Yosemite West
Community Wildfire Protection Plan

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The YOSEMITE WEST COMMUNITY WILDFIRE PROTECTION PLAN is approved:

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1.0. Introduction

Yosemite West (the Community) is an isolated mountain community in Mariposa County surrounded by undeveloped, privately owned lands and federal lands of Yosemite National Park (the Park) and Sierra National Forest (see the Project Area Map in Appendix A). The Community lies just north of Henness Ridge at the head of the Indian Creek watershed.

Prior to the arrival of European-Americans, wildland fire played a significant role in the determination of stand composition and the perpetuation of native plant communities (Pyne 1982). The influence of wildland fire was disrupted with the arrival of settlers. The area was extensively logged during the early decades of the twentieth century (Johnson 1995). The consequences of logging and fire suppression have lead to a more or less even-aged stand of mixed conifers, an accumulation of forest fuels on the ground and an increase in tree stand density. This description applies to the lands within and surrounding the Community. As a result, the forest has changed from one that was adapted to wildland fire to one that is more prone to catastrophic wildfires.

Under the right set of conditions, Yosemite West is susceptible to a large-scale, stand-replacing wildfire that is capable of consuming all in its path. A wildland fire of the magnitude experienced during the 1990 A-Rock and Steamboat fires could place firefighters and the public at risk and destroy public and private property.

The National Park Service (NPS) has created shaded fuel breaks along its boundary with the Community. This action and proposed future actions will decrease the threat of wildland fires originating in the Park south and east of the Community. The Community, however, may be at a greater risk from a wildland fire originating in the Indian Creek watershed to the north or in the Sierra National Forest to the south.

Certain private property owners in the Community are actively practicing the mitigation measures recommended by Fire Safe (http://www.firesafecouncil.org). Other private property owners, however, have taken little or no action to protect their properties from wildland fire. The inconsistent application of Fire Safe mitigation measures places the entire community at an increased risk from wildfires.

This document is intended to provide an overview of existing wildland fuel conditions, share findings, and outline a prioritized course of action that will lessen the impacts of a wildland fire to the Community.

1.1. Background

The Mariposa County Fire Department (MCFD) has prioritized communities in the County related to the risk from wildland fire and has requested grants and other funding to carry out fuel mitigation projects and wildland fire mitigation planning in the county. Yosemite West was identified as one of the high priority areas.

Yosemite West shares the same U.S. Postal Service zip code with Yosemite Valley. The Community having this zip code (95389) that lies within the Wildland-Urban Interface (WUI) was identified as a "Community at Risk" from wildland fire, as defined in the Federal Register (FR Vol. 66, No. 3, pages 751-754, January 4, 2001).

The U.S. Department of the Interior issued a directive to NPS in November 2003 to engage stakeholders and local communities to address wildland fire issues in the WUI. NPS

Fire Management Officer Michael Beasley met with the Community on December 14, 2003 to determine what actions could be taken to better protect it from the impacts of a wildland fire. Yosemite West Property & Homeowners, Inc. (YWPHI) agreed to be the Community's focal organization for fire safety. Following the meeting, the Park contracted with WFA (http://www.wildlandfireassociates.com) to conduct an analysis of the wildland fuels and other pertinent factors in the area and recommend a course of action.

In September 2004, the Park hosted a meeting to inform stakeholders of the study, solicit input and comments, and gather additional information in order to complete a draft of a community wildfire protection plan (CWPP) for Yosemite West. Wildland Fire Associates (WFA) presented its survey and MCFD Deputy Fire Chief Jim Middleton demonstrated the use of Geographical Positioning System (GPS) and Geographic Information System (GIS) technology to assess risks to homes from wildland fire.

In winter 2004-2005, YWPHI submitted concept papers for the California Fire Safe Council (FSC) Grants Clearinghouse to request funding to make Yosemite West more Fire Safe. While awaiting funding, in 2004, YWPHI facilitated, prepared and signed a Memorandum of Agreement between NPS and private property owners adjacent to Yosemite West for cooperation on fuel reduction on the perimeter of Yosemite West.

At the September 2004 stakeholders' meeting, WFA handed the draft CWPP to YWPHI. YWPHI initiated the grant process through the California FSC Grants Clearinghouse to obtain funding for projects in the draft CWPP, which includes completion of the CWPP. YWPHI met with stakeholders to clarify roles and responsibilities. MCFD agreed to work with YWPHI to complete the CWPP.

1.2. Methodology

WFA specialists located and sampled fuel transects in the planning area to determine the fuel loading and learn more about the stand density, canopy characteristics, and species composition (see the Photo Points in Appendix B). The study also collected information relating to slope, wildland fire history, and other pertinent data.

This data was used to adjust existing fuel data sets to more accurately model fire behavior and to develop a prescription to treat the vegetation in the vicinity of the Community. The recommended prescription reduces the stand density so that the forest canopy would be less likely to support a crown fire, and as a result, a crown fire would revert to a surface fire. Spot fires ignited in advance of a crown fire would also remain a surface fire, which could be more easily attacked by firefighters.

When fully implemented, the desired future conditions described in the Vegetation & Fuels Management Projects section (see 6.3.7.) can be expected to afford fire suppression personnel a 90% success rate when defending the Community against a high-intensity wildland fire. It provides for safe and effective fire suppression actions while also considering the aesthetic values important to the Community and the commercial value of timber on the undeveloped, privately owned lands to be treated.

WFA presented an overview of the proposed fuel management actions to the stakeholders thereby building the consensus for a collaborative fuels treatment program.

The planning process and resulting recommendations recognized the importance of the following:

• The Community and stakeholders must fully support the plan. To successfully compete for and receive grants, the Community must be willing and ready to actively participate in each identified project.

• Actions must be taken within the Community by individual property owners to improve the safety of firefighters and the public in the event of a wildfire and to reduce the likelihood of a fire originating within the Community escaping and threatening nearby structures or other privately owned or federal lands.

• The plan calls for immediate, near-term and long-term activities. Treatments must be properly sequenced by working first within and around the Community, and by then moving farther out into the surrounding landscape.

• Funding will come through a combination of grants and private funds, and all mitigation measures must be cost effective.

• Treatments should complement the fuels treatment work that NPS completed in the vicinity of the Community and tie into any future projects by NPS or Sierra National Forest.

• Existing roads and railroad grades should be used, with safeguards identified to protect cultural resources on public and private lands, water and air quality, and any endangered or threatened species.

• Forest and ecosystem health should be enhanced by any treatments.

• A monitoring program must be implemented to determine if and how much goals and objectives are achieved and to identify follow-up treatments.

2.0. Planning Process

2.1. Planning Area Boundaries

The planning area is bounded by Henness Ridge to the south and extends around Yosemite West in a 1.5 mile wide arc to the Park's boundary on the east along the upper Indian Creek watershed. In addition to the Community, the area includes other privately owned undeveloped lands, a small area within the Sierra National Forest, and lands within the Park (see the Initial Study Area and Project Area Maps in Appendix A).

2.2. Stakeholders

Stakeholders (see Table 1) include owners of developed and undeveloped lands within and adjacent to the Community, nonprofit organizations, and county, state and federal agencies that support the Community.

Table 1: Stakeholders
Property Owners
• individual property owners within the Community • Yosemite West Associates et. al. (Eight parcels, 763 acres) • Pacific Forest Trust (three parcels, 1,000 acres) • Cislaw, formerly McKelligan (one parcel, 31 acres) • Mariposa County (six parcels, 26 acres)
Other Stakeholders
• Mariposa County Fire Department • National Park Service, Yosemite National Park • Cal Fire (formerly the California Department of Forestry and Fire Protection) • U.S. Forest Service, Sierra National Forest • Mariposa County Fire Safe Council • Yosemite West Property & Homeowners, Inc. • Yosemite/Sequoia Resource Conservation & Development Council • Mariposa County Board of Supervisors

Yosemite West Associates[1] fully support and cooperate with the objectives of the Yosemite West CWPP, provided commercial timber on their lands is salvaged, when possible, and that liability concerns are addressed.

Pacific Forest Trust (PFT, http://www.pacificforest.org/pft) is a nonprofit organization that owns approximately 1,000 acres on Henness Ridge in three parcels (commonly known by their former owners' names): the 727-acre Ransome Ranch and the adjacent 80-acre Sparling Ranch, adjacent to the Community's south and western boundary; and the 170-acre Donohoe property farther west along Henness Ridge. PFT supports fuel reduction on Henness Ridge and fire safety in Yosemite West.

Mariposa County FSC (http://www.mariposafiresafe.org/) is a nonprofit, non-governmental, non-regulatory community partnership of residents, property owners, businesses, and agencies working together to reduce vulnerability to the threat of wildfires. The mission of the Mariposa County FSC is "to preserve Mariposa County's natural and manmade resources by mobilizing all Mariposans to make their homes, neighborhoods and communities fire safe."

YWPHI (http://www.yosemitewest.org) is a nonprofit organization with a voluntary membership that works to improve facilities and services in the Community, encourages community involvement in beneficial projects, cooperates with governmental agencies that support Yosemite West, and promotes friendship among residents. The Mariposa County FSC agreed to collaborate closely with YWPHI's Fire Safety committee.

The Yosemite/Sequoia Resource Conservation & Development (RC&D) Council (http://www.ysrcandd.org) is the fiscal sponsor for YWPHI's fire safety grants awarded by the California FSC in 2005. The RC&Ds are part of a nationwide program (http://www.rcdnet.org) of the U.S. Department of Agriculture affiliated with the Natural Resources Conservation Service (http://www.nrcs.usda.gov). The Yosemite/Sequoia RC&D's membership includes Mariposa, Madera, Fresno and Tulare counties as well as the County Resource Conservation Districts

[1] Yosemite West Associates also owns additional properties as Yosemite Highlands, Inc., Henness Ridge Associates, and Forty Acres, Inc. They are the original developers of Yosemite West.

(CRCD), tribal governments and other nonprofit organizations in these counties' foothills and mountains. The Mariposa County Resource Conservation District is a governmental body within Mariposa County, created by the county and authorized by the U.S. Department of Agriculture, with authority over the area's resource conservation.

Yosemite West Associates and PFT each signed the Memorandum of Agreement (MoA) between YWPHI, the Yosemite/Sequoia RC&D and private landowners establishing the terms and conditions for cooperation in addressing the risk of catastrophic fire in and adjacent to Yosemite West. The Cislaws have expressed their support, but not yet signed a MoA. Mariposa County has not yet signed the MoA. See the Parcel Map in Appendix A for a list of APNs and the acreage for each privately owned parcel.

The Mariposa County Board of Supervisors is responsible for approval of the Yosemite West CWPP.

3.0. Community Description

3.1. General Environmental Conditions

Between 1912 and 1923, the Yosemite Lumber Company logged private lands within the Indian Creek watershed using railroad-based methods that required the use of cable systems and resulted in a form of clear-cutting with no regard for regeneration. Without action by the timber company, the area reseeded naturally. The replacement forest was primarily pine with an understory of white fir and incense cedar. The pines required bare mineral soil with very little shade for successful regeneration, whereas the white fir and incense cedar regenerated in forest litter with deep shade.

When the Community was first developed in 1967, only trees in the roads' right-of-way were removed from a then 45-year-old forest. The logs were salvaged by the General Box Corporation of Oakhurst (now the site of Vons).

In the late 1970s, the adjacent Yosemite Highlands property (APN 006-070-029, see the Parcel Map in Appendix A) was selectively logged using tractor-based equipment, which resulted in a multi aged forest. This forest has recovered to the extent that it is ready for commercial thinning (removing primarily white fir and incense cedar) to reduce fuel loading and create a naturalized pine forest.

Today's forest in and around the Community is now an 85-year-old mixed conifer forest. Its natural condition should contain only about one quarter of the number of trees currently present with white fir and incense cedar constituting a much lower percentage of the total stand. The natural forest would also have much less undergrowth due to periodic surface fires.

3.1.1. Topography, Slope, Aspect, Elevation

Yosemite West lies on the north side of Henness Ridge between 5,600 feet and 6,200 feet with a northern and western aspect. Henness Ridge itself has an east-west orientation and divides the watershed of the South Fork and main stem of the Merced River. The terrain varies with slopes in the upper part (Henness Circle) ranging between 10% and 20% and slopes in the lower part

(Henness Ridge Road, Yosemite Park Way) ranging between 20% and 40%. Some areas have steeper slopes.

3.1.2. Meteorology, Climate, Precipitation

No meteorological records are available for Yosemite West. About 85% of the precipitation falls between November and April. December, January, and February have the highest average precipitation, with a monthly average of six inches in Yosemite Valley at 4,000 feet. Average annual precipitation in Yosemite Valley is 36.5 inches. Annual precipitation decreases to 25 inches in El Portal at 2,000 feet and increases to 50 inches in red fir forests between 6,000 feet and 8,000 feet. Higher than 5,000 feet, 80% of the annual precipitation falls as snow (NPS 2000).

Mean daily temperatures at YNP's South Entrance Station (6,192 feet) range from 36 to 67 degrees Fahrenheit. Below 5,000 feet, temperatures are hotter; mean daily high temperature at Yosemite Valley, for example, varies from 46 to 90 degrees Fahrenheit (NPS 2004).

Summer thunderstorms are common from June to August, and typically build along the high-elevation crest of the Sierra Nevada in the afternoon. Few of these thunderstorms expand over Yosemite West. When they do, the combination of dry vegetation, low relative humidity, and thunderstorms frequently results in lightning-caused fires (NPS 1990).

3.1.3. Hydrology

Indian Creek, the area's primary hydrological feature, is a tributary of the Merced River. Its two branches drain Henness Ridge. The source of its main branch originates just west of the Badger Pass Ski Area and flows north of the Community through a narrow, steep canyon where it cascades over Chinquapin Fall. Its southern branch, which originates in the western part of the Community, is primarily an intermittent stream ranging in length between four and five miles. Scattered springs and wet areas are in the tributaries of the Indian Creek watershed.

In 1987, the U.S. Congress designated the Merced River a "Wild and Scenic River" to protect the river's free-flowing condition and to protect and enhance its unique values for the benefit and enjoyment of present and future generations (16 United States Code [USC] 1271). This designation gives the Merced River special protection under the National Wild and Scenic Rivers Act. NPS manages the segment of river on federal lands.

3.1.4. Ecosystem Types

The primary vegetation is a mixed conifer forest composed of ponderosa pine *(Pinus ponderosa)*, sugar pine *(P. lambertiana)*, white fir *(Abies concolor)* and incense cedar *(Libocedrus decurrens)*. An inland variety of Douglas fir *(Pseudotsuga menziesii)* is nearby on privately owned land at lower elevations. An ecologically important hardwood, California black oak *(Quercus kelloggii),* is also in this forest.

Understory plants are both highly flammable evergreen shrubs and moderately flammable deciduous shrubs. Common evergreen understory plants are manzanita *(Arctostaphylos Mariposa)*, buckbrush *(Ceanothus cuneatus)*, and bearclover or mountain misery *(Chamaebatia foliolosa)*. Deciduous understory plants include pacific dogwood *(Cornus*

nuttallii), lilac *(Ceanothus impressus)*, beaked hazelnut *(Corylus cornuta),* and willow *(Salix spp.)*.

The natural forest condition is predominantly widely spaced pines with widely scattered understory plants. Early explorers commented in their journals on the openness of the forest on the Sierra Nevada's western slopes. The current forest has up to 1,000 tree stems per acre. In natural conditions, there would be only between 100 and 200 stems per acre, reducing to only fifty large trees per acre.

Existing vegetation has thickets of shade-tolerant seedlings and small understory conifers, particularly white fir and incense cedar, which were not historically present. These thickets and a lack of adequate seedbed have limited sugar pine and yellow pine generation.

Downstream (west) of the Community, the forest changes to a ponderosa pine forest. This forest also has a higher percentage and density of white fir and incense cedar than natural conditions.

Between 3,000 feet and 4,000 feet within the Merced River canyon, the forest changes to a canyon live oak forest, also called chaparral. Wildfires in this ecosystem type are infrequent, but intense. Most trees and shrubs in this vegetative community crown sprout after a wildfire.

3.1.5. Threatened & Endangered Species

On May 18, 2007, the Sacramento office of the U.S. Fish & Wildlife Service prepared a list of federally endangered and threatened species known to occur in or around Yosemite West (see Table 2). The list includes several fish that do not live near Yosemite West, but live downstream and could be affected by actions in or around Yosemite West.

A statewide list of endangered and threatened species, updated every 90 days, is available at http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf.

Table 2: Threatened & Endangered Species – Yosemite West Vicinity

Species	Federal List	State List
Delta smelt	threatened	threatened
Central Valley steelhead	threatened	
California red-legged frog	threatened	
Bald eagle	delisted	endangered
Mariposa pussy-paws	threatened	
Yosemite toad	candidate for listing	
Fisher	candidate for listing	

Before implementing projects specified in this CWPP (see Projects Summary in Appendix H), an environmental review process that includes potential project impacts relative to the Endangered Species Act (ESA) is required. Michael J. Tollefson, Superintendent, Yosemite National Park, wrote to YWPHI on June 13, 2007 (see letter Y1415 (YOSE-PM) in Appendix C) to explain the required compliance procedures. Projects must also comply with the California Environmental Quality Act (CEQA).

3.2. Cultural Resources

Compliance with the National Historic Preservation Act (NHPA) is also required to implement projects. The review process was outlined by Superintendent Tollefson (see section 3.1.5.). NPS made an archeological reconnaissance survey of cultural resources in Yosemite West in 2006. No survey was conducted within the Community, and there is no previous documentation of cultural resources within the project area. The archeological resources remaining from logging activities (see section 3.1.), both within the Park and adjacent to it, have not been evaluated for eligibility for the National Register of Historic Places and may be considered at a later date. These resources should be considered eligible until evaluated. The survey observed no prehistoric resources. Eleven isolated historic finds from the logging operations, and eight possible logging roads were located. See Appendix D for the report of the survey.

3.3. Population & Demographics

There are 293 parcels, 127 with structures and 166 vacant lots, and one parcel for water storage tanks. Structures in the Community as of October 2007 include 94 completed and eight under construction single-family residences, 22 duplexes, three Bed & Breakfasts, and two condominium buildings of 24 units each.

Approximately 28 structures are primary residences. Most structures are used as second homes or are rented. During summer the population increases greatly, reaching more than 600 in peak occupancy.

3.4. Legal Structure & Jurisdictional Boundaries

Yosemite West lies wholly within Mariposa County, which governs the Community. The Community map (number 1511) was recorded as Yosemite West Unit 1 on August 1, 1967. See section 3.7. for a description of which agencies provide emergency services.

Laws governing natural resources (including forested landscapes, soils, water courses, air quality, view sheds, and wildlife) are in the Government Code (GC), Public Resources Code (PRC), and the California Code of Regulations (CCR).

The Z'berg-Nejedly Forest Practice Act of 1973 (FPA) is contained in PRC §4511. Forestry Boards in California develop district-specific Forest Practice Rules (FPRs) protect public resources on non-federal lands in California. These laws apply to forests containing species with commercial value, generally defined as all conifers.

Any property owner must comply with the FPA and FPRs to sell, trade or barter any wood from conifers. Compliance requires the property owner to obtain a timber harvesting plan (THP) prepared by a Registered Professional Forester (RPF)[2] and submitted to Cal Fire for review and approval, and secure a timber harvest permit, which demonstrates CEQA compliance.

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[2] The Professional Foresters Law of 1972 (PFL) defines the principles and responsibilities of the RPF who provides the State with capacity to develop and implement forest management plans in accordance with PRC §752.

Cal Fire has mapped the state's fire hazard severity zones, identifying land where a Very High Fire Hazard Severity is present. This work was done under authorities defined in PRC §4102 and GC 51175. Yosemite West is classified as in a Very High Fire Hazard Severity Zone.

Structures in a Very High Fire Hazard Severity Zone are required to comply with provisions of GC 51175-89. All structures in mountainous or forest-covered land, no matter what fire hazard severity zone, are required to comply with provisions of PRC §4291. Cal Fire implements and enforces these laws.

3.5. Infrastructure

The Community has many characteristics of a subdivision: paved streets and houses set back from the street with short, paved parking areas and/or driveways. Henness Ridge Road, a paved two-lane public road, provides the only vehicle access to Yosemite West. The intersection of Henness Ridge Road and Wawona Road is within the Park, approximately one mile from the eastern boundary of the Community.

Mariposa County Public Works Department is responsible for the daily operation of the Yosemite West Maintenance District, a dependent special district governed by the Mariposa County Board of Supervisors, which is responsible for maintaining the Community's water supply, wastewater facility and roads. Property owners are responsible for all costs incurred by the Yosemite West Maintenance District, which is funded by revenue from a portion of annual property taxes and monthly user fees. Two water storage tanks are on Henness Circle: a 110,000 gallon domestic water supply; and an additional 140,000 gallon reserve designated for fire suppression uses only. Twenty-four fire hydrants are positioned throughout the Community.

The Yosemite West Wastewater Facility provides fully automated primary and secondary treatment capacity of 100,000 gallons per day. An unpaved access road starts at the western boundary of the Community and extends approximately two miles to the facility.

Power and telephone lines are underground. There are no cellular telephone towers in the area, thereby limiting cell phone coverage. Many, but not all, structures have individual external liquid propane tanks serviced by private companies. Some residents contract independently for refuse disposal from private companies.

The nearest medical facilities are in Yosemite Valley. One designated emergency helicopter landing zone is adjacent to the Henness Ridge Fire Lookout, half a mile south of the Community. Elementary school students attend school in Yosemite Valley or Wawona, and middle and high school students in Mariposa. Other than a limited number of vacation rentals and Bed & Breakfasts, there is no commercial development.

3.6. Land Use Development Trends

Development was limited by the lack of an adequate wastewater facility, and was halted by the county in 1998. The Yosemite West Wastewater Facility was upgraded between June 2004 and June 2006 after a ballot initiative and assessment to all property owners. The building moratorium was lifted in summer 2006 after successful testing of the new system, and has resulted in a modest amount of home building. The upgrade was designed to allow for a full build-out with homes having three bedrooms, two bathrooms, a kitchen and a laundry room.

3.6.1. Wildland-Urban Interface (WUI) Building Codes

New WUI building codes (http://www.fire.ca.gov/wildland_codes.php), adopted by the California Building Commission in 2005 and effective as of January 2008, are linked to fire hazard severity zones (see section 3.4.). The WUI building codes include provisions for ignition-resistant construction standards and enforcement. They incorporate improved wildland fire behavior science, data sets, and understanding of structure ignition mechanisms during conflagrations. Yosemite West is subject to the WUI building codes.

The fire hazard severity zone also requires property owners to comply with natural hazards disclosure at time of sale of property. It is likely that the fire hazard severity zones will be used by local government as they update the safety element of general plans.

Cal Fire's updated mapping of fire hazard severity zones is scheduled for adoption under CCR Title 14 regulation by December 31, 2007, in time for the January 2008 building codes.

County support for strict compliance with the WUI building codes will ensure newly constructed structures are ignition resistant.

3.7. Emergency Services

The Community, approximately 15 miles from the nearest assistance, is without ready access to emergency services. Mariposa County provides limited law enforcement coverage, primarily on an emergency-response basis.

Throughout the County, MCFD has the primary responsibility for response to structural fires and Cal Fire for vegetation fires. In Yosemite West, however, NPS provides initial response and dispatch on structural fires, vehicle accidents and emergency services through a Reciprocal Fire Protection Agreement with the County (see Agreement Number F8812-07-0001 in Appendix E). Mariposa County is responsible for providing fire suppression resources when necessary in addition to those provided by the Park. The County directs any evacuation measures in the event of an emergency.

The U.S. Forest Service (USFS) protects all public land and private land within the boundaries of Sierra National Forest through an agreement with Cal Fire.

Ultimately through mutual aid agreements, emergency fire response can be from any or all of four agencies depending on the type and location of fire suppression necessary (see Table 3): MCFD, Cal Fire, NPS and the USFS.

Table 3: Agency Responsible for Emergency Response

Ownership ➢	**Private Land**		**Public Land**	
	Structural Fire	**Vegetation Fire**	**Yosemite National Park**	**Sierra National Forest**
Mariposa County (excluding Yosemite West)	MCFD	Cal Fire	NPS	USFS
Yosemite West	NPS through agreement with MCFD	USFS through agreement with Cal Fire	NPS	USFS

NPS designates fire management units as either suppression or wildland fire use. The lands west of Wawona Road, including the Community, are classified as suppression (see the Map 2-20 Fire Management Units in Appendix F) and any wildland fire burning in or near Yosemite West would be suppressed using the appropriate management response. Resources available for suppression of wildland fires include helitacks, air tankers, and a complement of engines and hand crews. After lightning storms, NPS flies aerial detection patrols to locate wildland fires.

Due to the proximity of the Park, adequate suppression forces are readily available. In the event of multiple fire starts, the Park is large enough to establish response priorities and assign firefighting resources accordingly. A large catastrophic wildland fire occurring on a hot, dry day with a Haines Index, a tool developed by the National Wildfire Coordination Group (NWCG), of 5-6, during a period of high number of people in the area, would definitely present problems for firefighters. Two-lane roads with a high volume of traffic, high winds, air turbulence, and other factors could make emergency response difficult.

