify vegetation or other flammable material, pursuant to PRC 4296.5 shall be made substantially in the following format: (Name, Address and Telephone Number of Director's Agent or Agency having Primary responsibility for Fire Protection).

Appendix E
Assets at Risk

Assets at risk refer to real and societal values that have the potential for damaged by wildfire. CDF uses seventeen categories of assets and ranks each as to its risk from wildfire. The table below provides a description of the assets evaluated.

Assets at Risk	Public Issue Category	Location and ranking methodology
Hydroelectric power	Public welfare	1) Watersheds that feed run of the river power plants, ranked based on plant capacity; 2) cells adjacent to reservoir based plants (Low rank); and 3) cells containing canals and flumes (High rank)
Fire-flood watersheds	Public safety Public welfare	Watersheds with a history of problems or proper conditions for future problems, ranked based on affected downstream population
Soil erosion	Environment	Watersheds ranked based on erosion potential
Water storage	Public welfare	Watershed area up to 20 miles upstream from water storage facility, ranked based on water value and dead storage capacity of facility
Water supply	Public health	1) Watershed area up to 20 miles upstream from water supply facility (High rank); 2) grid cells containing domestic water diversions, ranked based on number of connections; and 3) cells containing ditches that contribute to the water supply system (High rank)
Scenic	Public welfare	Four mile view shed around Scenic Highways and 1/4 mile view shed around Wild and Scenic Rivers, ranked based on potential impacts to vegetation types (tree versus non-tree types)
Timber	Public welfare	Timberlands ranked based on value/susceptibility to damage
Range	Public welfare	Rangeland ranked based on potential replacement feed cost by region/ owner/vegetation type
Air quality	Public health Environment Public welfare	Potential damages to health, materials, vegetation, and visibility; ranked based on vegetation type and air basin
Historic buildings	Public welfare	Historic buildings ranked based on fire susceptibility
Recreation	Public welfare	Unique recreation areas or areas with potential damage to facilities, ranked based on fire susceptibility
Structures	Public safety Public welfare	Ranked based on housing density and fire susceptibility
Non-game wildlife	Environment Public welfare	Critical habitats and species locations based on input from California Department of Fish and Game and other stakeholders

Game wildlife	Public welfare Environment	Critical habitats and species locations based on input from California Department of Fish and Game and other stakeholders
Infrastructure	Public safety Public welfare	Infrastructure for delivery of emergency and other critical services (e.g. repeater sites, transmission lines)
Ecosystem Health	Environment	Ranking based on vegetation type/fuel characteristics

Appendix F
Fire Safety and Fire Preparedness

The principles of fire safety and fire preparedness are based upon and are a response to the characteristics of wildfire as described above. Through an understating of how environmental factors such as slope, weather, and fuels interact in order to affect fire behavior, property owners can work with the natural environment, rather than against it, in order to adequately protect property located within wildland areas.

Defensible Space

Plants growing adjacent to and in the proximity of structures have considerable influence on whether it will survive a wildfire and as a result, can greatly impact property insurance rates. Defensible space is the area between a structure and an oncoming wildfire where vegetation has been cleared or modified in order to reduce fire intensity. If vegetation is properly maintained, a rapidly advancing wildfire can be slowed thus providing an opportunity for occupants to safely escape and fire fighters to safely defend property. Defensible space is not a one time project. It requires continual maintenance in order to retain its usefulness. Consequently, it is important when planning and executing the creation of defensible space to factor in continued maintenance when developing the cost of such fire safety projects. It is also important to conduct maintenance before the fire season starts. The Table below shows Defensible Space Distances necessary to protect structures in the event of a wildfire.

