EL DORADO COUNTY FIRE SAFE COUNCIL

EL DORADO COUNTY FIRE DISTRICT COMMUNITY WILDFIRE PROTECTION PLAN

El Dorado County Fire Safe Council
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Serving the communities along Highway 50:

Placerville, Camino, Pollock Pines, and Pleasant Valley,

PREPARD BY
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Community Wildfire Protection Plan

Mutual Agreement Page

The Community Wildfire Protection Plan (CWPP) was developed for central El Dorado County and the City of Placerville:

- This CWPP was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the plan have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will help protect the communities.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Signed For: Date:

El Dorado County Fire Safe Council

Signed for: Date:

El Dorado County Fire District

Signed for: Date:

Amador - El Dorado – Sacramento – Alpine Unit, California Department of Forestry and Fire Protection

<u>Prepared By</u>

Barry Callenberger Bernhard Bahro

WILDLAND Rx

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I. Introduction

El Dorado County Highway 50/49 CWPP area is situated almost entirely within Sierra Nevada foothill scrubland and woodland lower- montane, Forest Ecological Zones. The primary vegetation types found in the CWPP area are:

- Foothill scrubland vegetation is made up of foothill pine, interior live oak woodlands, mixed hardwood and chaparral scrublands. Some blue oak woodland occurs in the western most boundary of the CWPP area.
- Lower montane forest, which is the most prevalent vegetation type, is made up of vegetation types including, California black oak, ponderosa pine, white fir, incense cedar, Douglas fir mixed conifer and mixed evergreen interspersed with chaparral, and meadows. (Edited by Neil G. Sugihara, 2006)

The county comprises 1,805 square miles with over half of the area in the Eldorado National Forests and recreation areas. The remainder of the county is a mix of residential areas, agriculture lands, and business parks all grouped in small communities scattered throughout open space made up of wildland vegetation. Sacramento County borders on the west and the eastern boundary is the state of Nevada and the Lake Tahoe region. Placer County is to the north and Amador County to the south.

The population of El Dorado County continues to expand into these vegetation types with residential and commercial development occurring in wildland/urban interface areas of high fire hazard risk. The California Department of Forestry and Fire Protection (CAL Fire) has classified this area of El Dorado County as very high fire hazard. Additionally, the CA Fire Plan indicates that some or all of the wildland fire threat to this county comes from the adjacent federal lands.

There appears to be a general attitude in the community that devastating wildfires are not likely to occur in this part of California or occur rarely and are easily contained by fire suppression resources. The reality is that wildfires can and have played a significant role in the development of vegetation in the county. Large wildfires (over 5,000 acres) occur about every decade on average in the county. Over the past two decades, there has been an increasing trend in population growth in the rural areas of the county. Combine this with relatively successful fire suppression; the vegetation in areas that once burned frequently has become over grown and susceptible to contributing to large damaging fires with multiple structure loss likely.

The Fire services and this Community Wildfire protection Plan point to the potential for large structure losses in the near future.

> A comment in a recent book, The Chili Bar Fire by Paul Hinds (Hinds, 2010), retired Fire Chief Leo Chaloux from the Mosquito Fire Protection District sums it up the best. "The Chili Bar Fire took place in September 1979 and is nothing more than a reflection of a fire that could take place in the very near future. One thing we must realize is a large fire can take place here, that can be a threat to our houses and families; as we all know, it did happen here 30 years ago and it will happen again."

Many areas of El Dorado County are just a mirror image of the growing fire problem in California as described in the newest state wide California Fire Plan, 2010

- Growing Population in Wildland Areas:
  More than 8 million people own homes and businesses in wildland areas of California (176,000 of those live in El Dorado county). As a result, fires that once burned as part of a natural process now threaten lives, property, and valuable resources.
  http://co.el-dorado.ca.us/AboutUs.aspx
- Growing Demand for Services
  The safety of those people and homes in our wildland areas force fire agencies to respond immediately to extinguish wildfires. As the population grows, so does the demand for firefighting services.
- Growing Cost of Protection
  Fire agencies are constantly challenged to meet the growing demand for services and the growing costs of providing those services. (California Fire Plan,2010)

CWPP Objective

The purpose of this document is to provide a comprehensive, scientifically based assessment of the wildfire hazards and risks within the central El Dorado County study area. The content of this assessment will aid stakeholders in developing short-term and long-term strategies for:

- Hazardous fuel treatment projects and priorities for those projects
- Community wildfire safety education opportunities
- Assist public agencies in making valid and timely decisions for wildfires and evacuations.
- This assessment estimates the hazards associated with wildland fire in proximity to communities. The hazard information, in conjunction with values-at-risk information, defines "areas of concern" for the community and allows prioritization of mitigation efforts.
- Provide communities with opportunities to make a difference in wildfire losses with little cost to the taxpayers and the communities themselves.

Requirements of a Community Wildfire Protection Plan (CWPP)

Federal

The CWPP is required to be consistent with and tiered to the following documents federal acts, and policies. The two acts most associated with fuels reduction policy *The 2010 Federal Land Assistance Management and Enhancement (FLAME) Act* (the most recent congressional act a summary is located at http://www.wflccenter.org/news_pdf/344_pdf) (U. S. House of represetnatives and Senate, 2009), and *The Healthy Forest Restoration Act (HFRA)* of 2003. The federal agencies' policies that implement the acts are the *10 Year Implementation Plan for HFRA and the Cohesive Strategy.* These are a national collaborative effort between wildland fire organizations, land managers, and policy making officials representing federal, state and local governments, tribal interests, and non-governmental organizations that will address the nation's wildfire problems.

The FLAME Act effort has spawned collaborative consideration and examination of wide-ranging but pertinent elements in creating a synergistic move forward. This report presents those elements in two parts.

- Part one addresses the specific elements requested by Congress in the FLAME Act.
- Part two expands upon those elements and goes further in providing a roadmap for the future—Cohesive Wildland Fire Management Strategy. As a living document, part two provides a foundation from which to build local and regional actions and direction.

Together, the two parts of this report, address the elements requested by Congress and represent the next stage in an evolving world of wildland fire management; all with the goal of achieving even safer, more efficient, cost-effective, achievable public and resource protection, and more resilient landscapes.

Fire-Adapted Communities

Despite the challenges of assessing and countering risks, progress is being made to address the threats. One approach is the concept of "fire-adapted communities," one of the three primary elements of the *Cohesive Strategy*.

A fire-adapted community is one consisting of informed and prepared citizens collaboratively taking action to safely co-exist with wildland fire. An inherent part of becoming a fire-adapted community is to assess the community and the threat posed to it by wildland fire. A fire-adapted community generally has achieved or is working toward the following:

- Implementing "Firewise" principles to safeguard homes and "Ready, Set, Go!" principles to prepare for fire and evacuation
- Developing adequate local fire suppression capacity to meet community protection needs•
- Designing, constructing, retrofitting and maintaining structures and landscaping in a manner that is resistant to ignition
- Adopting and enforcing local codes that require fire-resistant home design and building materials
- Raising the awareness of and creating incentives for growth planning and management that reduces, rather than increases, fire-prone development
- Properly spacing, sequencing and maintaining fuel treatments across the landscape
- Developing and implementing a CWPP or equivalent
- Establishing interagency mutual aid agreements
- Designating internal safety zones

The Healthy Forest Restoration Act (HFRA) (U.S. Congress, 2003) Requirements for a CWPP include:

The HFRA identifies CWPPs, which allow communities[1] to:

- Fuel-reduction projects identified in approved CWPPs receive priority for funding requests from the California State Clearinghouse (HFRA sec 103 [d1]). Federal agencies shall consider recommendations identified in CWPPs (HFRA sec. 103[b]) and implement those projects on federal lands (HFRA sec. 102[a]).

[1] Communities are defined as at-risk communities or a group of homes and other structures with basic infrastructure and services (utilities, transportation) within or adjacent to federal lands (HFRA sec. 101 [1]).

State of California

This analysis and finding of the Central El Dorado County CWPP are consistent and supported by the findings in the ***2010 Forest and Range Assessment of California***. (California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, 2010)

> California's Forests and Rangelands: 2010 Assessment, California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, June, 2010
>
> Current Status and Trends
>
> - California's long history of wildfire and population growth has led to a set of state laws, regulations and programs that address community wildfire safety. These include state and local planning laws, Fire Hazard Severity Zones and related building standards, defensible space requirements, various fuel reduction programs, the California Fire Plan and CAL FIRE Unit Fire Plans; and the State Hazard Mitigation Plan.
>
> - Community fire protection is also addressed by federal laws and programs such as the Disaster Mitigation Act, National Fire Plan, Healthy Forests Restoration Act, and Firewise Communities Program.
>
> - Local agencies and non-profits play a key role in community fire protection planning. This is accomplished through county fire plans, county general plan safety elements, and through involvement of local fire districts, Fire Safe Councils, and the California Fire Alliance. It also includes local groups such as the Forest Area Safety Taskforce (FAST) and Mountain Area Safety Taskforce (MAST) in San Diego, Riverside, and San Bernardino Counties.
>
> - Community planning is a collaborative effort that typically includes various federal, state and local agencies, CAL FIRE units, Resource Conservation Districts, local fire districts and private organizations.
>
> http://frap.cdf.ca.gov/assessment2010/pdfs/california_forest_assessment_nov22.pdf

The new state wide fire plan, **2010 Strategic Fire Plan for California, State Board of Forestry and Fire Protection California Department of Forestry and Fire, November 2010**, states for its vision:

> "…a natural environment that is more resilient and man-made assets which are more resistant to the occurrence and effects of wildland fire through local, state, federal and private partnerships." (California State Board of Forestry and Fire Protection, November 2010)

The California Fire Plan is the state's road map for reducing the risk of wildfire. By placing the emphasis on what needs to be done long before a fire starts, the plan looks to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. The plan was a cooperative effort between the State Board of Forestry and the California Department of Forestry and Fire Protection (CAL FIRE). The basic principles of the fire plan are as follows:

- Involve the community by encouraging community involvement to ensure that fire protection solutions meet individual community needs
- Assess community risk by identifying community assets at risk of wildfire damage. Community assets at risk are public and private resources (natural and manmade) that could be damaged by wildfire
- Develop solutions and implement projects by developing pre-fire management solutions and implement cooperative projects to reduce a community's potential wildfire losses

http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf668.pdf

Community Wildfire Protection Plans (CWPPs) and Local Jurisdiction

On the local level, CWPPs are a product of a collaborative process among local stakeholders to prepare for and deal successfully with a wildland fire emergency. CWPPs provide a specific risk-assessment to a community, identify areas needing specific treatments, and include roles and responsibilities, evacuation routes, resources, and other pertinent information a community needs in times of emergency. CWPPs are comprehensive wildfire planning tools for a community or a county.

CWPPs also include the opportunity to educate homeowners, targets prioritize and schedule fuels treatments, and building response capability. Working together to create a CWPP is an important first step in bringing the awareness of shared wildfire risk home to the community. Local authorities such as fire departments, fire protection associations, county planning and zoning departments and other authorities conduct risk assessments that help them determine their local needs for fuel treatments, equipment, personnel, training, mitigation needs, local ordinances or code adoption and enforcement. Local assessments also can identify which mitigation programs are best for a given community, such as NFPA's "Firewise" and the International Association of Fire Chief's (IAFC) "Ready, Set, Go!"

Regulation through codes and ordinances and subsequent enforcement is a major challenge for communities-at-risk since most of those communities are small. Even if they have authority to adopt codes, many communities do not have the resources to enforce them.

Most communities-at-risk are served by volunteer fire departments, if they have fire protection at all. Many of these departments do not have the resources to take on additional responsibility without additional funding. The paradox is obvious: Often, communities-at-risk that can do the most to make their communities fire-adapted do not have the resources to do so.

The CWPP is only a plan—it will not reduce the threat of a wildfire or increase protection for any community. Reducing the threat of a wildfire to a community will only be achieved by the local residents of that community. Federal, state, and local agencies may provide assistance, but ultimately, actions that modify fire behavior or increase structural resistance to a wildfire are the responsibility of the local residents.

For more information on CWPPs in California go to the following websites

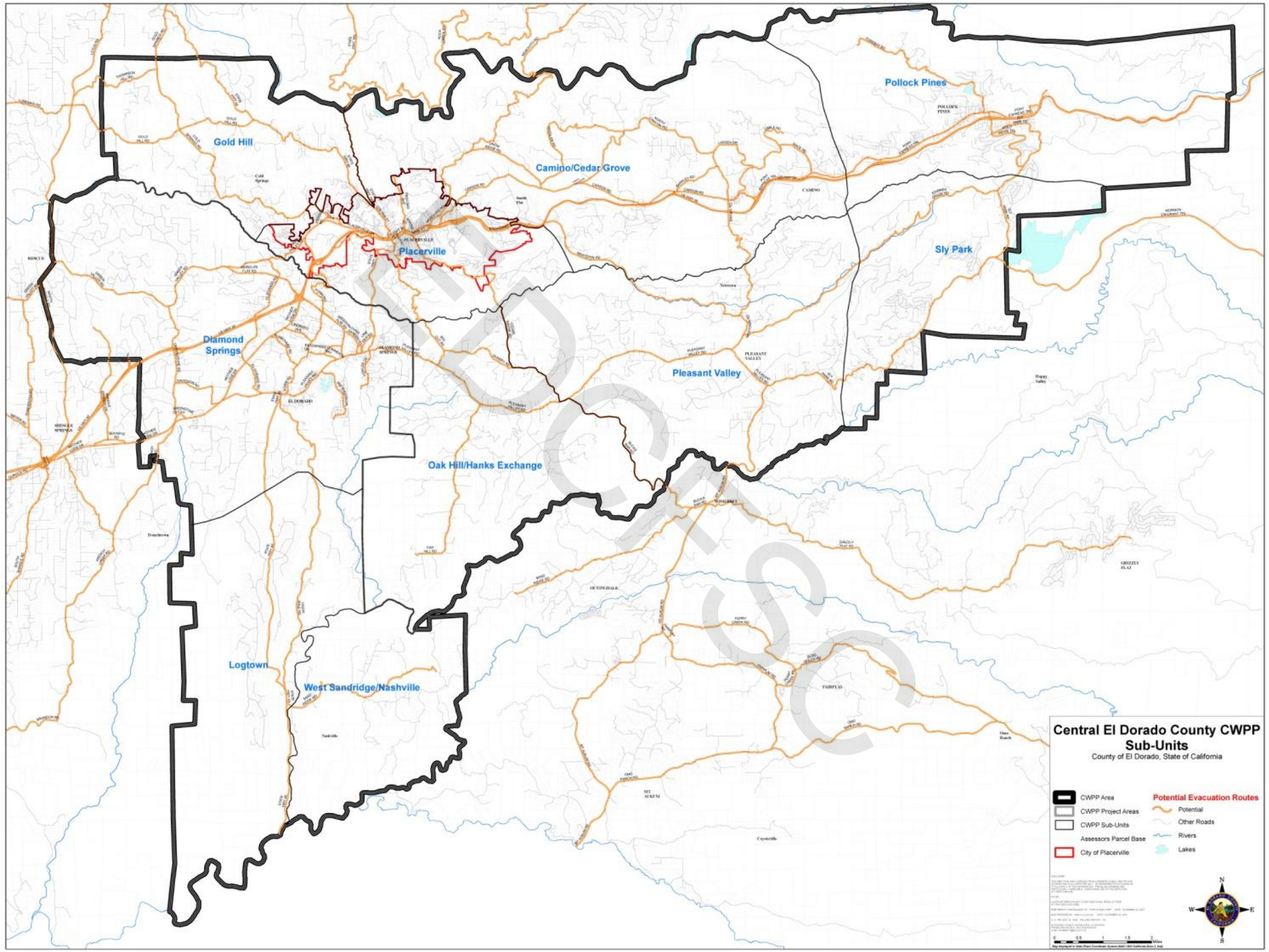
http://www.cafirealliance.org/cwpp

http://www.firesafecouncil.org/

Planning Area Boundaries

The central El Dorado County CWPP is divided into two principle planning and analysis zones by fire district. The El Dorado County Fire District serves the communities of Placerville, Camino, Pollock Pines, and Pleasant Valley. The Diamond Springs/El Dorado Fire Protection District serves the communities of Diamond Springs, El Dorado, Logtown and Nashville communities. The wildland fire protection is provided by CAL FIRE for all of the communities with the exception of the Placerville City limit which is a Local Responsibility Area (LRA). The City of Placerville wildfire protection falls under the responsibility of El Dorado County FD. Map 1 on page 15 shows the central El Dorado County CWPP boundaries and it's community based sub units that make up the CWPP area.

Map 1 CWPP Planning area boundary and sub units



II. Planning Process

Collaboration

Primary Collaborators

Government

- United State Forest Service
- United States Fish & Wildlife Service
- Bureau of Land Management
- Eldorado County
- Placerville City
- Resource Conservation Districts
- CalTrans
- Eldorado County GIS
- El Dorado County Planning
- El Dorado County Department of Transportation
- El Dorado County Public Health

Non-Government Agency Involvement

- El Dorado Irrigation District
- Red Cross - Sacramento Sierra Chapter
- El Dorado County Fire Safe Council
- Pollock Pines Fire Safe Council
- Logtown Fire Safe Council

Fire Department Involvement

- El Dorado County Fire (direct protection responsibility)
- Diamond Springs Fire (direct protection responsibility)
- CAL FIRE (direct protection responsibility)
- US Forest Service (limited direct protection responsibility)
- Bureau of Land Management (no direct protection responsibility)

Primary CWPP Development Team members and responsibilities

El Dorado County Fire Safe Council

The El Dorado County Fie Safe Council, local fire safe councils, and its contractor, Wildland Rx and the local Fire Safe Councils within the CWPP will be the lead agency representatives in the collaborative process and development of the CWPP will be responsible for the following:

- Serve on the CWPP development team

- Facilitate and coordinate the over-all CWPP process with Local Fire Protection Districts, Federal Agencies, and other key stakeholders.
- Develop central county-wide base map(s).
- Conduct a landscape-scale Hazard, Values, and Risk Assessment for all lands within the designated CWPP area.
- Assist fire departments in providing general discussions and assessments of their departments.
- Work with appropriate El Dorado county and Placerville City departments and staff to develop a project-specific implementation plan for county-owned and Placerville City properties.
- Provide technical expertise in developing prescriptions for wildfire mitigation treatments.
- Assemble and maintain the final CWPP document.
- Assist in public education efforts for the CWPP
- Assist the County GIS in maintaining the map library for the CWPP and the evacuation mapping tools as well as project maps.

Fire District's Serve on CWPP development team

- Provide input on the assessment process and feedback specific to the fire district for Hazard, Values, and Risk assessments.
- Provide information on past, current, and future mitigation efforts within your district.
- Provide a general description of the fire department and district including its history, size, structure, response statistics, equipment, stations, services, water systems, ignition sources, and any other pertinent information.
- Provide an objective assessment of the department's wildland fire program (including training, prevention, suppression, etc.) identifying its adequacies, future goals, and areas for improvement (training, personnel, equipment, etc.). Assist in recommending areas where grant funding can be utilized.

CAL FIRE

- Serve on CWPP development team.
- Provide oversight of the CWPP process.
- Provide guidance and technical expertise for CWPP development.
- Provide information on past, current, and future mitigation efforts around county.

USDA Forest Service

- Serve on CWPP development team.
- Provide information to past, current, and future mitigation work being conducted on Forest Service properties within or adjacent to the CWPP area.
- Provide a general discussion on Forest Service wildfire program (suppression, mitigation, training, prevention, etc.).

USDI Bureau of Land Management

- Serve on CWPP development team.

- Provide information to past, current, and future mitigation work being conducted on BLM properties within El Dorado County.
- Provide a general discussion on BLM wildfire program (suppression, mitigation, training, prevention, etc.).

Joint Tasks

All team members should work in concert to accomplish the following tasks:

- Identify appropriate landscape-scale hazard reduction areas throughout the CWPP area.
- Identify WUI boundaries throughout CWPP area.
- Develop an Implementation Plan for this project
- Facilitate and/or participate in community meetings that will allow the public and other stakeholders to provide input and stay informed about this process.
- Outreach and work to create bottom-up interest in WUI communities to develop smaller-scale CWPPs and project-specific implementation plans.
- Assist interested WUI communities in developing smaller scale CWPPs and executing project-specific implementation plans.

Public Education Effort

Public education is a key component to the successful implementation of any CWPP. The following lists communities in El Dorado County already focused on wildland fire mitigation and prevention.

List of communities with active fire safe councils in El Dorado County:

- Pollock Pines/Sly Park
- Chrome Ridge
- Gold Hill Estates
- Logtown
- Sandridge
- Grizzly Flats
- Auburn Lake Trails
- Cameron Park
- Latrobe
- Royal Equestrian Estates
- Georgetown
- Volcanoville
- Mosquito
- Nevada Fire Safe Council (South Lake Tahoe)

List of FIREWISE Communities in El Dorado County:

- Auburn Lake Trails

- Grizzly Flats
- Logtown

Critical to getting the prevention message and outreach of the information in this CWPP are the communities that are already organized into groups for other reasons. These include organizations such as neighborhood watch programs, road associations, fire safe councils, homeowner associations, real estate organizations, and various clubs and organizations in the CWPP area. Additional information on organized groups can be found at: http://www.eldoradocounty.org/clubmaster.asp

The following is a partial list of community service districts, road associations, homeowner associations, and areas with active neighborhood watch programs organized by fire district.

El Dorado County Fire District (Highway 50)

Community Service District

- Nashville Trail
- Rising Hill
- Audubon Hills

Zone of Benefit/Road Associations

- Oak Leaf Circle
- Shadow Lane
- Texas Hill
- Sundown
- Camino Vista
- Gilmore Vista
- King of the Mountain
- Randolph Canyon
- Lynx Trail
- Dolly Varden

Home Owner Associations

- Sierra Springs
- Rancho Del Sol
- Lakewood Sierra
- Gold Ridge
- Camino Heights

Local Responsibility areas

- City of Placerville

Fire Safe Councils

- Pollock Pines/Sly Park
- Chrome Ridge

Each of the local fire safe councils, local fire prevention officers, law enforcement officers, CAL FIRE and federal agencies can use these small-organized groups listed above to establish key contacts for road standards needed for emergency equipment, residential clearance standards

and evacuation, planning prior to an incident. These organized groups are key components to the information in this CWPP. It's important to remind the communities that residential clearance and road side clearances are the responsibilities of the community not the fire department. Communities may have to do their own work days to clear the roadsides so that equipment can safely travel the roads. Road associations may need to widen the roads and put in turn a rounds to allow fire equipment space to turn around. These are only a few of the responsibilities of the communities to keep their community safe from a wildfire. The job of the fire departments and the fire safe councils is to educate the community to what needs to be done to provide for safe ingress egress for residence and fire equipment.

III. Community Description

Emergency Services

The central El Dorado County CWPP area falls under the responsibility of several agencies. They are El Dorado County Fire Protection District which covers the Hwy 50 corridor and Placerville. Diamond Springs/Eldorado Fire Protection District which generally covers the HWY49 corridor south of Hwy 50, and CAL FIRE which covers most of the wildland in the CWPP area. State responsibility area (SRA) lands cover most of the Bureau of Land Management (BLM) lands in the CWPP area. The City of Placerville falls under the responsibility of the El Dorado County Fire Protection District and is considered to be a Local Responsibility Area (LRA) and not under the jurisdiction of CAL FIRE. There are a number of acres that belong to the US Forest Service but are under the direct protection of CAL FIRE. These lands are generally west of the Eldorado National Forest boundary. In the county of El Dorado, there are 56 state and local fire stations, seven US Forest Service Engine Stations, four federal hand crews, 5 CAL FIRE state hand crews, 2 federal helicopters, one CAL FIRE dozer, and one federal fire dozer. The following table describes the equipment availability and staffing within the CWPP area being analyzed.

Table 1 highlights the current fire staffing in the CWPP area. Information in this table comes from local fire agency websites and is subject to change.

Table 1 Fire agency staffing

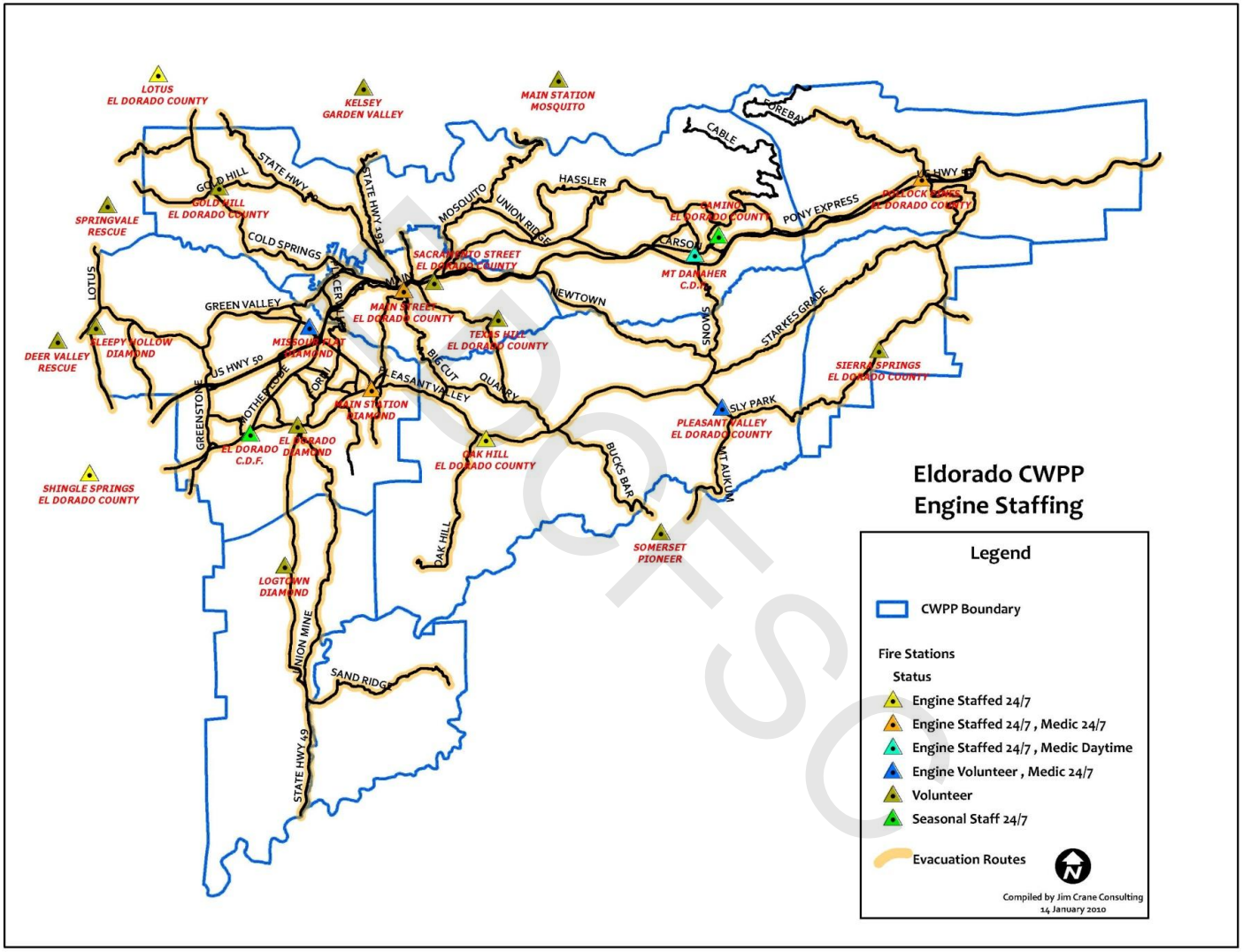
Fire Agency	24/7 Staffing Apparatus	Volunteer Off Duty Apparatus	Seasonal Staffing Apparatus	Hand crews	Helicopters Seasonal***
El Dorado County	7	15			
Diamond Springs El Dorado	1	5			
CAL FIRE*			7		
US Forest Service**			5	1	2

*CAL FIRE stations include equipment from El Dorado, Camino, Garden Valley, and Pilot Hill.

**US Forest Service includes equipment from Grizzly Flats, Sly Park, Pacific Ranger Station and Kyburz

***Big Hill and Pacific Ranger Station, additional CAL FIRE fixed wing and rotary wing aircraft are located in Grass Valley AAB and Columbia AAB

All departments have mutual aid agreements with each other so the local resource pool is large. However, dwindling county budget, more cuts to the fire departments are expected, which will lead to fewer staffed positions. Like all volunteer fire departments, they will continue to have difficulty filling and maintaining volunteers. Much of this is due to an aging work force, the large number of commuters, and the increase in training requirements. El Dorado County is known as a bedroom community with many residents living in the county but working in the greater Sacramento area which makes the pool of volunteers unavailable during the day. This keeps the local fire departments recruiting firefighting positions.