3.8. Insurance Ratings

Insurance Services Office (ISO, http://www.iso.com) is a source of information about property and liability risk. Insurance companies use ISO's Public Protection Classification (PPC) program to establish premiums for hazard insurance. A numerical PPC classification is assigned after evaluating a community's fire-suppression system using criteria in a manual called the Fire Suppression Rating Schedule (FSRS).

Individual insurance companies assign an ISO rating between 1 (most desirable) and 10 (least desirable) depending on distance to the nearest fire stations and fire hydrants, when the structure was first insured, whether the structure is a year-around residence, characteristics of the structure, etc. Yosemite West is currently rated a 10.

MCFD has successfully worked with other Mariposa County communities to identify what needs to be done to be reclassified into a lower PPC. Yosemite West's ISO rating will not likely be reclassified unless or until there is a fire station within five miles of the Community.

Some insurance companies may apply their own rating system and/or criteria instead of or in addition to an ISO rating. In recent years, it has become increasingly difficult to obtain and/or renew hazard coverage for homes in Yosemite West and premiums are correspondingly high.

4.0. Current Fire Environment

4.1. Wildfire Problem Definition

Fire suppression and changing land use practices have dramatically affected natural fire regimes, altering ecological structures and functions in Sierra Nevada plant communities (NPS 2000). The active suppression of wildland fires and alteration of the stand structure through extensive logging have combined to create extensive accumulations of wildland fuels that are continuous. Under the right set of environmental and fuel conditions, these factors can contribute to a catastrophic wildfire.

In 1990, the 22,000-acre A-Rock fire burned the south-facing slope directly across the Merced River gorge from Yosemite West before it was controlled. At the same time, the Steamboat fire burned the north-facing slope across the gorge from the A-Rock fire and a short distance to the east and north of Yosemite West. Had conditions been different or control efforts been ineffective, the Steamboat fire could have burned Yosemite West.

Distance from suppression forces, heavy fuels, topography, adverse weather conditions, and a history of lightning-ignited fires could combine to lead to a large, rapidly moving crown fire that would threaten the entire Community and place life and property at great risk. There currently are not adequate locations to establish holding lines to initiate a burnout operation that could possibly save the Community from a wildfire moving up the Indian Creek watershed or from the Merced River gorge. Due to long-range spotting and other phenomena associated with a large, rapidly moving wildfire, Henness Ridge may not afford the community protection from a wildfire originating in the South Fork of the Merced River's watershed. Under the current conditions, a wildland fire that started within Yosemite West could place nearby structures and possibly the entire community at risk, and escape to the national park and/or national forest.

4.2. Local Fire Ecology

All of the vegetative communities in this area are adapted to frequent natural fires sparked by lightning (van Wagtendonk 1994). Wildland fire, whether started by Native Americans or lightning, played a significant role in the establishment and perpetuation of native plant communities in the area (Grunell 2001, Hall 1997, Pyne 1982). The two primary forest types in the Indian Creek watershed, mixed conifer and canyon live oak communities, are well adapted to wildland fire.

Canyon live oak forests grow on both north- and south-facing talus slopes and often form pure or almost pure stands. Fires in this vegetative community are infrequent but intense, with a fire return interval between twenty and fifty years on south-facing slopes. Most trees and shrubs in this vegetative community crown sprout after a wildland fire (NPS 2000).

A mixed conifer forest in its natural condition is relatively fire resistant and well adapted to low-intensity, frequent fires. While fires will occur, for the most part they will be surface fires with short flame lengths and not disastrous crown fires. Analysis of old-growth trees shows that surface fires were frequent.

Nearly 100 years of fire suppression has shifted the forest structure and species composition around the Community. What would have been natural, open, mixed conifer forest now has dense thickets of shade-tolerant tree species, including incense cedar, white fir and some Douglas fir. These understory trees are less fire adapted. They can act as ladder fuels that lift a fire into the forest crown. Additionally, these shaded thickets and a lack of adequate seedbed limited generation of pines. Despite their size, none of the dominant conifers present today display the characteristics of mature trees, i.e., the tops retain a pointed or rounded characteristic as opposed to mature trees, which have flattened tops. Bark characteristics indicate continual rapid-diameter growth. Fire suppression also caused a heavy buildup of vegetation and dead wood fuel.

Fire suppression policy slowly started to change in the 1960s. Today foresters and other resource managers recognize that the natural "open forest," which was originally the result of

frequent surface fires, is a safer and more healthy forest. This forest can be replicated and maintained by mechanical or fire methods.

4.3. Fire History

Fire history data (see Table 4) for the area dates back to 1900. Between 1900 and 2005, thirty-four wildland fires were reported. Of those, six were caused by humans and 28 by lightning. Lightning strike fires tend to occur near ridge tops and have been relatively small. Also, see the Fire History Map in Appendix A.

Table 4: Fire Occurrence
Source: Yosemite National Park; California Assessment Program (FRAP)

Fire Occurrence		Fire Size	
Decade	Number of Fires	Fire by Size Class (Number of acres)	Number of Fires
1900	1	<1	25
1910	1	1 – 10	3
1920	0	10 – 100	1
1930	2	100 – 1,000	3
1940	2	1,000 – 10,000	1
1950	5	>10,000	1
1960	4		
1970	6		
1980	6		
1990	6		
2000	1		

Although the area only averages about three fires a decade and the fires are relatively small, it is important to note that there have been five fires of more than 100 acres. One of these large fires was human caused, and the largest was caused by lightning. The 1990 A-Rock and Steamboat fires were started by lightning. Suppression has held most wildland fires to less than 10 acres. NPS records indicate that human-caused fires tend to be larger than naturally ignited wildland fires.

The October 2007 lightning complex of 14 fires, including the Henness Ridge and Old Steamboat fires, started on orographically favored slopes or on ridge tops.

4.4. Fire Weather

The peak fire season typically occurs from June to September, when lightning strikes occur. Lightning with summer rainstorms is more common at higher elevations, but dry lightning storms with little or no precipitation also occur. Many lightning-caused wildland fires, which ignite due to a combination of duff depth and fuel moisture, have been reported in the area. Strikes on snags or large conifers often start fires, which may go undetected until they grow large.

Periods of drought are common and have been a contributing factor to large fire development. An observed phenomenon that may become more of a factor is the gradual warming of the environment. This can contribute to earlier snowmelt and heavy, isolated rainstorms or snowstorms, which are more conducive to runoff than moisture absorption. The early loss of snow cover and a patchy rainfall with a lower absorption rate may contribute to lower live and dead fuel moisture. A warming climate is also conducive to improved growing conditions for forest vegetation[3].

Low relative humidity, below average live and dead fuel moisture, low duff moisture, above average fuel loading, moderate to high winds, and periods of drought are known to contribute to large-scale wildland fire development. The Haines Index indicates that a relative humidity less than 25%, temperature greater than 90 degrees, sustained wind speed greater than 15 mph, dead fuel moisture less than 5%, and live fuel moisture less than 80%, gives a high probability that ignition will result in a high intensity, catastrophic wildland fire that will be difficult to control. These conditions occur each year around Yosemite West.

4.5. Hazardous Fuels

Presently, Fuel Model 9 (see Table 5) is predominant with stands of long-needled pines (ponderosa, Jeffrey, sugar) and hardwoods (oak), although the forest also has characteristics of Fuel Models 8 and 10.

Table 5: Fire Behavior Fuel Models

Fuel Model	Definition	National Fire Danger Rating System
8	Closed, Short Needle Timber Litter	E
9	Hardwood or Long Needle Pine Timber Litter	H
10	Mature/Overmature Timber and Understory	G

Under normal conditions, slow-burning surface fires with low flame lengths are generally the case in Fuel Model 8, although the fire may encounter an occasional “jackpot” or heavy fuel concentration and flare up. Only under severe weather conditions involving high temperatures, low humidity, and high winds do the fuels pose fire hazards. The higher the Fuel Model number, the faster a fire would burn through surface litter and the longer the flame lengths would be.

Fire suppression and logging activity have contributed to a higher than average fuel loading (and higher Fuel Model number). Fuel sampling indicates there is heavier than average fuel loading and horizontally and vertically continuity in the area that could lead to increased fire intensity and crown fires.

Based on existing California Fire Plan criteria for Fuel Hazard assessment, the entire area is rated at high hazard to very high hazard.

[3] An increase in CO_2 has resulted in an inverse relationship between plant growth, which increases, and water use, which decreases.

4.5.1. Natural Fire Regime

Natural fire regime categories describe the role fire would play in the absence of modern human intervention (Agee 1993, Brown 1995, Hardy et al. 2001, Hann and Bunnell 2001, Schmidt et al. 2002).

The five natural (historical) fire regimes (see Table 6) are based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant vegetation.

Table 6: Natural Fire Regimes

Regime	Definition
I	0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced).
II	0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced).
III	35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced).
IV	35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced).
V	200+ year frequency and high (stand replacement) severity.

Fire is an integral part of the ecology of ponderosa pine. Prior to 1900, most stands experienced low-severity surface fires at intervals ranging from one to thirty years. The median fire-return interval is between eight and ten years. Yosemite West's natural fire regime is classified as Fire Regime I. See the Fire Regime and Condition Class maps in Appendix A.

Returning the landscape to what existed naturally and historically is desirable. There generally should be fewer continuous vegetation types, more openings, trees of varying ages, and different plant communities in a random patchwork.

4.5.2. Condition Class

Condition Classes (see Table 7) are defined as the degree to which existing forest varies from the natural fire regime. As the Condition Class increases, the relative risk of losing one or more key components that define an ecological system increases.

Table 7: Condition Class Definitions

Condition Class	Natural Fire Regime & Management Options
I	Fire regimes are within a historical range and the risk of losing key ecosystem components is low. Forest structure and species composition are intact and within a historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.

Table 7: Condition Class Definitions	
Condition Class	**Natural Fire Regime & Management Options**
II	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals. This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
III	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.

In the Yosemite West area the natural forest that would exist if fire had been allowed to burn is a mixed conifer ecosystem dominated by ponderosa pine and sugar pine, with incense cedar and white fir as infrequent understory trees. Little or no brushy ground cover would exist, and the forest would have an open appearance. Today's forest, which is not natural, has too many shade-tolerant species such as white fir and incense cedar.

Yosemite West is a Condition Class II, but is moving toward Condition Class III as the natural pine forest is replaced by white fir, incense cedar, and other species. See the Fire Regime and Condition Class maps in Appendix A.

4.5.3. Fuel Breaks

Steep slopes with few natural or constructed fuel breaks characterize the area. The ridge line of Henness Ridge with spotty fuels to the south of the Community may afford some protection from a fire originating in the South Fork of the Merced River's watershed. A ridge line to the north of the Community was used to halt the spread of the 1990 Steamboat fire.

4.5.3.1. Fuel Breaks on Public Land

The Community worked with NPS's Fire & Fuels Management Program to include Yosemite West in the Park's Annual Fuels Treatment Plan. NPS mechanically treated approximately forty WUI acres in 2003 and twenty WUI acres on Park land along the boundary between the Park and the Community in October 2004. Additionally, the Henness Ridge Fire Lookout and helicopter landing zone, also on Park land adjacent to the Community, were treated in fall 2004.

Since 2004 NPS has conducted prescribed burns on its land adjacent to the Community:

- 233 acres in October 2005 PW17 Units A (105 acres) and D (128 acres); and
- 962 acres in October 2007 PW17 Units B (172 acres), C (66 acres) and E (724 acres).

NPS plans to follow up its mechanical treatment up with prescribed burns on 212 acres between the Park's boundary, Henness Ridge, Indian Creek and Wawona Road within the next two years

(by 2009). Completion of prescribed burns in PW17 helps to protect the Community's eastern and southern boundaries (see the Project Map - Yosemite West Burn Units in Appendix G).

4.5.3.2. Fuel Breaks on Private Land

Construction of a shaded fuel break on the western boundary of the Community on adjacent undeveloped private property (APN 006-070-029) is in progress as of October 29, 2007. This shaded fuel break will cover approximately 25 acres north from the unpaved road leading to the Yosemite West Wastewater Facility and then east around the Community's northwestern boundary. Completion of this shaded fuel break is expected by spring 2008. This work is being accomplished with hand crews and small mechanical equipment. Slash (woody debris) will be chipped and scattered in place.

4.5.4. Timber Harvesting on Private Land

PFT (see section 2.3.) initiated a timber harvesting plan (THP) on its land adjacent to the Community. Past management on these properties led to a forest dominated by white fir and incense cedar, significantly increasing fuel loading and wildfire danger. To start restoring the landscape, PFT submitted a THP to Cal Fire in August 2005. The plan, which was designed by an RPF in consultation with the Park, was approved in November 2005 after a review process that also involved the Central Valley Regional Water Quality Control Board and the California Department of Fish and Game. PFT started logging on the former Ransome and Sparling properties in October 2006 and continued logging in spring 2007.

5.0. Risk Assessment

In May 2004, MCFD completed an initial Red Zone Fire Risk Assessment of homes in the Community that focuses on wildfire suppression.

In July 2006, researchers with the Center for Fire Research and Outreach (CFRO) at the University of California, Berkeley completed a wildfire hazard assessment survey of homes in the Community that focuses on structural vulnerability to wildfires.

5.1. Red Zone Fire Risk Assessment

In May 2004, the MCFD conducted a Geographical Information System (GIS) survey whose purpose was to identify and rank which structures they can safely defend and which structures they cannot.

The survey gathered the following data about structures and infrastructure:

- access (posting of street address, condition and size of driveway);
- topography (slope and aspect of land);
- vegetation (clearance of yard debris, proximity of debris and vegetation to structures);
- construction (siding and roofing material, are eaves enclosed);

• mitigation notes (specific actions property owners can take to reduce their risk from fire);
• utilities (location of electrical and telephone underground); and
• fire protection (quality of hydrant system, location of fire hydrants, proximity of fire station).

The processed data gave a numerical and color-coded Hazard Value for each property (see Table 8). The numerical value ranges from 1 to 100. Four color-coded zones illustrate the risk: green zone (least risk), yellow zone (some risk), orange zone (more risk), and red zone (extreme risk). MCFD manually cross-checked the calculations of each Hazard Value weighing structure design, maintenance and fuel loading.

Table 8: Red Zone Fire Risk Assessment Results

Color-coded Zone	Actual % of Structures	Goal % of Structures
Green	0%	0%
Yellow	24%	100%
Orange	64%	0%
Red	12%	0%

The data also produced a color-coded community map and individual homeowner reports, which were made available to homeowners. The reports included a list of steps homeowners can take to improve their rating. MCFD's policy is not to commit firefighters and equipment to any structure classified in the red zone, so the goal of the Community and MCFD is to have zero properties in the red zone. MCFD is available to the Community to advise how to improve every red zone property to yellow zone. The survey indicates that 76% of structures (those in the red and orange zones) require immediate action by the homeowners.

The Red Zone Fire Risk Assessment is not a static survey. Rather, it needs periodic updating as property owners take action to improve their Hazard Values and as new homes are built. An updated survey is planned for 2008, which will include digital photography of every property.

5.2. Structural Vulnerability Survey

In spring 2006, YWPHI created a liaison with the Center for Fire Research and Outreach (CFRO) in the College of Natural Resources at the University of California, Berkeley that led to the Community being selected as a research site.

CFRO integrated the data on wildfire danger to the Community that was prepared by WFA (http://www.yosemitewest.org/wfa50225.htm), together with the GIS data (http://www.yosemitewest.org/mcfdgis.htm) collected by the MCFD into a parcel-based fire hazard assessment methodology, along with a web-based GIS decision support tool for displaying results. CFRO hopes (and has evidence from other communities) that these results will motivate homeowners to mitigate hazards on their property.

The CFRO's research provides a way to "see"what happens if a wildfire were to occur in the Community, and to evaluate how specific actions individual property owners take can alter the likely outcome. It tells how homeowners can protect (or not protect) their property.

The CFRO developed an array of related tools; real-time fire mapping, streaming news, integration with state-level Cal Fire products, etc. They invited members of the Community to complete a (voluntary) self-assessment on their own homes, which the CFRO compared with the center's own survey. This process helped CFRO to fine-tune their assessment system and it was also a way to involve the Community in the process.

In July 2006, CFRO mailed survey results with a map of overall ratings in the Community to all homeowners along with suggestions for reducing fire hazards and instructions on how to use their online Fire Information Engine (http://firecenter.berkeley.edu/toolkit). CFRO used a relative ranking so that one-third of the Community falls into each of the high, medium, and low categories. The intent is to focus on addressing survey results falling into the "high" category and mitigate these hazards quickly.

6.0. Mitigation Strategy

Lomakatsi's Ecological Principles for Fuel Load Reduction and Tree Planting
Lomakatsi is a Hopi word that means "Life in Balance" and is the concept behind Lomakatsi Restoration Project, a grass-roots 501(3)c non-profit organization in southwestern Oregon. The principles of the organization are sound, and ones that should be considered as fuels treatment plans are identified and completed. (Available online at http://lomakatsi.org.)
1. Act conservatively. Don't change things too much at once.
2. Respect what is already on site. • Maintain shaded areas and 70-90% overstory canopy coverage in mixed conifer forests. (Can be adjusted). • Retain large trees. • Leave a diversity of tree and plant species, and maintain uneven-aged stands. • In restoration work, plant only native species on site. • Include indigenous traditional ecological knowledge as reference point in ecosystem restoration.
3. Remember the wildlife. • Leave some places undisturbed for the birds and wildlife currently using the area. • Leave some small piles of cut material unburned, as habitat for wildlife. • Leave buffers of undisturbed vegetation in streamside riparian areas. • Retain snags for wildlife habitat. Chart their locations for monitoring and fire safety precautions.
4. Remember the soil: leave some of the cut materials on the ground, perpendicular to the slope, to catch upslope erosion and contribute to future soil.
5. Remember the people. • Listen to residents and neighbors. They know the ways in which each site is unique. • Match site diversity with worker diversity. Hispanic, Native American, and current youth cultures each have their own ways of understanding the complex diversity of nature. • Train workers about ecological principles and how to see the special characteristics of each place. • Pay workers according to their training, experience, and quality of work. • Pay workers well, and listen to them. Happy, respected people do the best work. • Look for usable material to carry from site to site for poles, furniture, fuels, etc.

Lomakatsi's Ecological Principles for Fuel Load Reduction and Tree Planting
6. Learn. • Keep complete records of prior conditions, work accomplished, and time, money, and people that it took. • Review information about similar sites before deciding how to treat new ones.

6.1. Desired Future Conditions

Protecting the Community from a catastrophic wildland fire remains the highest priority. This is possible if the Community and other stakeholders fully support the goal of making Yosemite West a Fire Safe community. All property owners should be fully informed so that they know what actions they can take on their own property. All stakeholders, as partners, should work together to reduce the amount of hazardous fuels within and adjacent to the Community to protect life, property and resources.

The owners of the undeveloped lands support protecting Yosemite West from wildland fire. The removal of smaller trees and brush to create and extend shaded fuel breaks will benefit standing trees by increasing water and nutrients and making the forest healthier and safer.

When fully implemented, the fuel reduction, in combination with a Fire Safe community, will provide for firefighter and public safety and afford fire suppression personnel a 90% success rate when defending the Community against a wildland fire, while considering the esthetic values important to the Community and the commercial value of timber in the undeveloped areas to be treated.

6.2. Mitigation Goals & Objectives

The primary mitigation goals are:

- to provide for firefighter and public safety;
- to protect public and private property, and cultural and natural resources;
- to coordinate efforts to secure adequate funding for fuels treatment;
- to implement a Fire Safe program;
- to improve overall forest health;
- to improve natural water courses; and
- to improve wildlife habitat.

The primary mitigation objectives are:

- to create an Evacuation Plan;
- to create defensible space around individual structures in compliance with PRC §4291 and for the Community as a whole by reducing fuel loading;
- to provide property owners with the information necessary on a property-by-property basis to fully implement the Fire Safe program;
- to establish lines of communication between stakeholders necessary to establish project priorities, request and receive funding, carry out fuel management projects, and fully implement the key elements of the Fire Safe program;

- to coordinate fuel management activities to take full advantage of fuels mitigation work completed by NPS;
- to create and extend shaded fuel breaks in appropriate locations on privately owned land;
- to enhance ecosystem health by reducing the fuel loading and stand composition to more natural levels and increasing growth rates of more fire-, disease- and insect-resistant species;
- to freshen springs and lengthen the run of seasonal streams by reducing the water demand created by overly dense vegetation;
- to return the forest to a more natural state that provides better habitat for wildlife and helps decrease nonnative wildlife;
- to use a variety of treatment methods that will provide the least impact to the Community and neighboring lands and utilize the by-products, when possible; and
- to formalize a means of systematically monitoring and evaluating fuel loading to ensure that completed projects are properly maintained.

6.3. Current & Future Actions

The goals listed above will be accomplished through specific projects (see the Projects Summary in Appendix H). The projects will be completed sequentially. The first projects will concentrate within the community and its immediate vicinity (see the Phase I Project Map in Appendix A). These projects take advantage of the fuels treatment work completed by NPS, enhance firefighter and public safety, and create and extend a series of shaded fuel breaks and openings that favor firefighters defending the Community. These projects take into consideration terrain features, changes in fuel type, and roads and other human-caused disturbances.

6.3.1. Evacuation Plan

Henness Ridge Road, the single means of ingress and egress, leads to Wawona Road, another two-lane paved road. In the event a wildfire cuts off or forces closure of Henness Ridge Road and/or Wawona Road in either or both directions[4], evacuation would become difficult, if not impossible, posing a risk for loss of human life.

A safety zone within the Community to "shelter in place" and ride a fire out poses substantial risk to human life due to lack of sufficiently large enough area with defensible space to provide a reasonable expectation of protection during a high-intensity, long-duration wildfire. Therefore, it will be necessary to evacuate the Community before fire poses such a risk. Accurate emergency evacuation procedures are vital for a safe, orderly and timely evacuation.

The key to safe evacuation is timely notification of all residents in the Community.

Public safety agencies in Mariposa County can deploy REVERSE 911 ® to aid in the evacuation and provide direct communication in a fire emergency. The automated phone system sends a recorded message to listed and unlisted telephone numbers within a geographical calling area. When the system gets a busy signal, it retries the number until someone answers or an answering machine picks up the call. The Community needs to inform homeowners of the

[4] During the 1990 Steamboat fire, Wawona Road was closed due to extreme fire behavior.

capabilities of the REVERSE 911 ® system and encourage homeowners without a telephone line to install one for emergency purposes.

The Community currently relies upon the Mariposa County disaster preparedness guidelines. The Mariposa County Sheriff provides public safety and disaster preparedness information at http://www.mariposacounty.org/sheriff/Devasting%20Acts.htm (also see section 3.7.). Residents need to be aware of these guidelines, and all residents should follow them in preparing individual procedures of what to do if an evacuation is ordered.

The Community should develop emergency information placards in several languages to post in individual structures, and at the information station. These placards are necessary to inform visitors who may not be reached by the REVERSE 911 ® system.

The Community lacks an outdoor emergency siren and warning system. Installation and implementation of such a system coordinated with agencies responsible for emergency response would enhance, but not replace the REVERSE 911 ® system.

6.3.2. Emergency Response

Response time to any emergency in the Community is at least thirty minutes due to its distance from the nearest responding agencies (see section 3.7.). In an emergency, the Community can initiate communication and start action before the first responding agency arrives on site.

6.3.2.1. Radio

The use of scanners to monitor public safety radio frequencies is useful for obtaining information. However, broadcasting over these frequencies is not permitted to the general public. Public frequencies allow two-way "walkie-talkie" use only. Monitoring public safety radio frequencies or use of hand-held "walkie-talkie" devices could enhance communication, but are not be intended to replace the REVERSE 911 ® system.

6.3.2.2. Emergency Telephone Tree

YWPHI maintains and annually updates the YOSEMITE WEST EMERGENCY TELEPHONE TREE, which lists homeowners and their telephone contact information. Many homeowners in the Community have primary residences elsewhere, and the tree endeavors to list any telephone contact information at alternative residences and cell phone numbers. Alternative residence and cell phone numbers cannot be reached through the REVERSE 911 ® system.

The existing emergency telephone tree, however, is not a comprehensive list; some homeowners have opted-out of voluntary participation. (The emergency telephone tree does not list contact information for vacant lot owners.) Homeowners can send an email to telephonetree@yosemitewest.org to inform YWPHI of any changes to their contact information, to request a copy of the telephone tree, or to remove their name for any reason.

The emergency telephone tree is intended to systematically notify residents during an emergency or when a situation arises that affects the entire Community. However, YWPHI, its members and officers, and those using the emergency telephone tree, cannot guarantee that anyone will receive timely and adequate notice of an emergency, and disclaims all liability.