Defensible Space Distance from Homes and Other Structures

Percent Slope	Uphill From Structure	At Sides of Structure	Downhill From Structure
Level to 20%	100 feet	100 Feet	100 Feet
21-41%	150 feet	150 feet	200 feet
41-60%	200 feet	200 feet	400 feet

Creating Defensible Space

Public Resource Code 4291 requires that fuel be removed or reduce and maintained for a minimum of 100 feet around structures. To accomplish this, the following steps describe the efforts needed to create effective defensible space:

- Remove all tree limbs within a minimum of 10 feet from chimneys, decks and open overhangs

- Remove all dead and diseased fuels including dead trees and shrubs. Remove dead branches, pine needles, oak leaves and twigs lying on the ground and on live plants.

- Break up continuous horizontal layers of live vegetation. Uninterrupted uniform layers of fuels spread fire more quickly than plants growing in patches or as widely spaced individuals.

- Remove "ladder fuels" which is vegetation that allows fire to move from lower fuels like grasses, into higher fuels like shrubs and trees. Mow grasses, remove lower tree limbs, tall brush and small trees. A vertical separation between fuel layers of at least three times the height of the lower fuel is recommended.

- Keep surface fuels (grasses shrubs and flowers) shorter than 18 inches.

- Care should be taken when clearing vegetation on slopes. Disturbed soil can be easily eroded by heavy winter rains. It may be necessary to plant cleared areas with fire retardant vegetation.

- Dispose of vegetation removed while creating your defensible space. Large piles of vegetative debris present a considerable fire hazard. Material may be disposed of in the following manner:

    - Save suitable wood for firewood.

    - Utilize a chipper to chip woody slash material and use the chips as compost or mulch for landscaping.

    - If you have curbside pickup, dispose of yard waste in bines.

    - Burn piles during permitted burn seasons; contact your fire district, CDF or Air Quality Management District for instructions and permits.

- Maintain your defensible space. Depending on the type, vegetation can grow back quickly and must be regularly trimmed or removed.

Ways to Reduce Fuel

- Removal with hand tools is the most common way to reduce fuel. While labor intensive, it has a low impact on soil and the ecosystem. Hand remove works well on smaller areas for removing limbs from trees and for the removal of small tress and shrubs

- Goats can take care of brush and grass given enough time. They require fencing, water and oversight. Large material like tree limbs will still have to be cut mechanically.

- Heavy equipment such as bulldozers or a masticator is the most economical way to remove brush on large parcels. Precautions need to be taken when using a bulldozer to guard against erosion that can occur by exposing bare soils. A masticator is a large piece of equipment that shreds the brush and other vegetation with a spinning blade, leaving the roots systems intact and causing less of an erosion problem

- Preserved burning is the controlled application of fire to wildlands. It is conducted only under safety standards that define ridged windows of opportunity where weather conditions are appropriate and fire fighting resources are readily available. Only experienced personnel should attempt to conduct a prescribed burn. Local fire departments can be contacted for current rules and regulations regarding the use of prescribed fire.

Residential Burning and Air Quality

The Tehama County Air Quality Management District (TCAQMD) works with various fire entities to ensure that agricultural and residential burning is timed to coincide with favorable atmospheric conditions. In addition, the TCAQMD is responsible for determining burn days and enforcing regulations pertaining to all forms of burning. Office hours and contact information for the Tehama County Air Quality District are shown below.

Tehama County Air Quality Management District

Location 1750 Walnut St., Red Bluff, CA 96080

Office Hours Monday - Friday 8:00am -12 Noon 1:00 pm - 5:00 pm

Phone Numbers

Office (530) 527-3717

Fax (530) 527-0959

Ag Burn (Local) (530) 527-2500

Ag Burn (Long Distance) 1-800-300-4066

Residential (Local) (530) 527-8320

Residential (Long Distance) 1-888-268-9259

Fire Safe Landscaping

Any plant can burn during extreme fire conditions as there are no fire proof plants. Some however, are harder to ignite burn slower and produce less heat and shorter flame lengths than others. Plants with high moisture content fit this category as long as they are kept green. Grasses and flowers are usually maintained by irrigation during the growing season and then cut back or removed in the autumn or winter. Plants that grow 18 inches tall or less can be a good choice for fire safe landscaping. Plants with resinous, waxy or oily parts along with those that produce large amounts of twiggy growth are often easy to ignite and can burn very quickly. The following are important characteristics that positively or negatively affect a plants ability to provide fire safe landscaping.