Map 2: Station location and staffing as of January 2011(staffing is subject to change)

IV. Community Hazard Assessment

Wildland Fire Behavior

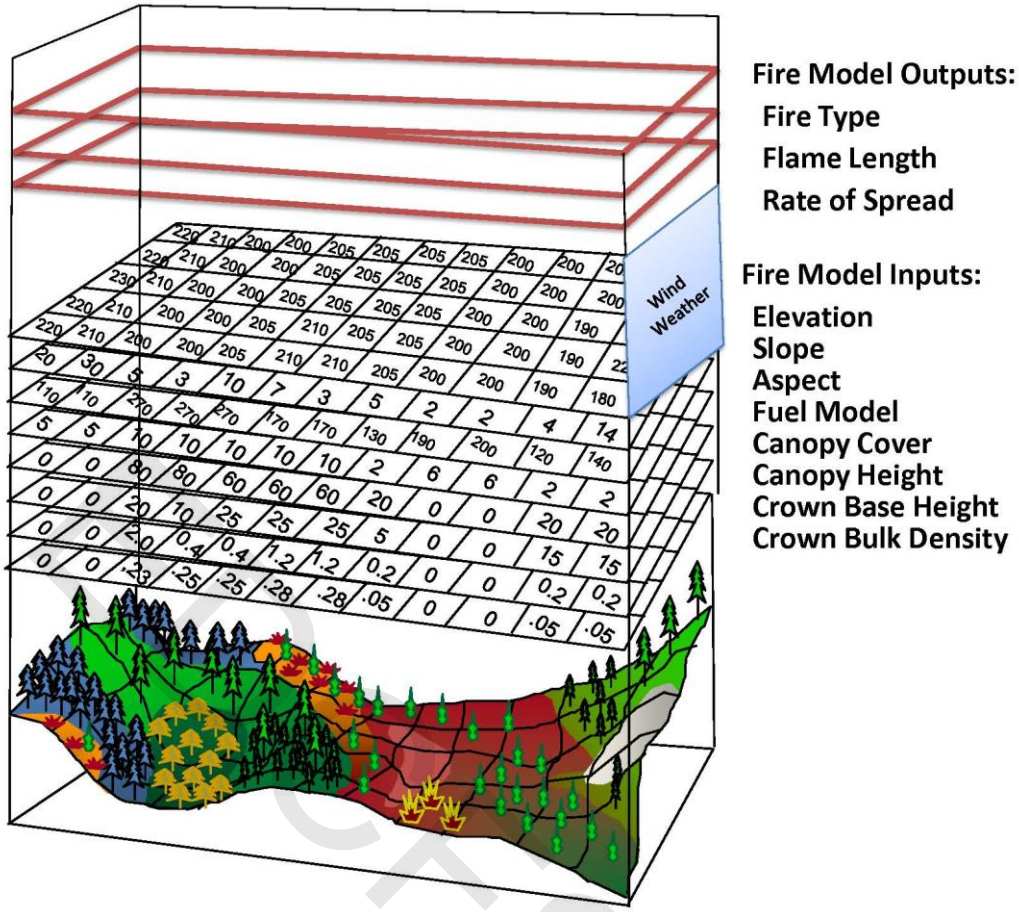
The wildland fire behavior analysis developed for this CWPP was designed to meet two objectives. The first was to examine the existing fire hazard and potential losses in the event of a wildfire, and secondly to establish the best treatment locations and priority for those treatments based on expected fire behavior with input from the fire fighting agencies and local community members. The 2010 version of the California Statewide fuels data for El Dorado County was used in this assessment. The fuels data is the most current inventory of California vegetation that interagency fire experts used to develop the spatial fuels layers for fire planning and decision support in California. The data set was made available from the US Forest Service regional office at McClellan, California. Weather data from the Bald Mountain Remote Automated Weather Station (RAWS) was used to model fire behavior. There were several models used to assist in the fire behavior modeling FARSITE, FLAMMAP, WINDNINJA, and FIREFAMILY Plus. The models are described in Appendix A.

Three important fire behavior outputs are derived from FlamMap and were used in designing the resistance to control maps and tables for the analysis.

> **Flame Length** - used to determine suppression tactics based on how close you can get to the fire
>
> **Rate of Spread** - used to determine fire spread, direction, and to develop triggers points for decisions
>
> **Fire Type** - based on the flame length and availability of ladder fuels, the fire can be a surface, torching, or actively crowning wildfire

Figure 1 depicts the modeling inputs and outputs for each 30 by 30 meter cell in the spatial grid (approximate every quarter acre). The surface fuel data and mapping done for this document used spatial input data that was randomly ground verified. This allows decision makers to have the best information possible on potential fire behavior and expected losses in the CWPP area.

Figure 1: Model inputs and outputs for fire behavior modeling



The outputs were used to evaluate fire effects, determine the likelihood of potential loss and to determine potential suppression tactics. This data was used to develop the matrix found in Table 7 on page 48. Further refinement and calibration of the analysis parameters in the matrix were completed after consulting with local fire officials and researching historical fire records. See RTC Map 6 on page 47.

Weather data is required to bring local conditions into the analysis to complete this assessment. Weather from the Bald Mountain Remote Automated Weather Station (RAWS), located in El Dorado County north of the CWPP analysis area, has the longest most accurate records available for the county. Descriptive weather parameters such as temperature and relative humidity are used to determine the fuel moistures to burn the vegetation. When the vegetation burns it releases energy. This energy can be measured and used to determine fire danger. It is called the Energy Release Component (ERC)

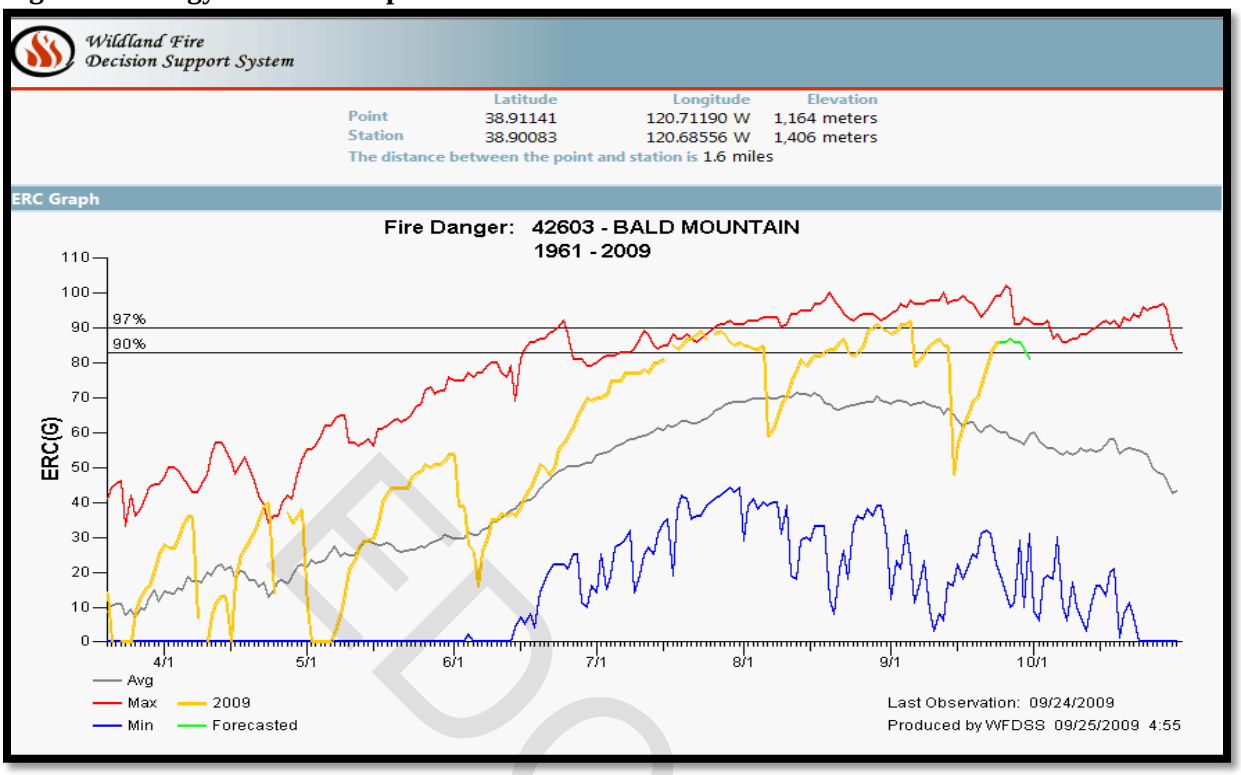
The fire behavior measurement used for this assessment was Energy Release Component (ERC) an NFDRS (National Fire Danger Rating System) index related to how hot a fire could burn. It is directly related to the 24-hour, potential worst case, total available energy (BTUs) per unit area (in square feet) within the flaming front at the head of a fire.

The ERC can serve as a good characterization of fire season as it tracks seasonal fire danger trends well. The ERC is a function of the fuel model and the live and dead fuel moistures. Fuel loading, woody fuel moistures, and larger fuel moistures all have an influence on the ERC, while the lighter fuels have less influence and wind speed has none. ERC has low variability and is the best fire danger component for indicating the effects of intermediate to long-term drying on fire behavior (if it is a significant factor) although it is not intended for use as a drought index. (Northern California Predictive Service Center, http://gacc.nifc.gov/oncc/predictive/fuels_fire-danger/psac/erc/index.htm)

The ERC graph (Figure 2) for the Bald Mtn. Station indicates when conditions historically in the CWPP area will support fires that are likely to escape initial attack. Fires which are likely to escape initial attack would occur when the conditions for ERC reaches above 90%. The graph records the average ERC, the maximum historic ERC, the minimum historic ERC, the forecasted, and the actual 2009 ERC for the Bald Mountain Weather station. As indicated by the graph; the period that a wildfire is most likely to escape initial attack begins around July 15 and lasts well into October on the average year. Recognizing that each year can be slightly different.

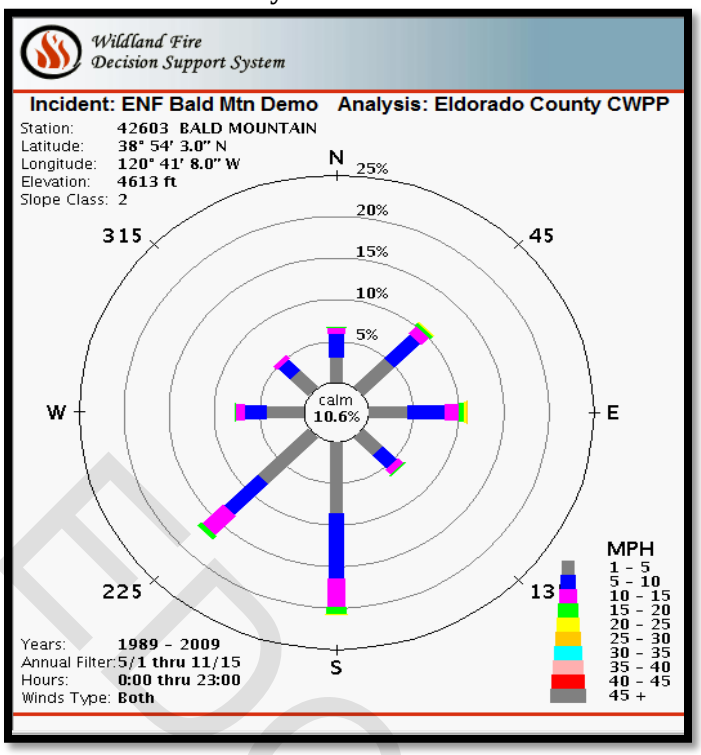
The rule of thumb is when the grass cures and the California buckeye turn brown; the chaparral vegetation and the conifer trees will begin to carry fire. Moisture content continues to drop and the vegetation goes into a dormant state usually mid August, at this point wildfires will generally move rapidly through the vegetation living or dead in the CWPP area.

Figure 2: Energy Release Component for Bald Mtn.



Another important factor in rapid fire spread is wind direction and speed. To analyze the last 20 years of hourly wind data from the Bald Mtn. RAWS, the Wind Rose Tool was used from the Wildland Fire Decision Support System (WFDSS). The wind rose on page 29(figure 3) graphically illustrates 20 years of hourly wind speed and direction collected from the Bald Mtn. RAWS. The wind rose clearly shows that most of the time during "fire season" the wind comes from the south-southwest direction across the CWPP area. During the months of September and October, winds often become erratic due to the passage of cold fronts. The winds during those months can also be very dry winds from the east and northeast adding to difficulty in controlling wildfires. One such fire in 1991, the Cleveland Fire, was driven first by erratic cold front winds which burned 26,000 acres. A large fire in the 1959, the Ice House Fire, was a fire driven by dry, northeast winds and it burned 19,099 acres.

Figure 3 Bald Mtn. weather wind rose analysis 5/1-11/15



Wind direction and speed is also influenced by vegetation type and terrain (slope and aspect) features on the landscape. Terrain is a landform feature that does not change nor can it be changed. It is a factor that is constant on the landscape of El Dorado County. Dominated by complex terrain, the CWPP area includes the major drainages of the south fork of the American River, Consumes River, Weber Creek, and Martinez Creek. A computer program called WindNinja develops a spatial gridded wind input corrected for terrain and vegetation that best characterizes the wind speed and directions for the CWPP analysis area. WindNinja demonstrates to the fire modeler how the complexities of terrain affect the speed and wind direction. Figures 4a and 4b on pages 29 and 30 illustrates the actual wind vectors used to model fire behavior on a Google Earth image background. Notice how ridge top wind speeds differ from valley winds and how terrain changes wind direction. Wind outputs from WindNinja are brought into FlamMap to produce very precise outputs for the fire behavior analyst to analyze how a wildfire will react under typical weather conditions that occur in El Dorado County from July through October every year.

A description of the modeling used for the risk assessment can be found in the Appendix A.

Figure 4a. WindNinga 2.03 initial input conditions 225 degrees (southwest) 25 mph (20 foot) wind speed (Hwy 50 corridor near Placerville)

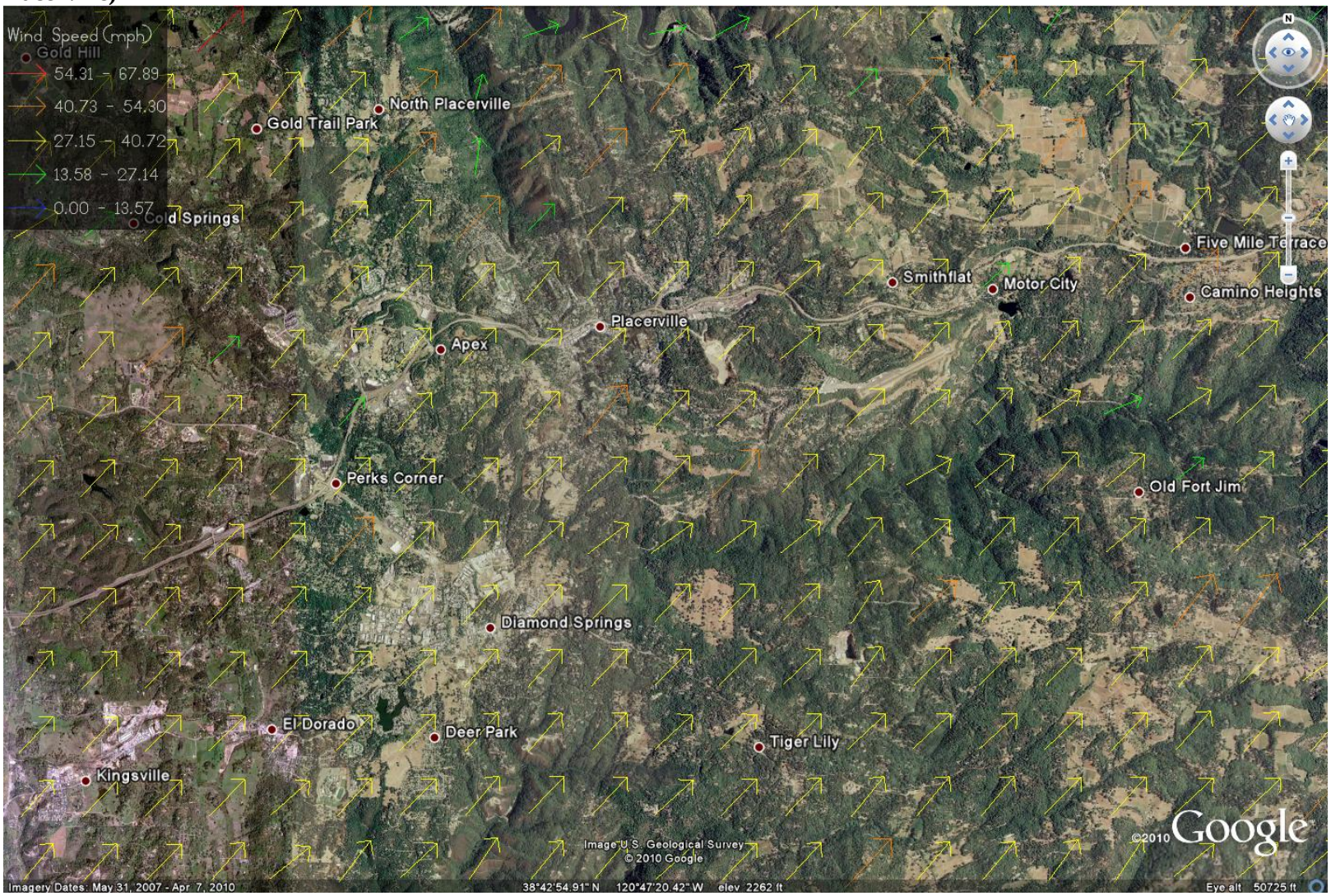


Figure 4b WindNinga 2.03 southwest wind with an initial condition of 25 mph at 20 feet(The Hwy 49 corridor looking north to Diamond Springs)

Current Risk Situation

The CAL FIRE, 2010 Forest and Range Assessment, chapter 2.1 *Wildfire Threat to Ecosystem Health and Communities*, wrote the definition of key terms for assessing risk. Consistency in understanding these terms and definitions is critical to understanding this analysis. These terms are also important to interpreting the results and rankings, which are used to identify areas that are best suited for projects and to set project priorities. The following are the key terms and their definitions. The 2010 Forest and Range Assessment can be found at the following website. http://frap.fire.ca.gov/assessment2010.html)

> Risk is a measure of the expected damage that a fire may have on assets that hold value to society. In some cases, fire effects may be view as beneficial, in which case a negative risk value would be applied. It is important to recognize that a given fire threat will have a varying impact on different assets, and that differing fire threats have different impacts on individual and collective assets. (Chapter 2.1 page 101, 2010 Assessment)
>
> Fire threat is a measure of fire hazard that includes components for the probability (chance of burning) and the nature of the fire (fire behavior). Taken collectively, these two features assess the basic threat features of periodic wildfires and their capacity to drive fire effects. It is important to understand that fire threat carries no direct measure of fire effects and associated value change associated with fire risk. (California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, 2010)
>
> The current risk to property loss from wildland fires has been classified as very high in the CWPP area. This has in, some respect, been caused by human intervention or lack of intervention in the accumulation of flammable vegetation in the urban interface. Years of successful initial attack from local suppression resources have created an environment of complex fuels. Homeowner complacency or desire not to change the vegetation surrounding, the community, has allowed hazard fuel to accumulate. Other human impacts that add to this problem of homeowner complacency are due to the increase in absentee ownership, the number of renters, and recent increase in home foreclosures in the more residential communities of the CWPP area. These properties are not likely going to receive any fire hazard mitigation treatments. Historically, in El Dorado County, grazing, logging, and other agricultural uses have played a large role in managing fuels and interrupting the continuity of vegetation across the county. In recent years, grazing has been significantly reduced and large parcels have been subdivided and developed creating a true wildland interface problem. More recently, many homes have been abandoned or reprocessed by banks leaving the properties unmanaged and grown over. Over 19,000 structures are in the current CWPP boundary, 1/3 of them on single dead end roads, and most are not compliant with CPRC 4291.

Figure 5: Illustrates an example of a home in foreclosure with no hazard mitigation.

Homes in various stages of foreclosure in the current housing market are on the increase adding to the problems of structure protection.

The California Fire Alliance has listed communities within the CWPP area that have been recognized by the Federal government as communities at risk. They are listed here in table 2.

Table 2: Federally listed communities at risk in the CWPP area

Federally Recognized Communities at Risk	
Communities	**FEDERAL THREAT**
Diamond Springs	Yes
Placerville	Yes
Pleasant Valley	Yes
Pollock Pines	Yes

CWPP Planning and Analysis Subunits

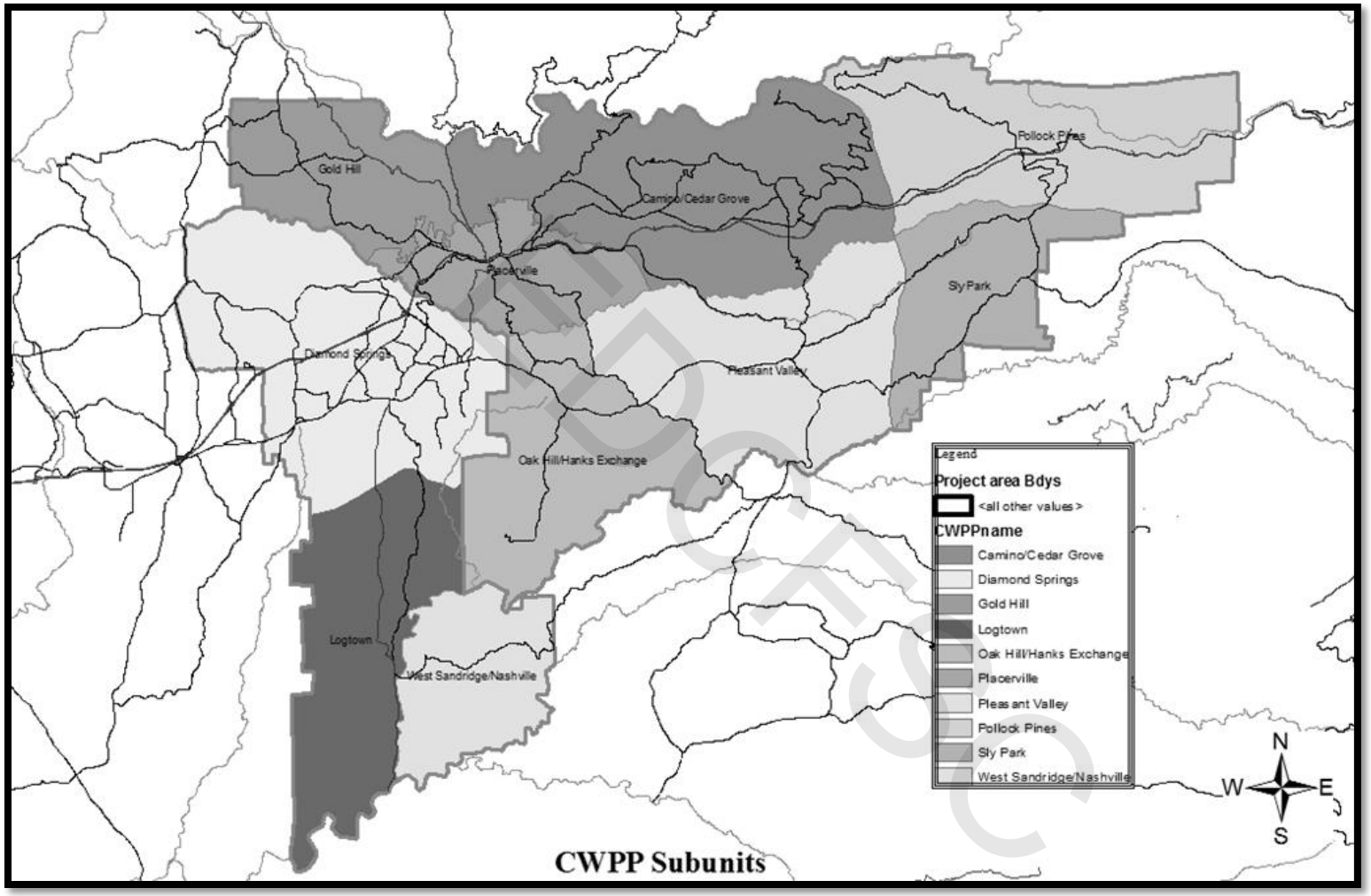
The central El Dorado County CWPP is divided into community based subunits for planning and analysis purposes. The subunits are nested into each of the two fire protection districts; this allows each district to view the analysis outcomes and project maps.

The first analysis by subunit is the building clusters data provided by El Dorado County GIS department. This helps understand the distribution of residential structures in the CWPP area and may assist in setting priorities based on risk of damage or loss from a wildfire. It also helps in evacuation planning, project layout, and treatment design. Managers can easily assess an average value based on replacement costs to these numbers and get a dollar value for the expected loss. Other environmental assets, such as, vegetation and wildlife habitats, watersheds, and timber values are not specifically valued in this CWPP analysis.

Table 3 listed below are the CWPP Subunits within the El Dorado County Fire Protection District and ranked by the number of structures/residences. Commercial and business properties are not included in these numbers.

Table 3: Subunit building clusters in El Dorado County FD

CWPP Subunit	Estimated Number of Building Clusters
Placerville	3862
Camino/Cedar Grove	2489
Pollock Pines	2420
Sly Park / Sierra Springs	1812
Pleasant Valley	1499
Gold Hill	1273
Oak Hill Hanks Exchange	960



Map 3:CWPP Sub units

Several communities in the CWPP area have significant commercial properties and business assets that would be impacted by a large wildland fire. They include Placerville, Diamond Springs/ Eldorado and Pollock Pines. While other CWPP Sub-units have commercial assets, they are more isolated and considered more residential areas. To explore the potential loss of assets, a value can be applied to number of structures to examine the risk.

> For example if a 6,000 acre wildfire burned in the West Sandridge/Nashville CWPP subunit, all 135 residences are at risk for some damage. If an average value of $175,000 is applied, the potential damage to structures has an estimated value of $23,625,000.00.
>
> A smaller fire in Logtown could have potential damage estimates over $100 million dollars. However, investments by the Logtown Fire Safe Council and El Dorado County Fire Safe Council have likely reduced the expected loss from just over $100 million dollars to $26 million dollars by enforcing CPRC 4291 with an estimated 75% compliance rate, strategically placed fuel treatments, roadside clearances, and developing a secondary exit for residents during an emergency. Community action by volunteers at the local level, grants and investments of $418,000 results in an expected damage loss reduction of $74 million dollars.

Historic Wildfire Ignitions and Fire Cause

Large Fire history

Large fires have been a part of the wildfire history of El Dorado County. The following table listed a few that have occurred in or near the CWPP area since 1959 and the fires listed in Table 4 are part of the large fires that have occurred in the county since records were kept by the fire agencies.

> We know from 1900 and earlier that large fires occurred in this part of the Sierra Nevada Mountains and fire return intervals were frequent 2-20 years in lower montane zone areas around Camino, Placerville and Pollock Pines. Foothill regions of the CWPP burn frequently with mixed severity. Much of the chaparral covered areas are more productive than their southern California relatives and the chamise can again become extremely flammable within 16 years of a fire (Sugihara,2006).