The YOSEMITE WEST EMERGENCY TELEPHONE TREE is for the exclusive use of Yosemite West homeowners and residents (including occupants of long-term rental properties). To protect privacy, the emergency telephone tree is confidential, and its recipients are asked not forward it or provide copies to others for any purpose. YWPHI provides the list to MCFD and YNP fire chiefs.

6.3.2.3. Fire Hydrants

Mariposa County Public Works Department is responsible for maintaining the system of twenty-four fire hydrants in the Community and the official hydrant map for agency use. In fall 2005, Public Works installed uniform reflective markers at each fire hydrant and standardized the color coding of snow stakes and street markers near fire hydrants to comply with State guidelines. Public Works conducts an annual roadside clearance, which includes cutting vegetation away from the fire hydrants, and is responsible for assisting with snow removal from around hydrants. Volunteers help annually to remove dirt and rock that accumulates around the base of the hydrants.

In spring 2007, Public Works said they would gather data on volume flow in gallons per minute (GPM) and PSI per hydrant so responding agencies know which are the "preferred" hydrants to use (i.e., the hydrants with the highest GPM). Public Works will add this data to the official hydrant maps and will redistribute them to agency personnel.

YWPHI prepared and made available a Yosemite West Fire Hydrant Map to familiarize Community members with the location of fire hydrants. The Yosemite West Fire Hydrant Map is not (and is not intended to be) an official hydrant map. Its primary purpose is to inform residents of hydrant locations.

6.3.2.4. Fire Hose Houses

In 2004, YWPHI installed three metal fire hose houses to store emergency firefighting equipment. Each hose house contains fire hoses, nozzles, valves and wrenches for emergency use until agency response arrives. YWPHI purchased, and the Park and MCFD donated the fire hose and hardware, giving enough equipment to stock four locations in Yosemite West.

Three red steel fire hose houses augment the previous single storage site on the ground-level porch at 7476 Henness Circle. That site (at the southeast corner of Henness Circle) still holds the largest supply of hose and equipment inside four large trash cans.

The three red hose houses are secured with combination locks and located on Yosemite Park Way:

- below the intersection of Henness Ridge Road, near the top of the fire road connecting Yosemite Park Way to Buck Brush Lane;
- near the intersection of Choke Cherry, at the top of the fire road connecting Yosemite Park Way and Manzanita Lane; and
- adjacent to the fire hydrant located between 7244 and 7254 Yosemite Park Way.

YWPHI conducts an annual inventory and inspection of the contents to ensure they are in proper working order. In 2007, volunteers re-rolled hoses in each fire hose house into donut

rolls as per a previous NPS demonstration and request. The unofficial fire hydrant map still needs to be copied/laminated and put into each of the four fire hose houses.

6.3.2.5. Hose Lays & Hydrant Training

YWPHI organizes regular hose lays and fire hydrant training for residents during the normal fire season. These training sessions have been conducted by personnel from the agencies serving the Community, which include MCFD, NPS and USFS. Training covers opening and closing fire hydrants and using fire hoses so residents can learn how to take an active role and start to put water on a fire prior to the arrival of emergency personnel. They are essential given the distance from emergency response.

MCFD's Chief Wilson stated the goal is for the Community to lead and conduct monthly hose lays throughout each summer with the goal of hooking up to a hose and getting water to it in less than 2-1/2 minutes timed with a stopwatch.

The most recent training, on May 15, 2007, was attended by thirty-one people: fourteen homeowners, one long-term renter, and sixteen employees of rental agencies. A digital video was made of this training to be available for 'refresher' viewing.

6.3.2.6. Volunteer Fire Department

MCFD has expressed willingness to work with the Community to establish a volunteer fire department (VFD). However, a shortage of physically qualified available volunteers in the Community has precluded further steps. The Community assesses its ability to staff a VFD each year at the hose lays and hydrant training.

6.3.3. Education

Educating and informing property owners and homeowners is a key element of the overall plan and essential for making Yosemite West a Fire Safe community. YWPHI elects a chair to head its volunteer fire safety committee, and to oversee and coordinate fire safety activities.

YWPHI's quarterly newsletter *In the West* contains information about fire safety and community-related activities, particularly each April issue. It is distributed to its membership, agency personnel and is archived online at http://www.yosemitewest.org/archive.htm. The YWPHI website includes a section on fire safety (http://www.yosemitewest.org/firesafe.htm). In September 2007, YWPHI mailed the *General Guidelines for Creating Defensible Space* to every property owner of record.

YWPHI prepared a *Fire Safety Education Packet* containing materials from Firewise (http://www.firewise.org) and the California FSC. The packets were distributed at the Memorial Day Weekend Yard Cleanup on May 29, 2005, and later mailed to new property owners. YWPHI makes USFS fire safety videos (*Protecting Your Home from Wildfire* and *Wildfire! Preventing Home Ignitions*) available to residents at no charge.

YWPHI promotes fire safety education by inviting NPS, MCFD, USFS and Cal Fire personnel to attend and speak at the annual Memorial Day Weekend picnic. These activities are open to all. In September 2005, NPS's Fire Prevention Office brought their Fire Prevention

Education Trailer to the Community for demonstration of what to do in the event of a structural fire.

MCFD is also available to assist the Community and the YWPHI Fire Safety committee to help familiarize property owners with fire prevention and suppression programs.

6.3.4. Fire Safe Program & Defensible Space

The purpose of a Fire Safe program is to stress to each and every property owner the importance of creating defensible space around their structure and reducing the fuel loading on vacant lots. The primary goal is to heighten the awareness of a solid majority of the owners to a level that they initiate and support a legally binding requirement (covenant) that each property owner must adhere to the Fire Safe concept. Incremental goals include the participation of more than 90% of the owners who are the sole occupants of their property, and more than 80% of the owners who rent their properties or own vacant lots.

Fire Safe requires grassroots support. Community meetings, distribution of educational materials to residents and visitors, and "talking it up" are key elements of a successful program.

USFS installed a defensible space sign at the entrance to the Community. Residents regularly receive information about defensible space through the YWPHI newsletter *In the West* and its website http://www.yosemitewest.org/firesafe.htm. Information is also posted at the Community's information station. This information included descriptions and illustrations of the Hazard Clearance Zone (0-30 feet) and Reduced Fuel Zone (30-100 feet) outlined in PRC §4291, and a "Defensible Space Reality Check" questionnaire to dispel any myths people may have about defensible space.

In January 2005 and 2006, YWPHI submitted concept papers to the California FSC Grants Clearinghouse to fund a Yosemite West Defensible Space Program. The program was designed to address buildups of fuels within the Community, especially on vacant lots, one of the projects identified by WFA. The concept papers were not accepted for funding. Property owners must share in the financial cost of implementing Fire Safe and creating defensible space.

6.3.4.1. Annual Memorial Day Weekend Cleanup

YWPHI organizes a Memorial Day weekend cleanup of yard debris to help property owners comply with PRC §4291. Individual property owners remove pine needles from their property and pile them at curbside during spring. On the Sunday before Memorial Day, volunteers with trucks pick up the needles and remove them to the community burn pile, located at the base of the Community.

Following the cleanup work, a community picnic hosted by YWPHI serves as a venue for agency personnel to inform the community about fire safety and PRC §4291 compliance. The 2007 Memorial Day Weekend event was attended by fifty-five people: six guests, and forty-nine residents from eighteen households.

An annual communitywide cleanup has been effective, but expanding it twice annually - once in the spring and fall - would be more effective.

6.3.4.2. Annual Spring Chipping Program

YWPHI has organized and sponsored an annual Spring Chipping Program in collaboration with the Mariposa County FSC since 2005. The goal of the program is to promote creating communitywide defensible space and to reduce the amount of yard debris that goes onto the community burn pile. The program expands upon and augments the pine needle clearance, and takes place during the week following the Memorial Day weekend cleanup. A chipper and crew are contracted to treat the residue of the hazard fuel reduction projects carried out by the property owners. Limbs, small trees and brush are chipped and the chips are broadcast back onto the property.

Funding for the program has varied each year. In 2005, Mariposa County FSC received funding through a two-year grant for a countywide chipping program. A three-person crew chipped sixteen tons. The Mariposa County FSC grant-funded chipping program was made available to every property owner in Yosemite West. In 2006 and 2007, YWPHI paid for the program offering participation to its membership for free and inviting nonmembers to join for the annual $25 per household fee. In 2006, thirty-five property owners of forty-four parcels participated in the program, representing 31% of the YWPHI membership. In 2007, twenty-nine property owners of thirty-two parcels participated in the program, representing 30% of the YWPHI membership.

The cost of the chipping program exceeds the annual gross income of YWPHI, so ongoing collaboration with the Mariposa FSC and securing alternative funding is necessary to continue the program.

6.3.5. Fire Safe Inspector Program

Cal Fire, which is responsible for enforcement of PRC §4291, makes hazard clearance inspections in the community as time and personnel are available.

The Chair of YWPHI's Fire Safety committee met with Cal Fire in Mariposa on May 29, 2007 to discuss Cal Fire's Volunteer-In-Prevention (VIP) program. Cal Fire mailed YWPHI an Orientation Guide and application form. The goal is for volunteers to attend a three-hour training course to be held in Yosemite West and then be able to conduct the following three tasks, thereby filling the existing gap in inspection and enforcement of PRC §4291:

- Wildland Occupant Fire Safe Program

  Perform hazard clearance inspections for compliance with all applicable federal, state and local forest and fire laws, codes and ordinances; and issue burning permits.

- Red Flag Warning, Holiday & Arson Patrols

  Patrol selected hazardous areas in marked vehicles during severe fire weather, provide public fire prevention contacts, arson deterrents, and early detection of wildland fires. These efforts could help enforce the existing camping ban in the Community.

• Supplemental Communications Networks

Supplement and assist Cal Fire with amateur radio communication networks, providing additional frequencies and radio-telephone capabilities to Cal Fire.

Volunteers would be able to work as many or as few hours a year as they want and can do only the tasks that they want to do. YWPHI plans to facilitate implementation of Cal Fire's VIP program in 2008.

6.3.6. Infrastructure Improvements

The narrow, unpaved road to the Yosemite West Wastewater Facility, if improved, would allow better access for fire suppression forces who could need to attack a wildland fire originating downslope of the community in the Merced River gorge and Highway 140 area. Mariposa County Public Works Department maintains the existing road.

6.3.7. Vegetation & Fuel Management Projects

All stakeholders recognize that reducing hazardous fuel within and around Yosemite West is necessary. They also recognize that it is a long-term project and can be overwhelming when considered in totality. WFA developed a prioritized set of projects for Yosemite West. Due to the small size of the planning area, community demographics, existing infrastructure, and the community's location, the prioritization process was fairly straightforward. Firefighter and public safety is the first priority, and establishing a shaded fuel break to impede the spread of a wildfire, provide firefighters defensible space, and allow for safe evacuation goes a long way toward meeting that goal. Providing education to encourage fire safety throughout the community is an essential complement of any vegetation and fuel management project.

NPS has constructed shaded fuel breaks on federal land east and south of the Community. YWPHI is working through the California FSC Grants Clearinghouse to complete the shaded fuel break around the perimeter of the Community. Following successful completion of the initial shaded fuel breaks surrounding the Community, the longer-term goal is to extend the treated area farther out a half-mile or more. It will be necessary to complete the process on a project-by-project basis. Community residents as well as absentee property owners must become involved in the education program to encourage fire safety throughout the community.

The programs will be monitored and adjusted when necessary. Meetings will be held as required to gather additional input on future projects and garner additional support for the program.

Projects will require compliance with federal Endangered Species Act and NHPA statutes, and with CEQA. There are no known adverse effects on soil and water quality for most projects. It is anticipated that machinery will be used to complete a portion of the work. Some equipment can cause soil compaction and soil disturbance. Care should be taken to reduce impacts by limiting use on wet or moist soils, in riparian areas, and on old railroad grades. Equipment with wide tracks and large pneumatic tires often causes less impact and should be specified in a request for quotes. Equipment should cross culturally significant railroad grades at right angles, whenever safe to do so. Water quality should be monitored, as necessary. Air

quality must be addressed and the impacts of any burning mitigated to the extent possible, and all necessary permits secured.

The use of a broad range of treatment methods is recommended to fully implement the CWPP's hazard fuel treatment component. Hazard fuel treatment in the undeveloped areas could be completed in conjunction with a commercial logging operation, as PFT is currently doing (see section 4.5.4.). The method of treatment would depend on access and steepness of slope. However, the emphasis should be placed on the use of mechanical means, as burning could pose risk to the Community and raise liability issues. In the undeveloped areas, it may be necessary to follow up mechanical treatment with a broadcast burn to reduce surface fuels and to maintain the sites.

The first project is the creation of a 150-foot to 300-foot-wide shaded fuel break immediately west and north of the Community. This fuel break connects shaded fuel breaks previously created by the Park on the east and south boundaries of the Community, and ties into the NPS fuel reduction project along the Henness Ridge Road at the Community's entrance (see Projects Summary in Appendix H). As additional funding becomes available other projects can be initiated to extend the fuel break to the west and north, taking advantage of terrain features. The goal is to create an open stand of timber, up to a half-mile wide in certain locations, where fire would not carry through the trees' crowns. The spacing between the trees would be greater than that of the open stand. This creates an area of defensible space that will keep flames from impinging on structures and aid firefighters as they protect structures and control the fire. In most instances, a wildland fire would not be able to advance as quickly in the treated areas and more than likely would drop to the ground. Once on the ground, the fire would burn out surface fuels which would provide firefighters a better chance of taking other suppression action to halt its spread.

Individual property owners within the Community must treat vegetation around their structures and on their undeveloped lots to create as much defensible space as possible within the Community and to improve access for firefighters by brushing back roads and driveways. This work should be initiated immediately and completed as soon as possible and maintained annually.

6.3.7.1. Thinning & Brushing

Thinning can be used to treat fuels in forested areas by reducing ladder fuels and creating more space between larger trees. Around structures, thinning can be used to remove ladder fuels to create more defensible space. The treatment of fuels around structures and on vacant lots must be an ongoing process that is maintained by property owners. Much of the work is required under PRC §4291. YWPHI is working with Mariposa County FSC and the Mariposa County Board of Supervisors to develop a community-specific regulation requiring hazard fuel clearance on vacant lots.

Brushing can be used to remove dead branches and to increase the distance between individual plants and clumps of bushes on the forest floor. Around structures, brushing can be used to remove dense brush to create more defensible space.

Thinning and brushing will be used to treat the area outside the Community to create shaded fuel breaks and to decrease stand density in the areas identified in Appendix H.

Mechanical equipment such as a masticator can be used on slopes 40% or less to reduce small trees and brush to surface fuels that can later be treated. On slopes greater than 40%, hand crews with chainsaws will be necessary. If the resulting residue cannot be burned, it could be brought to a road and chipped, with chipped materials blown back into the forest wherever possible to provide for soil protection and to return nutrients to the soil.

The number of trees remaining on the site would depend on the predominant tree species and the slope. Trees would not necessarily be evenly spaced. The contractor can be given the latitude to leave small groups of trees and encouraged to create a mosaic of uneven age classes of trees. Large trees would be favored, as would more fire adapted species such as pine and Douglas fir. Scattered brush, both single plants and groups of plants, would be left in more open sites. Openings would be created in the forest to encourage the regeneration of pine and grasses and forbs.

The subsequent projects would involve the treatment of approximately 343 acres to the west, southwest, and north of the initial shaded fuel break. The treatment methods would be the same, but the thinning would take place primarily on lands with a slope of 40% or less (see the Slope Map in Appendix A). The area could be logged as part of a fuels management project and the residue piled and burned or treated using a light under-burn. The treatment would result in an uneven-aged stand with a variety of trees and vegetation, which will favor a greater array of wildlife and bird life, while being esthetically pleasing and much more resistant to the impacts of fire. Subsequently, an additional 700 acres of land could be treated to further increase the area's defensibility (see Phase II on the Project Area Map in Appendix A).

6.3.7.2. Prescribed Fire

Prescribed fire has a place in a fuels management program. Prescribed fire can be used to treat residue following other thinning treatments. A low-intensity prescribed fire reduces the amount of woody debris and return nutrients to the soil. Hand piling and burning may be more economical and environmentally friendly as opposed to transporting the debris to a road to be chipped or hauled to another location for disposal. This may be especially true on steep slopes if the area is logged well in advance of the thinning project. However, narrow burning windows common to the area and concerns over safety and liability may make pile burning difficult.

Prescribed fire operations can only be conducted by someone qualified to do so. Smoke mitigation requires adherence to the California air quality regulations and permitting process. The entity planning the prescribed fire must notify the air district and provide burning location, acreage, vegetation type, fuel conditions, schedule, location of sensitive receptors, and other information. The Mariposa County Air Pollution Control District has primary responsibility for control of air pollution from prescribed burning. Rule 307 – Wildland Vegetation Management Burning – addresses prescribed burning in Mariposa County (see http://www.airqualityweb.com/government/usa/california/mariposa.shtml). Guidance for smoke mitigation also can be found in *Smoke Management Guide For Prescribed and Wildland Fire* (2001 edition), which is available at http://www.nwcg.gov.

The use of prescribed fire is not currently recommended or planned on privately owned lands within or adjacent to the Community due to safety and liability concerns, although it has been successfully used on adjacent federal lands.

6.3.7.3. Forest Products Utilization

The selective harvesting of saleable timber can be an important component of the thinning projects and help offset the cost of such work. Selectively harvesting timber reduces the stand density and creates openings, both of which are desirable conditions. Local sawmills can utilize logs as small as nine inches dbh[5]. However, small logs have little wood volume and lower value than larger logs, and the cost of logging and hauling is higher for small logs than with larger logs. Individual property owners could hire a logger and sell the wood to a sawmill. Currently, thinning is marginally feasible. Any harvesting of timber for sale, barter or trade is governed by California forestry laws (see section 3.4.). Homeowners are encouraged to use suitable residue for firewood.

Table 9: Comparison of Fuels Treatment Methods
Source: Michael Beasley, Yosemite National Park, July 2004

Method	Slope	Cost/acre	Pros	Cons
Masticator	<40%	$370-$430	Efficient Low slash	Not suitable for steep slopes Need place to turn around Soil disturbance
Chipping	All	$350-$600	No slash Can stabilize soils Utilizes products	Requires access Can be labor intensive Must haul chips to market
Thinning & Burning	All	Cut $170-$200 Pile $150-$170 Burn $70-$300	Low technology Broad range of applications	Labor intensive Residue could increase amounts of surface fuel Smoke concerns
Broadcast Burning	All	$500-$1,500 dependent upon size of treatment area	Can mimic nature Cost effective	Possibility of escape Requires experienced personnel Smoke concerns Water quality concerns
Logging	All	Dependent on commercial value	Utilizes products Removes biomass	Lack of available markets Low number of logs Soil disturbance
Pruning	All	$500-$1,000	Effective	Labor intensive Generates slash
Firewood	All	None	Utilizes products Removes biomass	Possible liability issues

6.4. Watershed Protection

The protection of the watershed, a key element in the planning process for any project, includes: leaving a buffer along intermittent streams and watercourses whenever possible; limiting the use of heavy equipment within fifty feet of an open watercourse or wetland; leaving or hand cutting

[5] Diameter at breast height (dbh) equals the diameter of a tree measured four feet above ground.

or trimming deciduous trees and shrubs within fifty feet of an open watercourse or wetland area; leaving chips, branches and logging debris on the forest floor to protect the soil and reduce erosion; using equipment with wide tracks or large-diameter pneumatic tires designed to reduce disturbance; and restoring damaged areas by reseeding with native species.

Any project requiring CEQA compliance will address watershed protection. The FPA also includes strict compliance standards for work within water protection zones (see section 3.4.). Proposed action within the Community should not cause any watershed degradation. Precautions to reduce or eliminate any watershed contamination should be taken since runoff leads to the federally protected Merced River (see section 3.1.3.).

6.5. Permitting & Exemptions

Any property owner who wants to sell, trade or barter any wood from conifers from their property must comply with the FPA and FPRs (see section 3.4.).

Any new construction must comply with the WUI building codes (see section 3.6.1.).

A free burning permit is available to property owners who want to burn anything on their property. Property owners can call the Mariposa County Burn Day Information Line (☎ 888-440-2876 or 209-966-1200) for recorded information, updated daily, that answers the following questions: Is a burning permit required at this time? What are the burning hours? Is today is a permissive burn day? Cal Fire provides useful tips for burning debris piles on their website.

6.6. Prioritized Actions & Implementation Timeline

Table 10: Prioritized Actions & Implementation Timeline

Project	<1 yr	1-5 yrs	5+ yrs	Steps to Implement	Remarks
Update Red Zone Fire Risk Assessment	2008			Collect additional data Validate existing data	Preliminary data is collected MCFD lead agency
Enhance Evacuation Plan	2008			Identify project leader Form committee Write and implement plan Install outdoor siren and warning system Enhance emergency response	Mariposa County Sheriff lead agency Work in close collaboration
Strengthen Fire Safe program	2008			Identify project leader Determine methods Continue education Implement Cal Fire's VIP program	It is a long-term, continuing project
Improve defensible space within the Community	2008	X		Get buy-in from owners who have not yet created defensible space Determine funding source Secure funding Schedule spring/fall cleanups	Determine lead person or agency Start work as soon as possible Outside funding may be factor for involvement

Table 10: Prioritized Actions & Implementation Timeline					
Project	**<1 yr**	**1-5 yrs**	**5+ yrs**	**Steps to Implement**	**Remarks**
Complete and extend shaded fuel breaks around Community		X		Identify project leader Secure necessary landowner agreements Identify and secure funding Finalize treatment methods and areas Secure contractors Implement project	Complete in stages due to project's size Complement work completed or scheduled by NPS Institute monitoring plan to insure objectives are achieved Schedule follow-up treatments
Treat fuels beyond shaded fuel break			X	Identify project leader Secure necessary owner agreements Identify and secure funding Finalize methods to be used and areas to be treated Secure contractors Implement project	Complete in stages due to project's size Complement work completed or scheduled by NPS Institute monitoring plan to insure objectives are achieved Maintain treated areas

6.7. Monitoring & Evaluation

When evaluating a treatment there are three important questions that must be answered:

- What is the need?
- What tools did I use?
- Were these tools effective?

These questions will help verify that the tool or suite of tools appropriate and the treatment objectives were achieved.

There is a tendency to view situations in one's own context. It can be challenging to keep the big picture in focus and it is human nature to want to fall back into one's own comfort zone. It is easier to focus on project elements like hazard fuel reduction in the WUI, instead of considering the integration of all elements into a Fire Safe program. However, the CWPP requires integrated management of a multi-faceted program.

The determination to treat an area is based on the existing fuel conditions, desired future conditions, available funding, and the ability to support the program, both at inception and down the line. Progress must be assessed at various points during the project to determine if the project is on schedule and if the desired results are being achieved. This should be accomplished using an interdisciplinary approach, as well as an inter-agency approach, whenever possible. Regular reporting by project managers is essential, indicating percentages of project components completed and how and when the remaining components will be accomplished. Use of photo-monitoring is an effective way to show progress.

A monitoring program is a vital part of the program. Monitoring determines if the quantifiable objectives identified in the individual plans are being achieved and if the desired long-term changes are occurring. Monitoring results will be used to validate the program, adjust

approaches and prescriptions, and identify those areas and topics that need additional effort. Photo-monitoring is highly effective to show not only before-and-after images of treatments, but also to show community accomplishments and other completed components.

Once the immediate actions are successfully completed, it is appropriate to start the long-term process of extending shaded fuel breaks and treating the lands to the west and north beyond the initial projects. If the initial projects are properly completed, the community's support will be present and the tools to do the job will be in place.

7.0. Conclusions

Experienced wildland fire specialists analyzed the situation through a series of site visits, a public meeting, interviews, and literature searches. They also established plots and conducted fuel-load sampling. The data collected during the fuel-load sampling process were used in a computer model to determine susceptibility of the area to crown fire and establish standards that would reduce the likelihood of the treatment area supporting a crown fire. The specialists used the results to recommend certain courses of action.

California's repeated history of catastrophic fire in the WUI points out that survival depends on maintaining a Fire Safe community. For Yosemite West, the Red Zone Fire Risk Assessment (see section 5.1.) identifies structures most at risk and, in conjunction with the CFRO Structural Vulnerability Survey (see section 5.2.), recommends actions owners need to take. All new structures must comply with new WUI building codes (see section 3.6.1.).

The education and involvement of the property owners is key to the success of the Fire Safe program. Lack of participation places the entire community at risk. Therefore, it is important that the Community launch a full-scale effort to involve the property owners in any fuel treatment projects. There is an immediate need to enact an Evacuation Plan for Yosemite West to provide for firefighter and public safety (see section 6.3.1.).

The amount of debris generated by creating defensible space around structures, from vacant lots, and shaded fuel breaks along the boundary of the Community is significant. These materials must be disposed of in an efficient, cost-effective manner. Burning is a good way to accomplish fuel reduction. Unfortunately, there are many limitations to the use of prescribed fire to treat fuels, including cost, air quality concerns, limited burn windows, limited resources, proximity to structures and the Park, etc.