High Moisture Content

Plants with high moisture content are usually more difficult to ignite and they burn slower. Green healthy and actively growing herbaceous plants have a greater percent of moisture content than woody plants. If kept green throughout the fire season by irrigation, herbaceous plants are usually more desirable than woody plants in a defensible space area.

Low Growing Habitat

Plant species vary regarding the amount of fuel they produce. Select plants that produce relatively small amounts of vegetation and with plant parts that are less than one half inch in diameter.

Desirable Chemical Content

Avoid selecting plants with resinous, oily or waxy parts. These characteristics increase flammability.

Pyrophytes

Plants that are high in resins and oils are extremely flammable and should be avoided in defensible space landscaping. Examples of these plants include pampas grass and junipers. Also to be avoided are plants that are listed as noxious weeds.

Maintain Your Landscape

The manner in which plants are maintained is as important as the species you select. Plants that are considered to be a low fire hazard can become a high hazard without proper care (irrigation, removed of dead branches and leaves).

Fire Safe Construction

Remodeling and new home construction is an opportune time to plan for a fire safe environment. New fire resistant siding and decking products are available that can be invaluable in preserving structures during a wildfire event. The Tehama County Building Department, County and City Fire Departments as well as the California Department of Forestry and Fire Protection can provide information on materials to use. A number of basic fire safe building methods are described below:

- Install duel pane or tempered glass windows along with fire resistant drapes

- Create precut plywood panes to cover windows in the event of a wildfire.

- Make property accessible to fire personnel by constructing and maintaining an all-weather driveway. In addition, the length of driveway and the number of homes that uses it for access will determine its required width and whether or not turnouts will be required. There must also be an area where fire equipment can turn around and there are regulations pertaining to how steep a driveway can be.

In the event of a wildfire, fire personnel will evaluate whether you home is safely accessible and whether or not defensible space has been created. Fire crews will try to save as many homes as possible, but if they are forced to make a choice, they will choose a home or other structure that has defensible space and represents a minimized hazard to personnel. Check state and local laws governing the fire safety of buildings and structures. The main law covering fire safety within State Responsibility Areas are Public Resources Code 4291 and Title 14, California Code of Regulation. In addition, there are a number of local regulations that apply.

Prepare for Wildfire

Planning for a wildfire requires care and thoughtful consideration. It should begin with a walk through structures and around properties in order to take an inventory of those items that are most valuable or even irreplaceable. There are many things you can do to prepare yourself for a wildfire.

- Talk with neighbors or adjacent landowners to discuss a fire plan with them. Learn what they've done to prepare for a fire. Find out if they need assistance in case of an emergency or if they can help you, especially if a fire breaks out while your property is unattended.

- Plan at least two evacuation routes from your neighborhood to a designated meeting place outside the immediate area.

- Emergency information is available on the radio at and on television channel . Write the station information down and put it near you radio and television set. A neighborhood phone tree can be arranged to notify those who won't be monitoring radio and television.

- Post the street address of structures at driveways and at any forks in the road. Numbers should be easily read both day and night. The address post should be made of non- combustible material.

- Bury all plastic waterlines that could melt in the event of a fire.

- Install gas-powered pumps on ponds, pools, hot tubs and other water containment structures that can be used as alternate water sources. Be sure to store gas in a metal cans with a tight fitting lids.

- Consider purchasing fire protective foams or gels to apply on structures before evacuation.

- Prioritize your possessions. In case of evacuation you will only have a short period of time to gather belongings. Most items can be replaced; pictures and pets cannot. Store papers and mementos in a suitcase near the front entrance with ribbon tied around it. Coordinate with neighbors to retrieve the suitcase if you are not home during an emergency. Consider storing photo negatives at another location.