Table 4: Large wildfires near the CWPP from 1959 to the present

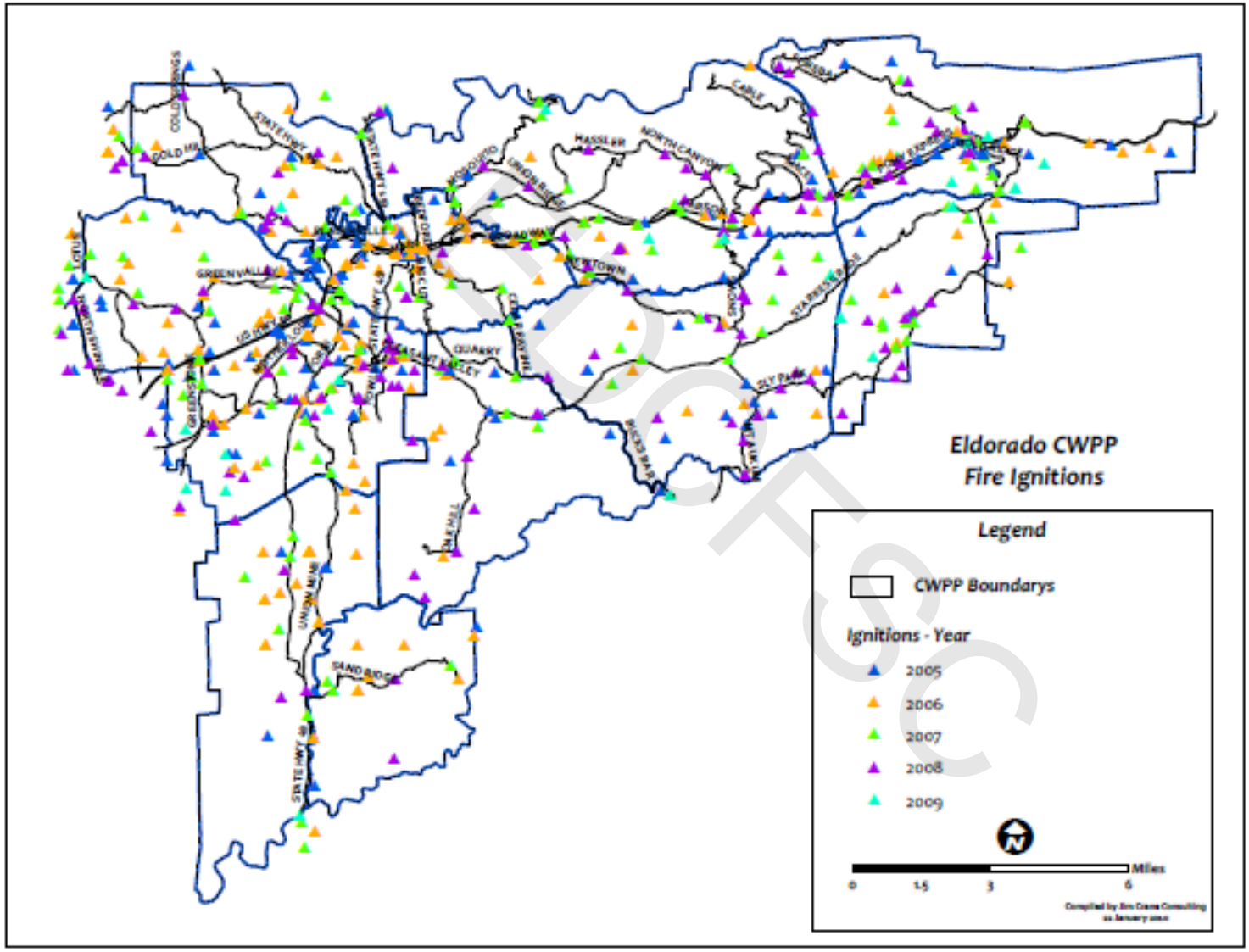
Fire Name	Year	Acres Burned
Ice House	1959	19,099
Camp 7	1960	11,212
Kelsey Mill	1961	11,816
Unknown	1970	1455
Unknown	1972	249
Starks Grade	1972	249
Quarry	1976	20,869
Chili Bar	1979	6927
Eight Mile	1985	813
Cleveland	1992	22,518
Scott	1996	8,828

Recent wildfire ignition history

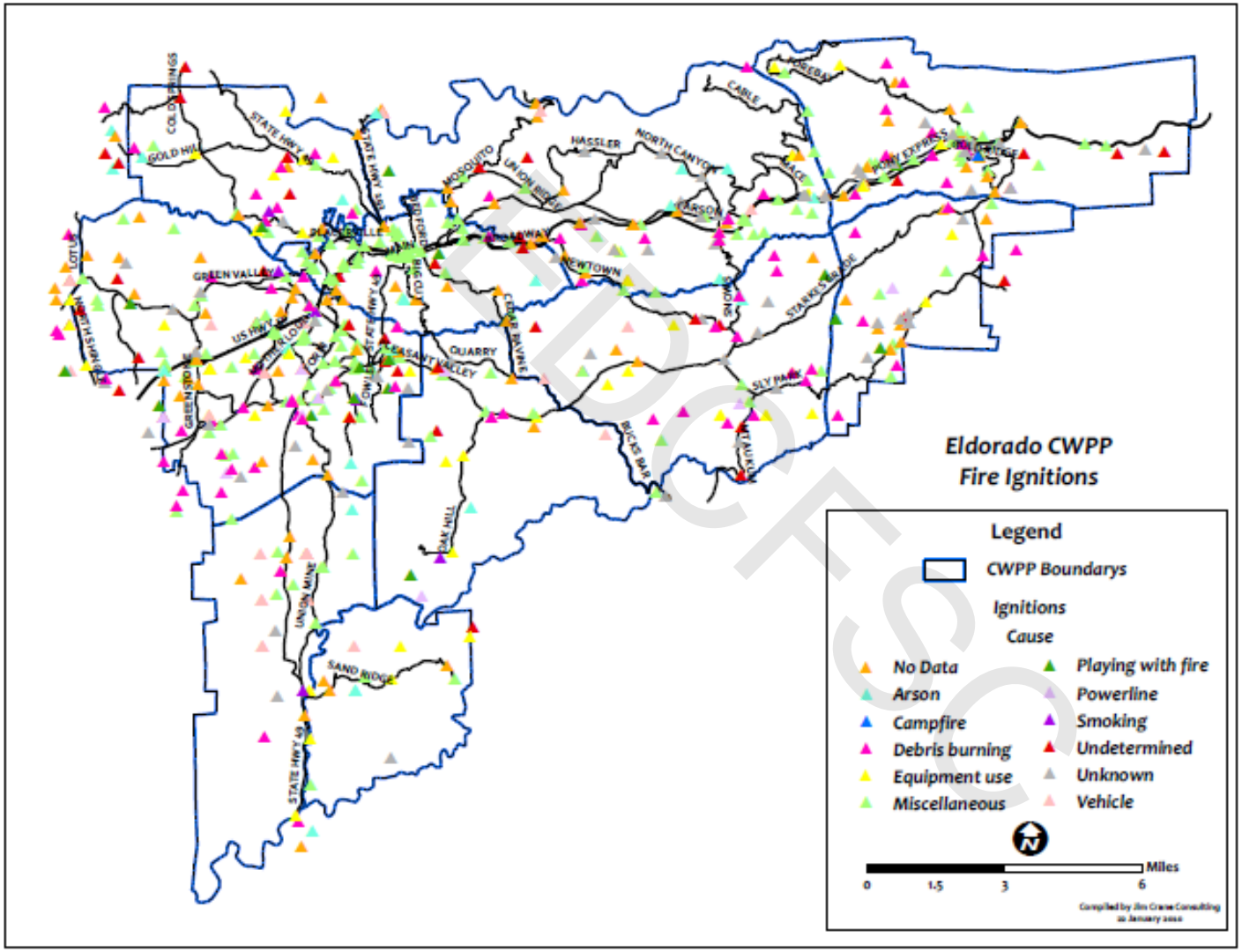
Understanding where wildfires are likely going to start and what caused them is important information. In the CWPP, the data from 2005 to 2009 is included to illustrate the distribution of fire in the CWPP area and causes. The maps reveal important patterns for fire managers and the fire safe councils to recognize. One is that the Hwy 50 and 49 corridors are important places to focus a prevention message about wildfires. Two, the CWPP area of Placerville has a prevention-education concern with children playing with matches. Most of the ignitions are located along heavily traveled roads. Another concern is the increase in homeless camps in and around the city of Placerville's open space particularly near shopping centers or food for the homeless sites. One area is on east Broadway in Placerville.

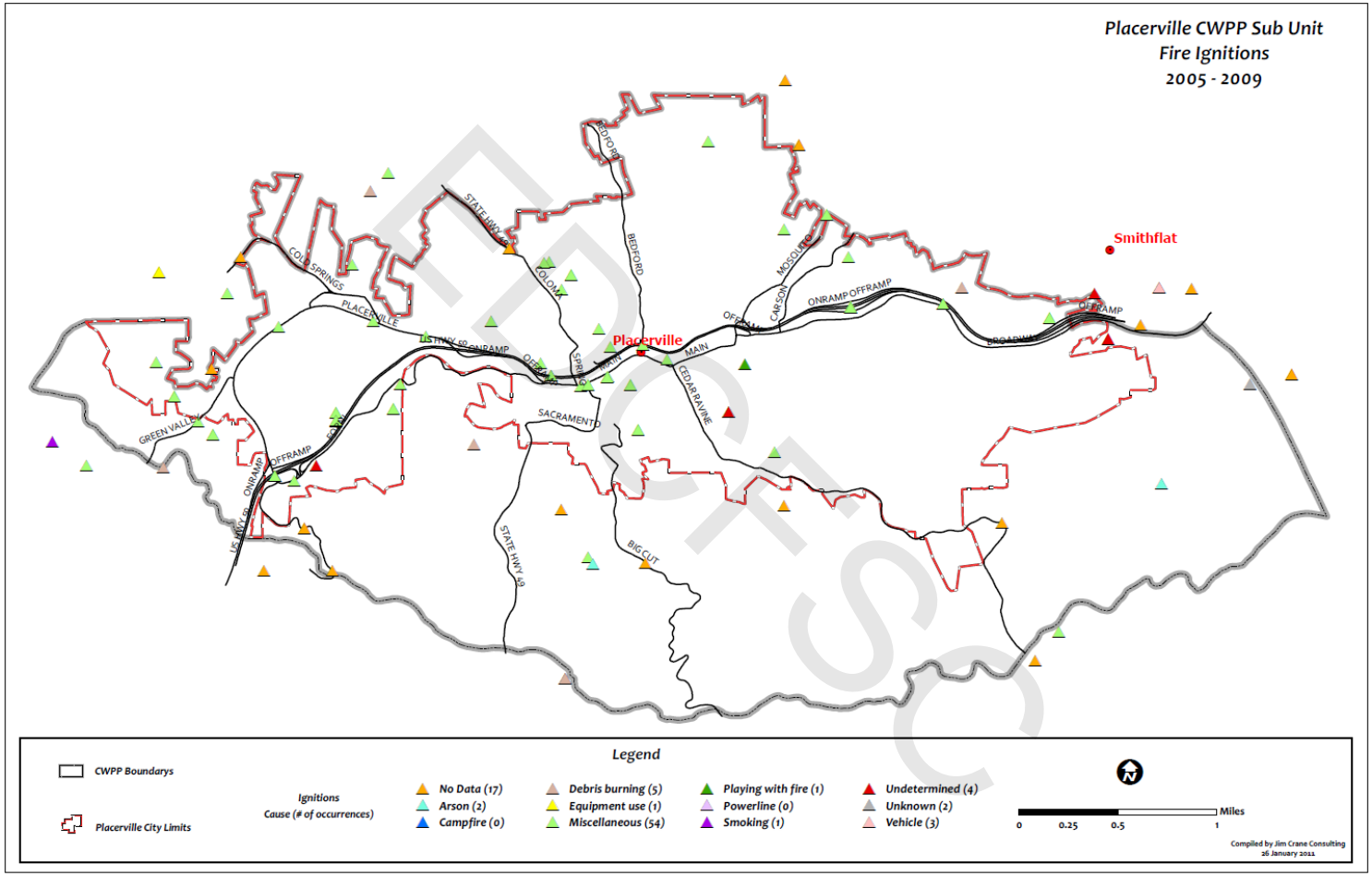
The local ignition data on Map 4 is stored in the Emergency Activity Reporting System (EARS) database; the following maps include data for the last 4 years, 2005 to 2009 by cause for the CWPP Area**.**

Map 4: Fire Ignitions by year



Map 5: Fire Ignitions by type





Analysis Matrix Elements and Tools

No single fire behavior output would provide fire managers the information to set priorities and place treatments on the landscape. This pre-fire analysis to assess the CWPP area to place treatments is based on fire behavior potential and values at risk. The proxy for values at risk came from the building cluster information provided by the El Dorado County GIS department. The analysis matrix is designed to consider multiple fire behavior parameters and combine them into a single pre-fire value. This single value characterizes the difficulty that would be encountered by fire suppression resources to control a wildfire. This allows local fire protection agencies to consider the placement and design of pre suppression treatments to protect community values. These pre-fire investments or treatments found in section's 7 and 8 of this document are located and designed based on the values at risk and the resistance to control analysis.

This CWPP analysis refers to this new single value as Resistance to Control (RTC) for a pre-fire condition. Historically this term was used to help fire managers during an ongoing fire, articulating a number of factors that determine the difficulty to control a wildfire. In this case, the analysis is used to anticipate a pre-fire environment where managers would invest in constructing fuel breaks before a fire actually happens. Models such as FARSITE can be used to game future fires on the landscape; this was done based on both historical ignitions and actual placers where fire officials believe there was a problem in their district. A matrix was then developed with those models and wildland fire experience to assist in project ranking. We'll call the matrix, the Resistance to Control matrix. The RTC matrix included three conditions derived from the modeling: flame length, rate of spread, and fire type. Table 5 illustrates the range of resistance to control levels and the type of effective suppression efforts required. Table 6 shows the range of flame lengths associated with the levels of resistance to control. Much of the CWPP area has flame lengths greater than 4 feet and requires a combination of direct and indirect suppression tactics during much of the fire season. Dozers and aircraft are often part of the initial attack suppression effort and generally can go direct on flame lengths up to 8 feet.

Table 5: Effective Suppression efforts

Resistance to Control		Interpretation
Low 1		• Fire can generally be attacked at the head or flanks by persons with hand tools and or engines • Handlines should hold the fire
Moderate 2		• Fire is too intense for direct attack on the head by persons using hand tools • Handlines cannot be relied on to hold the fire • Equipment such as dozers, fire engines, and retardant aircraft can be effective
High 3		• Fire may present serious control problems -- torching out, crowning, and spotting • Control efforts at the fire head will probably be ineffective
Very High 4		• Crowning spotting and major fire runs are probable • Control efforts at the head of the fire are ineffective
Extreme 5		

Resistance to Control above moderate makes suppression efforts extremely difficult unless there is a break in the vegetation or a change in the weather.

Resistance to Control matrix

The Resistance to Control (RTC) matrix Table 6 was developed for this CWPP analysis using raw fire behavior output data generated by FlamMap. This data includes fire characteristics specifically flame length, rate of spread, and fire type. The analysis score is the additive value of each cell in the grid stack and is classified into a RTC code of 1 thru 5.

Table 6: Resistance to control matrix

Flame Length (feet)	Rate of Spread (Chains / hour)*	Fire Type X 10	Analysis Score	Resistance to Control
0 to 3.9	0 to 4.9	1x10=10	Less than 18.8	Low (1)
3.9 to 7.9	4.9 to 9.9	10	18.9 to 27.8	Moderate (2)
7.9 to 10.9	9.9 to 19.9	2x10=20	27.9 to 50.8	High (3)
10.9 to 19.9	19.9 to 39.9	20	50.9 to 79.8	Very High (4)
20 +	40 +	3x10=30	79.9 and greater	Extreme (5)

*One Chain equals 66 feet 40 chanis per hour equals ½ mile per hour rate of spread

Formula example: Flame length + Rate of Spread + Fire Type = Analysis Score = RTC
3.4 + 4.8 + 10 = 18.2 = 1 (Low)

Fire type, is an important output from FlamMap. It considers multiple factors to determine if the fire is, surface, passively crowning (torching) or actively crowning in any particular cell of the fuels grid.

- Fire type 1 is a surface fire; the fire is generally on the ground, high likelihood of initial attack success.
- Fire type 2 is a passive crown fire, (torching and short range spotting).
- Fire type 3 is an active crown fire, (fire actively moving in the crowns of trees with mid to long range spotting).

The analysis score is the sum of flame length, rate of spread, and fire type. That score was then given a rating of Resistance to Control. The analysis score is validated by local fire behavior knowledge and experience gained on fires in the CWPP area, as well as, comparison to CAL FIRE fire hazard rating. The final product is displayed as a map. The RTC map is then used to locate places in the CWPP area, where ignitions are likely to escape initial attack, where asset loss could be the greatest, and where investment in treatments might have the greatest impact on fire spread and suppression effectiveness.

In modeling the fire behavior potential for the CWPP area, several additional factors are incorporated into the spatial landscape. FlamMap utilizes spatial data themes at the 30 by 30 meter cell. This means that roughly, every 1/4 of an acre has new information. Terrain features come from the Digital Elevation Model (DEM). It provides the slope, aspect, and elevation themes. The US Forest Service Remote Sensing Lab, located in McClellan, CA. maps and inventories vegetation on the federal lands. It is then modified by the Forest Service and its interagency partners for fire history perimeters and fuel treatments areas, merged into a single layer and made available for fire behavior analysis. The following layers are then created using the statewide previously mentioned vegetation layers as individual grids themes: surface fuels (fire behavior model), crown base height (ladder fuels), crown bulk density (how dense the crowns are), canopy cover (percent; used for shade and wind dampening), and tree height (wind dampening, torching and crown fire as well as lofting embers in spotting).

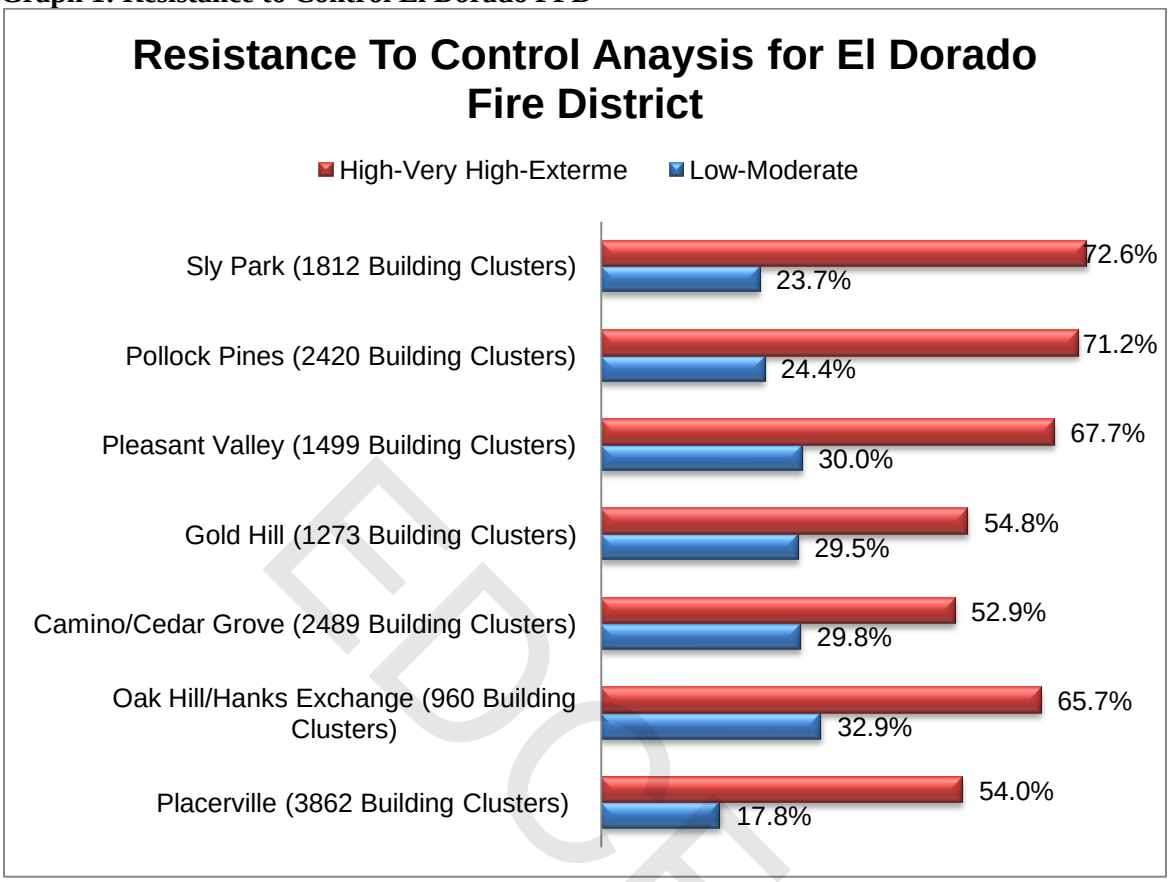
These layers were then imported into FlamMap model and then the fire behavior modeled using gridded winds from WindNinga and weather parameters based on the Bald Mountain Remote

Automated Weather Station (RAWS) observations. Bald Mtn. located east of Georgetown in El Dorado County. The Table 6, on page 41, indicates the output parameters and the ranges used to develop the conditions for the Resistance to Control analysis. Resistance to Control is a concept that is based on all the factors previously mentioned. The analysis is used to inform fire managers and community leaders where the most difficult fire suppression condition exists in the CWPP area.

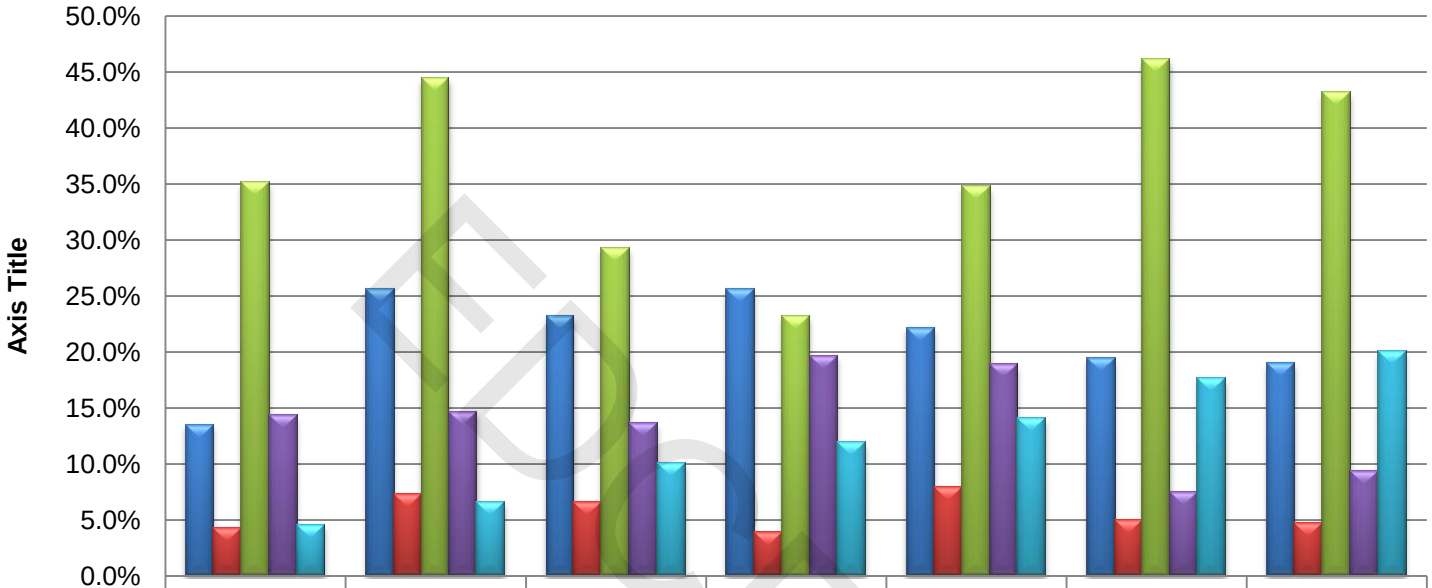
Resistance to Control by Communities

In order to better understand the distribution of conditions in the Resistance to Control analysis, Graph 1 shows a consolidated graph of Low - Moderate and High - Very High - Extreme grouped together for communities within the CWPP areas by building clusters. The subunits were ranked from high to lowest based on the overall percentage of extreme. Graph 1 page 44 shows the full range from low to extreme for the Resistance to Control percentages. An average late summer weather and wind condition were used in the analysis; therefore a slight increase in wind speed, lower humidity, and/or warmer days would yield a hotter set of fire outputs (high to a very high and very high to an extreme). On the other side of the analysis, one can see on the graphs on page 44 and 45, that subtle changes in wind speed, temperature and lower humidity would not move the moderate to high, even if some of the low went to moderate. Not much would change to the Resistance to Control. The fact that most subunits are well over 25 % Low - Moderate supports the initial attack success seen by our fire suppression resources. The table, Table 5, on page 41 is referred to by fire management specialists as the Fire Behavior Characteristics Charts or Hauling Chart which was modified, to illustrate the Resistance to Control levels with fire suppression efforts necessary to suppress a wildfire.

Graph 1: Resistance to Control El Dorado FPD



Graph 2: Resistance to control percent rank by subunits in El Dorado County FPD



	Placerville	Oak Hill/Hanks Exchange	Camino/Cedar Grove	Gold Hill	Pleasant Valley	Pollock Pines	Sly Park
Low	13.5%	25.6%	23.2%	25.6%	22.1%	19.4%	19.0%
Moderate	4.3%	7.2%	6.6%	3.9%	7.9%	5.0%	4.7%
High	35.1%	44.4%	29.2%	23.2%	34.8%	46.2%	43.2%
Very High	14.3%	14.7%	13.6%	19.7%	18.8%	7.5%	9.4%
Extreme	4.6%	6.6%	10.0%	11.9%	14.1%	17.6%	20.0%

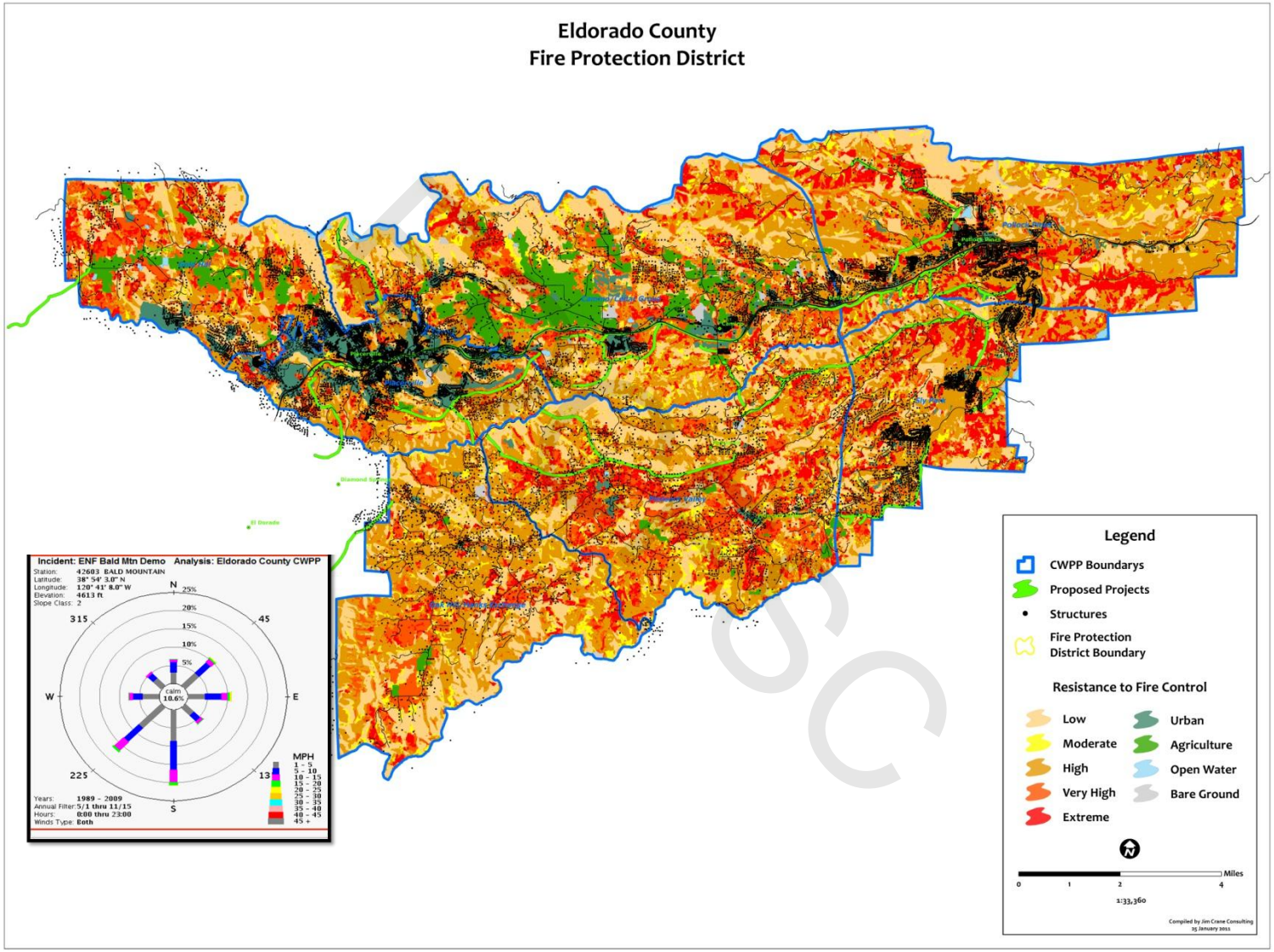
How to use and read the following RTC maps

Where flame lengths are less than 4 feet, rate of spread is low and the fire is either on the ground or a surface fire. This is a fire with a very high degree of suppression success. These places would be considered LOW in terms of Resistance to Control (RTC). Others places in the CWPP area where flame lengths are greater than 4 feet and the fire has moderate rate of spread but is still on the ground, with limited very short range spotting and suppression is likely successful during initial attack (IA) and is considered a Moderate in term of RTC.

Information shown on the maps includes portions of the landscape that are not burnable. The area that is not burnable is not shown in the tables. The unburnable areas include; water, barren ground, agricultural lands, and very dense urban areas. One might argue that under extreme conditions, these urban portions of the landscape could burn, but no actual fuel model data exists for urban. Under real-time fire behavior modeling conditions, a trained Fire Behavior Analyst might provide some fire behavior insight into these areas to support an incident decision. For the purpose of this CWPP analysis "true urban areas" were kept unburnable.

Subunits with the most urban conditions included Placerville City with 27.5% . The subunits with most agricultural lands were Cedar Grove / Camino with 11% and Gold Hill with 10%.

Map 6: El Dorado Count FD Resistance to Control



Summary of the Hazard and Risk Analysis

El Dorado County Fire District

Placerville Sub-unit (Placerville City extends south to Weber Creek and east to Newtown Road)

The City of Placerville is very susceptible to a fire like the Auburn 49 fire of 2009. During the first several hours of that fire 343 acres burned, destroying 63 residences and 3 commercial structures. The fire was contained by the end of one burning period. Placerville City is ranked the highest priority for action followed by Sly Park Pollock Pines and then Pleasant Valley. Camino/Cedar Grove and Gold Hill are interspersed with agricultural lands having a reduced hazard to many areas adjacent to values at risk. Oak Hill Hanks Exchange has the least values at risk for all the subunits in the El Dorado County Fire Protection District.