To successfully compete for limited WUI funding, it is important to show that other mitigation measures have been initiated or are in place. By initiating other projects within the Community, the stakeholders continue to demonstrate a willingness to take the actions necessary to protect their community. These include a community wildland fire education program and treating fuels on all lots.

Consensus and clear understanding between stakeholders are essential, and regular meetings must be held to solicit input and support the process. The CWPP itself will require periodic updating to reflect the changes to the community as new development takes place and initial projects, such as the sheltered fuel break, are completed. The Community and agencies must be proactive when seeking funding to complete future projects. The allocation of county, state and federal resources is a competitive process, and the Community will require advocates at

all levels. Creative financing will require use of matching funds, and funding will be contingent on successful completion of previous projects.

All treated areas must receive followup treatment. The open nature of shaded fuel breaks lends itself to the regeneration of vegetation that can impact the ability of firefighters to manage a wildland fire. If ignored, defensible space created around dwellings can soon be lost to regrowth. The Community needs to remain proactive and work closely with agencies and other stakeholders to prevent fire and to prepare to survive the inevitability of wildfire in the unique wilderness landscape.

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Appendices

Appendix A - Maps prepared by Wildland Fire Associates and Digital Mapping Solutions

Appendix B - Photo Points

Appendix C - NPS Letter Y1415 (YOSE-PM)

Appendix D - Archeological Reconnaissance Survey of Yosemite West Community

Appendix E - Reciprocal Fire Protection Agreement

Appendix F - NPS Map 2-20 Fire Management Units

Appendix G - NPS Project Map - Yosemite West Burn Units

Appendix H - Projects Summary

Appendix I - Glossary

Appendix A - Maps

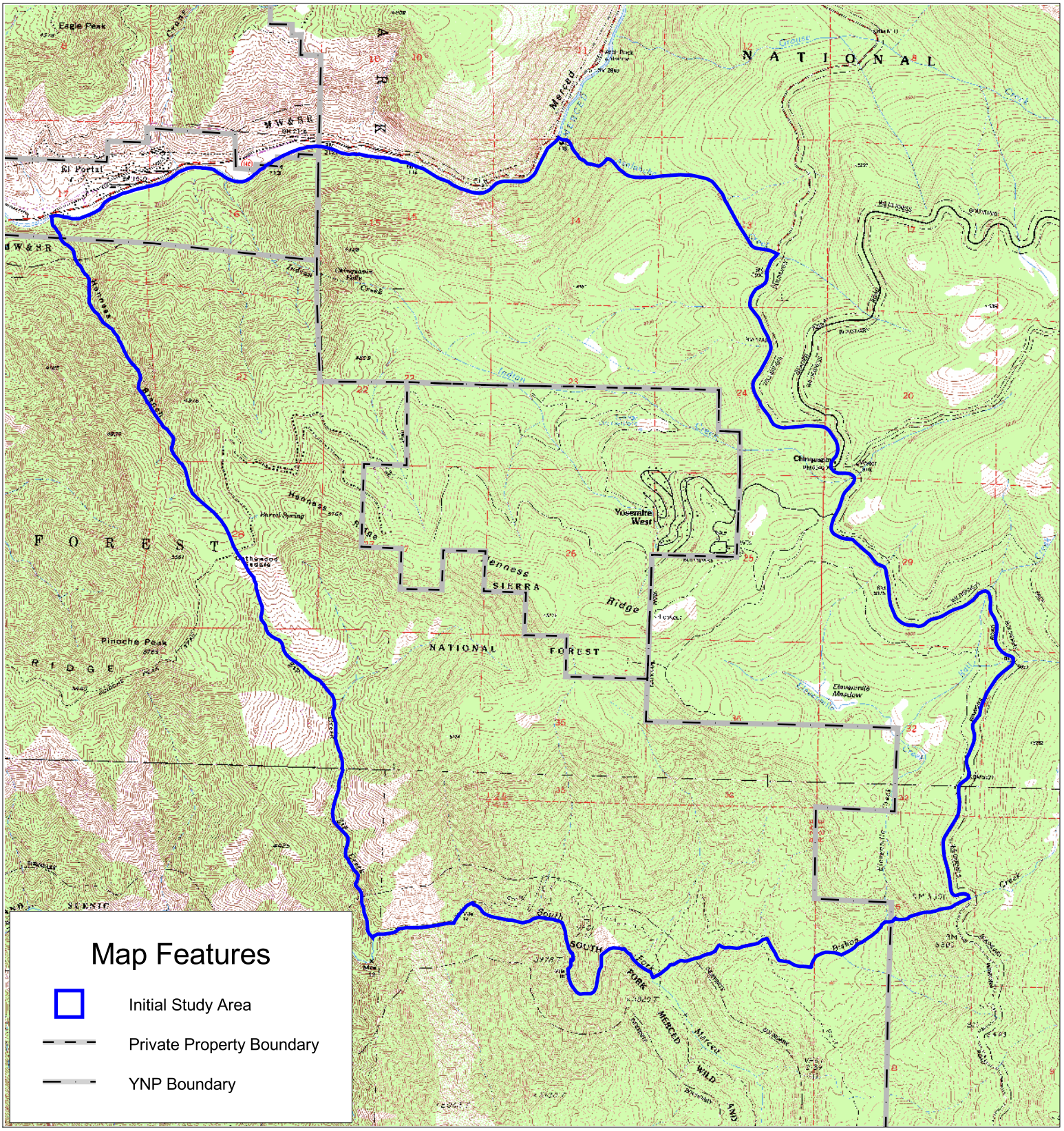
Appendix A contains these eight maps produced by Wildland Fire Associates and Digital Mapping Solutions:

- Initial Study Area
- Project Area Map
- Fire History Map
- Fire Regime and Condition Class
- Phase I Project Map
- Parcel Map
- Slope Map
- Phase 1 Project Slope Map

Yosemite West
Community Wildfire Protection Plan

USGS 7.5' Topographic Map
El Capitan and El Portal

Initial Study Area



Base data provided by Yosemite National Park.
Accurate for display purposes only.

Map produced by: Mandeno
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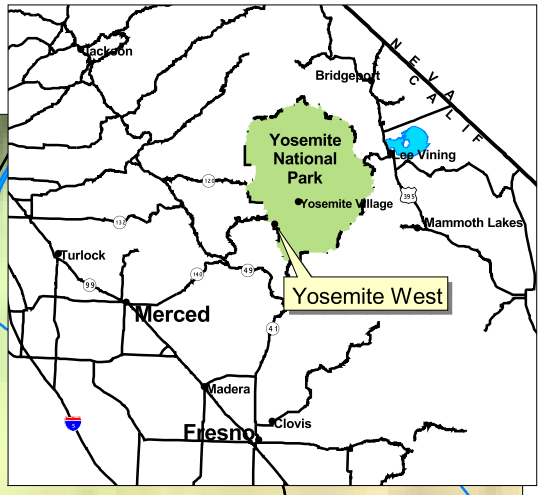
Digital Mapping Solutions
Integrating Data to Create Spatial Knowledge

Wildland Fire Associates

Yosemite West
Community Wildfire Protection Plan
USGS 7.5' Topographic Map
El Capitan and El Portal

Project Area Map



Key to Map Features

- Proposed Project Area
- Roads
- Trails
- Streams
- Lakes
- YNP Boundary
- Private Property Boundary

Base data provided by Yosemite National Park.
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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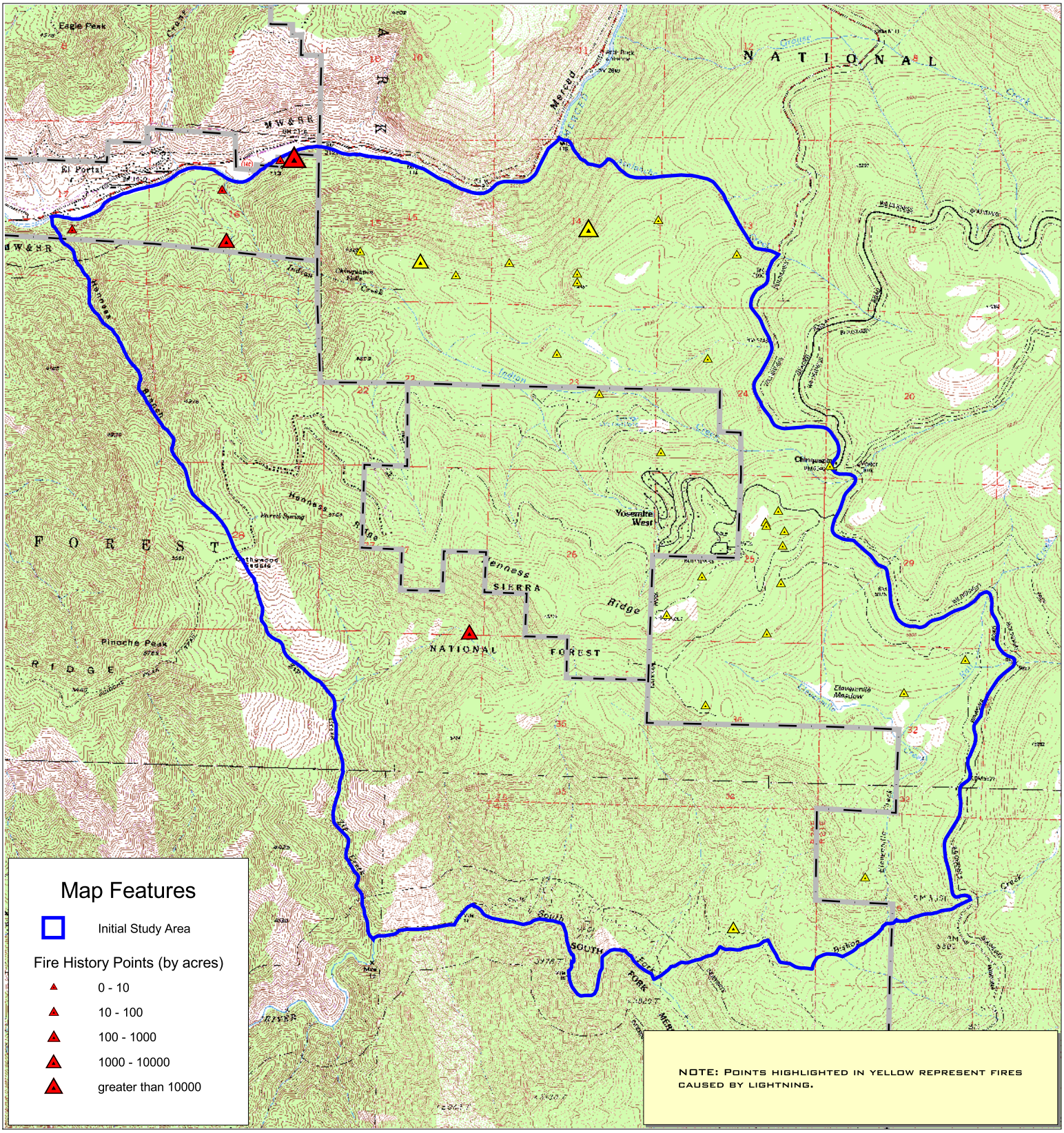
Digital Mapping Solutions
Integrating Data to Create Spatial Knowledge

Wildland Fire Associates

Fire History Map



Data provided by Yosemite National Park and the Fire Resource Assessment Program (FRAP).
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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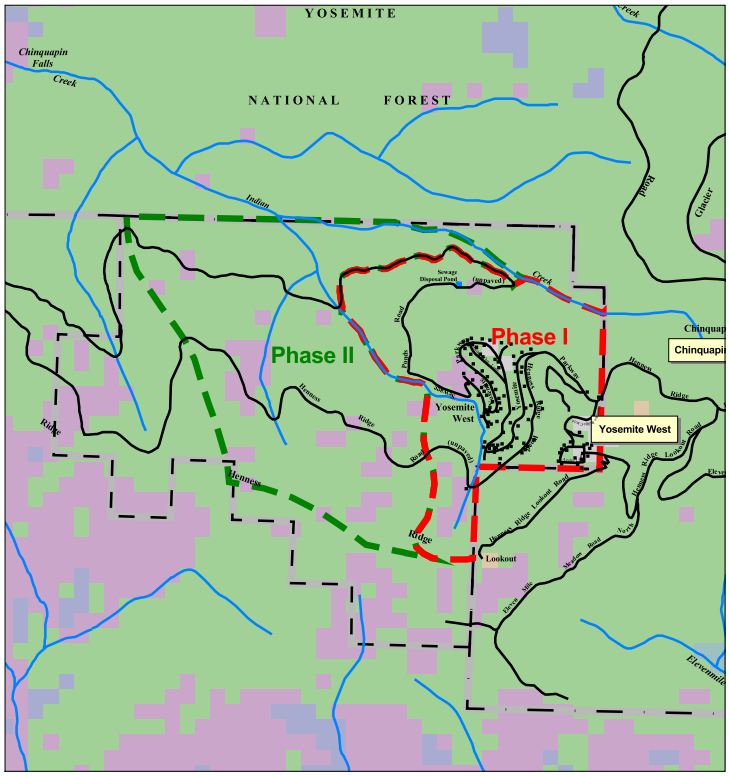
Digital Mapping Solutions
Integrating Data to Create Spatial Knowledge

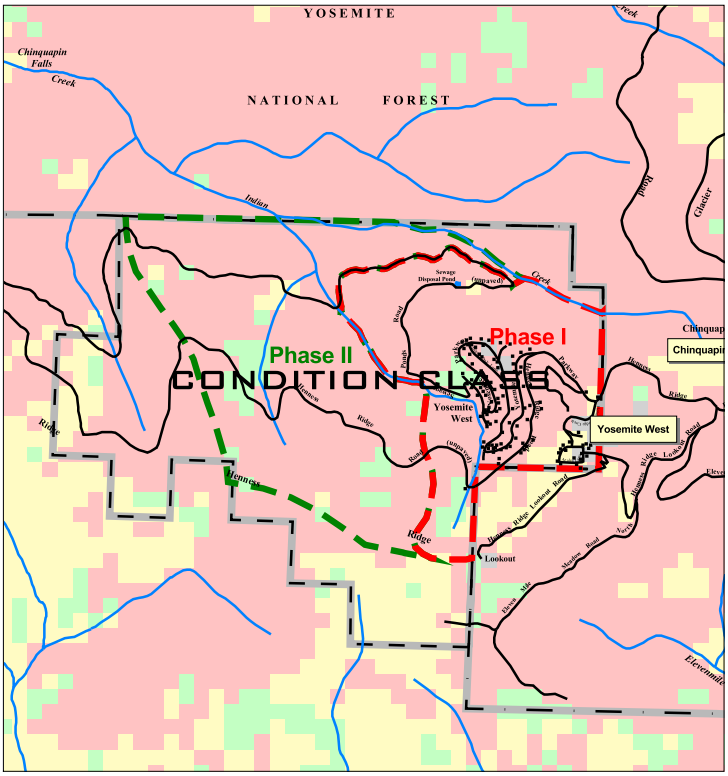
Wildland Fire Associates

Fire Regime and Condition Class

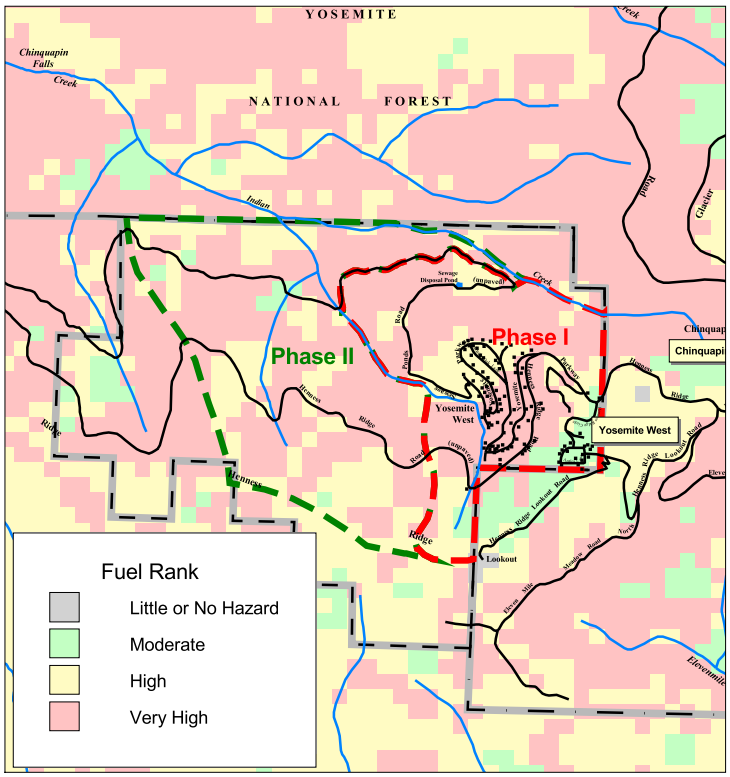
Fire Regime



Condition Class



Fuel Rank



Fire Regime

- Urbanized Land Cover
- Water
- Barren
- 0-35 year frequency, low severity
- 0-35 year frequency, mixed severity
- 35-100 year frequency, low severity
- 35-100 year frequency, mixed severity
- 35-100 year frequency, high severity

Condition Class

- Non-Wildlands, Developed
- Fire regime within or near historical range
- Fire regime moderately altered from historical range
- Fire regime significantly altered from historical range

Base data provided by California Department of Forestry and Fire Protection, FRAP (2004).
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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Miles

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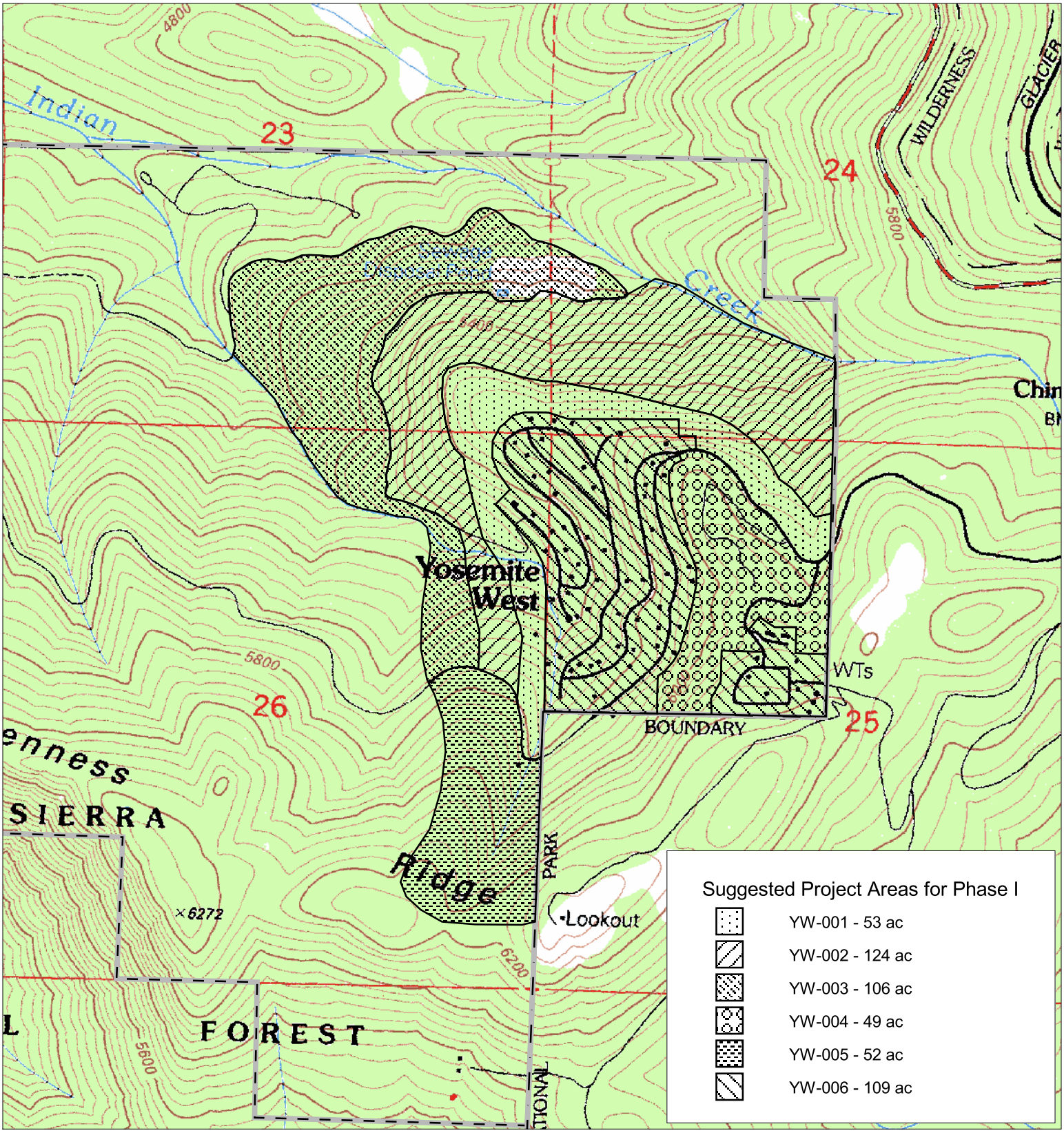
Wildland Fire Associates

Yosemite West
Community Wildfire Protection Plan

Phase I
Project Map

USGS 7.5' Topographic Map
El Capitan and El Portal



Base data provided by Yosemite National Park.
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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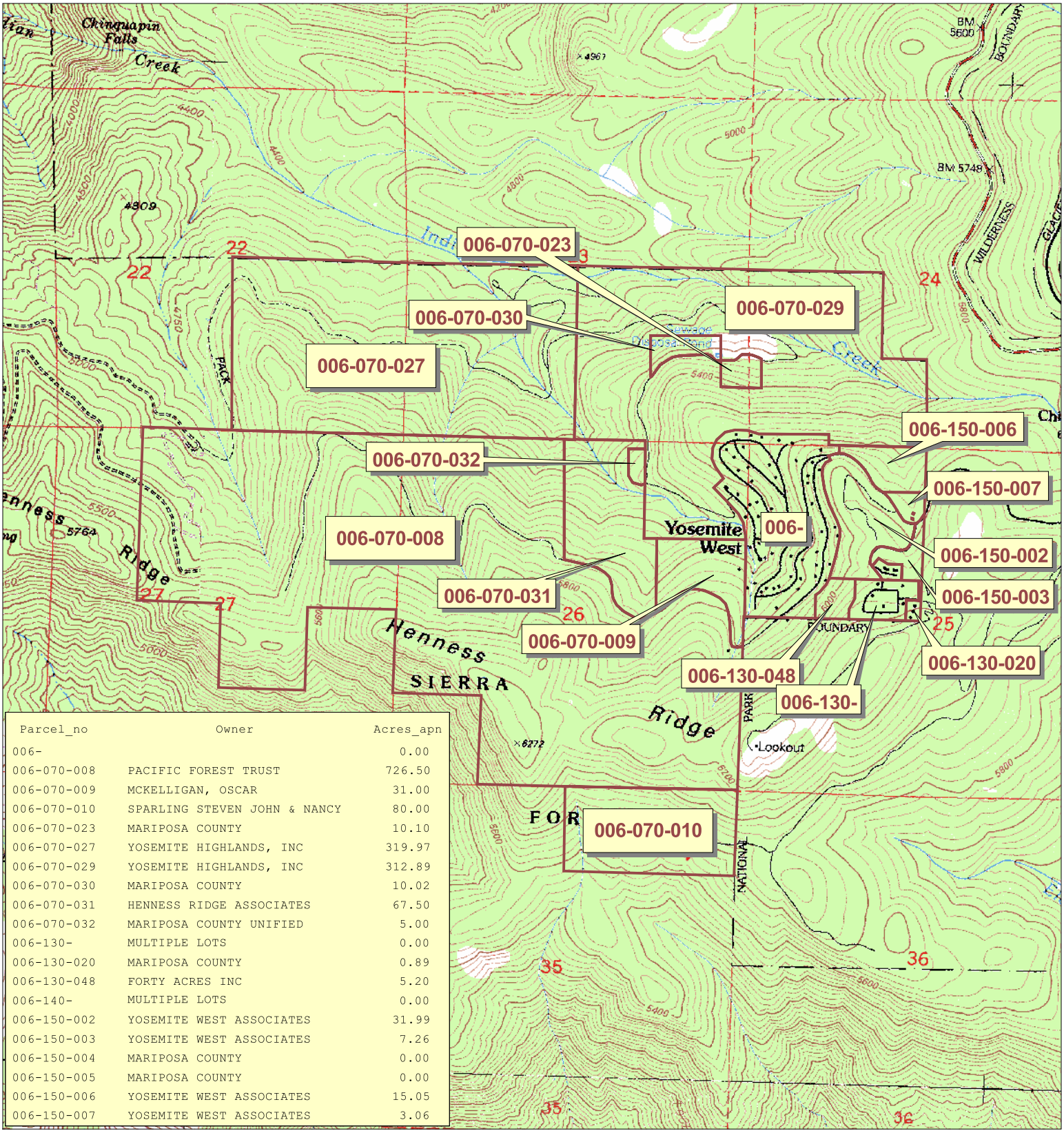
Parcel Map