- Review your home owner's policy periodically.

- Video tape or take photographs and keep an inventory list of valuables. Store these records in a safe deposit box or at an alternate location.

- Prepare an emergency kit and have emergency supplies ready.

- Have pet carriers ready for small pets. Be sure each pet has identification and prepare an emergency kit.

- If you own livestock, have an evacuation plan developed and readily available in the event of a fire emergency.

Initial Actions in the Event of Wildfire

If you see a wildfire, call 911. Don't assume that someone else has already called. Describe the location of the fire; speak slowly and clearly and answer any questions asked by the dispatcher. Should your home or other structure be threatened by wildfire, you may be advised to evacuate by fire or law enforcement officials. The purpose of an evacuation is to protect people form life threatening situations, but homeowners have the right to stay on their property as long as their activities do not hinder fire fighting efforts. Remember that if you decide to stay, the following suggestions will assist in protecting lives and property.

- Evacuate if possible, all family members and pets. Contact a friend or relative and let them know your plans. Make sure all family members are aware of the pre-arrange meeting place.

- Wear 100 percent cotton long pants, a long sleeved shirt (synthetic clothing can melt or ignite in extreme heat) good leather boots. Carry gloves, handkerchief, water and goggles.

- Tune to radio station or television station and listen for instructions.

- Place vehicles in the garage pointing out and roll up the windows. Be sure to park where you will not interfere with any emergency vehicles if you need to leave in a hurry. Place valuable papers and momentous in you car. Close the garage door, leaving it unlocked. Disconnect electric door openers. Place patio furniture inside the garage.

- Fill bathtubs, sinks, trash cans, buckets and other containers with water. Soak rags and towels for beating out embers and small fire.

- Close all interior and exterior doors, windows and vents.

- Close the fireplace damper and place a screen over the hearth.

- Remove lightweight non-fire resistant curtains. Close fire-resistant window coverings. Attach pre-cut plywood panels to the exterior side of windows and glass doors. Move furniture to the center of each room and leave the lights on.

- Turn off pilot lights and shut off propane tanks.
- Prop a ladder against structures so that firefighters have easy access to the roofs. Keep wood shake or shingle roofs moist. Place a sprinkler on the roof, but do not turn on until embers begin to fall on the roof.

- Attach garden hoses to faucets and attach a nozzle set to spray.

- Keep tools readily available.

- Work safely; use your home as a shelter if evacuation is not possible.

Preparing to Leave

- Turn on outside lights and leave a light on in every room to make the house more visible in heavy smoke.

- Don't lock up. Leave doors and windows closed but unlocked. It may be necessary for fire fighters to gain quick entry to fight fire.

- Have hoses connected to faucets with nozzles set to spray.

- Have gas powered pumps fueled and ready to pump water.

- Have one or more 5 pound multipurpose type fire extinguishers readily available.

- Provide a ladder that is long enough to reach the roof in clear view to fire fighters.

- Drive safely and share rides if possible. Park completely off the roadway to allow access for emergency vehicles.

Survival in a Vehicle

This is dangerous and should only be done in an emergency! It is less dangerous however, than trying to run from a fire

- Roll up windows and close air vents. Drive slowly with headlights on. Watch out for other vehicles and pedestrians. Do not drive through heavy smoke.

- If you have to stop, park away from the heaviest trees and brush. Turn headlights on and the ignition off. Roll up windows and close air vents.

- Get on the floor and cover up with a blanket or coat.

- Stay inside the vehicle until the main fire passes.

Caught in the Open

The best temporary shelter is in a sparse fuel area. Avoid canyons, natural chimneys and saddles. If a road is nearby, lie face down in a ditch on the uphill side. Cover yourself with anything that will shield you from the fire's heat. If hiking in the back country, seek a depression with sparse fuel. Clear fuel away from the area while the fire is approaching and then lie face down in the depression and cover yourself. Stay down until the fire passes.