A fire like the 49 Fire in the Placerville area would likely impact both business and residential area near town, the damage would likely be worse that what Auburn experienced. This in part is because fuel conditions are worse, access is limited, and the topography is steeper.

The City of Placerville has a weed abatement ordinance that appears to have limited enforcement. The enforcement process for local fire officials seems cumbersome and limited. Proper enforcement and implementation could go a long way to reduce structure ignitability.

Evacuation concerns are high in Placerville because of the age of the city and its winding narrow roads, streets overgrown with vegetation, and limited turnarounds for fire equipment. Some of the more susceptible areas are Sacramento Hill, north side of Highway 50, Diana Street area, Highway 49 Corridor, Broadway, Cedar Ravine, Southern end of Mosquito Road, and Texas Hill. All the roads and street, in the Placerville sub unit need to be evaluated for safe evacuation planning.

Sly Park, Pollock Pines, Pleasant Valley sub units

The vegetation is dominated by the transition from oak grass woodland into the lower montane conifer forest types. In fire behavior terms, this transition can be characterized as a surface fire with limited torching to an active crown fire. The areas of very high and extreme in the RTC map are driven by fires that are crowning in timber, and are difficult to suppress. The steep

topography of Weber Creek and Camp Creek are perfectly aligned with the south and southwest winds that dominant the CWPP area which also adds to suppression difficulty.

The Sly Park Road corridor is on to the most populated areas in the county, with over 5000 full time residences that stretch from Pollock Pines to Pleasant Valley. The area is also home to one of the most popular recreation areas south of Hwy 50, Jenkinson Land, the Sacramento County Sly Park Outdoor Education facility and several wineries. This winding narrow two lane road has many evacuation concerns along the Sly Park Road corridor. This, added to recreational The potential for conflicting objectives, evacuation and fire suppression, could make the Sly Park Road evacuation route a dangerous situation during a major wildfire.

Camino/Cedar Grove and Gold Hill Sub units

The primary vegetation types found in the these two subunits is a sampling of the vegetation found throughout the CWPP area with the Gold Hill sub-unit primarily foothill scrubland vegetation made up of foothill pine, interior live oak woodlands, mixed hardwood and chaparral scrublands. Some blue oak woodland occurs in the western most boundary of the sub-unit. This area is also topographically very steep terrain and limited access to some of the areas particularly in the American River Canyon and Weber Creek.

The Camino/Cedar Grove sub unit is made up of vegetation associated with lower montane forest, is made up of vegetation types including, California black oak, ponderosa pine, white fir, incense cedar, Douglas fir mixed conifer and mixed evergreen interspersed with chaparral, and meadows. (Edited by Neil G. Sugihara, 2006)

These sub units also contain the largest amount of agricultural lands 21% of the CWPP's area. This agricultural land does allow for suppression opportunities, however there is enough wildland interspersed within the agricultural area with homes that the threat is still high. In addition this agricultural land brings more visitors to the area during the time of the year when wildfire potential is the highest. The fruit harvest brings thousands of visitors to the Apple Hill area which will make evacuation a serious problem that needs to be addressed by the agencies responsible for evacuation. Wildfires have originated in the American River canyon and threatened these two sub units in recent history

V. Fire Response

Wildland fire suppression operations successfully control ninety-seven to ninety-nine percent of all wildfires at initial attack and structure firefighters typically limit a fire within a single structure or prevent the fire from spreading beyond that structure. However, when residential development is exposed to extreme wildfire conditions, numerous houses can ignite and burn simultaneously, overwhelming firefighters and reducing fire protection effectiveness. Thus, WUI fire disasters principally occur during the extreme fire behavior conditions that account for the one to three percent of the wildfires that escape initial attack control. Table 8 page 54 lists WUI fire disasters between 1990 and 2007 in the state of California. Every one of these disasters occurred because extreme fire behavior conditions overwhelmed the firefighting resources. The WUI fire disaster context depends on exposure of vulnerable homes to uncontrollable, extreme fire behavior. If the number of burning and vulnerable homes overwhelms the fire protection capability, fire protection effectiveness is reduced, and many homes are left without protection. If homes are ignition-resistant, then many homes do not ignite and fire protection is not overwhelmed by the ignitions that do occur. Thus, an extreme wildfire can occur without a WUI fire disaster. (Cohen J. , The Wildland Urban Interface Fire Problem, 2008)

Photo 1 Missouri Flats fire 2010

The previous photo (Photo1) is an example of how quickly a fire can start a structure on fire when CPRC 4291 standards are not implemented. This is a photo of a fire that occurred in the late summer of 2010. It is locate on Missouri Flats Road only nine tenths of a mile from a staffed fire station. The road is a well traveled two and four lane road with easy access to the scene. What would have happened if this fire would have occurred in a remote area with limited access and limited report visibility?

Wildland Urban Interface Wildfire Suppression Conditions

Generally, three wildland fire suppression conditions exist in the CWPP area, each requiring a specific suppression strategy that is modified as conditions change and the fire moves across the landscape. Table 7 below describes the three conditions, suppression strategy and treatments used to mitigate the pre-fire conditions. The pictures that follow are examples of each condition. The treatment strategies are designed to modify fire behavior so that fire suppression resources have a better chance for success. The treatments are not designed to work alone, that is, fire suppression resources must be present to take full advantage of the treatments during a wildland fire.

Table 7: Wildland Urban Interface(WUI) conditions and suppression and treatment strategies

Condition	Suppression strategy	Treatment Strategy
Wildland Fire with structures threatened (*parcels are generally larger than one acre*)	Perimeter control during IA with rapid transition to Asset protection	Design treatments to modify fire behavior for containment prior to reaching individual structures and groups structures. (Compliance of PRC-4291 critical) adjacent to fuel treatments
Wildland Fire with structure to structure ignition taking place (*parcels generally less than one acre)*	Asset protection	Compliance of PRC-4291 Building Codes Road Access / Turn-a-rounds
Wildland Fire without structures (*very few if any structures or assets at risk from the fire)*	Environmental conditions and resource objectives determine response to unplanned ignitions	Strategically designed treatments to modify landscape fire behavior including strategic perimeter control treatments

Examples of WUI fire environment conditions

Photo 2: Fire environment Condition 1(Table 7): Wildland Fire with structures threatened (parcels are generally larger than one acre)

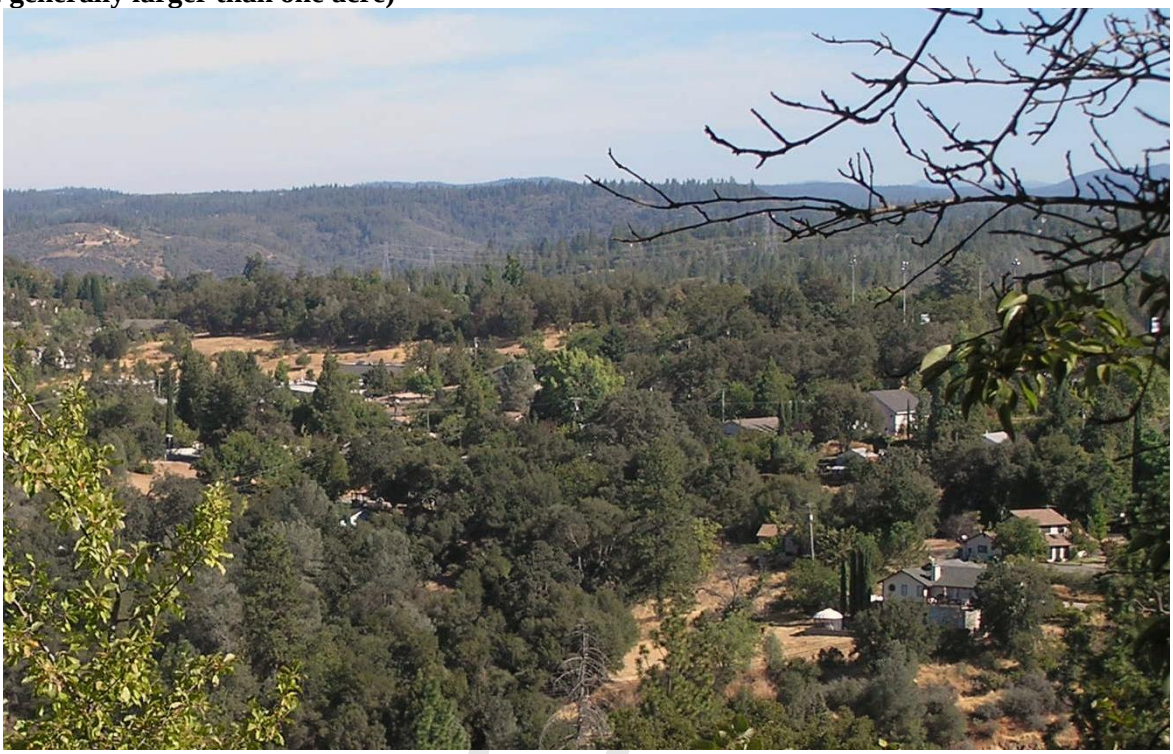


Photo 3: Fire environment condition 2(Table 7): Wildland Fire with potential structure to structure ignition taking place (parcels generally less than one acre)

Photo 4: Fire environment condition 3(Table 7): Wildland Fire without structures (very few if any structures or assets at risk from the fire)

Increase in population and development in the Wildland Urban Interface have led to steady increases in structure fire losses. Wildland fires in California, in recent history, have led to structure losses that were not even imaginable in the mid 1900s. These loses demonstrate a trend that will only increase into the future unless communities are prepared to reduce the hazards around them and reduce ignitability of the structures they live in. The technology exists to do just that but the public's attitude that it can't happen here has prevented the changes from occurring.

The table below highlights the large Wildland Urban Interface fires that other communities in California have experienced since 1990 with disastrous outcomes. El Dorado County is not immune to these types of losses under the right conditions as described in this document. The Angora and 49 fires were in the same vegetation type and weather conditions that occur in this county every year.

Table 8. Wildland-Urban Interface Disasters during Extreme Wildfires (1990–2009)

Year	Incident	Location	Homes destroyed (approx.)
1990	Painted Cave	Santa Barbara, CA	479
1991	Tunnel/Oakland	Oakland, CA	2900
1993	Laguna Hills Old Topanga	Laguna and Malibu, CA	634
2003	Old, Cedar, etc.	Southern CA	3640
2006	Angora	Lake Tahoe, CA	245
2007	Witch, Slide, Grass Valley, etc.	Southern CA	2180
2009	49 Fire	Auburn, CA	63 homes 3 commercial buildings

Transportation Systems

The CWPP area has two state highways, US Route 50 and State Highway 49. US 50 traversing east and west in the CWPP area and is a four lane divided highway. Highway 49 traversing north and south through the CWPP area and is a two lane road throughout the CWPP area (see map 9). As you can see from the map, there are numerous feeder roads that lead into the primary evacuation routes The feeder roads and some of the primary evacuation roads have issues that need to be resolved.

Roads have been an issue in El Dorado County for decades between the fire departments, the county planning department, the County Board of supervisors, and developers. Until recently with the advent of State wide standards for roads in Title 14, the road requirements have been under attack. To add to the standards issues, many of the roads in El Dorado County were constructed years before any standards were even considered and homes were constructed right up to the edge of the narrow roads. Some roads in the county are little changed from the gold rush era of the 1800s, particularly the roads in the older communities. Today's private and commercial vehicles and fire equipment are much larger than they were even 30 years ago. Many of the roads in the county that were constructed earlier than 30 years ago were not expected to be conduits for today's population or vehicle sizes.

One of the roads identified as a primary evacuation route is Stark's Grade. Stark's Grade is one primary evaluation route that has problems. It is narrow and if used to evacuate large numbers of residences it will easily become blocked to incoming suppression equipment. Stark's Grade, in places, is only one lane wide without turnouts. Traffic control along this route of travel is critical. Suppression equipment using this road needs to be cautioned that it could be block by evacuating residences.

Other weaknesses in the primary evacuation routes are choke points. Choke points are where feeder roads connect to primary routes and are points that potentially will hinder smooth and rapid evacuation. It is critical to any evacuation that traffic control be set in place as fast as possible at these choke points. Evacuation can be further constrained by the availability of law enforcement personnel and or CERT personnel in the event of an evacuation. The county is severely limited in the number of on duty personnel that can be used to begin evacuations in the event of a rapidly moving wildfire.

Evacuation planning is critical and scenarios for evacuation should be run periodically with law enforcement, fire personal, and local community members as well. More community evacuation practice sessions should be held in congested highly populated areas, so that the people living in the area understand the importance of evacuation planning and law enforcement can understand potential evacuation problems.

The number of egress constrained roads and the number of homes on roads that have only one way in and out is very high in the county. The number of homes on one way in and out roads, and limited road standard compliance makes for potentially tragic results. Today's large fire engines are limited by their size to access and maneuverability on narrow roads adding to the complexity of evacuation and suppression activities. In some cases, evacuation may need to occur earlier than anticipated. Individuals need to be better prepared for themselves to evacuate. Evacuation planning in the county is not at a level that can be safely implemented. Weaknesses in the strategy of evacuation should be found and tested to improve efficiency. Roads or road sides may need to be improved in many cases. Past road standards do not fit well with today's fire equipment.

The attitude that evacuation is based on the incident is not acceptable. Preplanning for evacuation is important to the safety of the public. As pointed out in the lessons learned publication *FACES: The Story of the Victims of Southern California's 2003 Fire Siege* (Mutch, July 2007) even communities such as San Diego County where wildfires requiring evacuations are annual events, they were ill prepared for evacuation and lives were lost. The Faces document is found in the Reference folder and should be required reading for all emergency personnel both firefighting and law enforcement. The county does have a very active Disaster Council and one of their tasks should be to identify specific problems that could impede suppression resources and evacuation. More needs to be done to inspire the community members to write their own evacuation plans. The evacuation planning website on the El Dorado County Fire Safe Council is one way to help in individual planning.

It's important that road and evacuation route treatments are completed on driveways, roads, and other key transportation corridors. A successful neighborhood fuels reduction project, depends on the priorities of local residents, opportunities for funding, conditions of the land, and land ownership patterns.

Sample problem roads

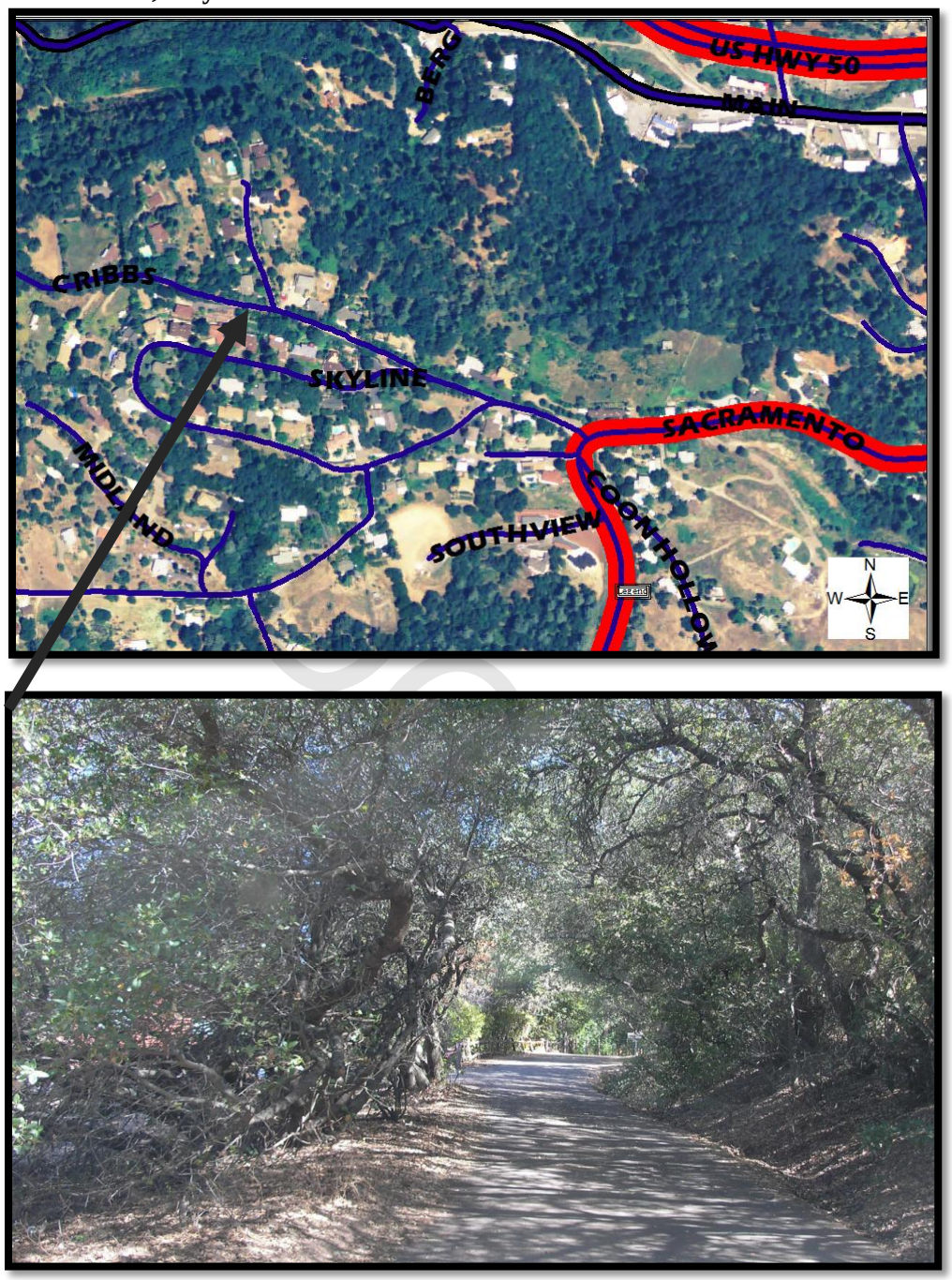
The following roads are only three examples of roads that could be hazardous to suppression resources and evacuees. There are many more that need to be evaluated, mapped and identified as potentially hazardous. The Map 9, page 72, illustrates egress constrained roads and shows a partial number of roads that need further study. The fire departments and emergency services agencies need to identify these roads and keep them in mind when planning evacuation and suppression activities.

The following is taken from a report on the Oakland Hills fire, October 1991 by the National Fire Protection Association.

> Another major hindrance to fire fighting was the system of narrow, winding roads in the fire area, many of which ended in cul-de-sacs. Fire apparatus could not pass each other nor the cars filled with fleeing residents. Traffic jams developed, especially near the large apartment complex. Many apartment residents abandoned their cars in frustration so they could run to safety. The abandoned cars, in turn, served as roadblocks to fire fighters and other residents. Downed power lines further impeded evacuation down the narrow roads. Some apparatus and private vehicles were trapped for hours on these roads. Eleven of the victims died as flames caught up with them while they were trapped in a traffic jam on Chafing Cross Road… (National Fire Protection Association, October 1991)

El Dorado County has many such roads that can turn into traps for evacuating residents or incoming fire suppression equipment. The following are just a few examples of hazardous roads in the CWPP area. More need to be identified and hazards reduced if possible or at least identified. Fire agencies must properly identify and map narrow roads or roads without a turnaround for emergency equipment. Use of those roads could result in very compromising situations and should be avoided. Residents along those roads should be evacuated as early as possible. This will take further coordination with the county Office of Emergency Services, County Department of Transportation, the County Transportation Authority, and Fire Services.

Photo 5: Cribbs Road, City of Placerville

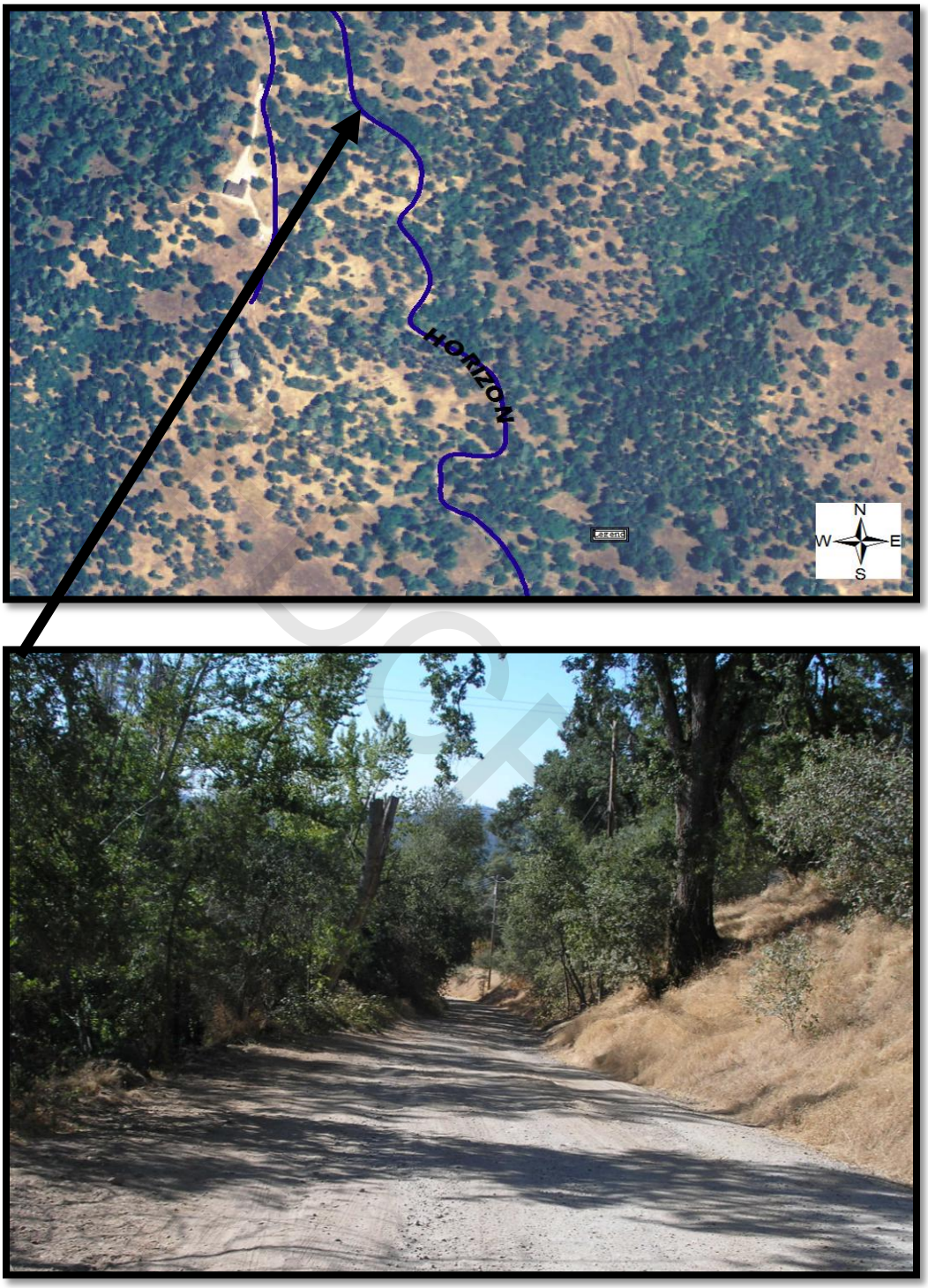


Looking North East up Cribbs Road, you see an overgrown condition that is less than 12 feet wide and less than 12 feet tall, there is limited turn around space for pick-up trucks and none for fire engines. The road is washed out at the bottom of the hill and does not connect through as indicated on the maps.

Photo 6: Diana Street City of Placerville

Diana Street is less than 12 feet wide and over grown to less than 15 feet tall. There is limited visibility and turn around for fire apparatus on this single lane road.

Photo 7:Horizon Road off of Oak Hill Road



Horizon Road is off of Oak Hill and Pleasant Valley Road; long, steep grade that leads into the Consumes River canyon. The fuels are continuous; high rates of spread, and torching are likely, expect mid-to-long range spotting. Control will be difficult.

The idea of keeping and maintaining roads and long driveways open for fire engines is important and recognition of the acceptable standard for roads is the clearance of 15 feet height and 18 feet wide is important to the safety of all. The California Title 14- Natural Resources Division, 1.5- Department of Forestry, Chapter 7- Fire Protection, Subchapter 2 SRA Fire Safe Regulations Articles 1-5, Article 1. Administration Article 2. Emergency Access Article 3. Signing and Building Numbering Article 4. Emergency Water Standards Article 5. Fuel Modification Standards, sets the current standards for new road construction. Understanding that new road bed standards can't be enforced on old roads vegetation removal, turnouts and turnarounds along these roads should be encouraged by the fire districts.

Road Maintenance and Primary Evacuation Roads

It is important to coordinate with the El Dorado County Department of Transportation (DOT) and local fire districts on setting priorities for roadside clearance to support emergency services as well as evacuation. The result would be that hazard tree and brush removal operations are focused in areas of greatest need based on evacuation planning, road conditions, and numbers of residences served. Road maintenance standards used by the county could be both educational and used as a model by homeowner and road associations.

Water Supply El Dorado Irrigation District (EID)

There has been an effort to GPS all the hydrant locations in the county by the County GIS department and the county fire departments. However, the project is not complete and it is the recommendation of this document that the GPS mapping effort should continue. Either a grant should be acquired to complete the mapping and research of the following information or perhaps work in cooperation with the high school as a student project. The current hydrant map and inventory can be viewed at http://www.edcfiresafe.org/index.php and then go to mapping tools.

The El Dorado Irrigation District has identified areas within the county and areas within the CWPP area that require electric pumps to maintain acceptable pressure and flow to fire hydrants. There are also areas that require electric pumps to maintain water in the tanks that service the hydrants. These areas need to be identified and made available to the fire

departments. EID knows which areas fall into this category and the data is available but was not made available for this analysis. EID has stated that it has available electric generators if there is a power failure. This is not acceptable during a wildfire emergency. It may take several hours for the generators to arrive on scene to provide the proper pressure to the hydrants. It is recommended that the fire departments obtain the location of these systems that require electricity and prepare an action plan to limit the potential for the loss of pressure.

A map of the most current inventory of fire hydrant locations can be found on the Evacuation Planning and Mapping Tools link found on the El Dorado County Fire Safe Council website. The inventory and GPS location of all of the fire hydrants in the county is not yet completed and needs to be done so that an up to date map can be provided to the fire districts.

Hydrant testing

It is important to determine current strategy and suggest a hydrant-testing schedule for all areas of the county and the CWPP. It is also important to determine how the testing should be done how often and by what agency. Testing has found issues in other areas in the county when testing was recommended in the CWPP. An example was Royal Equestrian Estates Fire Safe Plan which recommended that hydrant testing be done. The El Dorado County Fire engine in Shingle Springs did the testing and found one of the hydrants was not working. They contacted EID and the hydrant was repaired.

VI. Community Preparedness for a Wildfire Emergency

This is one of the most important sections of this document and meets several objectives of the CWPP. It is important enough to reemphasize the purpose of this document; that is to provide a comprehensive, scientifically based assessment of the wildfire hazards and risks within the central El Dorado County study area. The content of this assessment will aid all stakeholders including neighborhoods and individual residences in developing short-term and long-term strategies for:

- Hazardous fuel treatment projects and priorities for those projects
- Community wildfire safety education opportunities
- Assist public agencies in making valid and timely decisions for wildfires and evacuations.
- Estimates the hazards associated with wildland fire in proximity to communities. The hazard information, in conjunction with values-at-risk information, defines "areas of concern" for the community and allows prioritization of mitigation efforts.
- Provides communities with opportunities to make a difference in wildfire losses with little cost to the taxpayers and the communities themselves.

In preparing communities for a wildfire threat or other emergency a number of studies and reports have been cited to assist both the public and government agencies in focusing their effort. Essentially , there are 4 important considerations each individual, family, neighborhood, community and agency must ask of themselves:

1. Do I/we have a disaster plan,
2. Is Shelter-in-Place a primary or secondary option during a wildfire,
3. What are the transportation issues relevant to safety,
4. When do I go and where.

This section will direct individuals, business, and agencies to sources of information that will address each of these elements. Each plan must address the 3 questions before the incident. Once an incident occurs, follow the direction of emergency personal.

Evacuation planning is everyone's responsibility. The discussion around an individual or group evacuations, that includes what is packed and ready, other important information and documents what routes is used, are the animal collected, do you have food for them and where the family or neighbors will meet. Who might be sheltering in place, which neighbors need help all must be asked at the office as well as the home. Understanding the plan, thinking about

contingencies, and discussing them with neighbors and coworkers, will likely lead to successfully executed plan in the event of a real emergency.

- 1. Get a Kit, 2. Make a Plan, 3. Be informed: **http://www.readyforwildfire.org/** a CAL FIRE website
- Making your Family Disaster Plan: **http://www.ready.gov/america/makeaplan/index.html** a FEMA Make a Plan website
- Disaster Planning guide template: **http://ready.adcouncil.org/beprepared/fep/index.jsp** The AD Council website Be Prepared

Additional support for developing and reviewing plans may be received at any of the local fire safe councils, local fire prevention officers, law enforcement officers, CAL FIRE and at local forest service offices. These trained professionals can use the small-organized groups listed on pages 17-19, to establish key contacts for road standards needed for emergency equipment, residential clearance standards, and evacuation planning prior to an incident. These organized groups are key components to the information in this CWPP. It's important to remind the communities that residential clearance and road side clearances are the responsibilities of the community not the fire department.