Parcel_no	Owner	Acres_apn
006-		0.00
006-070-008	PACIFIC FOREST TRUST	726.50
006-070-009	MCKELLIGAN, OSCAR	31.00
006-070-010	SPARLING STEVEN JOHN & NANCY	80.00
006-070-023	MARIPOSA COUNTY	10.10
006-070-027	YOSEMITE HIGHLANDS, INC	319.97
006-070-029	YOSEMITE HIGHLANDS, INC	312.89
006-070-030	MARIPOSA COUNTY	10.02
006-070-031	HENNESS RIDGE ASSOCIATES	67.50
006-070-032	MARIPOSA COUNTY UNIFIED	5.00
006-130-	MULTIPLE LOTS	0.00
006-130-020	MARIPOSA COUNTY	0.89
006-130-048	FORTY ACRES INC	5.20
006-140-	MULTIPLE LOTS	0.00
006-150-002	YOSEMITE WEST ASSOCIATES	31.99
006-150-003	YOSEMITE WEST ASSOCIATES	7.26
006-150-004	MARIPOSA COUNTY	0.00
006-150-005	MARIPOSA COUNTY	0.00
006-150-006	YOSEMITE WEST ASSOCIATES	15.05
006-150-007	YOSEMITE WEST ASSOCIATES	3.06

Base data provided by Yosemite National Park.
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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Miles

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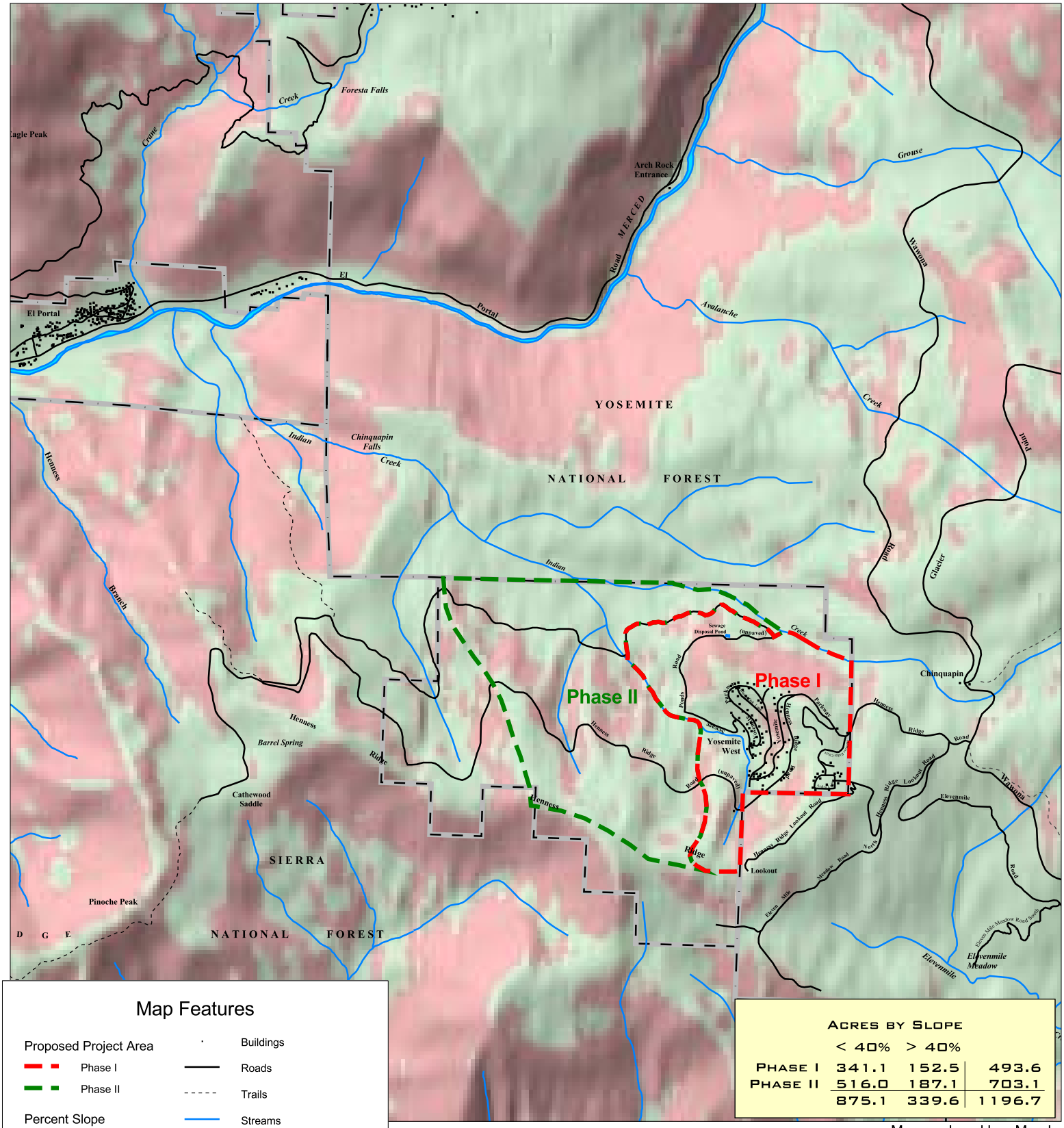
Wildland Fire Associates

Yosemite West
Community Wildfire Protection Plan

Slope Map

USGS 7.5' Topographic Map
El Capitan and El Portal



Map Features

Proposed Project Area
- Phase I
- Phase II

Percent Slope
- less than 40%
- greater than 40%

- Buildings
- Roads
- Trails
- Streams
- YNP Boundary
- Private Property Boundary

Acres by Slope

	< 40%	> 40%	
Phase I	341.1	152.5	493.6
Phase II	516.0	187.1	703.1
	875.1	339.6	1196.7

Map produced by: Mandeno
Date: 02/01/05

Accurate for display purposes only.

N

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0.5 0 0.5 1 1.5
Miles

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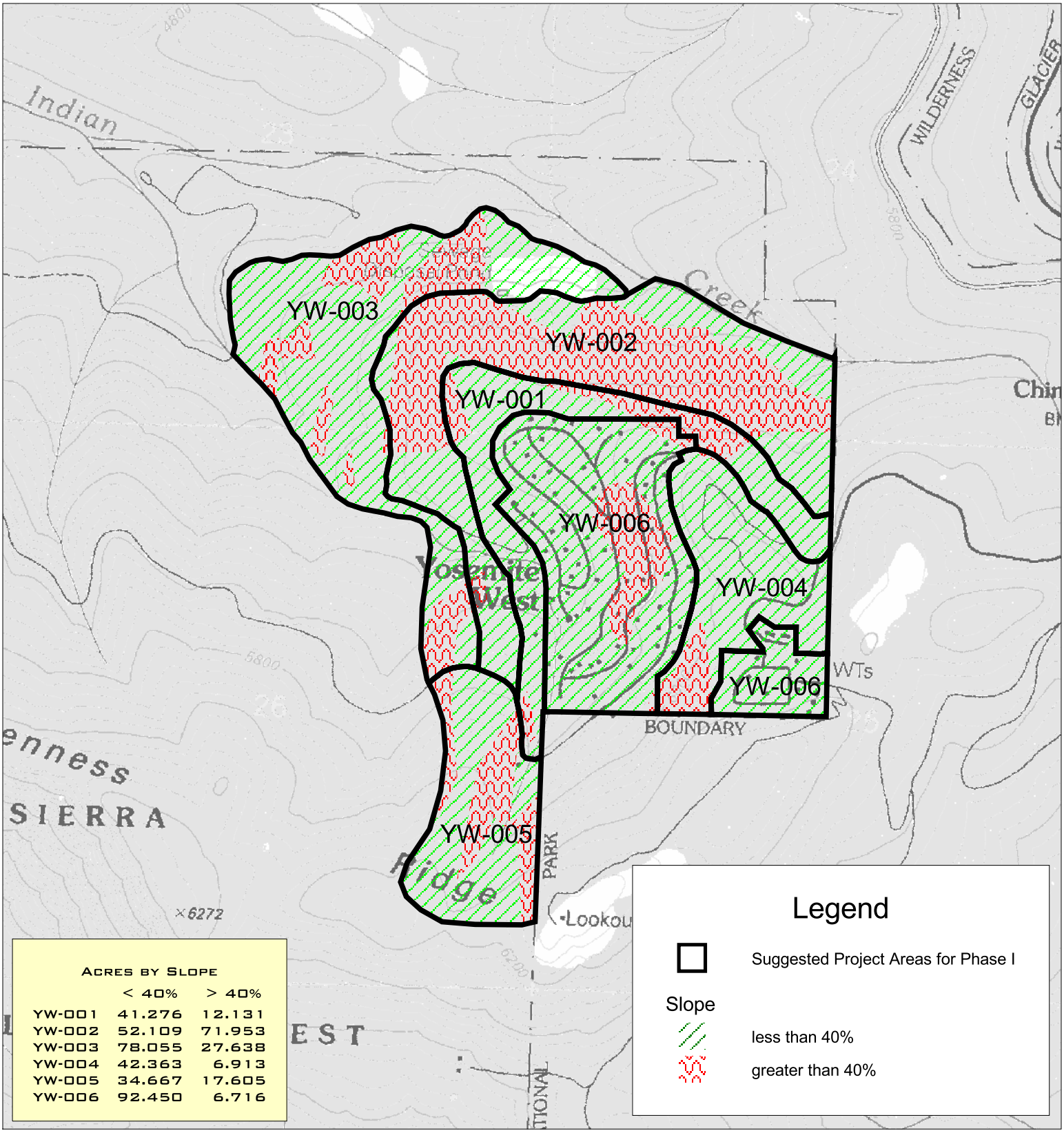
Wildland Fire Associates

Yosemite West
Community Wildfire Protection Plan

Phase I
Project Slope Map

USGS 7.5' Topographic Map
El Capitan and El Portal



Acres by Slope

	< 40%	> 40%
YW-001	41.276	12.131
YW-002	52.109	71.953
YW-003	78.055	27.638
YW-004	42.363	6.913
YW-005	34.667	17.605
YW-006	92.450	6.716

Base data provided by Yosemite National Park.
Accurate for display purposes only.

Map produced by: Mandeno
Date: 02/01/05

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1 : 15,000

0.25 0 0.25 0.5
Miles

Digital Mapping Solutions
Integrating Data to Create Spatial Knowledge

Wildland Fire Associates

Appendix B - Photo Points

DATA SHEET

Location **Henness Ridge Photo Point 1** Elevation **6377 ft**

Northing: **4169014** Easting: **259841** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.217
0.26 - 1	2.554
1.1 - 3	0.000
3+ sound	6.257
3+ rotten	14.372
Total	23.401

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.50
Avg. duff depth (in.)	1.25
Avg. sound diameter (in.)	8
Avg. rotten diameter (in.)	14
Tree canopy cover (percent)	70%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	448	0	50	0	0	497	0
Basal area (m^2/ha)	27	0	12	0	0	38	0
Avg. d.b.h. (cm)	26	0	54	0	0	29	0
Avg. height (m)	11	0	17	0	0	11	0
Avg. crown base hght (m)	4	0	3	0	0	4	0
2.5 to 15cm							
Trees per hectare	199	99	0	0	0	298	0
Avg. height (m)	3	6	0	0	0	4	0

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 10 with some heavy dead and down.

Mixed conifer stand with dead-down woody fuels (Anderson, 1982).

Expected Fire Behavior

Slow burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Crown fire potential is moderate.

Remarks

No evidence of recent disturbance.

DATA SHEET

Location **Henness Ridge Photo Point 2** Elevation **6222 ft**

Northing: **4169078** Easting: **259606** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.372
0.26 - 1	0.970
1.1 - 3	1.543
3+ sound	0.000
3+ rotten	0.000
Total	2.884

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.00
Avg. duff depth (in.)	2.5
Avg. sound diameter (in.)	0
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	77%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	50	50	50	249	50	448	0
Basal area (m^2/ha)	5	15	7	34	5	65	0
Avg. d.b.h. (cm)	36	61	42	38	36	37	0
Avg. height (m)	12	18	17	11	17	13	0
Avg. crown height (m)	3	8	5	2	8	4	0
2.5 to 15cm							
Trees per hectare	149	0	0	199	0	348	0
Avg. height (m)	14	0	0	9	0	11	0

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 10 with a live fuel component. (Anderson, 1982)

Some bitter cherry and manzanita present.

Expected Fire Behavior

Fires burn in the surface and ground fuels with a high fire intensity. Crowning out, spotting and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficultires.

Crown fire potential is high.

Remarks

Old, currently unused road running along ridge just north of plot. Evidence of past logging.

DATA SHEET

Location **Henness Ridge Photo Point 3** Elevation **6229 ft**

Northing: **4169125** Easting: **2593939** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.131
0.26 - 1	1.564
1.1 - 3	1.493
3+ sound	8.930
3+ rotten	0.000
Total	12.118

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	2.00
Avg. duff depth (in.)	3
Avg. sound diameter (in.)	6.25
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	70%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags
> 15cm d.b.h.							
Trees per hectare	249	99	0	50	0	547	149
Basal area (m^2/ha)	14	18	0	2	0	35	7
Avg. d.b.h. (cm)	30	47	0	25	0	32	28
Avg. height (m)	12	15	0	8	0	10	19
Avg. crown height (m)	2	5	0	2	0	2	0
2.5 to 15cm							
Trees per hectare	50	50	0	99	0	199	0
Avg. height (m)	5	2	0	2	0	3	0

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 8 and 9. (Anderson, 1982)

Closed canopy stands of short-needle conifers or hardwoods and closed stands of long-needled pine.

Expected Fire Behavior

Slow burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Crown fire potential is moderate.

Remarks

Old, currently unused road running along ridge just north of plot. Evidence of past logging.

DATA SHEET

Location **Photo Point 4** Elevation **5567 ft**

Northing: **4170367** Easting: **258162** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.016
0.26 - 1	0.000
1.1 - 3	7.390
3+ sound	3.667
3+ rotten	26.890
Total	37.963

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.75
Avg. duff depth (in.)	4.4
Avg. sound diameter (in.)	3.6
Avg. rotten diameter (in.)	7.9
Tree canopy cover (percent)	68%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	547	0	0	50	0	597	50
Basal area (m^2/ha)	38	0	0	2	0	40	1
Avg. d.b.h. (cm)	29	0	0	22	0	28	18.8
Avg. height (m)	14	0	0	9	0	14	13
Avg. crown height (m)	4	0	0	4	0	4	0
2.5 to 15cm							
Trees per hectare	547	50	0	696	0	1293	149
Avg. height (m)	6	3	0	3	0	4	4

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 9 and 10. Very young stand, some ponderosa pine and sugar pine. Plot near old logging road, area heavily impacted by logging, logging slash present.

Expected Fire Behavior

Fires burn in the surface and gournd fuels with a high fire intensity. Crowning out, spotting and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficultires. (Anderson, 1982) Crown fire potential is high.

Remarks

Evidence of past logging, landings and roads nearby.

DATA SHEET

Location **Photo Point 5** Elevation **5688 ft**

Northing: **4170131** Easting: **258331** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.351
0.26 - 1	2.136
1.1 - 3	0.000
3+ sound	0.841
3+ rotten	1.419
Total	4.746

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	0.75
Avg. duff depth (in.)	4.4
Avg. sound diameter (in.)	3.0
Avg. rotten diameter (in.)	4.5
Tree canopy cover (percent)	77%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	0	50	547	0	50	647	0
Basal area (m^2/ha)	0	1	32	0	1	34	0
Avg. d.b.h. (cm)	0	18	27	0	18	25	0
Avg. height (m)	0	10	10	0	7	10	0
Avg. crown height (m)	0	4	4	0	3	4	0
2.5 to 15cm							
Trees per hectare	746	497	497	249	149	2139	199
Avg. height (m)	4	4	6	3	6	5	4

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 8. (Anderson, 1982) Dense understory.

Expected Fire Behavior

Slow burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Crown fire potential moderate.

Remarks

DATA SHEET

Location **Photo Point 6** Elevation **5832 feet**

Northing: **4169852** Easting: **258788** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.130
0.26 - 1	0.310
1.1 - 3	1.481
3+ sound	17.262
3+ rotten	15.600
Total	34.782

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.00
Avg. duff depth (in.)	7.75
Avg. sound diameter (in.)	5.32
Avg. rotten diameter (in.)	6.88
Tree canopy cover (percent)	67%

Stand Information

Characteristic	Sugar pine	Ponderosa pine	Incense cedar	white fir	Douglas fir	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	249	50	249			547	99
Basal area (m^2/ha)	36	8	6			52	4
Avg. d.b.h. (cm)	41	45	20			32	21
Avg. height (m)	19	21	10			15	5
Avg. crown height (m)	9	7	4			7	0
2.5 to 15cm							
Trees per hectare	99		597	249	99	1044	
Avg. height (m)	18		21	16	24	20	

Fuel Model and Descriptive Narrative

Along ridge in relatively open area. Best represented by Fuel Model 10. (Anderson, 1982)

Understory dense in pockets.

Expected Fire Behavior

Typically low burning in open areas, where heavy concentrations of fuels exist, fire potential will increase.

Crown fire potential high due to 'dog-hair' thicket of pole-sized trees.

Remarks

Evidence of past logging operations.

DATA SHEET

Location **Photo Point 7** Elevation **5206 ft**

Northing: **4170695** Easting: **257939** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.182
0.26 - 1	0.632
1.1 - 3	6.032
3+ sound	17.479
3+ rotten	24.115
Total	48.439

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.30
Avg. duff depth (in.)	2
Avg. sound diameter (in.)	6.6
Avg. rotten diameter (in.)	8.5
Tree canopy cover (percent)	73%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Ponderosa pine	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	149			50	298	497	
Basal area (m^2/ha)	7			1	33	41	
Avg. d.b.h. (cm)	24			16	36	30	
Avg. height (m)	15			7	26	20	
Avg. crown height (m)	5			3	13	10	
2.5 to 15cm							
Trees per hectare	149		50	249	50	497	
Avg. height (m)	6		5	4	9	5	

Fuel Model and Descriptive Narrative

Area best represented by fueld model 10 (Anderson, 1982).

Mixed conifer forest with elevated dead and downed material due to past logging practices.

Expected Fire Behavior

Fire burn hot in the surface and ground fuels. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties (Anderson, 1982).

Crown fire potential is high to extreme.

Remarks

Most downed woody material a result of past logging practices.

Cultural resources nearby.

DATA SHEET

Location **Photo Point 8** Elevation **4711 ft**

Northing: **4171020** Easting: **257922** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.459
0.26 - 1	0.000
1.1 - 3	1.497
3+ sound	4.703
3+ rotten	0.000
Total	6.659

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.00
Avg. duff depth (in.)	4.05
Avg. sound diameter (in.)	7
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	83%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags
> 15cm d.b.h.							
Trees per hectare	50		50	149	249	497	
Basal area (m^2/ha)	1		5	15	8	30	
Avg. d.b.h. (cm)	18		37	32	20	25	
Avg. height (m)	12		20	12	14	14	
Avg. crown height (m)	3		7	5	8	7	
2.5 to 15cm							
Trees per hectare			99	149	50	298	
Avg. height (m)			5	4	9	5	

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 8. (Anderson, 1982)

Less fuel over all than most areas but heavily treed.

Expected Fire Behavior

Slow burning ground fires with low flame lengths (Anderson, 1982).

Crown fire potential is low to moderate.

Remarks

DATA SHEET

Location **Photo Point 9** Elevation **4784 ft**

Northing: **4170974** Easting: **258502** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.191
0.26 - 1	0.305
1.1 - 3	5.832
3+ sound	0.000
3+ rotten	8.204
Total	14.533

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	0.55
Avg. duff depth (in.)	0.85
Avg. sound diameter (in.)	0.0
Avg. rotten diameter (in.)	7.5
Tree canopy cover (percent)	80%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	99	50		50		199	
Basal area (m^2/ha)	7	3		16		26	
Avg. d.b.h. (cm)	29	28		64		38	
Avg. height (m)	18	15		27		19	
Avg. crown height (m)	8	2		10		7	
2.5 to 15cm							
Trees per hectare				50		50	
Avg. height (m)				4		4	

Fuel Model and Descriptive Narrative

Most represented by fuel model 9 (Anderson, 1982) with some dead and down material.

Relatively open mixed conifer forest.

Expected Fire Behavior

Fires run through the surface litter faster than model 8 and have longer (higher) flame lengths (Anderson, 1982).

Crown fire potential is low.

Remarks

Heavily disturbed and logged area. Logging landing and cultural resources nearby.

DATA SHEET

Location **Photo Point 10** Elevation **5113 ft**

Northing: **4170523** Easting: **258668** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.516
0.26 - 1	1.542
1.1 - 3	0.000
3+ sound	0.967
3+ rotten	8.005
Total	11.030

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	3.05
Avg. duff depth (in.)	#REF!
Avg. sound diameter (in.)	3.2
Avg. rotten diameter (in.)	7.5
Tree canopy cover (percent)	77%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	149		199	50		398	
Basal area (m^2/ha)	11		16	4		31	
Avg. d.b.h. (cm)	29		32	31		30	
Avg. height (m)	18		24	17		21	
Avg. crown height (m)	8		9	3		8	
2.5 to 15cm							
Trees per hectare			199	99		298	
Avg. height (m)			8	3		6	

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 8 (Anderson, 1982).

Relatively open mixed conifer stand, oaks nearby contribute to leaf litter.

Expected Fire Behavior

Slow burning ground fires with low flame lengths with some flare ups where heavy fuel concentrations exist (Anderson, 1982).

Crown fire potential is low to moderate.

Remarks

Interface between conifer and oak dominant vegetation.

DATA SHEET

Location **Photo Point 11** Elevation **4671 ft**

Northing: **4170895** Easting: **259287** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.572
0.26 - 1	0.322
1.1 - 3	4.615
3+ sound	8.735
3+ rotten	24.029
Total	38.274

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	3.30
Avg. duff depth (in.)	1.3
Avg. sound diameter (in.)	4.13
Avg. rotten diameter (in.)	7.76
Tree canopy cover (percent)	80%

Stand Information

Characteristic	Sugar pine	Ponderosa pine	Incense cedar	white fir	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare		50		298	50	398	
Basal area (m^2/ha)		30		18	22	70	
Avg. d.b.h. (cm)		88		28	74	41	
Avg. height (m)		33		19	24	22	
Avg. crown height (m)		10		9	11	9	
2.5 to 15cm							
Trees per hectare			398	149		547	
Avg. height (m)			5	5		5	

Fuel Model and Descriptive Narrative

Represented by fuel model 10 (Anderson, 1982).

Mixed conifer forest with hardwoods, heavy large woody debris above 3in diameter.

Expected Fire Behavior

Fires will burn with a greater intensity than in fuel models 8 or 9. Given the elevated large downed fuel, expect fireline intensity to be higher and fire duration longer. Crown fire potential is moderate.

Remarks

Skid and logging trails evident throughout the area. Area disturbed by past logging efforts.

DATA SHEET

Location **Photo Point 12** Elevation

Northing: **4170682** Easting: **259697** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.486
0.26 - 1	1.861
1.1 - 3	0.000
3+ sound	1.675
3+ rotten	0.000
Total	4.022

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	0.50
Avg. duff depth (in.)	1.65
Avg. sound diameter (in.)	4.2
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	60%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Ponderosa pine	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	50	50		99	99	298	99
Basal area (m^2/ha)	2	2		3	11	17	42
Avg. d.b.h. (cm)	20	20		19	38	25	72
Avg. height (m)	8	5		7	12	9	7
Avg. crown height (m)	2	2		2	4	3	0
2.5 to 15cm							
Trees per hectare	298	50		647		995	
Avg. height (m)	4	3		3		3	

Fuel Model and Descriptive Narrative

Fuel model 5 (Anderson, 1982), very steep terrain. Brush understory well developed. Brush layer consisting mostly of greenleaf manzanita and deer brush.

Expected Fire Behavior

Though fire behavior can be less intense due to the low fuel loading, aerial fire brands can be generated by this fuel model, leading to spotting behavior. Due to the relatively dense polesized tree in the understory, torching can also be a problem. Crown fire potential is moderate to high.

Remarks

DATA SHEET

Location **Photo Point 13** Elevation

Northing: **4170341** Easting: **259479** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.261
0.26 - 1	1.334
1.1 - 3	4.777
3+ sound	2.761
3+ rotten	22.783
Total	31.917

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	2.00
Avg. duff depth (in.)	0.6
Avg. sound diameter (in.)	5.2
Avg. rotten diameter (in.)	9.6
Tree canopy cover (percent)	33%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags
> 15cm d.b.h.							
Trees per hectare							
Basal area (m^2/ha)							
Avg. d.b.h. (cm)							
Avg. height (m)							
Avg. crown height (m)							
2.5 to 15cm							
Trees per hectare	50	50				99	
Avg. height (m)	5	8				7	

Fuel Model and Descriptive Narrative

Immediate area most represented by NFFL fuel model 5 and 8 (Anderson, 1982).