After the Flames Pass

Check the roofs of all structures and then adjacent vegetation for smoldering embers. Thoroughly check the inside of buildings including attics, garages, closets and storage areas. Leave nothing unchecked. Walk the property, checking wood piles, trees, fences, and out buildings for smoke or hotspots. Inspect properties frequently for the next twelve hours and watch for smoke for at least a week after the fire. Once the blaze is out and firefighters have left, you will have to decide quickly whether or not you can do cleanup work yourself. If the damage is extensive, leave everything as is. Call your insurance agency immediately so the damage can be documented and professionally repaired

Appendix G
Glossary

The following is list of common fire related terms used in the Tehama West Fire Plan, in common usage among members of the fire and fuels management community and as found in much of the literature pertaining to wildfire issues.

Aerial Fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition: Ignition of fuels by dropping incendiary devices or materials from aircraft.

Air Tanker: A fixed-wing aircraft equipped to drop fire retardants or suppressants.

Agency: Any federal, state, or county government organization participating with jurisdictional responsibilities.

Anchor Point: An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.

Aramid: The generic name for a high-strength, flame-resistant synthetic fabric used in the shirts and jeans of firefighters. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect: Direction toward which a slope faces.

Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Backpack Pump: A portable sprayer with hand-pump, fed from a liquid-filled container fitted with straps, used mainly in fire and pest control. (See also Bladder Bag.)

Bambi Bucket: A collapsible bucket slung below a helicopter. Used to dip water from a variety of sources for fire suppression.

Behave: A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: BURN and FUEL.

Bladder Bag: A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump. (See also Backpack Pump.)

Blow-up: A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. (See Flare-up.)

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush Fire: A fire burning in vegetation that is predominantly shrubs, brush and scrub growth.

Bucket Drops: The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.

Buffer Zones: An area of reduced vegetation that separates wildlands from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is usually used for another purpose such as agriculture, recreation areas, parks, or golf courses.

Bump-up Method: A progressive method of building a fire line on a wildfire without changing relative positions in the line. Work is begun with a suitable space between workers. Whenever one worker overtakes another, all workers ahead move one space forward and resume work on the uncompleted part of the line. The last worker does not move ahead until completing his or her space.

Burn Out: Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.

Burning Ban: A declared ban on open air burning within a specified area, usually due to sustained high fire danger.

Burning Conditions: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period: That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

Campfire: As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Candle or Candling: A single tree or a very small clump of trees which is burning from the bottom up.

Chain: A unit of linear measurement equal to 66 feet.

Closure: Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front: The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 or more miles per hour often continue for 12 to 24 hours.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff: The command staff consists of the information officer, safety officer and liaison officer. They report directly to the incident commander and may have assistants.

Complex: Two or more individual incidents located in the same general area which are assigned to a single incident commander or unified command.

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line: All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coyote Tactics: A progressive line construction duty involving self-sufficient crews that build fire line until the end of the operational period, remain at or near the point while off duty, and begin building fire line again the next operational period where they left off.

Creeping Fire: Fire burning with a low flame and spreading slowly.

Crew Boss: A person in supervisory charge of usually 16 to 21 firefighters and responsible for their performance, safety, and welfare.

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Curing: Drying and browning of herbaceous vegetation or slash.

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning: A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Deployment: See Fire Shelter Deployment.

Detection: The act or system of discovering and locating fires.

Direct Attack: Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Dispatch: The implementation of a command decision to move a resource or resources from one place to another.

Dispatcher: A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control in first attack, and sends them to the proper place.

Dispatch Center: A facility from which resources are directly assigned to an incident.

Division: Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located with the Incident Command System organization between the branch and the task force/strike team.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

Dozer Line: Fire line constructed by the front blade of a dozer.

Drip Torch: Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

Drop Zone: Target area for air tankers, helitankers, and cargo dropping.

Drought Index: A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm: Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

Energy Release Component (ERC): The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine: Any ground vehicle providing specified levels of pumping, water and hose capacity.