Shelter in Place (SIP) considerations

The decision of whether to evacuate or shelter-in-place (SIP) in a wildfire poses a significant challenge for emergency mangers and residents in fire prone areas (Cova et al. 2009) such as El Dorado County. The Hazard and Risk analysis created for this CWPP clearly states the risk to lives, property and resources that can occur under high, very high, and extreme fire weather conditions. (See Map 6, page 47 and analysis discussion on page 48-49)

> While less common than evacuation, the decision to shelter in place in a wildfire generally occurs in one of following three situations (Thomas J. Cova, 2002):
>
> 1. The existing roads are blocked by the fire, down power lines, trees, or vehicles etc.
>
> 2. When the evacuation is perceived to be "risky" because the exact whereabouts of the fire are unknown, or the fire is fast approaching and intensity is too high. The margin of safety becomes is too small.
>
> 3. In this case, the residents choose the in-home shelter to improve a structure's chance of survival by actively defending it against the fire.

In the three cases listed above, SIP is a secondary strategy for case 1 and 2. In the third case, it is a primary strategy. This means that the Plan you have developed has considered these options and has completed the necessary preparations to your home and property. If you have any questions in your mind, have your home evaluated by wildfire professional.

Reducing Structure Ignitability and Strengthening Community Fire Preparedness

Reducing structure ignitability is a key element to determining if shelter in place is an option.

Individual Responsibility

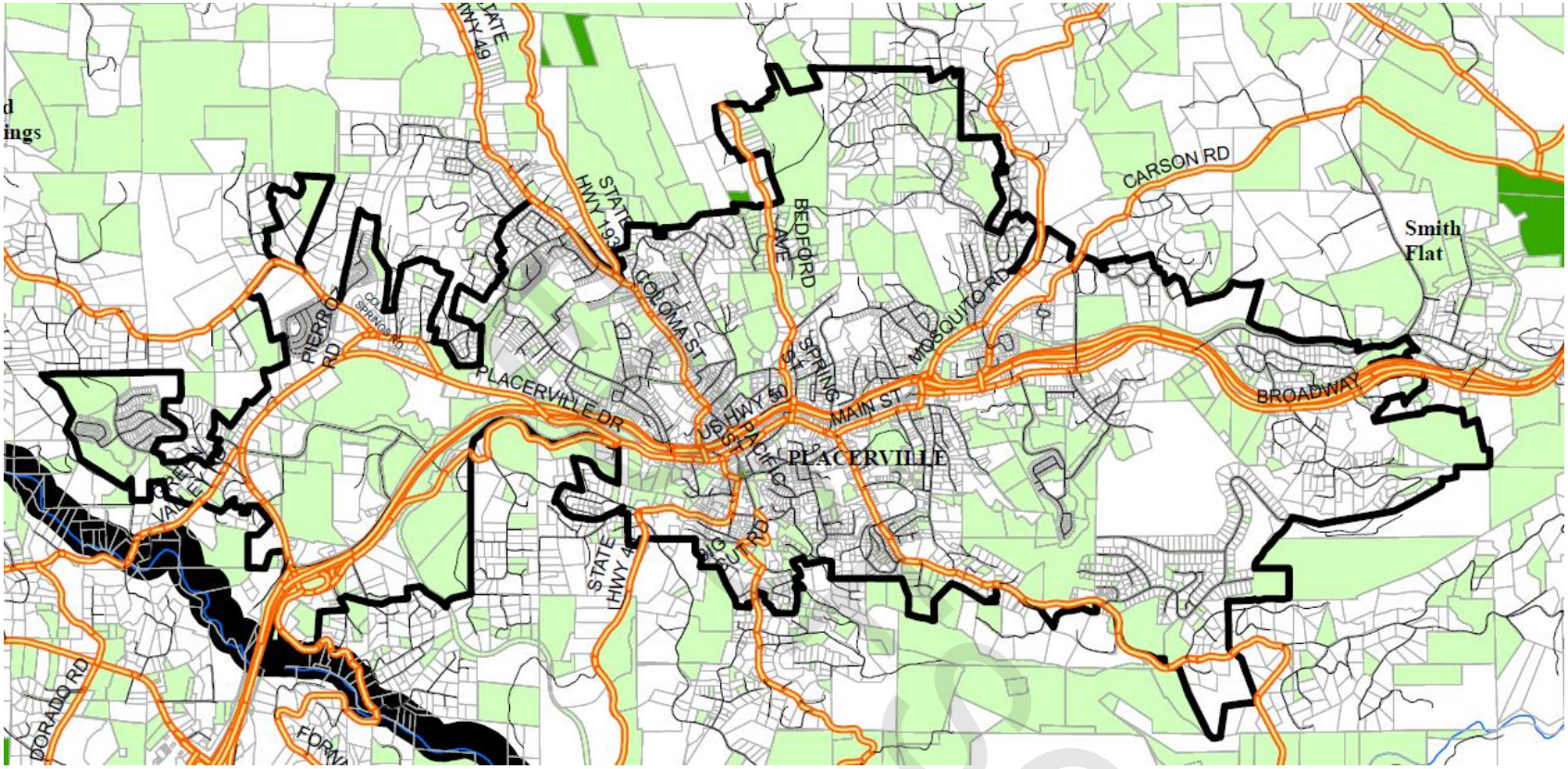
> Individual responsibility is paramount in reducing structural ignitability. Fire science research has demonstrated that ignition potential of structures, including homes, is minimized by modifying the home itself and the area within 100 to 200 feet around the home. Also, a home should be examined for its ignition vulnerabilities to firebrands and flames. Firebrand ignition factors include structure locations of firebrand accumulations on flammable surfaces and unscreened openings allowing firebrand entry. Vulnerabilities to flames depend on the potential for any flame contact with the structure and preventing the occurrence of large flames of high-intensity fires to burn within 100 feet of a home including structures adjacent to a home. (Cohen, 2008)

California Public Resource Code - 4291 Inspection Schedule

An established schedule for home inspections must be developed by the fire districts with CAL FIRE and the US Forest Service as well as through volunteers on the individual fire safe councils so that the inspections are accomplished on a regular, annual schedule. CPRC 4291 can be found in Appendix C.

City of Placerville

Since the city of Placerville is a Local Responsibility Area it is the El Dorado County Fire Protection District's responsibility to enforce the city ordinance that is similar to 4291 and can be found in Appendix C.



Map 7: City of Placerville

Map 7 of Placerville shows undeveloped parcels in light green. Orange roads are primary evacuation routes and white are developed parcels. This map illustrates the amount of undeveloped, unmanaged land in and adjacent to the city of Placerville which posses a wildfire threat to the community.

Schools, businesses, and large employers like hospitals, assisted living facilities jails, and other government facilities should have Fire Marshal approved plans for sheltering in place. These plans need to be shared with the public. The criteria for these plans can be modified by the local county Disaster Council to site specific needs. Many of these facilities should have an on the ground inspection to establish the need for any additional clearance requirements to ensure the structure's ability to handle a wildland fire. Additional information can be found at the following sites:

- **http://www.redcross.org/preparedness/cdc_english/Sheltering.asp**
- **http://www.ready.gov/business/plan/shelterplan.html**
- **http://www.osha.gov/SLTC/etools/evacuation/shelterinplace.html**
- **http://www.ready.gov/america/makeaplan/shelter_in_place.html**
- **http://www.calhospitalprepare.org/document/shelter-place-checklist**

Transportation issues associated with my route of travel to safety?

> Evacuation is a common strategy in emergency management. In many hazardous events the best option is to relocate threatened populations to safer areas. This is a complex problem with many behavioral and management facets (Perry 1985; Vogt and Sorensen et al 1992; Dow and Cutter, 1998; Drabek, 1999) Any number of transportation problems can arise during an evacuation. For example, notifying evacuees may be difficult, traffic delays are common, and transportation lifelines are often compromised by the hazard. (Thomas J. Cova, 2002)

Major concerns identified by the CWPP analysis include; many narrow one-way-in one-way out roads, these roads are often not up to today's standards for width and height clearances required for today's newer fire engines. No turn-a-rounds for emergency equipment is often the case in older developed areas in the CWPP area. Traffic flow concerns have been identified along primary evacuation routes. Lane based routing is one solution that could be pre-planned to ensure a steady flow of traffic.

Often these traffic flow concerns are called "choke-points" and occur where feeder roads connect to primary routes and are points that potentially will hinder smooth and rapid evacuation. It is critical to any evacuation that traffic control be set in place as fast as possible at these choke points. Evacuation can be further constrained by the availability of law enforcement personnel and or CERT personnel in the event of an evacuation. The county is

severely limited in the number of on duty personnel that can be used to begin evacuations in the event of a rapidly moving wildfire.

Communities may have to do their own workdays to clear the roadsides so that equipment can safely travel the roads. Road associations may need to widen the roads and put in turn a round to allow fire equipment space to turn around. These are only a few of the responsibilities of the communities to keep their community safe from a wildfire. The job of the fire departments and the fire safe councils is to educate the community to what needs to be done to provide for safe ingress egress for residents and fire equipment.

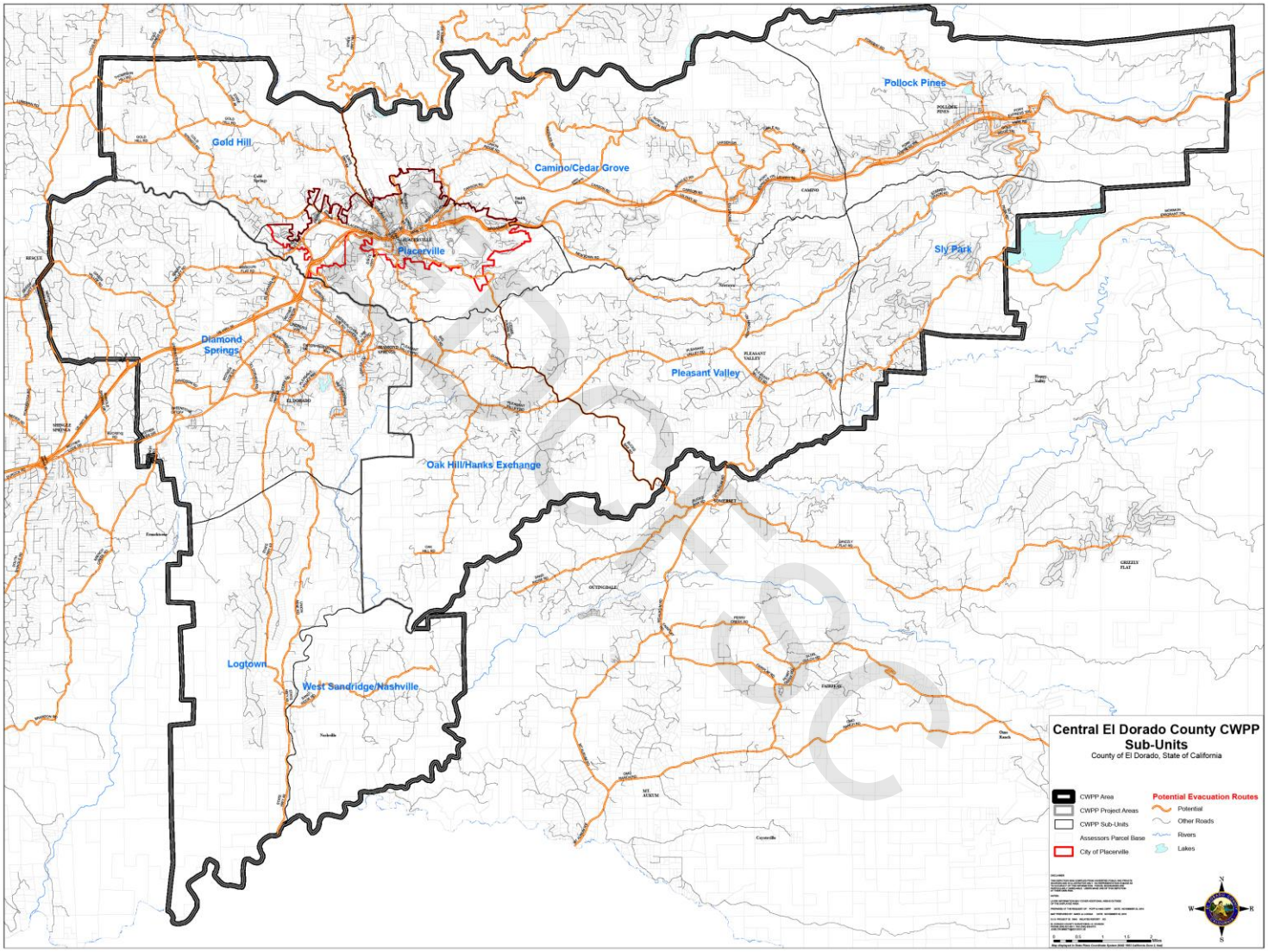
The number of egress constrained roads and the number of homes on roads that have only one way in and out is very high in the El Dorado County. The 1/3 of homes in the county are located on one way in and out roads, often with limited road standard compliance, makes for potentially tragic results. Map 9, pg.72 highlights the egress-constrained roads in the CWPP area.

Preplanning for evacuation is important to the safety of the public. As pointed out in the lessons learned publication *FACES: The Story of the Victims of Southern California's 2003 Fire Siege* (Mutch, July 2007) even communities such as San Diego County where wildfires requiring evacuations are annual events, the victims were ill prepared for evacuation and lives were lost. The Faces document is found in the electronic folder and should be required reading for all emergency personnel both firefighting and law enforcement. The county does have a very active Disaster Council and one of their tasks should be to identify specific problems that could impede suppression resources and evacuation. More needs to be done to inspire the community members to write their own evacuation plans. The evacuation-planning website on the El Dorado County Fire Safe Council is one way to help in individual planning.

It's important that road and evacuation route treatments are completed on driveways, roads, and other key transportation corridors. A successful neighborhood fuels reduction project, depends on the priorities of local residents, opportunities for funding, conditions of the land, and land ownership patterns.

To Use the following Maps: the maps in this document are embedded PDF files. Using Adobe Acrobat Reader, you can open them by placing the cursor on the map and **double click to open the reader.** Once the map is open, a set of tools is available in the menu bar to zoom in and look at specific areas of interest.

Map 8: Primary evacuation routes

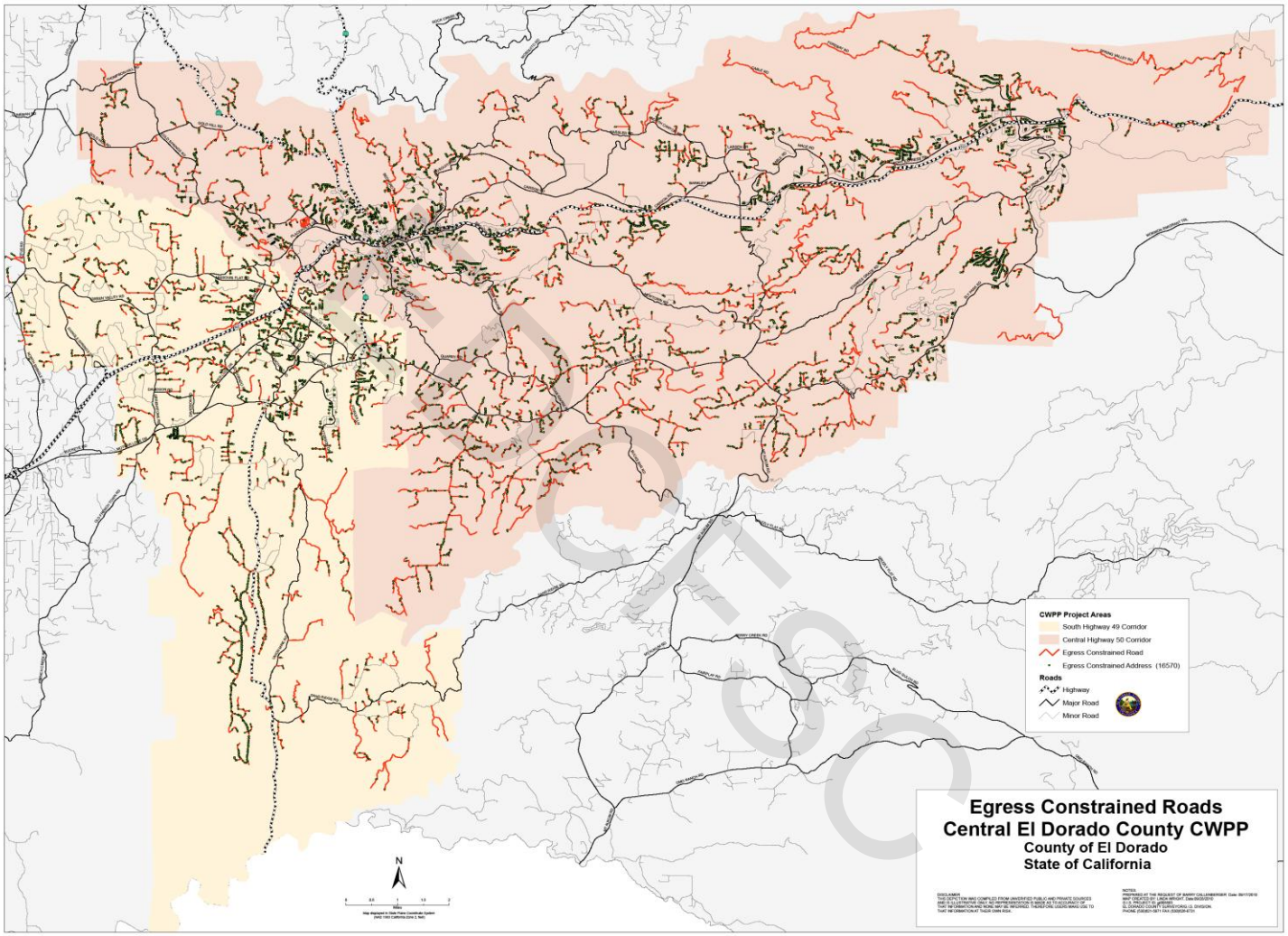


Map 9 (on the following page) illustrates egress-constrained roads and shows a partial number of roads that need further study. The fire departments and emergency services need to identify these roads and keep them in mind when planning evacuation and suppression activities.

The following is taken from a report on the Oakland Hills fire, October 1991 by the National Fire Protection Association.

> Another major hindrance to fire fighting was the system of narrow, winding roads in the fire area, many of which ended in cul-de-sacs. Fire apparatus could not pass each other nor the cars filled with fleeing residents. Traffic jams developed, especially near the large apartment complex. Many apartment residents abandoned their cars in frustration so they could run to safety. The abandoned cars, in turn, served as roadblocks to fire fighters and other residents. Downed power lines further impeded evacuation down the narrow roads. Some apparatus and private vehicles were trapped for hours on these roads. Eleven of the victims died as flames caught up with them while they were trapped in a traffic jam on Chafing Cross Road (National Fire Protection Association, October 1991)

El Dorado County has many such roads that can turn into traps for evacuating residents or incoming fire suppression equipment. Residents along those roads should be evacuated as early as possible. This will take further coordination with the county Office of Emergency Services, County Department of Transportation, the County Transportation Authority, and Fire Services.



Map 9: Egress Constrained Roads

Establishing Trigger Points in Pre Fire Evacuation Planning

Warning communities in the path of an advancing wildland fire is a challenging problem (Thomas J. Cova, 2002), El Dorado County is equipped with Reverse 911 capability. Once given the information, the Emergency Command Center (ECC) in Camino, dispatchers can initiate the call to a specific set of residences identified by fire and law enforcement officials. Timing is everything: evacuation planning is critical and scenarios for evacuation should be run periodically with law enforcement, fire personal, and local community members as well. More community evacuation practice sessions should be held in congested highly populated areas, so that the people living in the area understand the importance of evacuation planning and law enforcement can understand potential evacuation problems.

Developing trigger points for wildland fires can include a number of these elements: fire behavior, numbers of residences, time of day, day of the week, season, topography, suppression-access and resource availability to name a few. Developing the local criteria can be done before the fire occurs, once the location of the incident is known, trigger points can be quickly established. . This process can expedite evacuation times

FACES: the Story of the Victims of Southern California's 2003 Fire Siege (Mutch, July 2007)

> San Diego County was lacking in Fire Evacuation Interagency Planning. In early 2003—prior to the southern California Fire Siege—the California Department of Forestry and Fire Protection (CDF) and the U.S. Forest Service helped initiate a group called the Forest Area Safety Taskforce (FAST). This interagency team was brought together to prepare and practice an evacuation plan for Palomar Mountain (Lundberg 2005). The FAST exercise demonstrated that most communities in San Diego County did not have an evacuation plan. Unfortunately, for the most part, this was demonstrated when the multiple fire siege hit in October 2003 Twenty-Two people lost their lives either waiting too long to evacuate or during the process of evacuating.
>
> Not surprisingly, when the need arose on the Old Fire, those in San Bernardino County who had planned for months in advance for the contingency of evacuation—under the Mountain Area Safety Task Force (MAST) preparations—were able to safely conduct an exodus of mountain residents to safer locations. Those who had not accomplished similar interagency planning in San Diego County became victims of the fast spreading Cedar and Paradise Fires.
>
> The residential evacuation process from a wildfire can be one of the most hazardous undertakings, resulting in human injury or death due to chaotic conditions and

congestion on the roads. Many of those who died on the Cedar and Paradise fires were trapped by flames while trying to flee to safety. The development of a multijurisdictional evacuation plan with all partners, informing the public about evacuation procedures in advance and schedule evacuation simulations, such as the communities of San Bernardino county have done, was instrumental in safely evacuating 70,000 people from the mountain resort area who were threatened by the Old Fire in the San Bernardino area. (Mutch, July 2007)

The Action Plan Section in this CWPP has all the critical findings and recommendations and is found on Page 77. The following findings have been modified into Ask-Yourself, questions assist the users of this document in developing an evacuation plan

Collaboration, Public Education and Prevention

Finding: There are numerous organized communities groups, which include neighborhood watches, road associations, and homeowners association. They are not getting the direct message about road standards, residential clearance standards in CPRC 4291, and disaster/evacuation planning.

Ask yourself if you are part of one these organized groups and are you getting the information needed to plan for an emergency? If not how do I get it?

Community Hazard Assessment

Finding: The threat of damage to the residences of El Dorado County from a large wildland fire is high. Over 19,000 residents live in the CWPP area, 1/3 of them live on single land one way in and one way out road. Complex terrain, fuels build-up on open space lands, the lack of grazing, storm damage in 2009 from snow to low elevation oaks and pines, and limited homeowner compliance with CPRC 4291 has set the stage for a large wildfire in the future in many areas.

Based on the fire behavior maps and sub-unit analysis I live in (BLANK) area for Resistance to Control. What is it like around my neighborhood? The route I use to leave in case of an evacuation?
True or False The clearance around my property meets CPRC 4291? *True or False Our family has an evacuation or shelter in place plan.*

Roads and Evacuation Planning

Finding:

- 1/3 of the residents live on limited access egress roads, many of the primary and most of the secondary roads in the county have segments that need to be evaluated for accessibility for suppression resources and evacuation planning. Most large fire engines will have difficulty on these roads.
- Very limited hydrant testing and maintenance is occurring, and the current hydrant inventory is a work in progress. Water delivery may be compromised by wildfire interrupting power supplies to pumping facilities in several CWPP communities.
- **More public fatalities occur during evacuation than from their structure burning down around them**.

  During an evacuation, law enforcement/ emergency personnel may determine your route.

Using the Maps 8 and 9 I have determined the nearest Primary evacuation route and if the road I live on has limited access and egress.
I have hydrants near our property or my well is sufficient to meet fire suppression needs.
It is more dangerous to leave my property than it is to stay, so I have developed a shelter in place plan
My neighbors and I understand that emergency equipment has limitations and we have identified the problems associated with our roads during suppression and evacuation

Community Preparedness

Findings: The lack of actual individual or facility Shelter in place and disaster plans, including the understanding of evacuation issues is prevalent and this is especially true in areas where no fire safe councils exist. There should be focused education on CPRC 4291. The public needs to understand opportunities for assistance to do hazard reduction (El Dorado County Fire Safe Council's and other programs).

My work, and my children's school has a shelter in plan, I know exactly what to do and what is expected of me as a parent or guardian.

The questions and statements above should be used to facilitate the discussion around the table on what your evacuation or shelter in place plan for work or home includes. The notion that "these kinds of things don't happen up here" is gone, our community is very susceptible to all kinds of incidents that will require this type of planning and consideration.

VII. Action Plan

Critical Findings and Recommendations

Collaboration, Public Education and Prevention

Finding: There are numerous organized communities groups, which include neighborhood watches, road associations, and homeowners association. They are not getting the direct message about road standards, residential clearance standards in CPRC 4291, and disaster/evacuation planning.

Recommendation: Give Consistent messages to the public by all fire districts, using the organized community groups identified in the CWPP area. Develop a task force of law enforcement officers and fire prevention individuals to address these groups at their annual meetings.

Community Hazard Assessment

Finding: The threat of damage to the residences of El Dorado County from a large wildland fire is high. Over 19,000 residents live in the CWPP area, 1/3 of them live on single land one way in and one way out road. Complex terrain, fuels build-up on open space lands, the lack of grazing, storm damage in 2009 from snow to low elevation oaks and pines, and limited homeowner compliance with CPRC 4291 has set the stage for a large wildfire in the future in many areas.

Recommendation: Education to homeowners on CPRC 4291, streamlines the enforcement of Placerville's weed abatement ordinances. Inform road associations of emergency vehicle standards for clearances and turn a rounds. Prepare family and neighborhood emergency plans and practice drills. Use internets based applications for families and develop lesson plans for schools as assignments for students at the middle and high school levels.

Fire Response

Finding: Currently initial attack is successful and extended attack has worked well with all agencies working together to suppress fires quickly. Currently all fire districts in the county are finding themselves with insufficient funding and forced to reduce services across the board. This will lead to reduced capacity and increase in response times to incidents of all types within the county.

Roads and Evacuation Planning

Finding:

- 1/3 of the residents live on limited access egress roads, many of the primary and most of the secondary roads in the county have segments that need to be evaluated for accessibility for suppression resources and evacuation planning. Most large fire engines will have difficulty on these roads.
- Very limited hydrant testing and maintenance is occurring, and the current hydrant inventory is a work in progress. Water delivery may be compromised by wildfire interrupting power supplies to pumping facilities in several CWPP communities.
- More public fatalities occur during evacuation than from their structure burning down around them.

Recommendations: Residents need to understand the emergency equipment limitations that pertain to them and the problems there roads cause during suppression and evacuation

Fire Districts inspect all of the roads in their district and make recommendations on whether they are passable for fire equipment and evacuation. OES along with the Fire Districts establish trigger points for evacuation and actively get community support for evacuation drills. Make sure that the message for evacuation planning is consistent and the plans identified in this CWPP are well distributed to community members.
The Office of Emergency Services (OES) along with the Fire Districts, establish trigger points for evacuation and actively get community support for evacuation drills. It is important that the message for evacuation planning is consistent and the plans identified in this CWPP are well distributed to community members.

Hydrants

Findings: There has been an effort to GPS all the hydrant locations in the county by the County GIS department and the county fire departments. However, the project is not complete. The El Dorado Irrigation District has identified areas within the county and areas within the CWPP area that require electric pumps to maintain acceptable pressure and flow to fire hydrants. There are also areas that require electric pumps to maintain water in the tanks that service the hydrants. These areas need to be identified and made available to the fire departments. EID knows which areas fall into this category and the data is available but it was not made available for this analysis. EID has stated that it has available electric generators if there is a power failure. This is not acceptable during a wildfire emergency. It may take several hours for the generators to arrive on scene to provide the proper pressure to the hydrants.

A map of the most current inventory of fire hydrant locations can be found on the Evacuation Planning and Mapping Tools link found on the El Dorado County Fire Safe Council website. The inventory and GPS location of all of the fire hydrants in the county is not yet completed and needs to be done so that an up to date map can be provided to the fire districts.

It is important to determine current strategy and suggest a hydrant-testing schedule for all areas of the county and the CWPP. It is also important to determine how the testing should be done how often and by what agency. Testing has found issues in other areas in the county when testing was recommended in the CWPP. An example was Royal Equestrian Estates Fire Safe Plan which recommended that hydrant testing be done. The El Dorado County Fire engine in Shingle Springs did the testing and found one of the hydrants was not working. They contacted EID and the hydrant was repaired.

Recommendation: Establish a county wide committee with involvement of the Fire Districts and the water districts who may have responsibility for the hydrants and establish a countywide testing program and criteria. Develop a hydrant testing and maintenance protocol and implement during CPRC 4291 inspections. Utilize the Resistance to Control analysis to set inspection priorities by CWPP Subunit.

The GPS mapping effort of the hydrants should continue a grant should be acquired to complete the mapping and research of the following information or perhaps work in cooperation with the high school as a student project. The current hydrant map and inventory can be viewed at

http://www.edcfiresafe.org/index.php and then go to mapping tools. It is recommended that the fire departments obtain the location of the hydrant systems that require electricity and prepare an action plan to limit the potential for the loss of pressure.