Less fuel over all than most areas, overstory minimal.

Expected Fire Behavior

Fire behavior would be typical for fuel models 5 and 8.

Crown fire potential is low.

Remarks

Deer brush and elderberry around.

DATA SHEET

Location **Photo Point 14** Elevation **5465 ft**

Northing: **4170037** Easting: **259386** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.176
0.26 - 1	2.447
1.1 - 3	2.922
3+ sound	0.000
3+ rotten	0.000
Total	5.545

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.25
Avg. duff depth (in.)	2.85
Avg. sound diameter (in.)	0.0
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	70%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	99		50	249		398	
Basal area (m^2/ha)	25		30	16		71	
Avg. d.b.h. (cm)	56		88	28		42	
Avg. height (m)	24		20	14		17	
Avg. crown height (m)	5		13	6		6	
2.5 to 15cm							
Trees per hectare				199		199	
Avg. height (m)				4		4	

Fuel Model and Descriptive Narrative

Fuel models 10 (Anderson, 1982) best describe the ground conditions at this locations. In the vicinity is dense mountain whitethorn, deer brush and chinquapin, however, these species did not intercept the transect.

Expected Fire Behavior

Fuel loading is relatively low and understory is not well developed in the immediate plot location, however, due to the dense brush field adjacent to this location, fire behavior can be expected to be fast and intense.

Crown fire potential is moderate.

Remarks

Disturbed by past logging practices.

DATA SHEET

Location **Photo Point 15** Elevation **5892 ft**

Northing: **4170298** Easting: **261232** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.877
0.26 - 1	1.830
1.1 - 3	2.914
3+ sound	0.000
3+ rotten	0.000
Total	5.621

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	0.75
Avg. duff depth (in.)	1.7
Avg. sound diameter (in.)	0.00
Avg. rotten diameter (in.)	0.00
Tree canopy cover (percent)	77%

Stand Information

Characteristic	Sugar pine	Ponderosa pine	Incense cedar	white fir	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	99			398		497	
Basal area (m^2/ha)	69			68		137	
Avg. d.b.h. (cm)	86			42		51	
Avg. height (m)	39			24		27	
Avg. crown height (m)	21			9		12	
2.5 to 15cm							
Trees per hectare	50		298	149		497	
Avg. height (m)	5		4	4		4	

Fuel Model and Descriptive Narrative

Dense understory due to high water table. Very large trees with large openings of dense forbs. Best represented by fuel model 5 and 10 (Anderson, 1982).

Expected Fire Behavior

Due to the dense understory and light fuels, under typical conditions, fire behavior can be expected to be relatively low. However, during drought conditions, shrubs and forbs can contribute to the available fuel bed. In this case, crown fire potential in the understory can be high to extreme.

Remarks

Between two small drainages.

DATA SHEET

Location **Photo Point 16** Elevation **6183 ft**

Northing: **4169947** Easting: **261044** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.065
0.26 - 1	0.625
1.1 - 3	5.973
3+ sound	18.770
3+ rotten	0.000
Total	25.434

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.15
Avg. duff depth (in.)	1.75
Avg. sound diameter (in.)	14.0
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	87%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Ponderosa pine	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	99	99		50	50	348	50
Basal area (m^2/ha)	6	56		2	2	66	3
Avg. d.b.h. (cm)	26	74		23	22	41	29
Avg. height (m)	13	25		9	10	16	13
Avg. crown height (m)	4	11		0.5	2	5	0
2.5 to 15cm							
Trees per hectare				50			
Avg. height (m)				5			

Fuel Model and Descriptive Narrative

Plot on NPS land on which a prescribed burn was conducted. Site looks great, tree density down, tree diversity up. However, this area can still be best represented by fuel model 10 (Anderson, 1982) with elevated fuel loading.

Expected Fire Behavior

Fire will generally burn along the surface with a high intensity and rapid spread rate under drought conditions. Crown fire potential is low to moderate given the lack of understory.

Remarks

Open stand, however, canopy of large trees resulted in a rather high tree canopy cover.

DATA SHEET

Location **Photo Point 17** Elevation **6075 ft**

Northing: **4169924** Easting: **260701** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.350
0.26 - 1	0.639
1.1 - 3	1.525
3+ sound	4.791
3+ rotten	0.000
Total	7.304

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	3.85
Avg. duff depth (in.)	2.5
Avg. sound diameter (in.)	7
Avg. rotten diameter (in.)	0.0
Tree canopy cover (percent)	80%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Black oak	ALL	Snags
> 15cm d.b.h.							
Trees per hectare	298	199				497	99
Basal area (m^2/ha)	47	60				107	18
Avg. d.b.h. (cm)	42	61				50	47
Avg. height (m)	25	34				29	13
Avg. crown height (m)	12	20				15	0
2.5 to 15cm							
Trees per hectare	50					50	99
Avg. height (m)	5					5	7

Fuel Model and Descriptive Narrative

Best represented by fuel model 8 and 10 (Anderson, 1982) due to lack of developed understory, however, with an elevated 1000hr fuel loading. No brush in vicinity.

Expected Fire Behavior

Fire would burn in the surface and ground fuels generating high intensities with a relatively low spread rate. Crown fire potential is low to moderate.

Remarks

No treatment conducted and little past disturbance evident. Fairly open terrain.

DATA SHEET

Location **Photo Point 18** Elevation **5265 ft**

Northing: **4169894** Easting: **257355** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.230
0.26 - 1	0.943
1.1 - 3	3.001
3+ sound	0.000
3+ rotten	3.049
Total	7.222

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	2.60
Avg. duff depth (in.)	2.1
Avg. sound diameter (in.)	0.0
Avg. rotten diameter (in.)	6.5
Tree canopy cover (percent)	57%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	50	50	50	149	50	348	
Basal area (m^2/ha)	6	2	13	9	4	33	
Avg. d.b.h. (cm)	38	23	58	27	31	33	
Avg. height (m)	23	15	32	13	22	19	
Avg. crown height (m)	12	6	14	3	8	7	
2.5 to 15cm					Dogwood		
Trees per hectare		50		99	50	199	
Avg. height (m)		9		5	5	6	

Fuel Model and Descriptive Narrative

Fuel model 10 (Anderson, 1982).

Fuel loading lightly higher than typical for fuel model 10.

Expected Fire Behavior

Fires burn in the surface and ground fuels with greater fire intensity than fuel models 8 and 9 (Anderson, 1982).

Crowning out, spotting, and torching can be a problem.

Crown fire potential is moderate to high.

Remarks

Some deer brush in vicinity. Fairly open stand.

DATA SHEET

Location **Photo Point 19** Elevation **6184 ft**

Northing: **4169307** Easting: **259232** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.084
0.26 - 1	0.000
1.1 - 3	0.000
3+ sound	1.998
3+ rotten	0.000
Total	2.082

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	0.75
Avg. duff depth (in.)	3.1
Avg. sound diameter (in.)	4.5
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	80%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Dogwood	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare		99				99	
Basal area (m^2/ha)		25				25	
Avg. d.b.h. (cm)		55				55	
Avg. height (m)		18				18	
Avg. crown height (m)		8				8	
2.5 to 15cm							
Trees per hectare	50				3631	3680	
Avg. height (m)	9				4	5	

Fuel Model and Descriptive Narrative

Fuel model 8 (Anderson, 1982).

Fuel bed in transition.

Expected Fire Behavior

Fire behvavior can be expected to be light and fast through the surface fuels.

Crown fire potential is low.

Remarks

Dense dogwood in understory, near riparian area.

Chinquapin also in understory.

Yosemite West Fuel Assessment, Digital Mapping Solutions, 2004.

DATA SHEET

Location **Photo Point 20** Elevation **5901 ft**

Northing: **4169768** Easting: **258559** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.306
0.26 - 1	1.542
1.1 - 3	1.473
3+ sound	8.950
3+ rotten	14.009
Total	26.280

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.10
Avg. duff depth (in.)	2.25
Avg. sound diameter (in.)	4.30
Avg. rotten diameter (in.)	6.88
Tree canopy cover (percent)	70%

Stand Information

Characteristic	Sugar pine	Ponderosa pine	Incense cedar	White fir	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	99			448		547	50
Basal area (m^2/ha)	4			42		46	2
Avg. d.b.h. (cm)	21			34		32	20
Avg. height (m)	14			20		19	14
Avg. crown height (m)	7			6		6	0
2.5 to 15cm							
Trees per hectare	99		298	199		597	50
Avg. height (m)	7		4	6		5	3

Fuel Model and Descriptive Narrative

Fuel model 10 (Anderson, 1982).

Fuel loading is higher than described for this fuel type.

Expected Fire Behavior

Fires will burn in the surface and ground fuels with a relatively high intensity (Anderson, 1982). Given the dense understory, crowning and torching can be expected.

Crown fire potential is high to extreme.

Remarks

Dogwood near by in a riparian area. Fairly open. Skid trail runs along side of plot. Plot located directly above historic blacksmith shop.

DATA SHEET

Location **Photo Point 21** Elevation **5468 ft**

Northing: **4170158** Easting: **259772** (UTM, Zone 11, NAD27)

Woody Fuel Loadings

SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.255
0.26 - 1	0.305
1.1 - 3	7.278
3+ sound	5.251
3+ rotten	10.976
Total	24.065

Other Measurements

Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.75
Avg. duff depth (in.)	4
Avg. sound diameter (in.)	7.5
Avg. rotten diameter (in.)	6.8
Tree canopy cover (percent)	43%

Stand Information

Characteristic	White fir	Sugar pine	Douglas fir	Incense cedar	Ponderosa pine	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare				50	50	99	
Basal area (m^2/ha)				22	1	24	
Avg. d.b.h. (cm)				75	19	47	
Avg. height (m)				18	8	13	
Avg. crown height (m)				5	2	3	
2.5 to 15cm							
Trees per hectare	99			50		149	
Avg. height (m)	2			2		2	

Fuel Model and Descriptive Narrative

Stumps and slash evident but overgrown with brush.

Fuel model 5 and 10 (Anderson, 1982).

Expected Fire Behavior

Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and trees (Anderson, 1982).

Fire can be expected to burn hotter than expected due to elevated fuel loading.

Crown fire potential is moderate.

Remarks

Plot is in a heavily disturbed area. It is located just between a road and it's switchback. Lots of deer brush and deer.

DATA SHEET

Location **Photo Point 22** Elevation **5595 ft**

Northing: **4170225** Easting: **260153** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.067
0.26 - 1	1.933
1.1 - 3	0.000
3+ sound	0.000
3+ rotten	0.000
Total	2.000

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.75
Avg. duff depth (in.)	7.5
Avg. sound diameter (in.)	0
Avg. rotten diameter (in.)	0.0
Tree canopy cover (percent)	67%

Stand Information

Characteristic	White fir	Ponderosa pine	Douglas fir	Incense cedar	Black oak	ALL	Snags
> 15cm d.b.h.							
Trees per hectare		50			50	99	
Basal area (m^2/ha)		21			6	27	
Avg. d.b.h. (cm)		74			40	57	
Avg. height (m)		39			16	28	
Avg. crown height (m)		7			2	5	
2.5 to 15cm							
Trees per hectare		149		50		199	
Avg. height (m)		3		3		3	

Fuel Model and Descriptive Narrative

Fuel model 5 and 9 (Anderson, 1982).

Expected Fire Behavior

Fires will generally run slowly through this fuel bed. In dry, wind events, however, this fuel type can generate high flame lengths, exhibit crowning and torching, and can loft many fire brands.

Crown fire potential high to extreme.

Remarks

Fairly open stand with dense understory of brush. Plot in amongest homes.

DATA SHEET

Location **Photo Point 23** Elevation **5982 ft**

Northing: **4170259** Easting: **260246** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.017
0.26 - 1	0.000
1.1 - 3	0.000
3+ sound	0.000
3+ rotten	0.000
Total	0.017

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	3.75
Avg. duff depth (in.)	5.25
Avg. sound diameter (in.)	0.0
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	57%

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare	50	99	149			298	
Basal area (m^2/ha)	1	4	14			20	
Avg. d.b.h. (cm)	19	23	32			27	
Avg. height (m)	10	9	14			12	
Avg. crown height (m)	4	4	6			5	
2.5 to 15cm							
Trees per hectare	50	50		249		348	
Avg. height (m)	2	2		3		3	

Fuel Model and Descriptive Narrative

Fuel model 5 and 9 (Anderson, 1982).

Fuel loading very light.

Expected Fire Behavior

Brush understory will contibute to the intensity, flame length and spread rate. Fire can be expected to travel quickly and erratically through this fuel type.

Crown fire potential high.

Remarks

Brush not as dense as in photo point 22, however, most brush is dead. Plot in between homes.

DATA SHEET

Location **Photo Point 24** Elevation **6036 ft**

Northing: **4170038** Easting: **260578** (UTM, Zone 11, NAD27)

Woody Fuel Loadings	
SIZE CLASS (inches)	Loading (tons/acre)
0 - 0.25	0.080
0.26 - 1	0.308
1.1 - 3	0.000
3+ sound	2.411
3+ rotten	0.000
Total	2.799

Other Measurements	
Forest floor loading (T/ac.)	
Avg. litter depth (in.)	1.75
Avg. duff depth (in.)	2.75
Avg. sound diameter (in.)	3.55
Avg. rotten diameter (in.)	0
Tree canopy cover (percent)	#REF!

Stand Information

Characteristic	White fir	Sugar pine	Ponderosa pine	Incense cedar	Black oak	ALL	Snags > 15cm d.b.h.
> 15cm d.b.h.							
Trees per hectare		50		50	50	149	
Basal area (m^2/ha)		19		2	9	31	
Avg. d.b.h. (cm)		70		25	49	48	
Avg. height (m)		18		8	14	13	
Avg. crown height (m)		1		1	6	3	
2.5 to 15cm							
Trees per hectare	50					50	
Avg. height (m)	2					2	

Fuel Model and Descriptive Narrative

Open stand. Fuel model 5 and 8 (Anderson, 1982).

Expected Fire Behavior

Slow burning ground fires with relatively low flame lengths is typical for this fuel type. With the addition of the brush, fire can be expected to produce some fire brands that could potentially be a problem.

Crown fire potential low to moderate.

Remarks

Several dirt roads running through area. This is the flatest place in Yosemite West, possible development site?

Plot located in vegetated area between two main paved roads. Some brush in understory, mainly manzanita.

Appendix C - NPS Letter Y1415 (YOSE-PM)

Michael J. Tollefson, Superintendant, Yosemite National Park, wrote to YWPHI on June 13, 2007 [Letter Y1415 (YOSE-PM)] to explain the required compliance procedures.

United States Department of the Interior

NATIONAL PARK SERVICE
Yosemite National Park
P. O. Box 577
Yosemite, California 95389

IN REPLY REFER TO:
Y1415 (YOSE-PM)

JUN 13 2007

Dr. John Mock, Fire Management Committee Chair
Yosemite West Property & Homeowners, Inc. (YWPHI)
7585 Henness Ridge Road
Yosemite National Park, CA 95389-9108

Dear Dr. Mock:

Congratulations on your receipt of a 2006 Community-Based Wildfire Prevention Grant through the California Fire Safe Council (FSC). The specifications for these projects are found in the recently developed draft *Yosemite West Community Wildfire Protection Plan* .[1] Implementation of these projects will help safeguard the Yosemite West community from the adverse effects of a wildfire.

Since the funding for these grants originates from National Park Service appropriations, we will work closely with you to ensure that necessary federal environmental compliance is completed, prior to the start of any work. Yosemite's involvement will be to provide guidance and subject matter knowledge in an advisory role. Our staff will provide you with informational and technical assistance; however you (and your consultant) will be required to finalize the compliance documents and complete consultation with the requisite agencies. We have received the news of your hiring of Charles Sikora, founder of Sikora Forest Consulting, to be the manager of your grant projects.

We have recently met with Mr. Sikora and have begun consultation with him. We anticipate scheduling a field visit to examine the project area with him and the appropriate Yosemite West community members in the near future. Following that, it is our expectation that we will work with Mr. Sikora and the community to review draft contract specifications, finalize the Community Wildfire Protection Plan, and ensure all final compliance and administrative approvals are in place. It is our goal to work closely with you and your consultant and allow the projects to proceed as soon as possible. We look forward to working with Mr. Sikora and appreciate your interest in making sure your project is fully compliant with all requirements.

Since the Grants Clearinghouse Selection Committee of the FSC, rather than the National Park Service, selected this project, it is our understanding that National Environmental Policy Act (NEPA) compliance is not triggered. NEPA is not triggered because the National Park Service had no decision in the actions that are planned to occur on the private property, where your project will be implemented. This interpretation is supported by statements from the President's Council on Environmental Quality.[2]

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[1] Wildland Fire Associates (2005), see Project YW-001 (53 acres), pages E-14 though E-22.
[2] Dinah Bear, General Council on Environmental Quality, from http://www.cafirealliance.org/environment.php.

Your project will, however, require a minimum environmental review process that will include a review of potential project impacts relative to the National Historic Preservation Act (NHPA) and the Endangered Species Act (ESA). To help facilitate compliance with these two federal mandates, this letter will outline those regulations and provide you with guidance for meeting their requirements. It is our goal to assist you in making this process as expeditious and efficient as possible.

National Historic Preservation Act (NHPA) of 1966 as amended

Please find enclosed a brief summary report on a reconnaissance survey of cultural resources, including archeological resources, museum objects, traditional areas, historic structures, and cultural landscapes in the project area (enclosure 1). This report makes recommendations for treatment of cultural resources in the project area based on the treatments the park would take, and has taken, in similar projects with similar cultural resources, on land immediately adjacent to the project area. These recommendations would meet the requirements of the NHPA by avoiding impacts to cultural resources.

The report references the park's Standard Operating Procedures for Cultural Resources in Fire Management Actions, as found in the Fire Management Plan. This SOP is also provided for your reference, as a guide to the appropriate application of the recommended treatments (enclosure 2).

Please also find enclosed an example letter of consultation with the State Historic Preservation Officer (SHPO)(enclosure 3). The SHPO will review the project and the proposed treatments as outlined above and make any further recommendations or comments within thirty days of receipt of a letter.

Together, these documents should facilitate the necessary compliance with the NHPA for your project. Please feel free to contact our Fire Archeologist, Jun Kinoshita, at (209) 379-1317 with any further guidance needs.

Endangered Species Act

The state and federal agencies that identify and regulate Threatened and Endangered plant and wildlife species, sensitive species, and their habitats are the U.S. Fish & Wildlife Service (USFWS) and the California Department of Fish & Game (DFG). User-friendly guidance for local governments, businesses, and private parties can be found on their websites:

USFWS – http://www.fws.gov/endangered/landowner/index.html
DFG – http://www.fws.gov/sacramento/cons_plan.htm

Refer to the local agency contacts listed on these sites for guidance regarding species of concern for your area and recommendations on appropriate methods for any biological surveys or mitigation measures that might be necessary.

Before you implement your project, you must determine if the project will harm a protected Threatened or Endangered species or their habitat. To aid you in this process, we are enclosing a USFWS Consultation Species List (enclosure 4). A basic botanical survey may be required to determine if these species, or their habitat, are present within the project area. Guidelines for conducting a botanical survey and a survey for the Red Legged Frog are attached (enclosures 5 and 6). If listed species are present within your project area, and if the project may affect these species or their habitat, then a permit and/or habitat conservation plan may be required.

Should your project change in scope from that which is described in your communication with the regulator agencies noted above about implementation of the Yosemite West Shaded Fuel Break project, then additional environmental review may be necessary. Please feel free to contact Mike Beasley, Prescribed Fire & Fuels Program Manager, at (209) 375-9574, Jun Kinoshita, Fire Archeologist, at (209) 379-1317, or Mark Butler, Environmental Planning and Compliance Program Manager, at (209) 379-1371 if you have any questions.

Your grant submission and ongoing efforts to implement the Yosemite West CWPP both speak highly to the commitment you and your wife have shown towards making Yosemite West a better place. Thank you for your participation in this collaborative effort to reduce threat of wildfire to rural communities.

Sincerely,

for Michael J. Tollefson
Superintendent

Enclosures(6)

cc w/out enclosures: Charles Sikora, A.C.F., Sikora Forest Consulting
Robin Smith, Yosemite Sequoia Resource Conservation District
Kelly Martin, Fire Management Officer, Yosemite National Park
Mike Beasley, Prescribed Fire & Fuels Program Manager,
Yosemite National Park
Mark Butler, Environmental Planning and Compliance Program Manager,
Yosemite National Park

Appendix D - Archeological Reconnaissance Survey of Yosemite West Community

Archeological Reconnaissance Survey of Yosemite West Community Assistance Fuels Reduction Project

Project Number: YOSE 2006 L

J. Kinoshita, C. West
Yosemite Archeology Office
Division of Resource Management and Science, Yosemite National Park
October 2006

Introduction:

This project consists of archeological resources treatment advice in support of mechanical thinning along the western edge of the Yosemite West subdivision, a grant-funded, community assistance project for which Yosemite National Park is providing planning assistance. Archeologists from the Division of Resources Management and Science are providing suggested treatment measures, based on a reconnaissance survey and the Yosemite Cultural Resources Standard Operating Procedure for Fire Management, presented in appendix A. This summary report provides the Yosemite West Property & Homeowners Inc. (YWPH Inc.) with reconnaissance information about the cultural resources in the project area.

Location and Setting:

Yosemite West is located one mile west of Wawona Road and 16 miles southwest of Yosemite Valley at an elevation near 6,000 feet (Figure 1). It consists of between 30 to 50 private homes and rental properties perched on a west facing ridge overlooking the Merced River Canyon. The vegetation is dominated by forest and shrub alliances of Ecological Zone III, which include white fir, red fir, Jeffery pine and chinquapin (Keeler-Wolfe, 2004). Dense vegetation below the community, a result of years of fire suppression, and the steep terrain, with slopes exceeding 40 degrees, result in a high risk of wildland fire and need for fuels reduction. The project area consists of the western periphery of the subdivision. Project objectives include slowing wildland fire, dropping a crown-run fire coming from below and facilitating evacuation and protection of the community. This effort is especially important given that the community has only one route of egress, into the park.

The YWPH Inc. intends to conduct fuels reduction on various private properties in and around Yosemite West to reduce the threat of fire to the community. With planning and information assistance from the park, YWPH Inc. has created a draft Wildfire Protection Plan which outlines several proposed fuels reduction measures, which will be contracted out by YWPH Inc.

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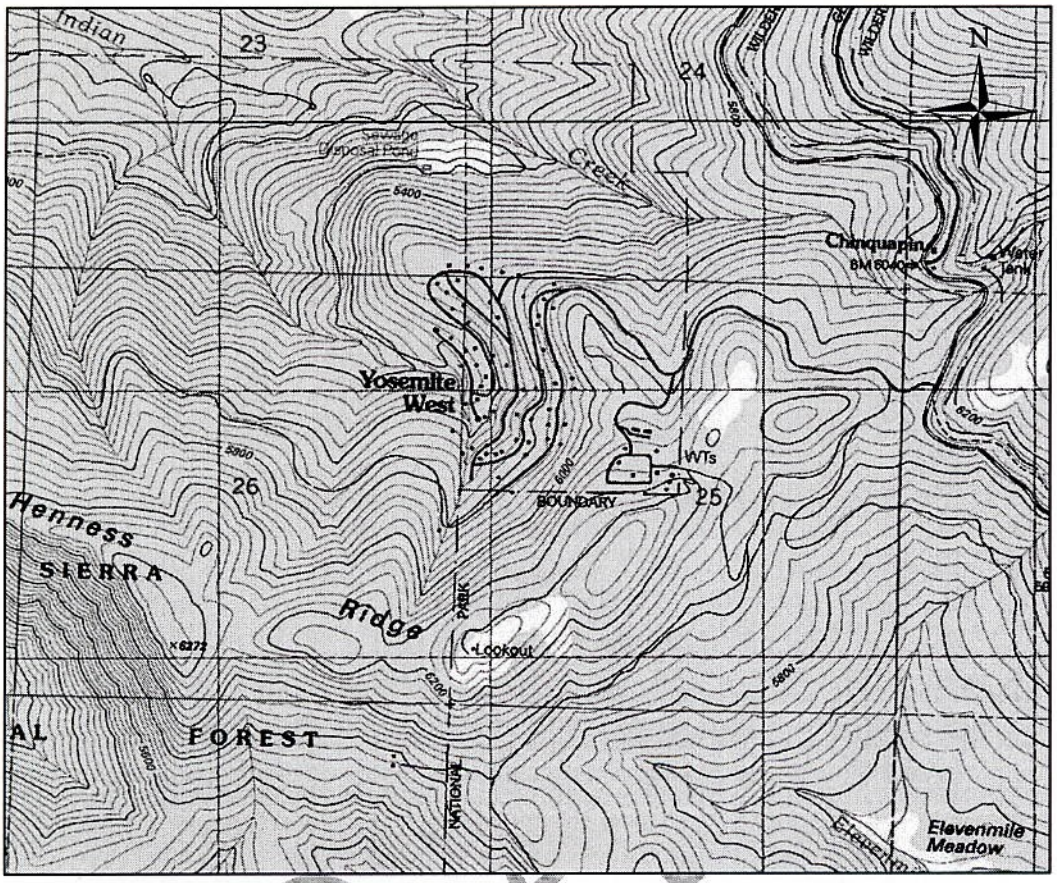


Figure 1. Vicinity of Project Area, Quads: El Portal, El Capitan, 1990

Background Information:
There is no previous archeological survey and no documentation of cultural resources within the project area. Given the resources just within the park boundary, there is a high potential for archeological finds relating to activities involving the Yosemite Lumber Company which was in operation in this area from 1912 to 1923. The logging system extended from Henness Ridge east to Elevenmile Meadow and north to Indian Creek, and would have included Yosemite West and the project area. Twelve logging camps were established throughout the area. In the first year of operation, 35,000,000 board feet of lumber was harvested and shipped down an incline railroad that moved the felled timber from these higher elevations down to the Merced River where it was shipped out of El Portal to the Central Valley (Johnston 1995). Archeological resources remaining from the Yosemite Lumber Company on the park side have not been evaluated for eligibility for the National Register of Historic Places and may be considered at a later date. These resources, including those extending outside the park boundaries, should be considered eligible until evaluated.