Engine Crew: Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment: A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis and an array of action alternatives, allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Equilibrium Moisture Content: Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won’t burn, natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire: A fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended Attack Incident: A wildland fire that has not been contained or controlled by initial attack forces and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

Extreme Fire Behavior: "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

Faller: A person who fells trees. Also called a sawyer or cutter.

Field Observer: Person responsible to the Situation Unit Leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine (Light) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fingers of a Fire: The long narrow extensions of a fire projecting from the main body.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Behavior Forecast: Prediction of probable fire behavior, usually prepared by a Fire Behavior Officer, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist: A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuel, weather and topography.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire Cache: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew: An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Front: The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Line: A linear fire barrier that is scraped or dug to mineral soil.

Fire Load: The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Perimeter: The entire outer edge or boundary of a fire.

Fire Season: 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Shelter: An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life-threatening situations, as a last resort.

Fire Shelter Deployment: The removing of a fire shelter from its case and using it as protection against fire.

Fire Storm: Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Triangle: Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module (Prescribed Fire Module): A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, that can ignite, hold and monitor prescribed fires.

Fire Weather: Weather conditions that influence fire ignition, behavior and suppression.

Fire Weather Watch: A term used by fire weather forecasters to notify using agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into dangerous fire weather.

Fire Whirl: Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

Firefighting Resources: All people and major items of equipment that can or potentially could be assigned to fires.

Flame Height: The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flaming Front: The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flanks of a Fire: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, that ignite readily and are consumed rapidly when dry. Also called fine fuels.

Forb: A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel: Combustible material. Includes, vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire. (See Surface Fuels.)

Fuel Bed: An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee: A colored flare designed as a railway warning device and widely used to ignite suppression and prescription fires.

General Staff: The group of incident management personnel reporting to the incident commander. They may each have a deputy, as needed. Staff consists of operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area: A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization

Ground Fuel: All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust that normally support a glowing combustion without flame.

Haines Index: An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line: A fireline built with hand tools.

Hazard Reduction: Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Head of a Fire: The side of the fire having the fastest rate of spread.

Heavy Fuels: Fuels of large diameter such as snags, logs, large limb wood, that ignite and are consumed more slowly than flash fuels.

Helibase: The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot: A temporary landing spot for helicopters.

Helitack: The use of helicopters to transport crews, equipment, and fire retardants or suppressants to the fire line during the initial stages of a fire.

Helitack Crew: A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions: Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources: Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Hose Lay: Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew: A highly trained fire crew used mainly to build fireline by hand.

Hotspot: A particular active part of a fire.

Hotspotting: Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP): Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map.

Incident Command Post (ICP): Location at which primary command functions are executed. The ICP may be co-located with the incident base or other incident facilities.

Incident Command System (ICS): The combination of facilities, equipment, personnel, procedure and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.

Incident Commander: Individual responsible for the management of all incident operations at the incident site.

Incident Management Team: The incident commander and appropriate general or command staff personnel assigned to manage an incident.

Incident Objectives: Statements of guidance and direction necessary for selection of appropriate strategy(ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Infrared Detection: The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

Job Hazard Analysis: This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions and the required safety equipment to ensure public and employee safety.

Jump Spot: Selected landing area for smokejumpers.

Jump Suit: Approved protection suite work by smokejumpers.

Keech Byram Drought Index (KBDI): Commonly-used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

Knock Down: To reduce the flame or heat on the more vigorously burning parts of a fire edge.

Ladder Fuels: Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Large Fire: 1) For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Lead Plane: Aircraft with pilot used to make dry runs over the target area to check wing and smoke conditions and topography and to lead air tankers to targets and supervise their drops.

Light (Fine) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number, on a scale of 1 to 6 that reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout: A firefighter who determines the location of a fire line.

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Micro-Remote Environmental Monitoring System (Micro-REMS): Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and ATMU to an incident.

Mineral Soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Mobilization: The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS): A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop-up: To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.