Community Preparedness

Findings: The lack of actual individual disaster plans, shelter-in-place plans and understanding of evacuation issues is prevalent and this is especially true in areas where no fire safe councils exist. There should be focused education on CPRC 4291. The public needs to understand opportunities for assistance to do hazard reduction (El Dorado County Fire Safe Council's and other programs).

Recommendations: Inspections/education, weekend exercises, local government (police, CHP, sheriff offices, fire departments, volunteers, CAL FIRE) utilize pre-existing organized groups, pre-announce, and participate to extent possible. These efforts must be community or neighborhood based outreaches.

Fuel Treatments and Restoration Projects

Findings: There are many opportunities for a large wildfire to establish in the complex terrain of Camp Creek, Weber Creek, Martinez Creek, the Consumes River, or the South Fork of American Rivers, which will then threaten hundreds of residents in the CWPP area. In many communities, there is a high likelihood for structure-to-structure fire, not unlike the 49 Fire in Auburn, CA in 2009. Several new housing development projects are in the planning stage some of these developments are in direct alignment with prevailing wind and topographic features which makes them vulnerable to losses from a wildfire.

Recommendations: Start with no-cost or low cost programs like CPRC 4291, enforcement of Placerville weed ordinance in coordination with El Dorado County Department of Transportation (DOT) road crews to clear primary evacuation roads first. Apply for grants that support pre-suppression efforts in fuel breaks, for maintenance treatments of existing treatments. Use demonstration projects to provide example for the public on treatment expectations. Signage and bill boards are good reminders to people, as well.

VIII. Community and Project Priority

There are specific treatments and recommendations for treatments based on vegetation types and topography. The following pictures can give the user an idea of some of those local considerations.

Photo 8: Special Considerations for treatments and maintenance in chaparral.

Burning conditions in chaparral are characterized with high rates of spread and long flame lengths, which makes direct attack unlikely. So treatments need to consider the fuel type when determining protection treatments.

Photo 9: Special Considerations for treatments and maintenance in Grass and Oak Woodlands

Special consideration in this fuel type would be to treat the low brush, limb up the trees, and remove trees based on open canopy between them. Favor black oak and white oak over live oak and ponderosa pine over gray pine.

Photo 10: Special Considerations for treatments and maintenance in Live Oak, Grass and Gray Pine

This photo, like the previous vegetation it needs to be treated by removing the ladder fuels in addition treat the low brush, limb up the trees, and remove trees based on open canopy between them. Favor black oak and white oak over live oak and ponderosa pine over gray pine.

Photo 11: Special Considerations for treatments and maintenance in Ponderosa Mixed Conifer

Special considerations favor saving black oak and removing the understory and removing the incense cedar. All trees under 8 inches in diameter should be removed, and tree canopy should be opened by spacing the trees on an average of 20 foot spacing between the tree trunks.

Table 9: Treatments for sub units Gold Hill

Community	Name	Treatment Type	Road Name	Mechanical	Hand	RxFire	Acres	Est. Cost	Priority	Est. Year
Gold Hill										
	GH_1	Fuel Break		Yes			79			
	GH_2	Road Hazard &Hydrant Insp.	Thompson Hill							
	GH_3	Road Hazard &Hydrant Insp.	Gold Hill							
	GH_4	Road Hazard &Hydrant Insp.	Cold Springs							
	GH_5	Road Hazard &Hydrant Insp.	HWY 49							

Table 10: Subunits Camino/Cedar Grove, Oak Hill/Hanks Exchange, Pleasant Valley, Pollock Pines/Sly Park

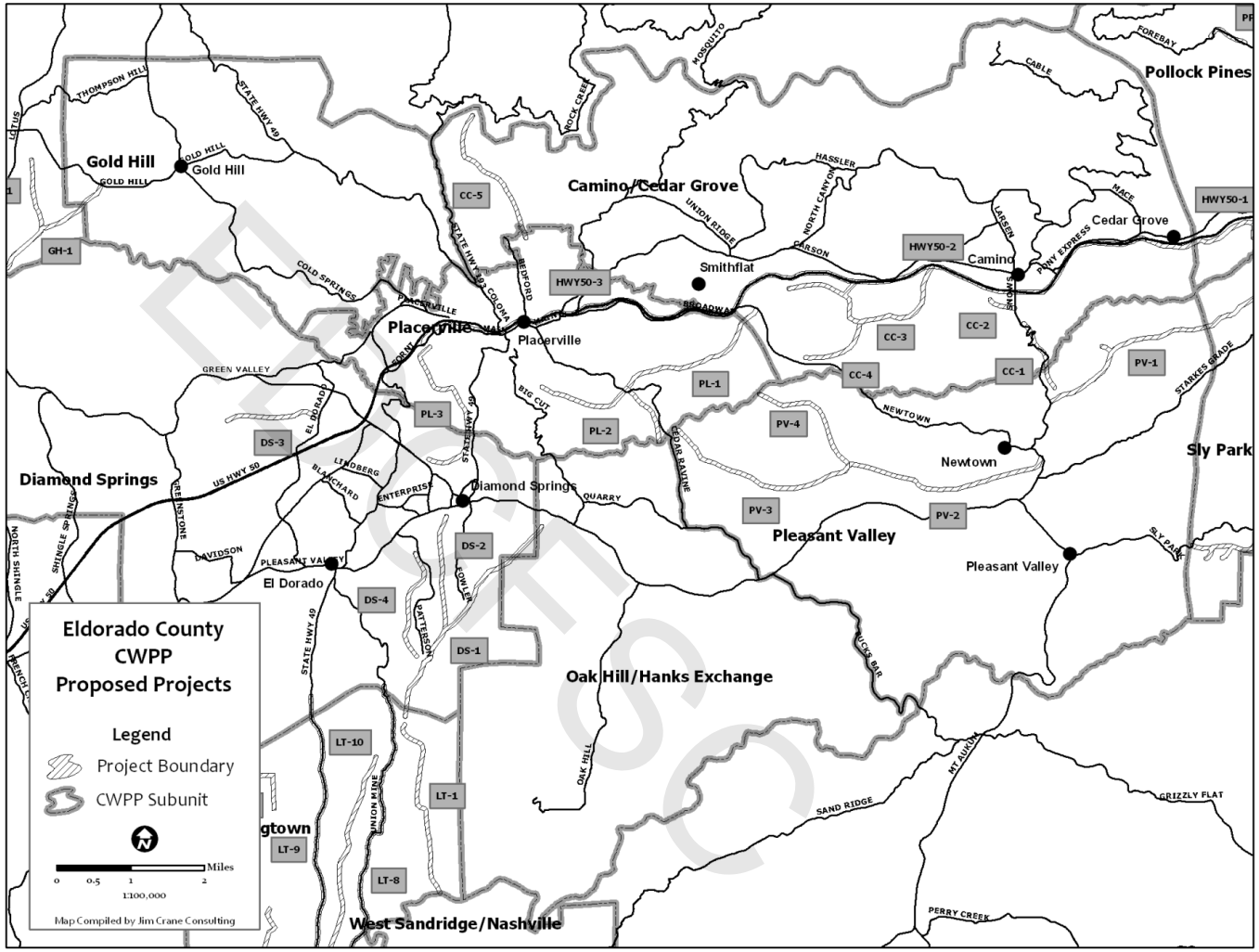
Community	Name	Treatment Type	Road Name	Mechanical	Hand	RxFire	Acres	Est. Cost	Priority	Est. Year	
Camino / Cedar Grove											
	CC_1	Fuel Break		Yes			38				
	CC_2	Fuel Break		Yes			15				
	CC_3	Fuel Break		Yes			110				
	CC_4	Fuel Break		Yes			37				
	HWY_50_2	Fuel Break DEMO		Yes			230				
	CC_5	Fuel Break		Yes			76				
	CC_6	Road Hazard &Hydrant Insp.	Pony Express								
Community	**Name**	**Treatment Type**	**Road Name**	**Mechanical**	**Hand**	**RxFire**	**Acres**	**Est. Cost**	**Priority**	**Est. Year**	

	CC_7	Road Hazard &Hydrant Insp.	Mosquito Rd								
	CC_8	Road Hazard &Hydrant Insp.	Union Ridge								
	CC_9	Road Hazard &Hydrant Insp.	North Canyon								
	CC_10	Road Hazard &Hydrant Insp.	Barkley								
	CC_11	Road Hazard &Hydrant Insp.	Cable Rd								
	CC_12	Road Hazard &Hydrant Insp.	Mace								
Oak Hill Hanks Exchange											
	OH_1	Road Hazard &Hydrant Insp.	Pleasant Valley								
	OH_2	Road Hazard &Hydrant Insp.	Oak Hill								
	OH_3	Road Hazard &Hydrant Insp.	Quarry								
	OH_4	Road Hazard &Hydrant Insp.	Cedar Ravine								
	OH_5	Road Hazard &Hydrant Insp.	Bucks Bar								
	OH_6	Road Hazard &Hydrant Insp.	Hanks Exchange								
Community	**Name**	**Treatment Type**	**Road Name**	**Mechanical**	**Hand**	**RxFire**	**Acres**	**Est. Cost**	**Priority**	**Est. Year**	
Pleasant Valley											
	PV_1	Fuel Break		Yes			96				

	PV_2	Fuel Break		Yes			103				
	PV_3	Fuel Break		Yes			98				
	PV_4	Fuel Break		Yes			64				
	PV_5	Road Hazard &Hydrant Insp.	Pleasant Valley								
	PV_6	Road Hazard &Hydrant Insp.	Newtown Rd								
	PV_7	Road Hazard &Hydrant Insp.	Snows Rd								
	PV_8	Road Hazard &Hydrant Insp.	Starks Grade								
	PV_9	Road Hazard &Hydrant Insp.	Sly Park								
	PV_10	Road Hazard &Hydrant Insp.	Mt Aukum								
Pollock Pines											
	PP_1	Fuel Break		Yes			67		1		
	PP_2	Fuel Break		Yes			79				
	PP_3	Fuel Break		Yes			73				
	HWY_50_1	Fuel Break DEMO		Yes			174		2		
	PP_4	Road Hazard &Hydrant Insp.	Forebay Rd								
	PP_5	Road Hazard &Hydrant Insp.	Pony Express								
Community	**Name**	**Treatment Type**	**Road Name**	**Mechanical**	**Hand**	**RxFire**	**Acres**	**Est. Cost**	**Priority**	**Est. Year**	
Pollock Pines											
	PP_6	Road Hazard &Hydrant Insp.	Gold Ridge Trail								

	PP_7	Road Hazard &Hydrant Insp.	Sly Park								
Sly Park											
	SP_1	Fuel Break		Yes			136				
	SP_2	Fuel Break		Yes			125				
	SP_3	Fuel Break		Yes			35				
	SP_4	Fuel Break		Yes			35				
	SP_5	Road Hazard &Hydrant Insp.	Sly Park								
	SP_6	Road Hazard &Hydrant Insp.	Starks Grade								

Map 10: Projects



Map 11: Projects

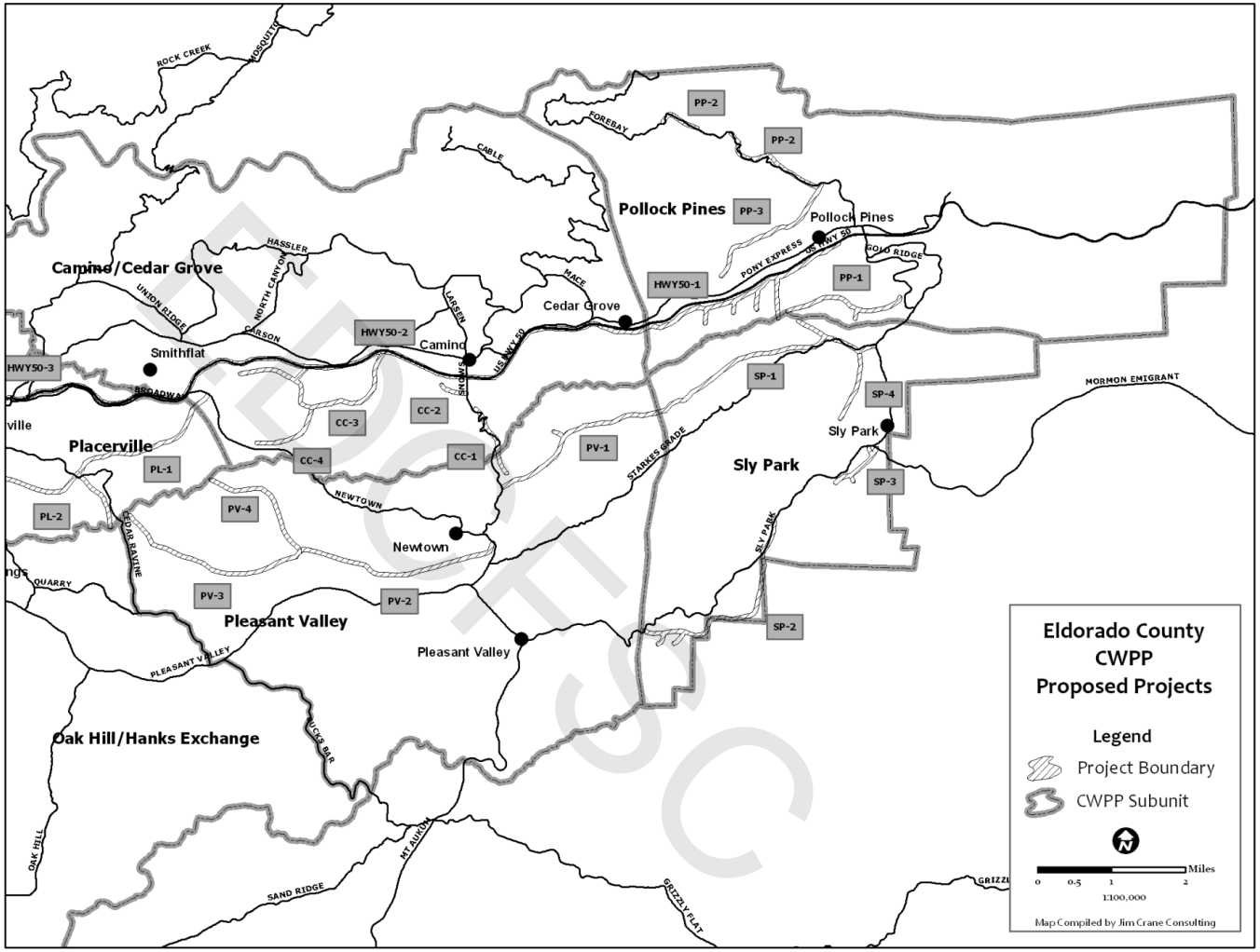


Table 11 Project table for the City of Placerville

Community	Name	Treatment Type	Road Name	Mechanical	Hand	RxFire	Acres	Est. Cost	Priority	Est. Year
Placerville										
	PL_1	Fuel Break		Yes			81		3	
	PL_2	Fuel Break		Yes			82		2	
	PL_3	Fuel Break		Yes			88		1	
	PL_4	Fuel Break		Yes						
	PL_5	Road Hazard &Hydrant Insp.	HWY 49							
	PL_6	Road Hazard &Hydrant Insp.	Placerville Drive							
	PL_7	Road Hazard &Hydrant Insp.	Cold Springs							
	PL_8	Road Hazard &Hydrant Insp.	Green Valley							
	PL_9	Road Hazard &Hydrant Insp.	Forni Rd							
	PL_10	Road Hazard &Hydrant Insp.	Bedford							
	PL_11	Road Hazard &Hydrant Insp.	Cedar Ravine							
	PL_12	Road Hazard &Hydrant Insp.	Mosquito Rd							
	PL_13	Road Hazard &Hydrant Insp.	Broadway							

IX Monitoring and Evaluation

A CWPP does not end when it is adopted; a thorough process should involve a continuous cycle of collaborative planning, implementation, monitoring and adapting strategies based on lessons learned. As communities learn from successes and challenges during the development and implementation of their CWPP, stakeholders may identify new actions, propose a shift in how decisions are made or actions are accomplished, and evaluate the resources necessary for successful CWPP implementation.

- Track accomplishments and identify the extent to which CWPP goals have been met.
- Examine collaborative relationships and their contributions to CWPP implementation, including existing participants and potential new partners.
- Identify actions and priority fuels reduction projects that have not been implemented, and why; set a course for future actions and update the plan.

Table 12 is a framework that can help a community in monitoring and evaluating its CWPP. The table lists six CWPP goals and a series of questions to help communities monitor and evaluate accomplishments, challenges, and how well goals have been met. Communities and agencies may want to work together to ensure that, at a minimum, data are collected to evaluate the plan measures to gain consistency. The community must recognize that fire safety is rapidly changing. It is likely that new developments and new sources of money in fire safety will change from year to year. It is recommended that this plan be reviewed on an annual basis by the fire districts with updates every 5 years or sooner if necessary.

Table 12: Framework for Monitoring and Evaluating a CWPP

1. Partnerships and Collaboration	1.1 Who has been involved with CWPP development and implementation? How have relationships grown or changed through implementation? What resources did they bring to the table?
	1.2 Have partners involved in the planning process remained engaged in implementation? Have new partners become involved? How have the relationships established through the CWPP enhanced opportunities to address CWPP goals?
	1.3 How has the collaborative process assisted in implementing the CWPP and

	building capacity for the community to reduce wildfire risk?
	1.4 Has CWPP collaboration made a difference or had a positive impact on local organizations, neighborhoods and/or actions?
2. Risk Assessment	2.1 How has population growth/change and development in your community affected wildfire risk?
	2.2 Are there new or updated data sources that may change the risk assessment and influence fuels priorities?
	2.3 Has the community enacted a wildfire-related ordinance? If so, county, state, or local?
	2.4 Has the community enforced local or CPR 4291 ordinances
3. Reducing Hazardous Fuels	3.1 How many acres have been treated for hazardous fuels reduction on public and private land that were identified as high-priority projects in the CWPP? What percentage of total acres treated does this constitute?
	3.2 How many fuels reduction projects have spanned ownership boundaries to include public and private land?
	3.3 What is the number and percent of residents that have participated in projects and completed defensible space on their land?
	3.4 How many hazardous fuels reduction projects have been implemented in connection with a forest restoration project?
	3.5 Economic development resulting from fuels reduction How many local jobs have resulted because of fuels reduction or restoration activities?
	3.6 Evaluate any CWPP fuels treatment utilized during suppression for effectiveness
4. Reducing Structural Ignitability	4.1 What kind of resource losses (homes, property, infra-structure, etc.) have occurred from wildfires?
	4.2 Are the current codes and regulations for wildfire hazard adequate? If not, are there efforts to change or update them? Are there

	action items in the CWPP to develop codes and recommendations?
	4.3 Has the public knowledge and understanding about structural ignitability been increased by strategies adopted in the CWPP? Have homeowners been educated on how to reduce home ignitability, and are they replacing flammable building components with non-flammable materials?
	4.4 How many Firewise Communities have been recognized? How many citizens, neighborhoods, or communities have taken action to increase the resilience of their structure to fire?
	4.5 How has the availability and capacity of local fire agencies to respond to wildland and structural fires improved or changed since the CWPP was developed?
5. Education and Outreach	5.1 What kind of public involvement has the CWPP fostered? Examples include public education, household visits, demonstration projects, etc.
	5.2 Has a change in public awareness about wildfire resulted from the plan?
	5.3 What kinds of activities have citizens taken to reduce wildfire risk?
6. Emergency Management	6.1 Is the CWPP integrated within the county or municipal Emergency Operations Plan?
	6.2 Does the CWPP include an evacuation plan? If yes, has it been tested or implemented since the CWPP adoption?
	6.3 Is the CWPP aligned with other hazard mitigation plans or efforts?
	6.4 Is the Evacuation Website operational been updated with new information

* Include goals that can be evaluated with measures as part of a local CWPP evaluation process. This table identifies specific measures that relate to outcomes that can be evaluated at a national level and are associated with HFRA or identified within the 10-Year Implementation Plan.

Appendix A – Fire Behavior Modeling

Model Descriptions
(from http://www.fire.org/)

FARSITE

FARSITE is a fire behavior and growth simulator for use on Windows computers. It is used by Fire Behavior Analysts from the USDA FS, USDI NPS, USDI BLM, and USDI BIA, and is taught in the S493 course. FARSITE is designed for use by trained, professional wildland fire planners and managers familiar with fuels, weather, topography, wildfire situations, and the associated concepts and terminology.

What is FARSITE?

- FARSITE is a fire growth simulation model. It uses spatial information on topography and fuels along with weather and wind files.
- FARSITE incorporates the existing models for surface fire, crown fire, spotting, post-frontal combustion, and fire acceleration into a 2-dimensional fire growth model.
- FARSITE runs under Microsoft Windows operating systems (Windows 98, me, NT, 2000, and XP) and features a graphical interface.
- FARSITE users must have the support of a geographic information system (GIS) to use FARSITE because it requires spatial landscape information to run.

FIREFAMILY Plus

FireFamily Plus is a Windows program that combines the fire climatology and occurrence analysis capabilities of the PCFIRDAT, PCSEASON, FIRES, and CLIMATOLOGY programs into a single package with a graphical user interface

FLAMMAP

FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics (spread rate, flame length, fireline intensity, etc.) over an entire FARSITE landscape for constant weather and fuel moisture conditions.

- FlamMap software creates raster maps of potential fire behavior characteristics (spread rate, flame length, crown fire activity, etc.) and environmental conditions (dead fuel moistures, mid-flame wind speeds, and solar irradiance) over an entire *FARSITE* landscape. These raster maps can be viewed in FlamMap or exported for use in a GIS, image, or word processor.
- FlamMap is not a replacement for *FARSITE* or a complete fire growth simulation model. There is no temporal component in FlamMap. It uses spatial information on topography and fuels to calculate fire behavior characteristics at one instant.
- It uses the same spatial and tabular data as *FARSITE*:
  - a Landscape (.LCP) File,

- Initial Fuel Moistures (.FMS) File,
- optional Custom Fuel Model (.FMD),
- optional Conversion (.CNV),
- optional Weather (.WTR), and
- optional Wind (.WND) Files.

- It incorporates the following fire behavior models:
  - Rothermel's 1972 surface fire model,
  - Van Wagner's 1977 crown fire initiation model,
  - Rothermel's 1991 crown fire spread model, and
  - Nelson's 2000 dead fuel moisture model.

- FlamMap runs under Microsoft Windows operating systems (Windows 95, 98, me, NT, 2000, and XP) and features a graphical user interface.
- Users may need the support of a geographic information system (GIS) analyst to use FlamMap because it requires spatial coincident landscape raster information to run.

FlamMap is widely used by the USDI National Park Service, USDA Forest Service, and other federal and state land management agencies in support of fire management activities. It is designed for use by users familiar with fuels, weather, topography, wildfire situations, and the associated terminology. Because of its complexity, only users with the proper fire behavior training and experience should use FlamMap where the outputs are to be used for making fire and land management decisions.

WindNinja

WindNinja is a computer program that computes spatially varying wind fields for wildland fire application.

It was developed to quickly simulate (less than 1 minute) terrain effects on wind flow for time sensitive emergency response applications. It requires elevation data for the modeling area (in the form of an ASCII Raster DEM file, FARSITE landscape file, GeoTiff, or ERDAS Imagine file), a domain-mean initial wind speed and direction, and specification of the dominant vegetation in the area. A diurnal slope flow model can be optionally turned on or off. Outputs of the model are ASCII Raster grids of wind speed and direction (for use in spatial fire behavior models such as FARSITE and FlamMap), a GIS shapefile (for plotting wind vectors in GIS programs), and a .kmz file (for viewing in Google Earth). WindNinja is typically run on domain sizes up to 50 kilometers by 50 kilometers and at resolutions of around 100 meters.

Appendix B: Treatment Descriptions and Prescriptions

Fuel Treatment and Restoration Projects Strategy these are a few landscape treatments designed to support wildland fire suppression, demonstration projects designed to educate, roadside treatments designed to facilitate safer evacuations, maintenance treatments and critical individual clearance zones that minimize structure-to-structure ignitions. (CPRC - 4291 and Open Space Treatments)

Treatment Prescriptions

The following treatment techniques are typical of those currently used by the, private forest landowners, the U. S. Forest Service, and described in the Sierra Nevada Framework. It was assumed that no new roads would be constructed to implement the projects. The following is a brief description of potential treatment techniques that could be employed to accomplish fuels treatment.

Mechanical Thinning

Mechanical thinning utilizes heavy equipment with large hydraulically-driven saws to cut and remove trees (generally under 24 inches in diameter). The two major harvesting methods include “whole tree removal (WTR)” and “cut-to-length (CTL)”. CTL machines use a “stroke delimber” to remove branches before automatically cutting a log to predetermined lengths (Figure 7). While whole tree removal is preferable from a fuels-reduction standpoint, CTL machines create a mat of slash on which they can operate, reducing impacts to the soil. The slash vs. soil disturbance tradeoff must be considered on a site-specific basis. It is possible to use an in-woods chipper to reduce surface fuels in concert with CTL. Mechanical thinning equipment is generally confined to slopes less than 30%. WTR projects require large landings than can accommodate a skidder operation, a large chipper, and semi-trucks. CTL operations require fewer and smaller landings.

Mechanical Thinning using a cut-to-length harvesting system

Mechanical thinning has the ability to create a more precisely targeted stand structure than prescribed fire. The net effect of removing ladder fuels is that surface fires burning through treated stands are less likely to ignite the overstory canopy fuels. By itself, mechanical thinning with machinery does little to beneficially affect surface fuel loading. The only exception is that some level of surface fuel compaction, crushing, or mastication may occur during the thinning process. Depending on how it is accomplished, mechanical thinning may add to surface fuel loadings, thereby increasing surface fire intensity. It may be necessary to remove or treat fine fuels that result from thinning the stand.

Prescription Mechanical Thinning: Thin stands from below by removing trees up to 30 inches in diameter at breast height (DBH). The thinning is done by starting with the smallest diameter class; removing sufficient suppressed and intermediate trees to achieve an average crown base height (distance from the ground to the base of the leaf [needle] crown) of at least 20 feet and spacing of 10 feet between the crowns of residual trees. On drier sites and on southern aspects, favor the removal of white fir over all other conifer species.

Retain 2-5 snags per acre (minimum size of 24 inches dbh) and 3-7 large downed logs per acre (minimum size 14 inches dbh and 20 feet long). The trees are removed by whole tree yarding and or disposing of slash in stands by hand piling and burning, or by chipping and scattering.

Mastication

Mastication requires machines to grind, rearrange, compact, or otherwise change fire hazard without reducing fuel loads. These treatments tend to be relatively expensive, and are limited to relatively gentle slopes and areas of high values (near homes and communities). Rocky sites, sites with heavy down logs, and sites dominated by large trees are difficult places in which to operate mastication equipment. Additionally, sparks from mastication heads have the potential to start fires and, when working on public land, these machines are subject to the same activity-level restrictions that apply to most other logging equipment.

The ecological and fire effects of mastication treatments vary depending on the size, composition, and location of the fuels left after treatment In many cases, mastication creates a window of 2-5 years in which surface fire intensity actually increases. While this may be offset by a decrease in crown fire potential, mastication tends to increase fuelbed continuity, and can increase fire rates of spread. Mastication is a useful tool in plantations and brush fields, and has applications in thinning small trees for fuel break maintenance.

Prescription Mastication: Use rubber tired or low impact tracked vehicles to cut, chip, and scatter all shrubs and small trees up to 10 inches dbh on site. White fir should be the priority for tree removal. Brush cover should be reduced by creating a mosaic of treated and untreated shrubs. Openings between shrubs should be twice the height of the shrubs and 50-70% of the shrubs should be treated. Brush that is treated should be cut to the maximum stump height of 6 inches. No individual pieces of cut material should be greater than 4 feet long. All masticated stumps should be cut to within 6 inches of the ground. Debris should not average more than two inches in thickness over the entire project area. All cut vegetation should be kept within the unit boundaries. Any cut vegetation falling into ditches, roads, road banks, trails, or adjacent units should be removed immediately.

Tractor Piling or Grapple piling: Use of rubber tired or tracked machines to pile slash, brush and small trees. Where needed trees under 8” DBH will be thinned out to 20’ spacing. Most trees over 8” DBH will not be piled. Live oak will be thinned out in many places. Generally Black oak will be left on site Protection of desirable residual trees from skin ups and damage is very important. Slash piles should not be piled near residual tress so when they are burned the piles will not damage trees remaining onsite. Contractor should create clean piles that are free of dirt and no larger then 15 feet tall and 15 feet in diameter. The piles should be partly covered with a 6’x6’ piece of water proof material to allow them to be burned after significant rain fall.

Mastication Soil Issues

Thin layers of wood chips spread on the forest floor tend to dry and rewet readily. Deep layers of both chips and chip piles may have insufficient air circulation, making poor conditions for decomposition. Moreover, when layers of small woody material are spread on the forest floor and decomposition does occur, the decomposing organisms utilize large amounts of nitrogen reducing its availability to plants. Therefore, the impact of any crushing, chipping, or mulching treatment on decomposition processes and their potential contribution to smoldering fires needs to be considered (Graham, 2004).