Purpose:
If this project was on park land and under federal jurisdiction, Resource Management and Science would recommended that archeological survey and recordation be completed prior to thinning or burning work in the area in compliance with section 106 of the National Historic Preservation Act. The Yosemite Archeology Office Cultural Resources

DRAFT

Standard Operating Procedure for Fire Management is attached for reference. The land is not federally owned, nor is there any federal funds being expended in the execution of the project. Federal support of the project is limited to expert advice on planning for the project and application for grants to accomplish the project. The information in this report is provided so that the YWPH Inc. may manage the project effects on cultural resources in the project area.

Methods:

A two-person reconnaissance surface survey for prehistoric and historic resources began at the southern edge of the subdivision and park boundary and moved north along the west edge of the subdivision and then turned east and followed the northern boundary of the subdivision to the limits of development. Transect spacing was at 20 meter intervals. This created a 40 meter survey area around the western, southern and northern periphery of the homes (Figure 2). Artifact and feature locations were recorded using a Garmin V GPS unit.

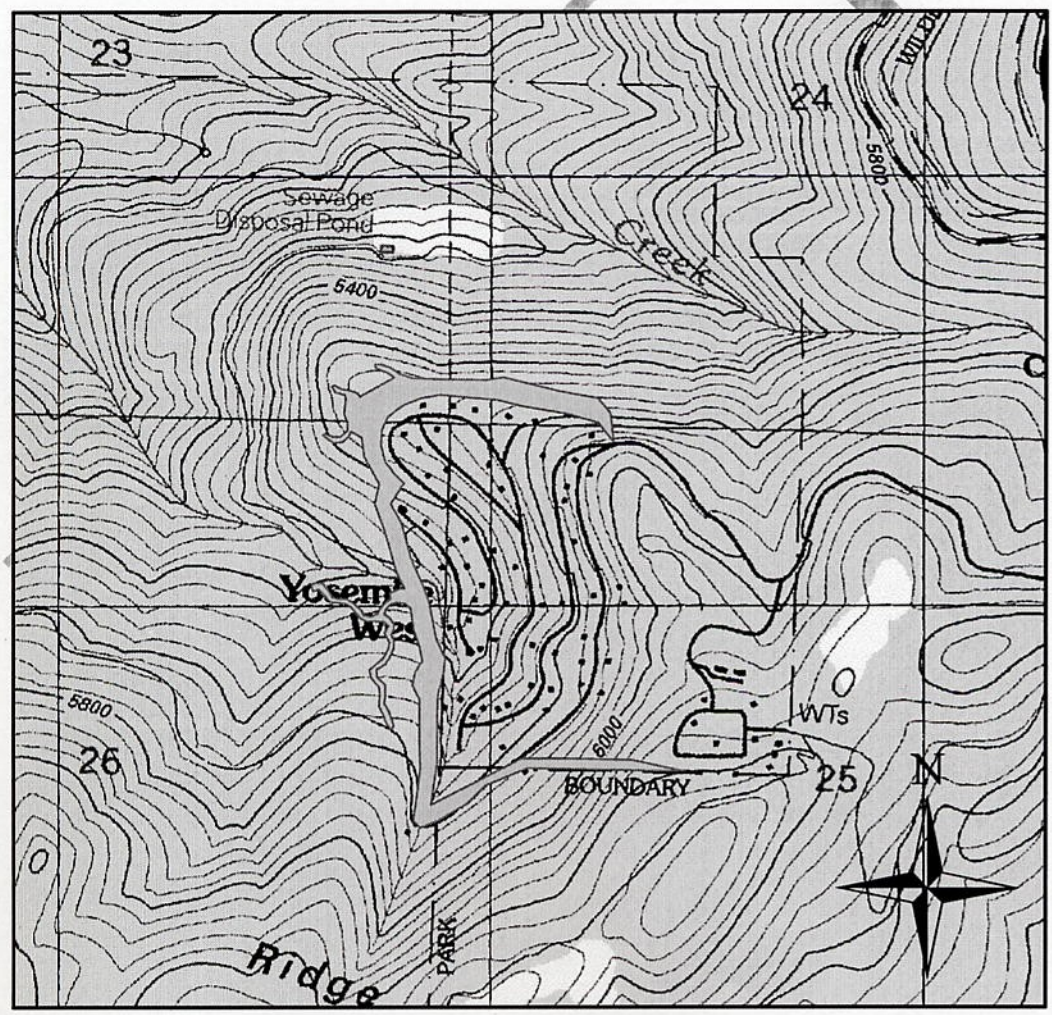


Figure 2. Survey Area

Results:

Visibility of the ground surface was limited by heavy fuel loading in many areas. This fuel loading includes dead and downed material as well as thick live brush and trees. Taking this reduced visibility into account, the park predictive model does suggest that the area would be of low probability for prehistoric sites and no prehistoric resources were observed. Eleven isolated historic finds and eight possible logging roads were located within the survey area (Figure 3). Of the isolated finds, six were high-cut stumps remaining from logging operations, and five were historic steel cable with the same association. It was not possible to determine whether the road spurs were historic and associated with logging operations or were bulldozer lines put in during the 1990 Steamboat Fire. Three of the road spurs were associated with steel cable, which supports interpretation of their use as logging spur roads. Visibility in the area was best on the roads, probably due to their more recent clearing and compacted soils. In the surrounding areas we anticipate the presence of cultural resources similar to those found on adjacent park land, including artifacts and features from logging operations.

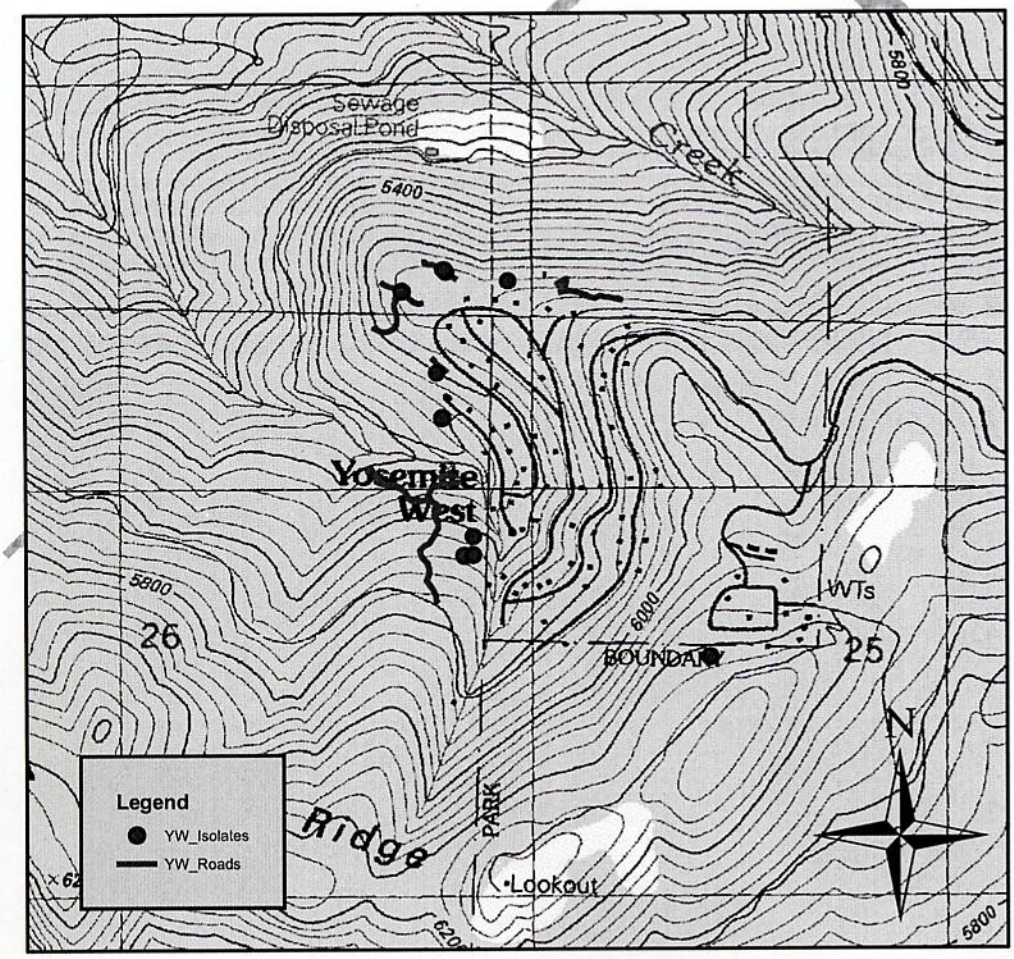


Figure 3. Survey Results

Recommendations:
This survey was only for reconnaissance purposes and was not a complete survey with documentation historic resources in the area. Heavy vegetation and dead and down fuels made visibility poor throughout most of the project area. The preliminary survey results indicate a potential for more historic resources in the area. We recommend managing the potential effect of treatments. Consideration of these effects should include direct, indirect and operational effects. Direct effects may include physical loss of a resource due to consumption by fire. Indirect may include loss of a resource or context due to increased erosion or oxidation. Operational effects include those caused by foot or vehicle traffic, or fire break (handline) construction. Many of these effects may be eliminated by avoidance. We recommend incorporating these measures into the contracts to be let with crews conducting the treatments, and an educational component to inform the crews of what type of resources they might encounter and what measures to take.

Further survey and documentation may be needed if a broadcast burn is proposed. Other measures may include further survey and documentation of the area after a treatment. For mechanical thinning and burn pile operations, piles should not be put on top of historic resources such as tree stumps and steel cable. The skid roads, if locally free of historic artifacts, are appropriate and convenient places to build and burn piles of slash. Any cultural material should be flagged for avoidance.

DRAFT

References:

Johnston, Hank

1995 *Railroads of the Yosemite Valley.* Yosemite Association, Yosemite National Park (pgs. 125-135)

Keeler-Wolf, Todd

2004 *Draft Classification of the Vegetation of Yosemite National Park and Surrounding Environs in Tuolumne, Mariposa, Madera and Mono Counties, California.* Draft report on file with DOI. Natureserv.

DRAFT

Appendix E - Reciprocal Fire Protection Agreement

COPY

RES. NO. 06-535

Reciprocal Fire Protection Agreement
between
The United States Department of Interior
National Park Service
and the
County of Mariposa

This Agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Yosemite National Park (hereinafter "Park"), and the County of Mariposa acting through its Chairman of the Board of Supervisors.

ARTICLE I— BACKGROUND AND OBJECTIVES

The objective of this Agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfires on lands within the Park's boundaries, including El Portal, within the County of Mariposa, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing fire prevention, detection, and suppression, and on federally owned land within the Park. The Mariposa County Fire Department is primarily responsible for providing fire prevention, detection, and suppression within the County of Mariposa and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II— AUTHORITY

This Agreement is entered into under the authority of *42 U.S.C. § 1856a (1994).*

ARTICLE III— STATEMENT OF WORK

A. The NPS agrees to:

1. Provide initial attack on structural fires in Yosemite West, with up to three Type I engines.

2. Provide initial attack on structural fires in Foresta, with up to three Type I engines.

3. Furnish mutual aid to Fish Camp in cases of structural fires or other emergencies, as requested.

4. Provide (1) Type I structural fire engine in Wawona and (2) Type I or II engines in El Portal for protection of County residents.

5. Provide a rescue vehicle or fire engine with auto extrication equipment in Wawona and El Portal for dispatch to vehicle accidents when requested by the county.

6. Provide command, control, and leadership for Engine Company #4 in Wawona, and Engine Company #1 and Engine Company #34 in El Portal.

7. Strive to provide a minimum of seven persons qualified as firefighters residing in El Portal, and a minimum of seven such persons residing in Wawona.

8. Provide structural fire dispatching for El Portal, Foresta, Wawona, Yosemite West and the rest of the Park.

9. Provide structural fire response and extrication and rescue response for motor vehicle accidents in the El Portal area along the Merced River Corridor as far as Bryceburg.

10. Furnish automatic emergency assistance in the Merced River corridor as far west as Briceburg for structural fires and motor vehicle accidents. Provide emergency assistance beyond Bryceburg at the county's request. The Park will determine the appropriate equipment to dispatch.

11. Provide command for structural fires and motor vehicle accidents in Foresta, Wawona, Yosemite West, El Portal, and the Merced River Corridor as far as 11 miles west of El Portal (Old Richardson's Hotel), and the rest of the Park.

12. Furnish a firehouse, including utilities, for the El Portal fire and rescue response vehicles.

13. Provide assistance and cooperation with fire training for county firefighters.

B. The County of Mariposa agrees to:

1. Furnish structural fire suppression resources for Yosemite West, if required, beyond the engines provided by the Park.

2. Provide fire cause investigation and scene security of structural fires occurring in non-NPS owned buildings inside the Park, including El Portal.

3. Provide evacuation measures, if required, at Yosemite West and El Portal.

4. Provide engine coverage for Wawona when the Park engine is dispatched to an incident in Yosemite West.

5. Provide emergency assistance to the Park, Wawona, El Portal and the Merced River Corridor, Foresta, and Yosemite Valley, as requested by the Park.

6. Provide assistance and cooperation with fire training for Park firefighters.

7. Strive to provide for a minimum of seven County volunteer firefighters signed on by the County and covered by the County's worker's compensation program, to serve with the Park's Wawona Engine Company #4.

8. Strive to provide for a minimum of seven County volunteer firefighters signed on by the County and covered by the County's worker's compensation program, to serve with the Park's El Portal Engine Company #1.

9. Furnish turnout gear and other required personal protective equipment meeting Federal and State OSHA requirements, including helmets, turnouts, boots, shrouds, and gloves for county firefighters.

10. Provide one County-owned Type I or Type II fire engine for Engine Company #34 at El Portal if needed because a NPS owned engine is unavailable, along with maintenance, repairs, gas, and lubricants for the engine. The County will outfit the engine with radio, hoses, ladders, SCBA's, and other equipment to meet the ICS standards for the engine. The County will also provide one high volume/low-pressure portable pump and one positive pressure ventilation fan for the El Portal fire station. The County will maintain and test the equipment in accordance with manufacturer's recommendations.

11. Provide payment to the Park of the sum of $2,000.00 per year specifically for equipment maintenance and replacement, facility modification, Rescue 1 maintenance and tire replacement, Jaws-of-Life accessories, SCBA testing, SCBA bottle testing, and training supplies. These funds will be used for whatever station equipment needs work or replacement. Tentative expenditures shall be agreed to at the annual meeting between the Park and the County.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Provide mutual assistance to each other in cases of major emergencies beyond that provided for above, when critical needs arise and the response capability is available. The Park and the County shall bear their own expenses in such circumstances.

3. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

4. Each party to this Agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this Agreement.

5. Nothing in this Agreement shall be construed as obligating the NPS to expend in any one fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this Agreement.

ARTICLE IV— TERM OF AGREEMENT

A. This Agreement shall supersede any existing fire related Agreements between the Park and the County.

B. This Agreement shall be effective as of November 1, 2006, and shall continue in effect until November 1, 2011.

C. This Agreement will be reviewed annually, prior to the start of the County's fiscal year, to determine if modifications are needed, and funding is available. The Park's obligations under this Agreement shall be subject to the availability of funds. This Agreement may be amended by the mutual written consent of the parties.

ARTICLE V— KEY OFFICIALS

All communications and notices regarding this Agreement shall be directed to the following key official(s) for each party:

A. **For the NPS:**

Superintendent
Chief Fire Management Officer
Yosemite National Park
P.O. Box 577
Yosemite N.P., CA 95389

B. **For the County of Mariposa, California:**

Chairman, Mariposa County Board of Supervisors
Mariposa County Fire Chief
P.O. Box 784
Mariposa, CA 95338

ARTICLE VI— PAYMENT

A. Each year between July 1 and October 31 during the term of this Agreement, the County shall pay to the Park an amount to cover the administrative costs of providing the services described in this Agreement to Fish Camp, Wawona, Yosemite West, Foresta and El Portal including the Merced River Corridor as far as Bryceburg.

B. It is agreed that for the first 2 years of this Agreement, the amount will be $22,000.00 per year. In years 3-5, the amount will increase to $25,000. Of these amounts, $2,000.00 is designated for the specific uses listed in Section III. B. 11 above.

C. Payment shall be made by the County to the Park Fiscal Office in El Portal on or before October 1 of each year that this Agreement is in effect.

ARTICLE VII— REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with each other final reports of incidents involving both parties.

ARTICLE VIII— PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to the other shall remain the property of the furnishing party. Any property furnished by the NPS to the County of Mariposa during the performance of this Agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE IX— MODIFICATION AND TERMINATION

A. This Agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this Agreement by providing the other party with thirty (30) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this Agreement.

C. In the event that the County terminates this Agreement in mid-year, the County shall pay the Park a prorated portion of the current Agreement year amount after receipt from the Park of a bill of collection.

ARTICLE X— STANDARD CLAUSES

A. **Civil Rights**

During the performance of this Agreement, the participants agree to abide by the terms of USDI-Civil Right Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. **Promotions**

The County of Mariposa shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the County of Mariposa represents. No release of information relating to this Agreement may state or imply that the Government approves of the County of Mariposa's work product or considers the County of Mariposa's work product to be superior to other products or services.

C. **Public Information Release**

The County of Mariposa must obtain prior Government approval from the Superintendent of Yosemite National Park for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this Agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

ARTICLE XI—SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this Agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE:

Signature: _____
Name: Michael Tollefson
Title: Superintendent
Yosemite National Park
Date: _____

Signature: _____
Name: Lloyd Sheetz
Title: Contracting Officer
Yosemite National Park
Date: 1/17/06

FOR THE COUNTY OF MARIPOSA, CALIFORNIA

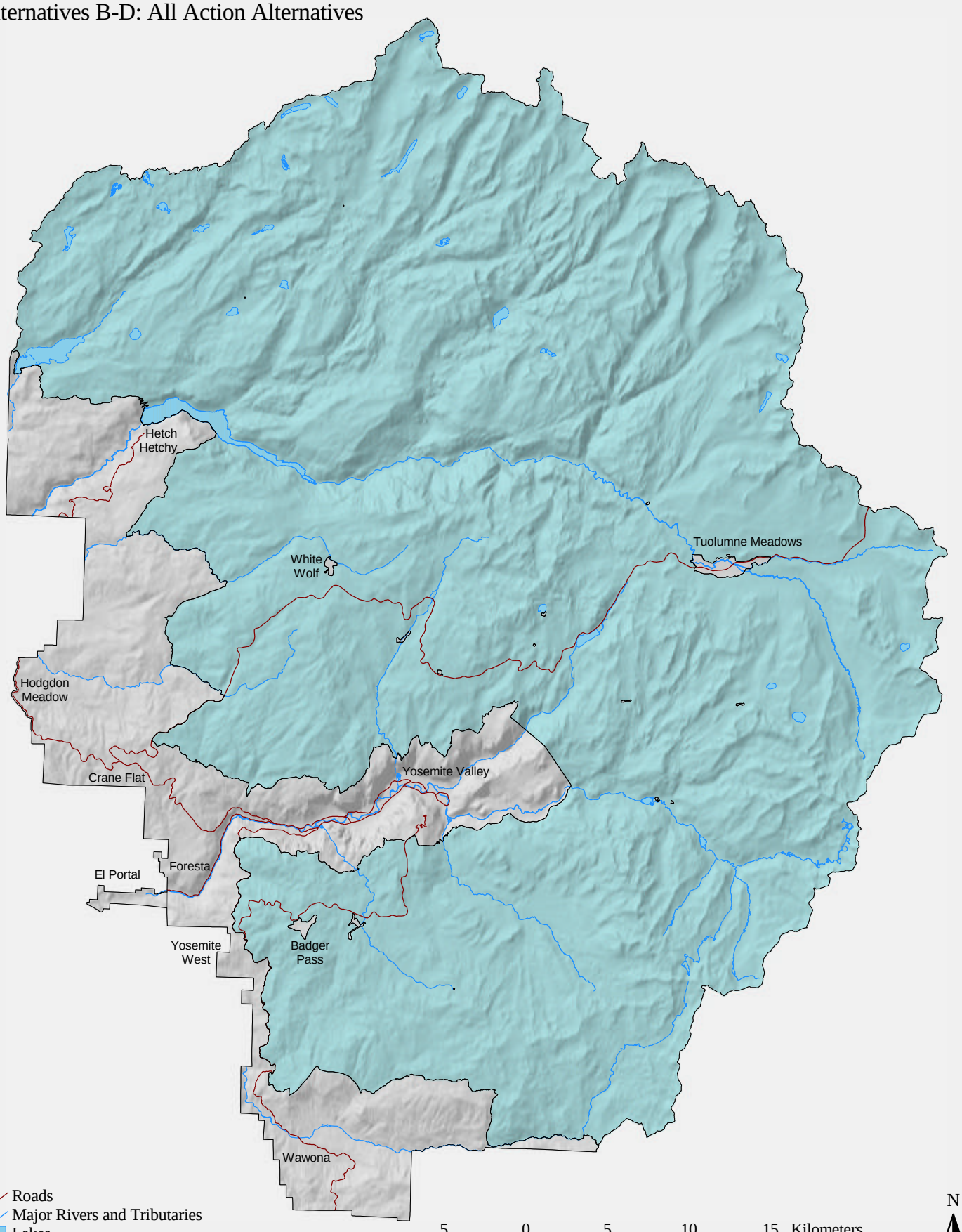
Signature: _____
Name: Lee Stetson
Title: Board Chair
Mariposa County
Date: 11-28-06

APPROVED AS TO FORM

_____
Thomas P. Guarino
County Counsel

Appendix F - NPS Map 2-20 Fire Management Units

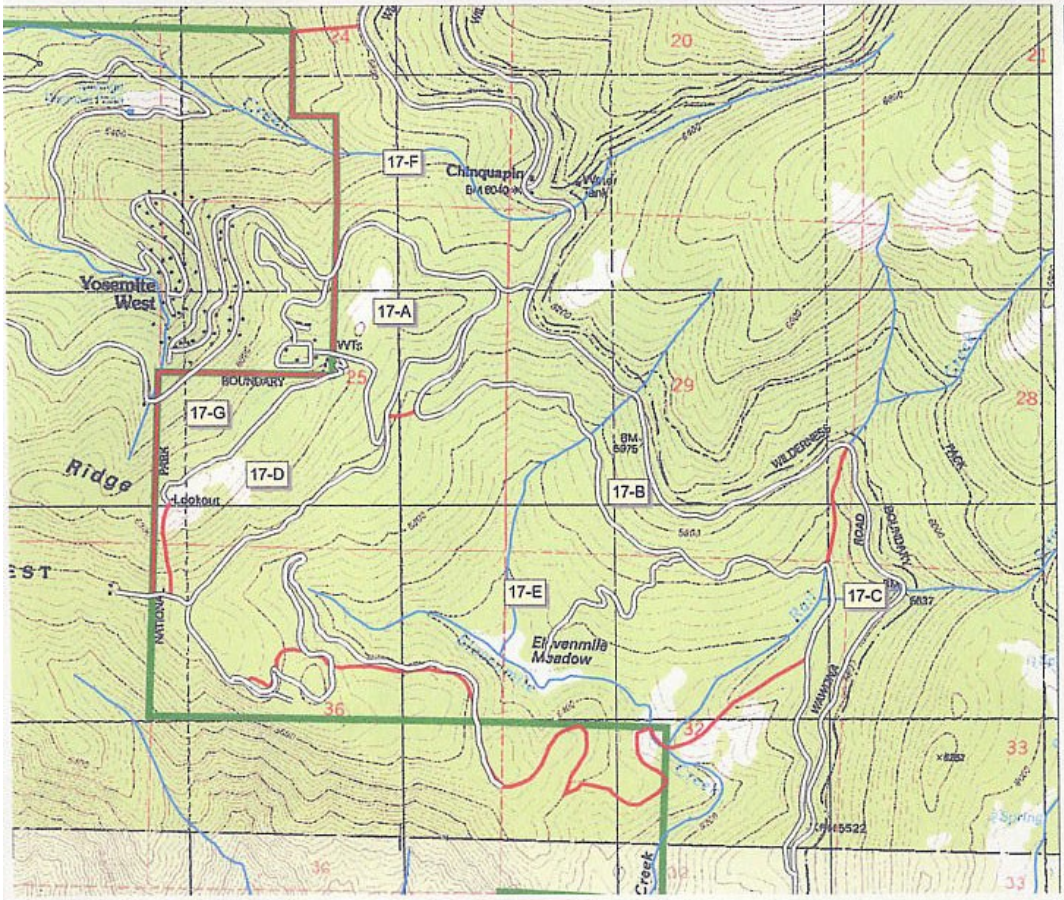
Map 2-20
Fire Management Units
Alternatives B-D: All Action Alternatives



Appendix G - NPS Project Map - Yosemite West Burn Units

Project Map
Yosemite West Burn Units

Appendix B



Proposed Burn Area

RX Unit	Acres
17-A	105
17-B	172
17-C	66
17-D	128
17-E	724
17-F	212
17-G	64

National Park Service
Yosemite National Park
Fire Management Program

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Appendix H - Projects Summary

- Yosemite West Project Summary #1 - Improve Defensible Space Within Community
- Yosemite West Project Summary #2 - Complete and Extend Shaded Fuel Breaks Around Community
- Yosemite West Project Summary #2 - Cost Estimates
- Phase I Projects/Parcels Map

Yosemite West Project Summary #1 - Improve Defensible Space Within Community	
Priority: High Number of Acres: 109 Project Type: Mechanical	Cost estimates: Chip/dispose of residue: . . . . . $38,150 Project administration: . . . . . $9,500 (Cost estimates were calculated in 2004, and current costs are likely to be higher, and need to be adjusted prior to submitting any grant applications.)