Multi-Agency Coordination (MAC): A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement: Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make decisions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildfire Coordinating Group: A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex ®: Trade name for a fire resistant synthetic material used in the manufacturing of flight suits and pants and shirts used by firefighters (see Aramid).

Normal Fire Season: 1) A season when weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

Operations Branch Director: Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Operational Period: The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Overhead: People assigned to supervisory positions, including incident commanders, command staff, general staff, directors, supervisors, and unit leaders.

Pack Test: Used to determine the aerobic capacity of fire suppression and support personnel and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.

Paracargo: Anything dropped, or intended for dropping, from an aircraft by parachute, by other retarding devices, or by free fall.

Peak Fire Season: That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Personnel Protective Equipment (PPE): All firefighting personnel must be equipped with proper equipment and clothing in order to mitigate the risk of injury from, or exposure to, hazardous conditions encountered while working. PPE includes, but is not limited to: 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves and individual first aid kits.

Preparedness: Condition or degree of being ready to cope with a potential fire situation

Prescribed Fire: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed Fire Plan (Burn Plan): This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription: Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project Fire: A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Pulaski: A combination chopping and trenching tool, which combines a single-bitted axe-blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

Radiant Burn: A burn received from a radiant heat source.

Radiant Heat Flux: The amount of heat flowing through a given area in a given time, usually expressed as calories/square centimeter/second.

Rappelling: Technique of landing specifically trained firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn: The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Red Card: Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions in a large fire suppression or incident organization.

Red Flag Warning: Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (Rh): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automatic Weather Station (RAWS): An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which the data is re-transmitted to an earth-receiving station for use in the National Fire Danger Rating System.

Resources: 1) Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order: An order placed for firefighting or support resources.

Retardant: A substance or chemical agent which reduced the flammability of combustibles.

Run (of a fire): The rapid advance of the head of a fire with a marked change in fire line intensity and rate of spread from that noted before and after the advance.

Running: A rapidly spreading surface fire with a well-defined head.

Safety Zone: An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity.

Scratch Line: An unfinished preliminary fire line hastily established or built as an emergency measure to check the spread of fire.

Severity Funding: Funds provided to increase wildland fire suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource: An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Size-up: To evaluate a fire to determine a course of action for fire suppression.

Slash: Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps and broken understory trees or brush.

Sling Load: Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over: A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smokejumper: A firefighter who travels to fires by aircraft and parachute.

Smoke Management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering Fire: A fire burning without flame and barely spreading.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester: A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire: A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast: A special forecast issued to fit the time, topography, and weather of each specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts.

Spotter: In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area: Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging areas are managed by the operations section.

Strategy: The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team: Specified combinations of the same kind and type of resources, with common communications, and a leader.

Strike Team Leader: Person responsible to a division/group supervisor for performing tactical assignments given to the strike team.

Structure Fire: Fire originating in and burning any part or all of any building, shelter, or other structure.

Suppressant: An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when direction applied to burning fuels.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Swamper: (1) A worker who assists fallers and/or sawyers by clearing away brush, limbs and small trees. Carries fuel, oil and tools and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Temporary Flight Restrictions (TFR): A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident which restricts the operation of nonessential aircraft in the airspace around that incident.

Terra Torch ®: Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildland fire or during a prescribed fire operation.

Test Fire: A small fire ignited within the planned burn unit to determine the characteristic of the prescribed fire, such as fire behavior, detection performance and control measures.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Two-way Radio: Radio equipment with transmitters in mobile units on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type: The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability due to power, size, or capacity.

Uncontrolled Fire: Any fire which threatens to destroy life, property, or natural resources, and

Underburn: A fire that consumes surface fuels but not trees or shrubs. (See Surface Fuels.)

Vectors: Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD): A fire department of which some or all members are unpaid.

Water Tender: A ground vehicle capable of transporting specified quantities of water.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line: A line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire: Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

Wildland Urban Interface: The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Wind Vectors: Wind directions used to calculate fire behavior.