Prescribed Burning

Prescribed burning reduces the loading of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels (Figure 9). These changes, together with increased fuel compactness and reduced fuel continuity change the fuel energy stored on the site, reducing potential fire spread rate and intensity. Burning reduces horizontal fuel continuity (shrub, low vegetation, woody fuel strata), which disrupts growth of surface fires, limits buildup of intensity, and reduces spot fire ignition probability (Graham, 2004). Given current accumulations of fuels in some stands, multiple prescribed fires—as the sole treatment or in combination with thinning—may be needed initially, followed by long-term maintenance burning or other fuel reduction (for example, mowing), to reduce crown fire hazard and the likelihood of severe ecosystem impacts from high severity fires (Peterson and others in prep).

Prescription for Prescribed Burning: Low intensity broadcast burning should be used to reduce all 100-hour fuels (< 3 inches diameter) by 60-80%, the brush component by 50%, and 75% of trees less than 3 inches dbh. Use fire to prune ladder fuels by scorching the lower 1/3 of branches on 100% of trees less than 8 inches dbh. Retain large down logs (20 inches in diameter or greater) to a maximum density of five per acre. Maintain 60 to 70% of ground cover on slopes 35% or less. Additionally, acceptable standards for prescribed fires should include:

- 13 foot maximum scorch height; and,
- less than 10% mortality in conifers > 12 inches dbh.

Do not ignite fires in Steam Environmental Zones (SEZ). However, allow backing fires to enter SEZs affecting a maximum of 45% of the area in a mosaic pattern. No more than 50% of the 100-hour fuels (<3 inches diameter) should be consumed in SEZ's.

Opportunities to use prescribed fire are limited because of smoke management concerns.

Hand Thinning and Chipping

Hand thinning and chipping is usually accomplished by a crew of persons using chainsaws and pole saws to thin and clear undesirable vegetation. Hand thinning is conducted with crews of approximately 10 individuals who cut trees with chainsaws. Hand thinning is generally used to cut smaller trees (less than 14 inches dbh), on steep slopes where machines cannot operate, or in environmentally sensitive areas where machines would have a significant environmental impact. Removal of smaller trees is generally limited to younger stands where the trees are smaller. Because hand thinning can only effectively remove smaller material, silvicultural and fuel management objectives may be more constrained than those achieved with mechanical thinning. Therefore, hand thinning may require more frequent treatments to maintain acceptable fuel loads than mechanical thinning and hand thinning may not be cost effective in forest stands with excessive ground fuel loading where mechanical thinning would remove or compact those fuels.

Prescription Hand Thin and Pile Burn: Hand thinning and pile burning should be accomplished using a ten person hand crew with chainsaws. Starting with the smallest diameter trees, remove trees up to 6 inches dbh to achieve spacing of 20 feet between residual crowns . All dead and down material greater than 3 inches in diameter and up to 8 inches in diameter and all cut material regardless of size should be piled for burning. Piles should be constructed compactly, beginning with a core of fine fuels and minimizing air spaces to facilitate complete combustion. Piles should be constructed away from trees to prevent damage when burning and should not be taller than 5 feet. If broadcast burning is not scheduled for the area, then a fire line should be surrounded around each pile. Piles will be covered with a 4x4 foot square of water resistant paper to cover the fine material in the center of the piles.

Chipping: Chipping may be used as an alternative to burning. It redistributes forest vegetation that is cut by mechanical thinning or hand thinning. The chips may be removed from the site and converted to energy for other products, or they can be scattered throughout the project area.

Grazing: Use of Goats sheep, horses or cows to reduce the small fuels such as grass, Black Berries and small brush

Cost Estimates

Cost estimates developed as part of this planning effort are based on data from the resource conservation district and costs for similar work in Amador County. Cost estimates vary widely because of fuel loadings, operational constraints, and crew capabilities. The costs are limited to the direct cost of project implementation. These cost estimates **do not include** offsetting revenue that may be generated by providing commercial products, costs associated with project planning or preparation of environmental compliance reports, or administrative overhead incurred during implementation.

Administrative cost are approximately 40% of the total project costs if the project is estimated to be $100,000 for on the ground implementation the administrative costs would be $40,000. Administrative costs would include environmental documentation, financial administration, project layout and contract administration.

Prescription specific cost estimates.

Table 13: Treatment Costs

Fuel Reduction Treatment	**Cost per acre**
Mechanical thinning (urban interface)	$1,000-$3,200
Mastication	$700 - $1,500
Prescribed burning	$400-$900
Hand thin and Chip	$850 - $1,350
Pile Burn	$300 - $700
Machine Pile	$185-$275

Appendix C Codes and Ordinances

City of Placerville Weed Ordinance

3-3-1: ELIMINATION OF HAZARDS:

No person shall permit paper, rags, boxes, waste or combustible rubbish or inflammable substances of any character to accumulate in any quantity in any building, yard, street, alley or other place in such a manner or to such an extent as to cause a fire menace, or increase the danger of fire or to endanger life or property. The accumulation of rubbish or any materials is hereby declared to be a nuisance and it shall be the duty of the fire chief, a representative from his department, or any police officer, to see that such nuisances are abated immediately after discovery, using summary measures if necessary to effect immediate abatement. If in his judgment the fire menace is not immediate he shall give written notice to the occupant or owner of the premises or building or the person responsible for the condition, to remedy or remove the condition within forty eight (48) hours thereafter, and such order must be complied with. (Ord. 758, 6-6-1953; and. Ord. 1355, 5-8-1984)

BEETLE INFESTED AND DEAD TREES

7-9-1: INSPECTING DEAD OR INFECTED TREES:
The city of Placerville and the United States forest service, through authorized employees, may go upon private property in the city of Placerville for the purpose of inspecting dead or beetle infested trees if there is reason to believe that there are either dead or beetle infested trees on the premises. (Ord. 1069, 2-25-1975)

7-9-2: NOTIFYING OWNER OF INFECTED TREES:
If upon inspection it is determined that there are either dead or beetle infested trees upon the premises which in the opinion of the person making the inspection should either be eradicated, destroyed or controlled in order to eliminate a dangerous condition and spread of the infestation, then the recorded owner of the premises should be notified in writing to eradicate or destroy the infested or dead trees or to control the beetle infestation within a reasonable period of time not to exceed thirty (30) days. The written notice should be sent to the recorded owner of the property at the last known address of the property owner on file with the assessor of El Dorado County. (Ord. 1069, 2-25-1975)

7-9-3: FAILURE TO ERADICATE:
If the property owner fails to eradicate or destroy the infested or dead trees or to control the beetle infestation as requested by the city of Placerville, then the city of Placerville may have this done by a private, professional tree surgeon and the property owner shall be obligated to pay the city the amount charged by the private, professional tree surgeon in eradicating or destroying the tree or controlling the infestation. (Ord. 1069, 2-25-1975)

7-9-4: CITY TO INSPECT AND ADVISE ONLY:
The city of Placerville, through its employees, is not going upon the property in order to

eradicate, destroy or control the infested trees but is only going upon the premises to make inspections or to consult with or advise the property owner with respect to the dispensation of dead trees or the control of infested trees. (Ord. 1069, 2-25-1975)

8-4-1: ACCUMULATION OF WEEDS PROHIBITED:
No property owner, lessee or occupant of property shall allow weeds, dry grass, rubbish, or other debris to grow or collect upon his property within thirty feet (30') of any fence, house, or building whether the fence, house or building is on his property or on adjacent properties, to such an extent that it is a fire hazard. Any accumulation of weeds, dry grass, rubbish, or other debris in violation of this section shall constitute a public nuisance. (Ord. 1380, 10-22-1985)

El Dorado County Codes and Ordinances specific to fire prevention

8.08.020 Hazard removal Required.

Every person, co partnership, firm, corporation and company owning, controlling, renting or operating any cabin, tent, residence, store, hotel or other like structure or improvement in any unincorporated territory in the county shall, at all times do all the following:

A.Maintain a fire break or clearing around the cabin, tent, residence, store, hotel or other like structure or improvement free from all inflammable material for a distance of thirty feet from any portion of the structure, or to his or its property line, whichever is the lesser distance; and

B. Keep the roofs of all such cabins, tents, residences, stores, hotels or other like structures or improvements free from leaves, needles or other debris. (Ord. 3528 ¶1, 1985: prior code ¶7202)

8.08.080 Enforcement.

The director of the department of forestry and all his agents, duly authorized by the laws of the state, all United States Forest Service officers and officers of legally constituted fire protection districts are designated as, and given the powers of, peace officers for the purpose of making arrests for violations of any of the provisions of this chapter. (Ord. 3528 ¶4, 1985: prior code ¶7210)

12.08.240 Obstructions.

All obstructions placed on county highways shall comply with the following requirements:

A.No obstruction shall be placed upon or over any county highway which changes the route of, or otherwise interferes with, the normal flow of vehicular traffic on the road.

B.No obstruction shall be placed upon or over any county highway which would obstruct the view of traffic between any two points on the road within five hundred feet (500') of each other.

C.No obstruction shall be placed over any county highway which reduces the vertical clearance below fourteen feet (14') from the road surface. (Prior code ◆11,242)

CALIFORNIA PUBLIC RESOURCES CODE SECTION 4291-4299

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

(1) Maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line except as provided in paragraph (2). The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location, and type of vegetation. Fuels shall be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. This paragraph does not apply to single specimens of trees or other vegetation that are well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Consistent with fuels management objectives, steps should be taken to minimize erosion. For the purposes of this paragraph, "fuel" means any combustible material, including petroleum-based products and wildland fuels.

(2) A greater distance than that required under paragraph (1) may be required by state law, local ordinance, rule, or regulation. Clearance beyond the property line may only be required if the state law, local ordinance, rule, or regulation includes findings that the clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. Clearance on adjacent property shall only be conducted following written consent by the adjacent landowner.

(3) An insurance company that insures an occupied dwelling or occupied structure may require a greater distance than that required under paragraph (1) if a fire expert, designated by the director, provides findings that the clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. The greater distance may not be beyond the property line unless allowed by state law, local ordinance, rule, or regulation.

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

(5) Maintain a tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood.

(6) Maintain the roof of a structure free of leaves, needles, or other vegetative materials.

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

(b) A person is not required under this section to manage fuels on land if that person does not have the legal right to manage fuels, nor is a person required to enter upon or to alter property that is owned by any other person without the consent of the owner of the property.

(c) (1) Except as provided in Section 18930 of the Health and Safety Code, the director may adopt regulations exempting a structure with an exterior constructed entirely of nonflammable materials, or, conditioned upon the contents and composition of the structure, the director may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding those structures.

(2) An exemption or variance under paragraph (1) shall not apply unless and until the occupant of the structure, or if there is not an occupant, the owner of the structure, files with the department, in a form as the director shall prescribe, a written consent to the inspection of the interior and contents of the structure to ascertain whether this section and the regulations adopted under this section are complied with at all times.

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

(e) The Department of Forestry and Fire Protection shall develop, periodically update, and post on its Internet Web site a guidance document on fuels management pursuant to this chapter. Guidance shall include, but not be limited to, regionally appropriate vegetation management suggestions that preserve and restore native species, minimize erosion, minimize water consumption, and permit trees near homes for shade, aesthetics, and habitat; and suggestions to minimize or eliminate the risk of flammability of non vegetative sources of combustion such as woodpiles, propane tanks, decks, and outdoor lawn furniture.

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

4291.1. (a) Notwithstanding Section 4021, a violation of Section 4291 is an infraction punishable by a fine of not less than one hundred dollars ($100), nor more than five hundred dollars ($500). If a person is convicted of a second violation of Section 4291 within five years, that person shall be punished by a fine of not less than two hundred fifty dollars ($250), nor more than five hundred dollars ($500). If a person is convicted of a third violation of Section 4291 within five years, that person is guilty of a misdemeanor and shall be punished by a fine of not less than five hundred dollars ($500). If a person is convicted of a third violation of Section 4291 within five years, the department may perform or contract for the performance of work necessary to comply with Section 4291 and may bill the person convicted for the costs incurred, in which case the person convicted, upon payment of those costs, shall not be required to pay the fine. If a person convicted of a violation of Section 4291 is granted probation, the court shall impose as a term or condition of probation, in addition to any other term or condition of probation, that the person pay at least the minimum fine prescribed in this section.

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

4291.3. Subject to any other applicable provision of law, a state or local fire official, at his or her discretion, may authorize an owner of property, or his or her agent, to construct a firebreak, or implement appropriate vegetation management techniques, to ensure that defensible space is adequate for the protection of a hospital, adult residential care facility, school, aboveground storage tank, hazardous materials facility, or similar facility on the property. The firebreak may be for a radius of up to 300 feet from the facility, or to the property line, whichever distance is shorter.

Appendix D Emergency Planning

How to prepare for Pre-Fire / Emergency Planning

This guide is divided into three topic areas, (Print this PDF so that you can use this to take you through the steps to prepare for an evacuation.)

1. How to Navigate and Use the Mapping Tools For Evacuation Planning provided by El Dorado County GIS on the web page, http://gem.edcgov.us/emerplan
2. Tips for preparing for an Evacuation,
3. Useful Resources in Pre Fire and Emergency Planning in our Community.

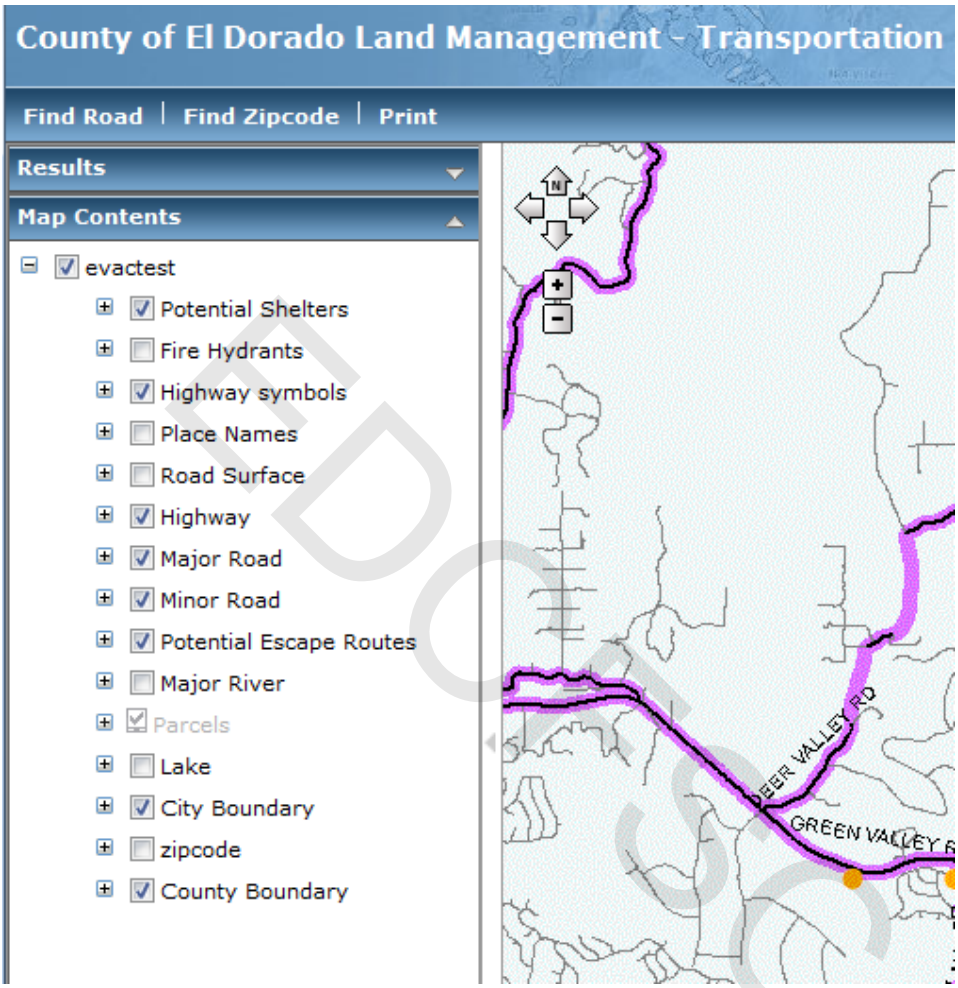
Mapping tools Web Address http://gemp.edcgov.us/emerplan

Disclaimer: The website and this document are in draft form and are presented at this time so that comments can be received and the site improved. The pre fire emergency planning map site is temporary and will be changed in the future. The mapping tools website may be a little slow if a lot of people log on at one time. The mapping tools are currently maintained on a server provided by the El Dorado County GIS Department. Use of this mapping tool is to give the homeowner a pre planning tool to create maps and develop their own evacuation route. The evacuee should also be prepared to follow the evacuation directions of local law enforcement or fire department. The website for the mapping tools program is: http://gem.edcgov.us/emerplan/

1. How to Navigate and Use the Mapping Tools

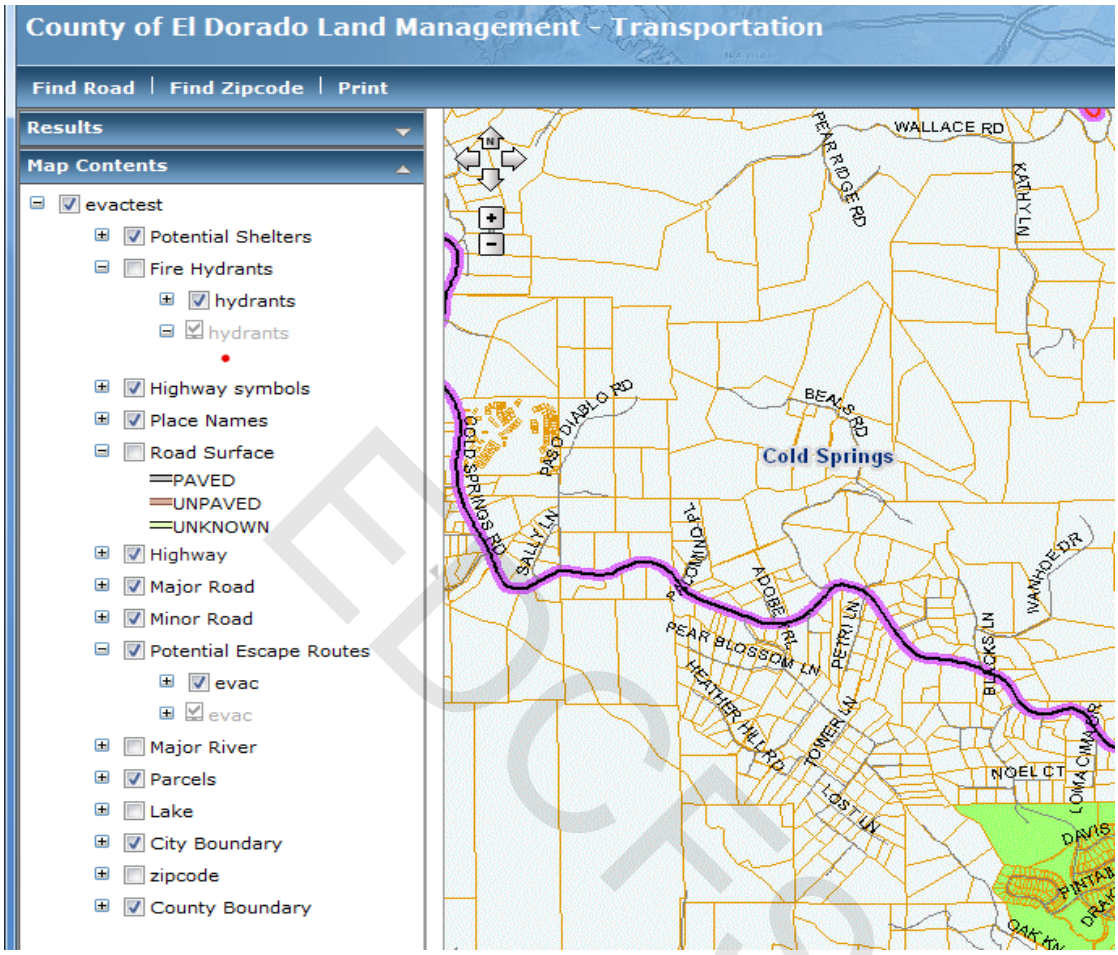
A. The Menu Tree

Figure 1. Screen capture of the Menu Tree.



The Menu Tree is a user-friendly tool that allows the user to either display or not to display the map features provided. This is done by placing the curser over the box and "+" sign and right clicking the mouse.

Figure 2. Menu Tree with expanded branches to display additional map features.



The branches of the Menu Tree are the primary map features like; Highways, Place Names, Major Roads and Potential Escape Routes. These features may be turned ON or OFF, expanded, and collapsed to meet the users' needs. In Figure 2 the Fire Hydrant feature is expanded but turned off from being displayed. Take this opportunity to expand and collapse the different map features as well as turning them on and off from display.

B. The Tool Bar

Figure 3. The icons across the top right hand side of the map screen banner are useful to navigate on the map.

Zoom In	Zoom Out	Pan	Full Extent	Back Extent	Forward Extent	Magnifier	Identify	Measure	Overview

By placing the cursor over each ICON, a label will appear to identify what each tool does. These tools will become very help in navigating the map, identifying features, and determining distances.

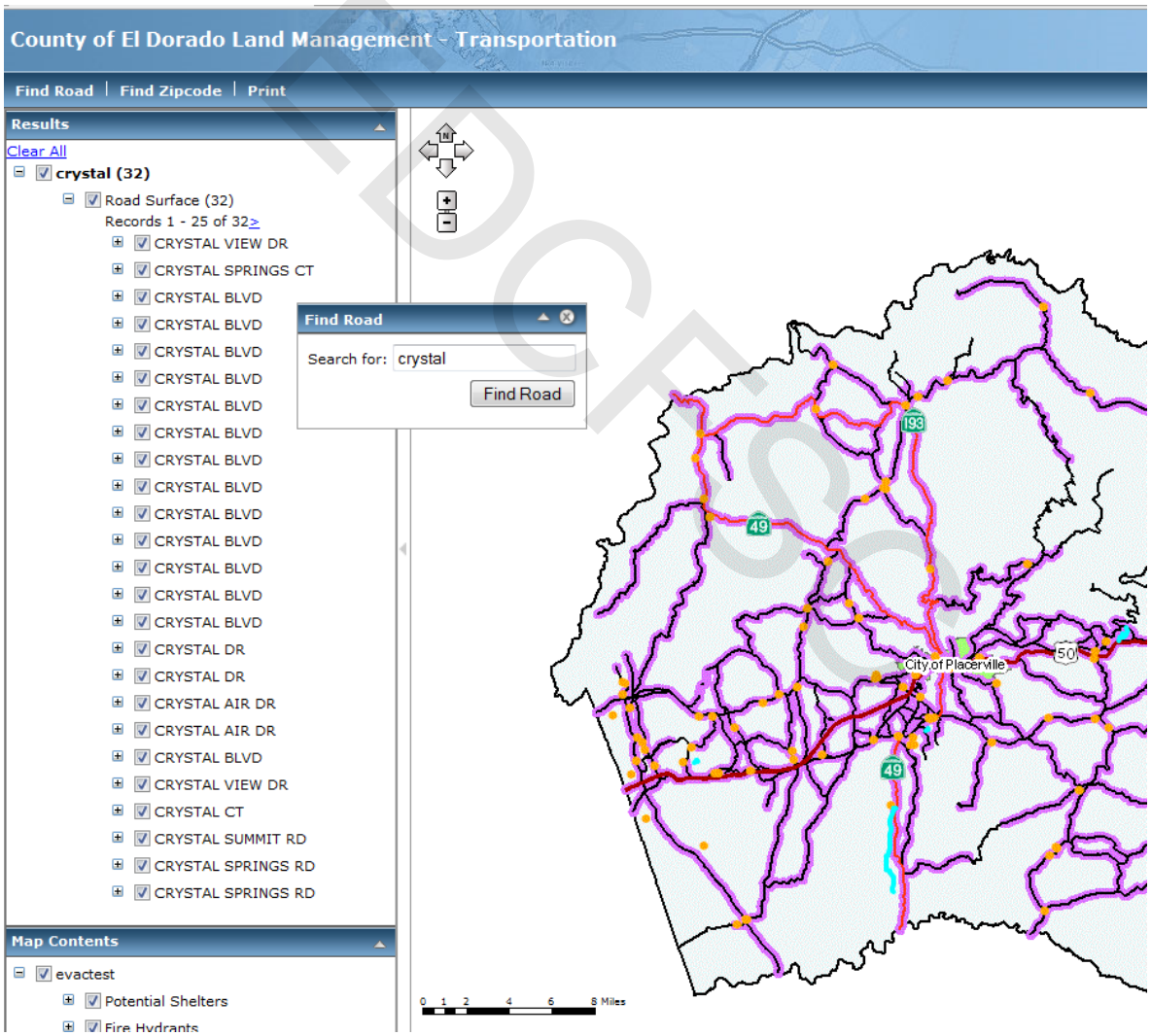
Use the Mapping Tools Website to determine your potential escape routes and print a map.

- An Evacuation Route Map with at least two routes.*▪▪
- Drive your planned route of escape before an actual emergency.*▪▪
- **During an evacuation, law enforcement/ emergency personnel may determine your route.*

Step 1 Finding your Road

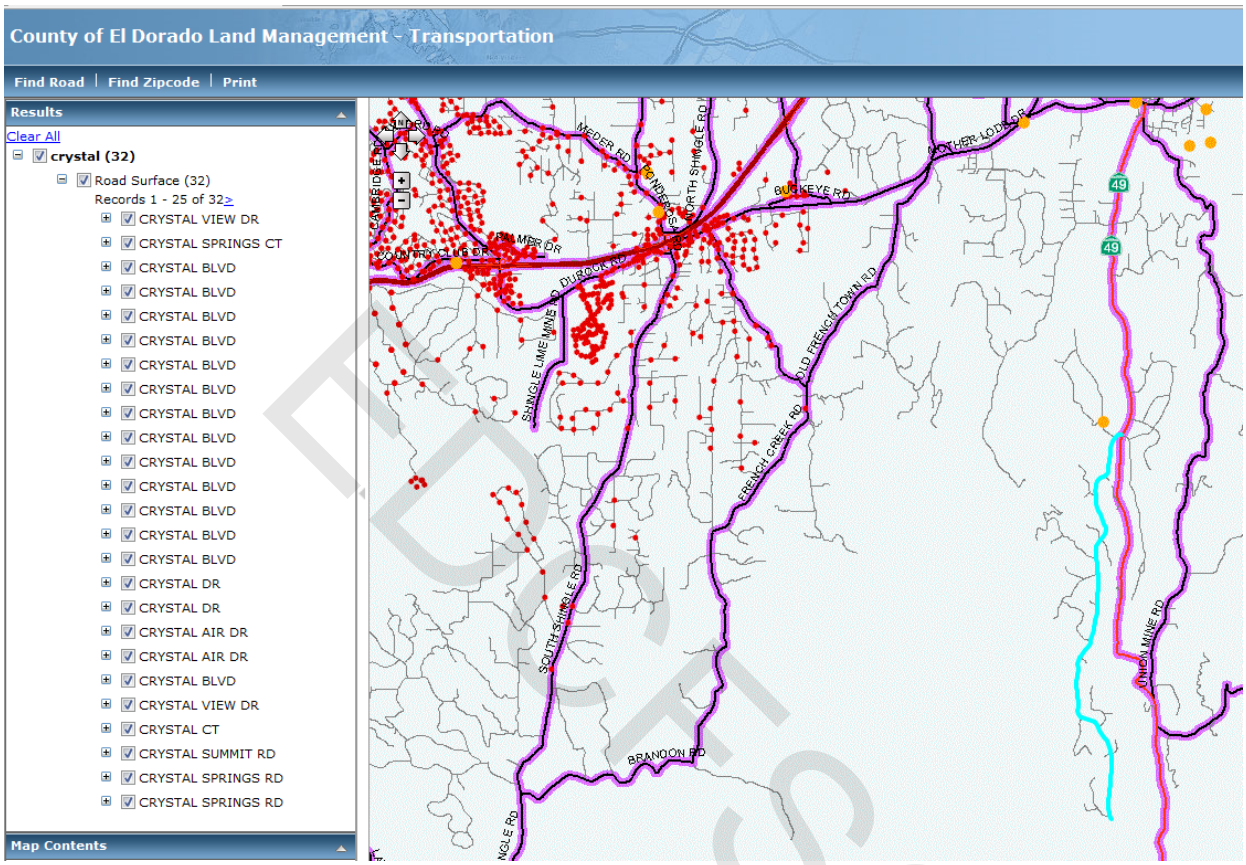
In this example the users is looking for Crystal BLVD, using the FIND feature, ONLY type the street name, you can see that the search found 32 results for Crystal in El Dorado County transportation data base. Crystal Blvd is used in this example is the CYAN colored road segment that parallels Highway 49.

Figure 4. Illustrates the Find Window open and search results for Crystal




By using the Magnify Tool one can zoom into the area and begin to see more details. The more you zoom in the more details appear on map until you reach the individual parcel data.