Project Description

Property owners within the Community (parcels number 006-080-***, 006-090-***, 006-100-***, 006-110-***, 006-120-***, 006-130-***, and 106-130-020) would treat vegetation around their structures and on their vacant lots to create as much defensible space as possible within the Community, reduce the amount of receptive fuels that could easily ignite and spread a wildland fire, and improve access for firefighters by brushing back roads, parking areas and driveways.

The project area (see Phase I Projects/Parcels Map in Appendix H) is identified as YW-006 (109 acres).

Desired Results

Discussion: This project has been developed on the assumption that due to the location of the Community and the condition of the surrounding fuels, Yosemite West is vulnerable to a wildland fire ignited on surrounding land. Intense wildland fires usually loft firebrands that can be carried by air currents for some distance (commonly called spotting distance). Modeling using Behave Plus (Andrews 1986, Andrews et al. 2003) indicates that the spotting distance in the common fuel types in the area is between 0.5 and 0.8 miles. Depending on environmental conditions and other factors, the lofted embers can land on receptive fuels and ignite new fires (spot fires) in advance of the main fire. The treatment of fuels within the Community is a key element in the overall defense.

Goal: The primary goal is to reduce the amount of flammable fuels on vacant lots and create defensible space around all structures in the Community so that spots fires are less likely to occur; and when they do occur, fire suppression resources have a 90% probability of suppressing them.

Objectives: Measurable objectives include participation of more than 90% of the owners who are the sole occupants of their property, and more than 80% of the owners who rent their properties or own vacant lots.

Objective: As part of a program to improve firefighter and public safety, an Evacuation Plan for Yosemite West should be developed within the first year.

Method

Individual property owners would be responsible for determining the method of reducing the fuel loading on their property and creating defensible space around their structures. Options include cutting and removing the residue themselves or hiring contractors. The residue not utilized for

Yosemite West Project Summary #1 - Improve Defensible Space Within Community
other purposes, such as firewood, should be disposed of. The funding for the related support elements could come from a combination of property owners, a grant or through the County. If the objectives for the above goals are not achieved through voluntary efforts, the County should pursue the creation of a binding covenant that requires Fire Safe to be practiced. The Mariposa County Sheriff and MCFD in conjunction with the Community would develop a concise, easy-to-follow Evacuation Plan that is distributed to all property owners and posted in conspicuous places.
Prescription
Property owners should use the standards found in the publication *Fire Safe Landscaping* or other similar publication provided by the Fire Safe Council or Firsewise standards.
Remarks
The Fire Safe Council's recommended standards are available online at http://www.firesafecouncil.org/education/landscaping/landscaping2.html. Firewise is online at http://www.firewise.org. Fire investigators and others looked closely at what led to the loss of homes and outbuildings in Los Alamos, New Mexico as a result of the Cerro Grande fire. Forest Service investigator Jack Cohen examined the area following the fire, and concluded that much of the fire burned "within several hundred yards or more of the Los Alamos residential area…as a surface fire - an underburn…the tree canopy was scorched but not consumed. [His] examination suggests that the high ignitability of Los Alamos was principally due to vegetation, flammable shrubs, wood piles, etc. adjacent to, touching and/or covering the homes…the high ignitability of most of the residential area allowed numerous simultaneous house fires that quickly overwhelmed the suppression forces" (Carle 2002). Cal Fire, a department of the Resources Agency of California, provides leadership and services to protect and encourage sound land management of the forest, brush and grass-covered lands in California. Fire Safe Landscaping is part of a series of fire safety informational materials.

Yosemite West Project Summary #2 - Complete and Extend Shaded Fuel Breaks Around Community	
Priority: High Number of Acres: 384 Project Type: Mechanical	Estimated Cost: See following table. (Cost estimates were calculated in 2004, and current costs are likely to be higher, and need to be adjusted prior to submitting any grant applications.)

Project Description

Create and extend shaded fuel breaks up to half a mile wide in some locations to protect Yosemite West from a high intensity wildland fire. Five project areas (see Phase I Projects/Parcels Map in Appendix H) are identified as:

YW-001 (53 acres); divided into two projects YW-001A (25 acres) and YW-001B (28 acres)
YW-002 (124 acres)
YW-003 (106 acres)
YW-004 (49 acres)
YW-005 (52 acres)

Desired Results

It is the desire of the stakeholders to reduce the amount of hazardous fuels within and adjacent to the Community, reduce and regulate fuel loading and modify the vegetation structure and stand composition as necessary to protect life, property and resources.

When fully implemented, shaded fuel breaks in combination with increased defensible space around structures are expected to afford fire suppression personnel a 90% success rate when defending the community against a high-intensity wildland fire. The project will provide for safe and effective fire suppression actions while also considering the esthetic values important to the Community and the commercial value of timber in the undeveloped, privately held areas to be treated.

The landscape should take on an appearance of what may have existed naturally and historically. It should display a mosaic of complex vegetation patterns and types. There generally should be less continuous, uninterrupted vegetation types, more openings, trees of varying ages, and different plant communities in a random patchwork.

The work completed by the private property owners will enhance the fuels mitigation work completed by NPS.

Method

Discussion: This project is based on the assumption that Yosemite West is vulnerable to a wildland fire ignited on the surrounding lands. Intense wildland fires usually loft firebrands that can be carried by air currents for some distance (commonly called spotting distance). Modeling using Behave Plus (Andrews 1986, Andrews et al. 2003) indicates that the spotting distance in the common fuel types in the area is between 0.5 and 0.8 miles. Depending on environmental conditions and other factors, the lofted embers can land on receptive fuels and ignite new fires

Yosemite West Project Summary #2 - Complete and Extend Shaded Fuel Breaks Around Community

(spot fires) in advance of the main fire.

History shows that the ridge to the north of Indian Creek can be used to hold a fire threatening the Community from the north. It is important to treat the lands between Indian Creek and the Community to remove fuels that could be ignited by windborne embers and contribute to a crown fire that would be difficult to control.

Henness Ridge will slow the advance of a wildland fire burning up slope in the canyon to the south of the ridge. However, spotting on the backside of a ridge (in this case, in the Indian Creek watershed) often occurs and spot fires can gain intensity and quickly burn up the slope as a crown fire.

NPS created shaded fuel breaks on the Park's boundary with the Community and additional work is scheduled for the future. This action should afford the Community needed defensible space to the east and south along the boundary, provided the Community treats the fuels on vacant lots and around existing structures within the Community.

Goal: Mitigate the threat to Yosemite West from a wildland fire igniting on surrounding lands so that fire suppression resources have a 90% probability of successfully defending the community. There is a need to attain all these objectives, as failure to meet any one – including the treatment of fuels within the Community - may compromise the effectiveness of the other actions and place the residents and structures in jeopardy.

Objective: Complement the fuels mitigation work completed by NPS on the east and south boundary between the park and the community.

Objective: Treat the north-facing slope of Indian Creek from the Park's boundary west to the limit of the project so that any spot fires caused by windborne embers will burn as low-intensity ground fires that can be controlled by suppression forces.

Objective: Treat lands to the south and to the west bordering Sierra National Forest so that a crown fire moving up the Indian Creek watershed cannot be sustained and fire suppression forces will be able to safely suppress the resulting surface fire or defend the community through the use of indirect suppression tactics.

Objective: Create awareness in the community of the importance of creating defensible space around structures and reducing receptive fuels within and adjacent to the Community.

Method: Five project areas have been identified for treatment. The first priority is to complete and extend the existing shaded fuel breaks to at least approximately 300 feet wide on the west and north sides of the Community (project area YW-001). YW-001 is divided into two parts: YW-001A, twenty-five acres treated in 2007; and YW-001B, twenty-eight acres yet to be funded for

Yosemite West Project Summary #2 - Complete and Extend Shaded Fuel Breaks Around Community

treatment. YW-005 has been treated in 2006 and 2007 by its owner PFT (see section 4.5.4.).

Treatment of the other areas will be completed incrementally on a funds available basis to strengthen the primary fuel break and improve the defensibility of the Community from a high-intensity wildland fire. When all the treatments are completed, the fuel break will tie in to the shaded fuel break created by NPS on the south and east sides.

Some project areas may be logged prior to other treatment and the logs salvaged for commercial purposes. An RPF using the standards established for this project should mark the trees to be cut for saw logs. The landowner will be responsible for finding a market for the logs and arranging for their removal in a timely manner. Skidding equipment and methods that do not cause a great deal of ground disturbance should be used remove the logs in order to protect the ground cover and prevent silt laden run-off that could impact the water quality of the Merced River.

The methods to be used to thin the remaining stand will depend on the terrain and vegetation type. On slopes 40% or less, mechanical equipment such as a masticator should be used to reduce small trees and brush to surface fuels that can later be treated with prescribed fire, as needed.

It may be necessary to use chainsaws and other similar devices to cut small trees and brush on slopes greater than 40%, and to limb trees to reduce ladder fuels. The materials not utilized as saw logs or for other purposes would be hauled away or brought to a road and chipped. The chipped materials would be blown back into the forest wherever possible to provide for soil protection and to return nutrients to the soil.

With the exception of any logging activity, which will be completed at the discretion of the property owner, the thinning will be completed using contracted equipment and labor.
The project areas may receive followed up mechanical treatment.

Prescription

The desired results are a forest composed of less continuous vegetation with more openings,trees of varying ages, and different plant communities in a random patchwork that will not support a crown fire. To achieve those results several things must be considered:

Species Composition: When selecting species to retain, preference should be given to the pine species, oak, and Douglas fir. In riparian areas, brush should be given preference. The historic stand composition was one composed of large pine, with Douglas fir and some oak. A few white fir and incense cedar would have been present. Oak brush and manzanita would have been present in dryer, more open sites.

Age Classes: The desire is to create a forest that is composed of uneven-aged trees and brush. Older trees should be scattered through the stand to replicate what would have been present following a fairly intense wildland fire. These larger trees would have survived subsequent light under burns that would have killed groups of small trees. The result would have been an uneven

aged stand with pockets of the same cohort scattered through the site.

Tree Size: Trees, regardless of species, greater than twenty inches dbh should be favored. However, in order to create an uneven-aged stand, trees of different ages and species should be left.

Stand Composition: Forested stands should be composed primarily of pine, Douglas fir and oak with a limited number of incense cedar and white fir. Trees should be clumped and unevenly spaced through the stand in a random pattern with scattered small open areas. The result should be an uneven aged stand with pockets of the same species scattered through the site. Small patches (ten square meters or less) of dog-hair pine can be left, provided the patches are more than 150 feet from the nearest structure. The clumping of white fir is not recommended unless the boles are limbed to eliminate fuel ladders.

Areas currently occupied by brush should be allowed to remain unless the stand is highly decadent. However, there must be a transition area between brush fields and timbered areas to prevent the creation of fuel ladders.

Tree Spacing: Three elements generally must be present for the development of a surface supported (active) crown fire: 1) high wind speeds; 2) high crown bulk density and cover; and 3) low crown base height. Little can be done about the wind, but the other two elements can be manipulated to reduce the likelihood of an active crown fire. To prevent a wildland fire from reaching the tree canopies, remove smaller, understory trees and raise the height of lower branches of the larger trees. These two form ladder fuels that allow the fire to reach the crowns. Determining tree spacing will reduce crown bulk density. For slopes less than 40%, computer models suggest the spacing to be twenty-two feet between single tree crowns or groups of trees. For slopes greater than 40% the spacing should be twenty-four feet. Trees should be limbed from six to eight feet from the ground in undeveloped areas and ten feet next to roads.

Trees should be spaced randomly. Groups of two to four larger trees (twenty inches dbh) can be left but must be limbed to a height of ten feet and living surface fuels, such as young trees and brush, removed. The creation of openings of one acre (0.405 hectare) to two acres (0.810 hectare) is encouraged.

It is not necessary to mark the trees to be left in the unit following thinning. It has been demonstrated that experienced operators, once given the standards, can thin the forest and remove the brush and undergrowth without further direction.

Limitations

Several historic railroad grades created and used during past logging operations must be protected from damage due to their historical significance. They should not be disturbed, if possible, and should be crossed at right angles, when it is safe to do so.

Yosemite West Project Summary #2 - Complete and Extend Shaded Fuel Breaks Around Community
Adequate protection must be afforded water quality. Riparian areas and drainages should not be disturbed and vegetation should not be treated within twenty-five feet of a watercourse.
Remarks
It is important to note that this project is not a "cure-all." History has shown that little can be done to halt or modify the rate and direction of spread of an independent crown fire. This type of crown fire is burning independently of the surface fire and burns with such a high intensity that it often creates its own environmental conditions. Fire investigators and others looked closely at what led to the loss of homes and outbuildings in Los Alamos, New Mexico as a result of the Cerro Grande Fire. Forest Service investigator Jack Cohen examined the area following the fire, and concluded that much of the fire burned "within several hundred yards or more of the Los Alamos residential area…as a surface fire - an underburn…the tree canopy was scorched but not consumed. [His] examination suggests that the high ignitability of Los Alamos was principally due to vegetation, flammable shrubs, wood piles, etc. adjacent to, touching and/or covering the homes … the high ignitability of most of the residential area allowed numerous simultaneous house fires that quickly overwhelmed the suppression forces" (Carle 2002). Therefore, it is highly important that this project be completed in its entirety and in conjunction with the creation of defensible space around structures in the community. When both projects are completed, the safety of firefighters and the public greatly improved. Depending on slope and aspect, surface fires may spread more quickly in open stands of timber than in closed stands of timber.

Project administration includes a monitoring program that is intended to conduct representative sampling prior to treatment and post-treatment in Year 1, followed by follow-up monitoring in Year 3, and Year 5 or 6. At least one Brown's transect or equivalent should be randomly placed in each transect area, and at least two randomly placed photo plots per project area should be established.

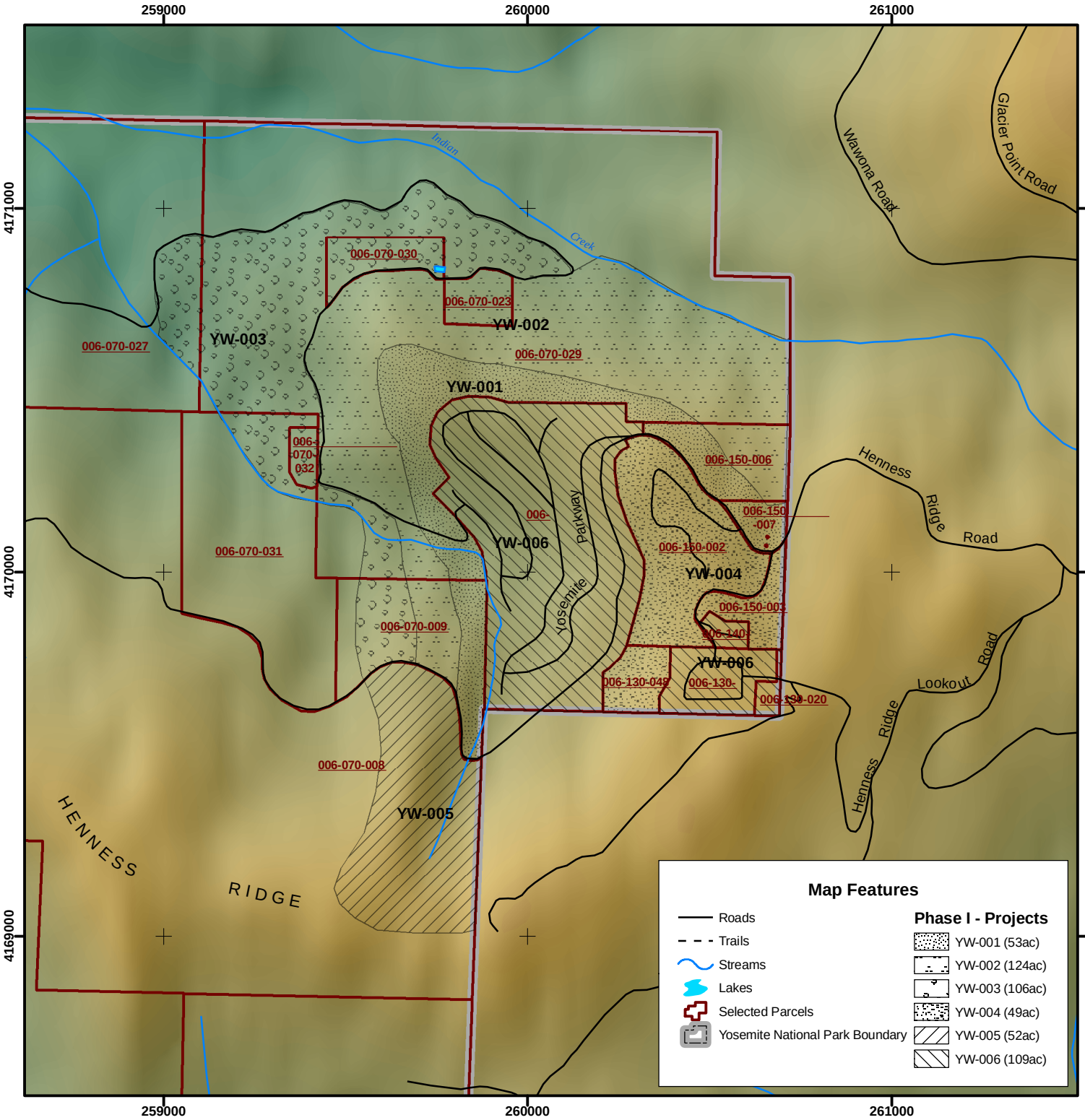
Yosemite West Project Summary #2 - Cost Estimates
(Cost estimates were calculated in 2004, and current costs are likely to be higher, and need to be adjusted prior to submitting any grant applications.)

Project Area	Treatment Method	Acres	Cost	Remarks
YW-001A	Thinning, Chipping	25	$36,000	Grant 06NPS9093 awarded; work in progress as of November 2007.
YW-001B	Masticator Thinning Chipping/Hauling Project Admin Disposal Project Admin	28 7 7 35	$11,200 $ 1,450 $ 3,450 $ 3,650 **$19,750** $18,500 $ 4,650 **$23,150**	
YW-002	Masticator Thinning Piling/Hauling Project Admin	52 72 72	$20,800 $14,400 $18,000 $13,300 **$66,500**	Much of this area has slopes exceeding 40%. Hand piling may be appropriate.
YW-003	Masticator Thinning Piling/Hauling Project Admin	78 28 28	$31,200 $ 5,600 $13,300 $12,525 **$62,625**	
YW-004	Masticator Project Admin Disposal Project Admin	49 44	$19,600 $ 4,900 **$25,500** $44,000 $11,000 **$55,000**	It may be necessary to hand thin approximately five acres.
YW-005	Masticator Thinning Piling/Hauling Project Admin Prescribed Burn Project Admin	35 17 17 35	$14,000 $ 3,400 $ 4,250 $ 5,410 **$27,060** $35,000 $ 8,750 **$43,750**	PFT, the private property owner, has been coordinating and funding fuels treatment on project area YW-005.

Yosemite West
Community Wildfire
Protection Plan

Phase I
Projects/Parcels Map

Elevation Shaded Relief
USGS 7.5' Topographic Maps:
El Capitan and El Portal, CA



Map produced by:
Digital Mapping Solutions
Date: 01/11/05

Projection: UTM, Zone 11, NAD27
Accurate for display purposes only.

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DIGITAL MAPPING SOLUTIONS
INTEGRATING DATA TO CREATE SPATIAL KNOWLEDGE

WILDLAND FIRE ASSOCIATES

Appendix I – Glossary

This glossary is edited from the National Fire Plan.

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.
Aspect - Direction toward which a slope faces.

Behave - A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: burn; and fuel.
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.
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.
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.

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.
California Code of Regulations (CCR) - the official compilation and publication of the regulations adopted, amended or repealed by state agencies.
CFRO - Center for Fire Research and Outreach at the College of Natural Resources, University of California, Berkeley.
Closure - Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.
Complex - Two or more individual incidents located in the same general area, which are assigned to a single incident commander or unified command.
Conifer - Any cone-producing tree such as pine, fir and cedar.
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 where all organic material has been removed exposing bare mineral soil wide enough to stop an advancing 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.

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 thirty feet around a structure that is cleared of flammable brush or vegetation.

Detection - The act or system of discovering and locating fires.

Dog-hair Pines - A forest consisting of unnaturally dense pines.

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, leaves, and immediately above the mineral soil.

Engine - Any ground vehicle providing specified levels of pumping, water, and hose capacity.

Entrapment - A situation where personnel are unexpectedly caught in a fire behaviorrelated, 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.

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, or 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).

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, and strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

Fire Behavior - The manner in which a fire reacts to the influences of 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 Hazard Severity Zones - Zones for lands where the State has fiscal responsibility for wildland fire protection that rate the severity of fire hazard.

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 is regulated by state or local authority.

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.

Forest Practice Rules (FPR) - Regulations for commercial timber operations on private and other nonfederal lands in California that govern the protection of archaeological, historical, and cultural sites as detailed in Title 14 of the California Code of Regulations (CCR 14).

Forest Practices Act (FPA) - Refers to the Z'berg-Nejedly Forest Practices Act of 1973.

Fuel - Combustible material. Includes vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire. (See Surface Fuels.)

Fuel Break - An area where changes in forest types tend to force wildfires into surface fires, permitting firefighters to make direct, effective attacks on fire. (See Shaded Fuel Break.)

Fuel Loading - The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

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.

Geographic Area - A political boundary designated by the wildland fire protection agencies, where these agencies work together in coordination and effective utilization.

Geographic Information System (GIS) - A system for gathering, managing and analyzing data whose attributes are spatially referenced to the Earth.

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.

Hazard Reduction - Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Heavy Fuels - Fuels of large diameter such as snags, logs, and large limb wood that ignite and are consumed more slowly than flash fuels.

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.

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.

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.

Ladder Fuels - Fuels that 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.

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.

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.

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.

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.

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.

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 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, and 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.

Professional Foresters Law of 1972 (PFL) - A law that defines the principles and responsibilities of the RPF who provides the State with capacity to develop and implement forest management plans in accordance with PRC §752.

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.

Red Flag Warning - Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Registered Professional Forester (RPF) - A person who holds a valid license as a professional forester, issued by the California State Board of Forestry and Fire Protection, pursuant to Article 3, Chapter 2, Division 1, of the Public Resources Code.

Rehabilitation - The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Retardant - A substance or chemical agent that reduces the flammability of combustibles.

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.

Shaded Fuel Break - An area where trees have been retained without crown closure or thinned to reduce crown closure lessening the likelihood of a crown fire and to reduce the intensity of a surface fire.

Smoke Management - Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Snag - A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Strategy - The science and art of command as applied to the overall planning and conduct of an incident.

Structure Fire - Fire originating in and burning any part or all of any building, shelter, or other structure.

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.

Timber Harvesting Plan (THP) - A plan approved by the Director of the Cal Fire or by the State Board of Forestry and Fire Protection upon appeal, pursuant to Section 1032 of the Forest Practice Rules.

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.

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.

Wildland Fire - Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

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 (WUI) - The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.