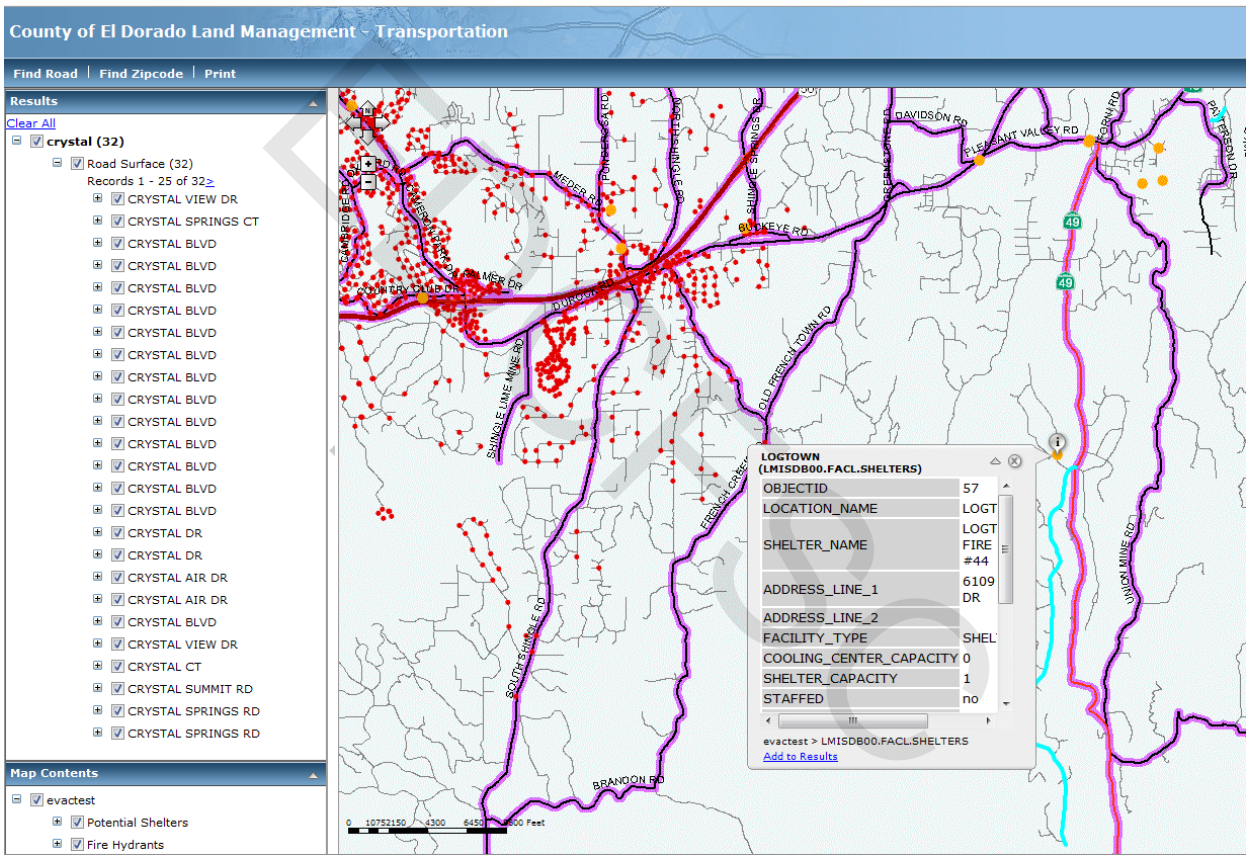
Figure 5. Zoom into highlighted road segment



Step 2 Locate the nearest information and potential shelter site

By using the Identify Tool, one can point the cursor at the nearest ORANGE dot in their area and get the information given for that point, in this case the Diamond Springs El Dorado Fire Station is identified. The ICONs change from these ORAGNE dots as the user zooms in, until schools, fire stations, and other locations are visible on the map.

Figure 5. The Identify Tool was use to identify the nearest orange dot the Crystal Blvd highlighted road segment.

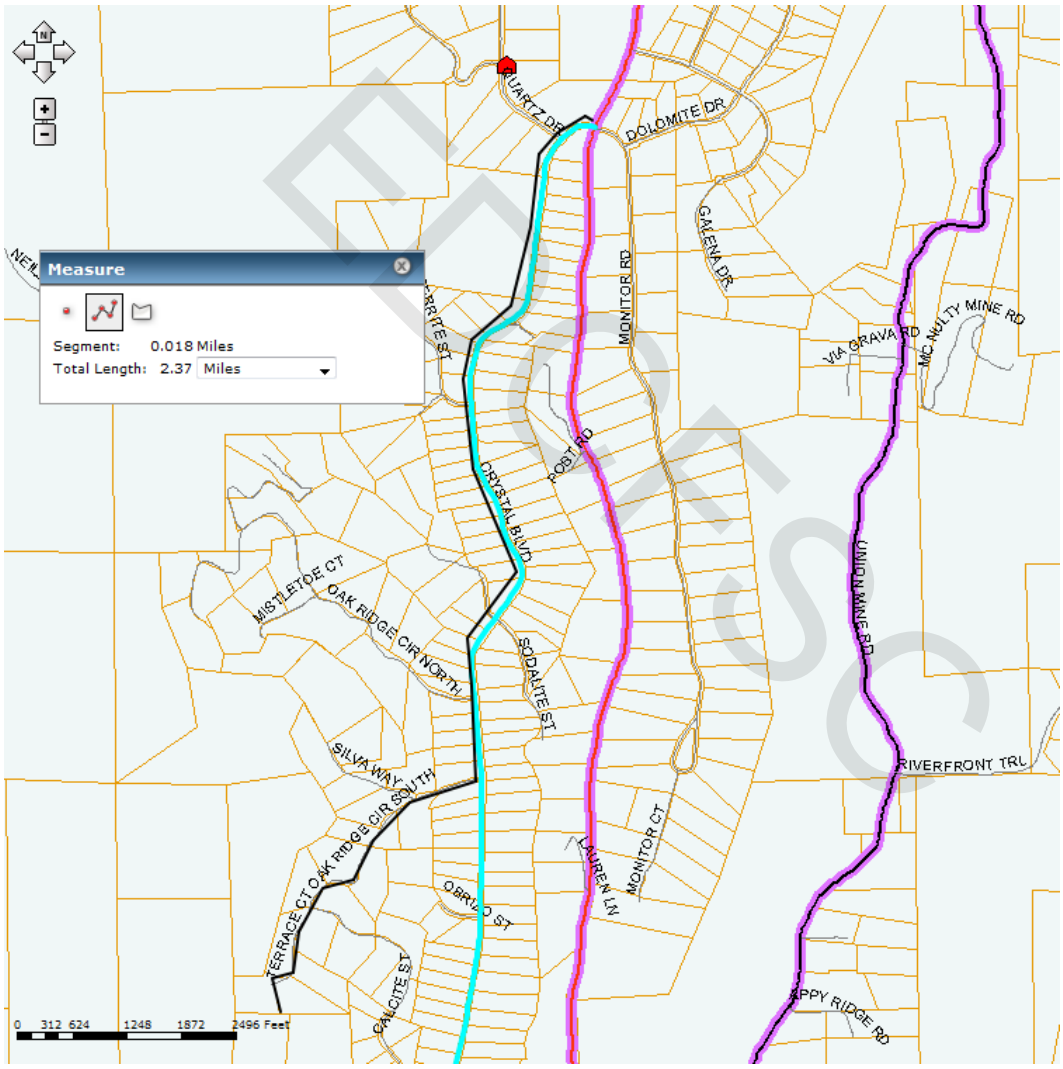


Step 3 Determine you have more than one way in and out from your residence or location.

CAL FIRE and local emergency services recommend that you have more than one way out of your area identified. In this case the residences in the Crystal Blvd area is represented by the Log Town Fire Safe Council; working within their community they have established a secondary emergency exit that is known to its residences but is <u>not</u> part of the county database and is <u>not</u> shown here.

The Distance Tool was used to determine the last resident on Terrance Ct/Oak Ridge South will drive 2.37 miles to reach Highway 49. Each resident should record the time it takes to make that trip and consider what the traffic would be like under emergency conditions.

Figure 6. Illustrates the Distance Tool output window called Measure. The tool is used by Clicking on the ruler icon and single clicking each segment with a Double Click when done to get the total length.



Step 4 Print maps

To print a map, move the cursor over the Print label and Click the mouse. A small Print Window will open as shown below. Choose the size of map from the Pull Down Tab, in this example a Large Map is chosen.

Figure 7. The print Window with pull down menu open

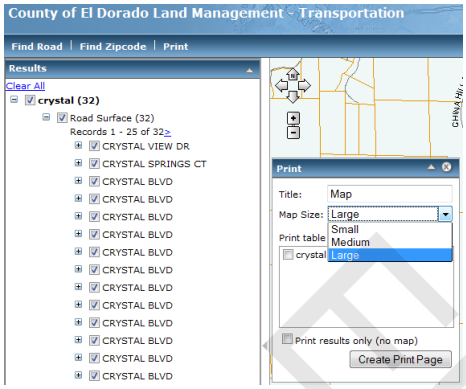
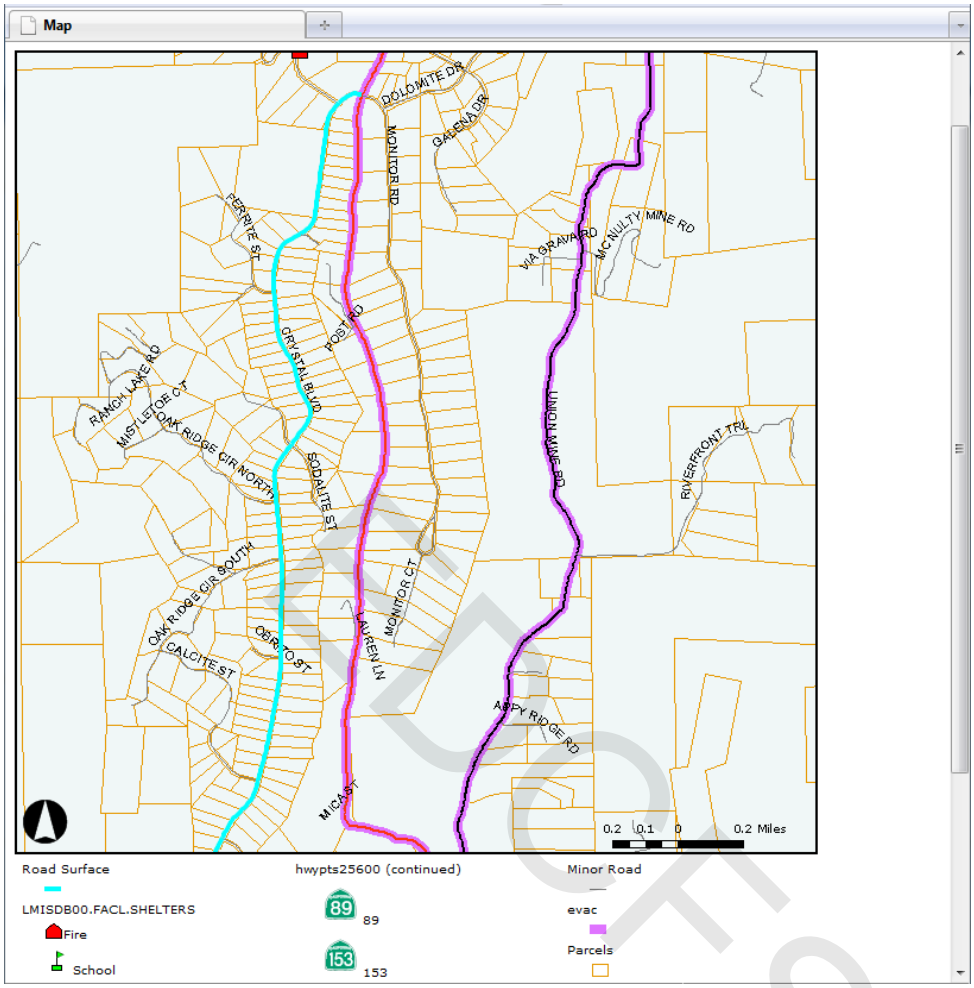
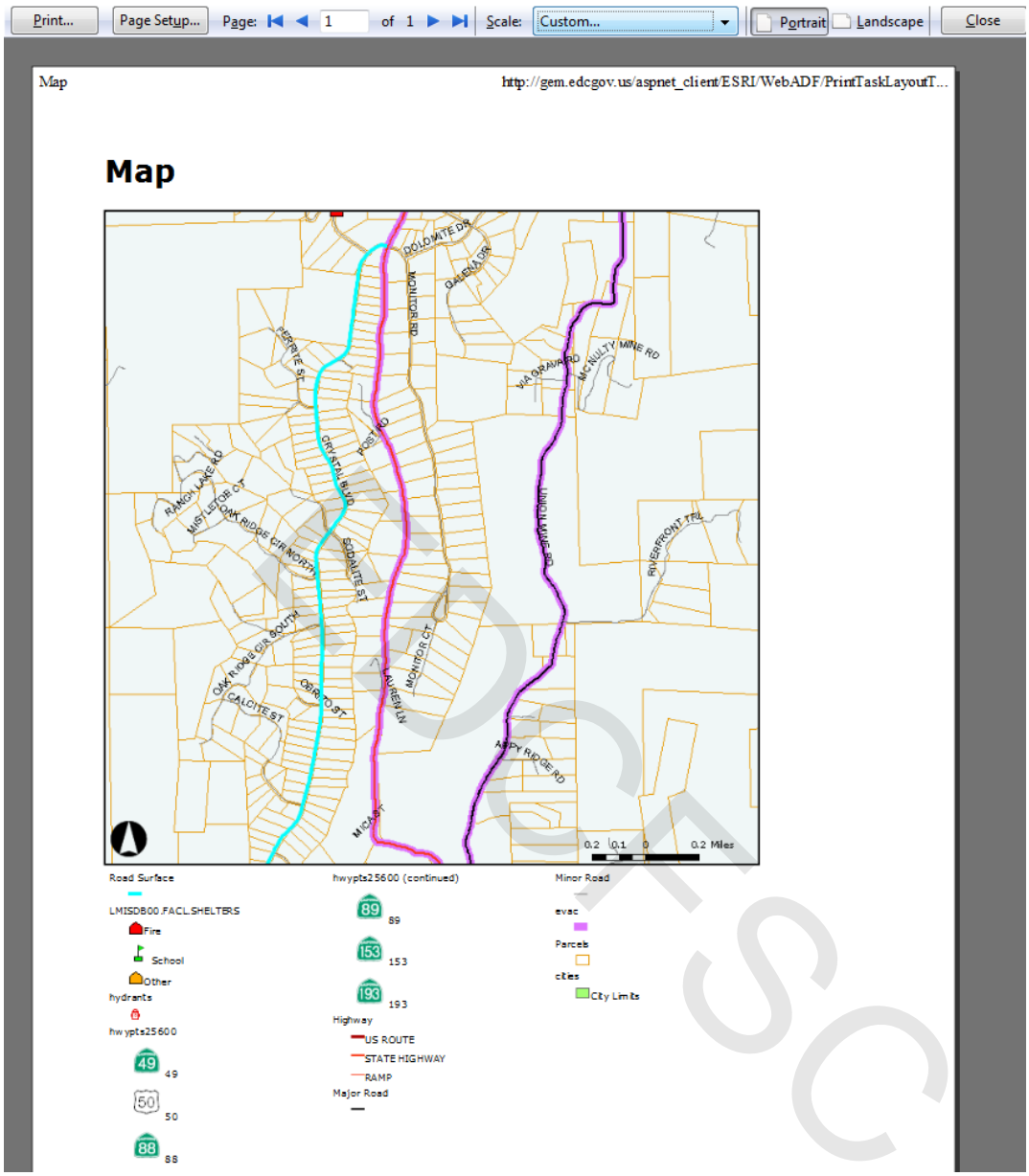


Figure 8: move the mouse over the Create Print Page button and Click the mouse. The following window will open.



To ensure you Print the Map you want, use the Print Preview Feature provided by your Operating System. If you desire your map fit on one page (8 1/2 by 11) then you may have to adjust the Scale to the Custom feature and adjust it down until it does. These maps can be included your personal/family evacuation plan and in Neighborhood Watch guides, as handouts for Road Association meetings, Homeowner Association meetings, and other meetings a neighborhood may have.

Figure 9. Print Screen window open the Scale pull down menu set to Custom


Print...
Page Setup...
Page: 1 of 1
Scale: Custom...
Portrait
Landscape
Close
Map
http://gem.edcgov.us/aspnet_client/ESRI/WebADF/PrintTaskLayoutT...
Map
DOLOMITE DR
GALENA DR
MONITOR RD
PERRIN ST
POST RD
CRYSTAL BLVD
VIA GRAVA RD
MC KULTY MINE RD
RANCH LAKE RD
MISTLETOE CT
OAK RIDGE CIR NORTH
SODALITE ST
UNION MINE RD
RIVERFRONT TRL
OAK RIDGE CIR SOUTH
CALCITE ST
OBERTO ST
LAUREN LN
MONITOR CT
ARMY RIDGE RD
MICAPT
0.2 0.1 0 0.2 Miles
Road Surface
LMISDB00.FACL.SHELTERS
Fire
School
Other
hydrants
hwypts25600
49
50
88
hwypts25600 (continued)
89
153
193
Highway
US ROUTE
STATE HIGHWAY
RAMP
Major Road
Minor Road
evac
Parcels
cities
City Limits

2. Tips for preparing for an evacuation

Neighborhood and Residence Planning

This tool is designed to assist and educate local county residences and others in pre-fire and disaster planning. Understanding your specific situation as well as others in immediate area is critical to safe and efficient travel during an emergency.

California law authorizes officers to restrict access to any area where a menace to public health or safety exists due to a calamity such as flood, storm, fire, earthquake, explosion, accident or other disaster. Refusal to comply is a misdemeanor. (Penal Code 409.5)

When evacuation orders are issued they are done in terms ***Voluntary*** and ***Mandatory*** are used to describe evacuation orders. However, local jurisdictions may use other terminology such as *Precautionary* and *Immediate Threat*. These terms are used to alert you to the significance of the danger. **All evacuation instructions provided by officials should be followed immediately for your safety.**

To accomplish a plan well in advance of a need to evacuate this document has provided places to look to assist in the development of a plan for evacuation. This document provides the Mapping Tool Website and other sources to guide you to accomplish the following Pre-Fire and Disaster elements. The link to this information is provided in the resource section of this document.

Long Before a Fire Threatens (Go to http://www.readyforwildfire.org/ and follow the links making a family plan, this can take approximately 30 minutes to complete depending on your individual situation)

- Prepare an *Evacuation Checklist* and Organize:
- Critical medications.▪▪
- Important personal papers, photos.▪▪
- Essential valuables.▪▪
- Pet and livestock transport, limited amount of pet food.▪▪
- Change of clothing, toiletries.▪▪
- Cell phone.▪▪
- Critical papers and effects in a fire-proof safe.▪▪
- An Evacuation Route Map with at least two routes.*▪▪
- Drive your planned route of escape before an actual emergency.*▪▪

**During an evacuation, law enforcement/ emergency personnel may determine your route.*

The following information is provided to help you and/or your family understand the process of evacuation, the personal expectations and situations that can occur during

an emergency. There are other sources of information provided at the end of this document

3. Preparation for Evacuation

If Evacuation is a Possibility

- Locate your ▪▪*Evacuation Checklist* and place the items in your vehicle.
- Park your vehicle facing outward and carry your car keys with you.▪▪
- Locate your pets and keep them nearby.▪▪
- Prepare farm animals for transport.▪▪
- Place connected garden hoses and buckets full of water around the house.▪▪
- Move propane BBQ appliances away from structures.▪▪
- Cover-up. Wear long pants, long sleeve shirt, heavy shoes/boots, cap, dry bandanna for face cover, goggles or glasses. 100% cotton is preferable.
- Leave lights on in the house - door unlocked.▪▪
- Leave windows closed - air conditioning off.▪▪

The Evacuation Process

1. Officials will determine the areas to be evacuated and the routes to use depending upon the fire's location, behavior, winds, terrain, etc.
2. Law enforcement agencies are typically responsible for enforcing an evacuation order. **Follow their directions promptly.**
3. You will be advised of potential evacuations as early as possible. You must take the initiative to stay informed and aware. Listen to your radio/TV for announcements from law enforcement and emergency personnel.
4. You may be directed to temporary assembly areas to await transfer to a safe location.

If You Become Trapped

While in your vehicle:

- Stay calm.▪▪
- Park your vehicle in an area clear of vegetation.▪▪
- Close all vehicle windows and vents.▪▪
- Cover yourself with wool blanket or jacket.▪▪
- Lie on vehicle floor.▪▪
- Use your cell phone to advise officials – Call 911.▪▪

While on foot:

- Stay calm.▪▪
- Go to an area clear of vegetation, a ditch or depression if possible.▪▪
- Lie face down, cover up.▪▪
- Use your cell phone to advise officials - Call 911.▪▪

While in your home:

- Stay calm, keep your family together.▪▪
- Call 911 and inform authorities of your location.▪▪
- Fill sinks and tubs with cold water.▪▪
- Keep doors and windows closed, but unlocked.▪▪

- Stay inside your house.▪▪
- Stay away from outside walls and windows.▪▪

** Note – it will get hot in the house, but it is much hotter, and more dangerous outside.*

After the fire passes, and if it is safe, check the following areas for fire:

- The roof and house exterior.▪▪
- Under decks and inside your attic.▪▪
- Your yard for burning trees, woodpiles, etc.▪▪

Returning Home

Fire officials will determine when it is safe for you to return to your home. This will be done as soon as possible considering safety and accessibility.

When you return home:

- Be alert for downed power lines and other hazards.▪▪
- Check propane tanks, regulators, and lines before turning gas on.▪▪
- Check your residence carefully for hidden embers or smoldering fires.▪▪

The following information provided by

Useful Resources in Pre Fire and Emergency Planning

CAL FIRE http://www.fire.ca.gov

1. Get a Kit, 2. Make a Plan, 3. Be Informed http://www.readyforwildfire.org/

Making your Family Disaster Plan http://www.ready.gov/america/makeaplan/index.html

Disaster Planning guide template http://ready.adcouncil.org/beprepared/fep/index.jsp

California Emergency Management Agency http://www.calema.ca.gov/

El Dorado County Fire Department http://eldoradocountyfire.com/

City of Placerville http://ci.placerville.ca.us/ (Go to the City Services tab and then scroll down to City Code)

El Dorado County Home Page http://www.co.el-dorado.ca.us/

El Dorado Irrigation District http://www.eid.org/

Builders Wildfire Mitigation Guide http://firecenter.berkeley.edu/bwmg/

Wildfire Preparedness for horse owners http://www.ext.colostate.edu/pubs/livestk/01817.html

California Fire Safe Council http://www.firesafecouncil.org/

El Dorado Fire Safe Council http://www.edcfiresafe.org/index.php

Red Cross - Sacramento/Sierra Chapter http://sacsierraredcross.org/

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Glossary

Term	Definition
Bole	The main stem of a conifer tree, which becomes a log or logs when the tree is cut.
Burning Period	That part of each 24-hour period when fires spread most rapidly, typically from 10:00 AM to sundown.
Canopy Base Height	For a single tree, it is the height from an imaginary line drawn across the trunk at ground level to the bottom of the obvious lowest live foliage. Stated also as the height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire.
Canopy Cover	The ground area covered by tree crowns, or the degree to which the canopy (forest layers above one's head) blocks sunlight or obscures the sky, expressed as a percent of ground area; also referred to as *canopy closer* or *crown cover*.
Crown (Canopy)	The branches and foliage of trees; does not include stems and boles.
Crown (or Canopy) Bulk Density	The weight of the canopy per unit volume. Kg/m3 A mathematical model taken from cruise/forest inventory data using these measurements: tree diameters at chest height, Tree height, ratio of crown height to tree height, and crown width. Species factors are also used, newer inventory methods that just use: species, basel area and stand density.?
Crown Fire	A fire that advances through the canopy of a forest, either as a Passive, Active, or Independent Crown Fire. Effective strategies for reducing crown fire occurrence and severity are to (1) reduce surface fuels, (2) increase height to live crown, (3) reduce canopy bulk density, and (4) reduce continuity or density of the forest canopy
Crown Fuel	Expressed as canopy cover or crown bulk density includes living and dead foliage.
Defensible Fuel Profile Zone	This definition is not really correct, but I'll have to look and see how its defined in type Also referred to as a DFPZ. This is an approximate 1.75 mile radius that is designed to protect improvements from wildland firesaccessible to firefighters (usually along roads) in which fuel loads are light enough to cause approaching crown fires to drop to the ground where it may be successfully attacked by ground forces during 90th percentile weather conditions.

Term	Definition
Fine Fuels	Fuels that ignite readily and are consumed rapidly by fire (for example, cured grass, fallen leaves, needles, small twigs less than 1/4 inch in diameter).
Fire Behavior	Flame length, fire type, tree mortality, fuel loading, and canopy base height are all measures used in understanding fire behavior for current conditions and for evaluating pre- and post-treatment conditions.
Fire Brand	Burning material, such as foliage, that is carried by the wind or fire generated convection, the chance that fire brands will ignite fuels where they land is expressed as Probability of Ignition.
Fire Frequency	The average number of years between fires.
Fire Regime	The kind of fire activity (frequency and intensity) that characterizes a specific region.
Fire Severity	A qualitative term used to describe the relative effect of fire on an ecosystem, especially the degree of organic matter consumption and soil heating. Thus, fires are commonly classed as low, moderate, and high severity. Fire severity may or may not be closely related to fireline intensity.
Fire Type	Fire type is described in four ways. The first type is a surface fire, which burns only the fuels at or near the surface without torching the trees above—this is the desired condition. The second type is the passive crown fire, which torches out individual or small groups of trees as the surface fuels burning under them provide the convective heat to ignite the above-ground fuels. The third is the active crown fire in which fire is spread from tree to tree in conjunction with the convective heat of the surface fuels burning under them. The fourth is the Independent or running crown fire—this is a very rare occurrence in which the fire is spread from tree to tree independent of the burning surface fuels. This type of crown fire requires extreme weather conditions and contiguous heavy tree canopy.
Fireshed Analysis	Fireshed Assessment (SFA) is an interdisciplinary, collaborative process for designing and scheduling fuels and vegetation management treatments across broad landscapes to help natural resource managers balance goals for reducing potential for large, severe wildland fires with other ecological and social goals
Flame Length	The length of flame measured in feet—it is measured from the base of the flame to the tip of the flame. It is an indicator of fire intensity: longer flame lengths increase resistance to control and the likelihood of torching events and crown fires.

Term	Definition
Fuel Arrangement	Describes how fuels are distributed in the fuel bed.
Fuel Bed	The fuels laying on or very near the forest floor, both living and dead, that are available to burn.
Fuel Load/Loading	Green fuels are not included weight/quantity of fuel present at a given site—usually expressed in tons per acre. This value generally refers to the fuel that would be available for consumption by fire. Fuel load and depth are significant fuel properties for predicting whether a fire will be ignited, its rate of spread, and its intensity. Fuel loading can slow the suppression efforts of firefighters if there are large accumulations of dead and down fuel.
Fuels	Anything within the forest that will burn. Usually live and dead woody vegetation.
Fuel Strata	This is the vertical and horizontal continuity and arrangement of the fuel bed.
Fuel Treatment	The process of removal, consumption or rearrangement of naturally or human-created fuels to reduce fire hazard and achieve other resource objectives.
Hazard	When used in fuels management, refers to the existence of a fuel complex that constitutes a threat of unacceptable fire behavior and severity, or suppression difficulty.
Ladder Fuel	A vertical continuity in fuel between the ground and the crowns of a forest stand; shrubs or trees that connect fuels at the forest floor to the tree crowns. Ladder fuels are expressed in feet.
Multilayer	A stand with three or more distinct foliage layers (canopies). Trees in the different layers may or may not be in the same age class.
Problem Fire	The problem fire defines the weather conditions of concern (wind directions, wind speeds, fuel moistures, and expected fire behavior) under which fuels treatments in the fireshed must perform. The location, size, and severity of the problem fire provide the baseline for assessing the extent to which various treatment scenarios change potential large wildfire outcomes..
Rate of Spread	The estimated or observed spread distance of a fire. It is expressed generally in chains per hour (ch/hr).
Stand	A recognizable area of the forest (either a community of trees or other vegetation) that can be managed as a single unit because it is relatively homogeneous (having uniform composition, constitution, age, spatial

Term	Definition
	arrangement or condition) and distinguishable from adjacent communities.
Stand Characteristics/ Attributes	A description of stand characteristics takes into account canopy cover, Crown bulk density,stand structure, and density. Stand structure is a description of the distribution of tree size classes (such as saplings, poles, small trees, etc.) within a stand. Understory and overstory are some other terms that are used in referring to stand structure.
Surface Fire	A fire that burns dead and down woody fuel,, and smaller vegetation with little to no torching of larger shrubs and conifers. Surface fire activity is described with rate of spread, flame length primarily.
Torching (Event)	The envelopment in flame of live or dead branches on a standing tree or group of trees.
Values at Risk	Any or all natural resources, improvements, or other values that may be jeopardized if a fire occurs.
Wildland Urban Interface	Commonly referred to at the WUI (woo-ee). This is an area, or zone, where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. It generally extends out for 1.5 miles from the edge of developed private land into the wildland.