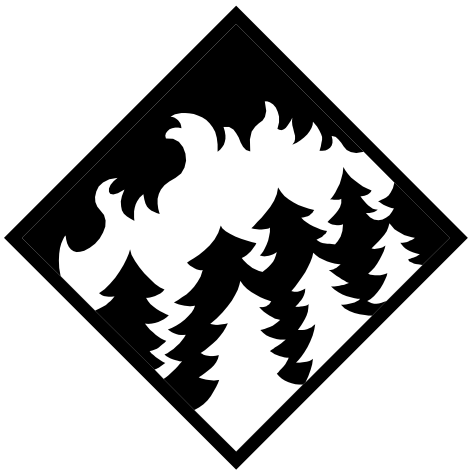
Mitigation Strategies for Reducing Wildland Fire Risks



San Diego County Wildland Fire Task Force
Findings and Recommendations

Report to the Board of Supervisors
August 13, 2003

Table of Contents

EXECUTIVE SUMMARY

On August 13, 2002 (27), at the request of Supervisor Dianne Jacob, the County of San Diego, Board of Supervisors, directed staff to assemble a team of specialists to develop a comprehensive plan for managing wildland vegetation to reduce the severity of wildfires and decrease their impact on residents. Representatives from 24 agencies and organizations have met over the last year, conducting an in-depth analysis of wildland fire issues and developing a comprehensive wildland fire mitigation plan.

The Task Force researched the history and complexities of wildland fires, including weather, topography, fuel (vegetation), multiplicity of owners/managers, wildland-urban interface, and the diseases and pests that can destroy trees weakened by drought. The Task Force members formed subcommittees to analyze major areas of concern and develop wildland fire mitigation recommendations in each area.

The Vegetation Management Subcommittee developed six recommendations regarding annual evaluations of fire risks, defensible space, weed abatement/fuel modification ordinances, grant funding, wildland fire rapid response teams and low cost insurance for prescribed burning.

The Codes and Ordinances Subcommittee developed five recommendations regarding property setbacks, venting and glazing requirements for new construction, weed abatement issues, fire hazards and review of regulatory compliance on County-owned, operated or controlled properties.

The Bark Beetle Management Subcommittee developed two recommendations regarding grant funding for removal of dead and dying trees and establishing priorities for such tree removal efforts.

The Public Education Subcommittee developed four recommendations for education efforts regarding forest health, risks and responsibilities of those living in the wildland-urban interface, defensible space and reactivation of a UC cooperative extension position dedicated to wildland fuel management and education.

INTRODUCTION TO THE WILDLAND FIRE TASK FORCE

The San Diego County Wildland Fire Task Force was formed following the Pines Fire of July/August 2002 to address the continuing wildland fire problem facing the residents of San Diego County. The Pines Fire near Julian was the third largest fire in the County's history, consuming 61,690 acres, destroying 45 structures and damaging 121 structures. It cost an estimated $22.6 million to extinguish.

Following the Pines Fire, the County Board of Supervisors directed staff to assemble a team of specialists from federal, state, and local agencies to develop a comprehensive plan for managing wildland vegetation to reduce the severity of wildfires and decrease their impact on county residents. Topics of specific review included establishing and maintaining firebreaks, performing prescribed burns, clearing hazardous brush, and organizing a "bug crew" to develop a plan to deal with problems associated with the County's bark beetle infestation.

On September 3, 2002, the Department of Agriculture, Weights and Measures sent a letter inviting various agencies and community groups to a meeting on September 18, 2002. A broad base of expertise was recruited including representatives from local, state and federal agencies, as well as members of local environmental groups. Representatives from 24 agencies and organizations attended that initial meeting to provide diverse expertise for an in-depth analysis of wildland fire issues and for the development of a comprehensive wildland fire mitigation plan. (A list of participanting agencies and other stakeholders can be found in Attachment II, and a list of the meetings held is provided in Attachment III.)

Due to the complexities of the issues and the large number of participants, Task Force members divided into subcommittees to develop a full spectrum of strategies that could be used to reduce wildland fire risks in the unincorporated area.

Vegetation Management – Investigate methods of vegetation management including fuel breaks, prescribed burning, mechanical clearing, biological brush control, and chemical brush control.

Codes and Ordinances – Review the existing codes relating to wildfires including building codes and vegetation clearance requirements around structures located in wildland-urban interface areas.

Bark Beetle Management – Investigate methods for bark beetle eradication or control**.**

Public Education – Expand strategies to educate the public on the essential steps for and the benefits of reducing fire risks.

This report of wildland fire issues and mitigation recommendations is generated from meetings held by the full Task Force, subcommittee meetings, and research of the scientific literature regarding the various issues addressed. A glossary of fire-related terms used in this report is provided in Attachment I. A bibliography of the resources utilized in the Task Force's research is shown in Attachment IV.

HISTORICAL PERSPECTIVE

The Natural Fire Regime

Fire is a natural and beneficial part of the Mediterranean ecosystem that makes up the mountains and valleys of San Diego County. Cool wet winters and warm dry summers preclude the rapid decomposition of organic material common in other climates of the world. Here, fire recycles nutrients and stimulates new growth.

Fires in the forests and brush lands of San Diego County have been a recurring part of the ecosystem for thousands of years. Early inhabitants used fire in hunting, for enhancing plant yields, and for insect control, as well as for cooking and warmth. Fires were commonly set by Native Americans to enhance the following year's crop of seeds or to force game from thickets into a hunter's path. Burned areas attracted deer to feed on the tender sprouting plants and provided access for hunting. Fire cleared grounds around villages, minimizing the risk to young children from snakes and became an early form of insect control. Frequent fires set by early residents or lightning provided a natural mosaic of different ages of brush. The mosaic landscape tended to limit the size of fires because young brush is generally less dense and less likely to burn.

Fire Exclusion Practices

Europeans brought a contrasting view of fire to the region. They looked upon fire as destructive -- a force to be prevented, controlled, and suppressed. Europeans considered Native Americans' burning for improving seed production to be wanton destruction of livestock feed, attested to by the following viewpoint.

> *With attention to the widespread damage which results...I see myself required to have the foresight to prohibit...all kinds of burning, not only in the vicinity of the towns, but even at the most remote distances... Therefore I order...to take whatever measures they may consider requisite and necessary to uproot this very harmful practice of setting fire to pasture lands...and in case some burning occurs, they are to try immediately to...stop the fire, or failing that, to direct it into another direction which may result in less damage…"*
>
> *Don Jose Joaquin de Arrillaga, Captain of Cavalry, Interim Governor and Inspector Comandante of Upper and Lower California. Santa Barbara, May 31, 1793.*

By the early twentieth century, fire exclusion was the accepted practice. However, what was seen as a good policy to protect lives and property from fire began to have unexpected consequences. A fire regime of smaller, more frequent fires was being replaced by one of fewer, larger and more intense fires. In spite of advances in wildland firefighting technology and resources, the average number of acres burned annually in San Diego County between 1910 and 2000 remained constant at approximately 25,000 acres. A bar chart of average acres burned, by decade, is shown in Figure 1. A statistical analysis of the trendline found that the slight upward slope of the trendline is not statistically significant.

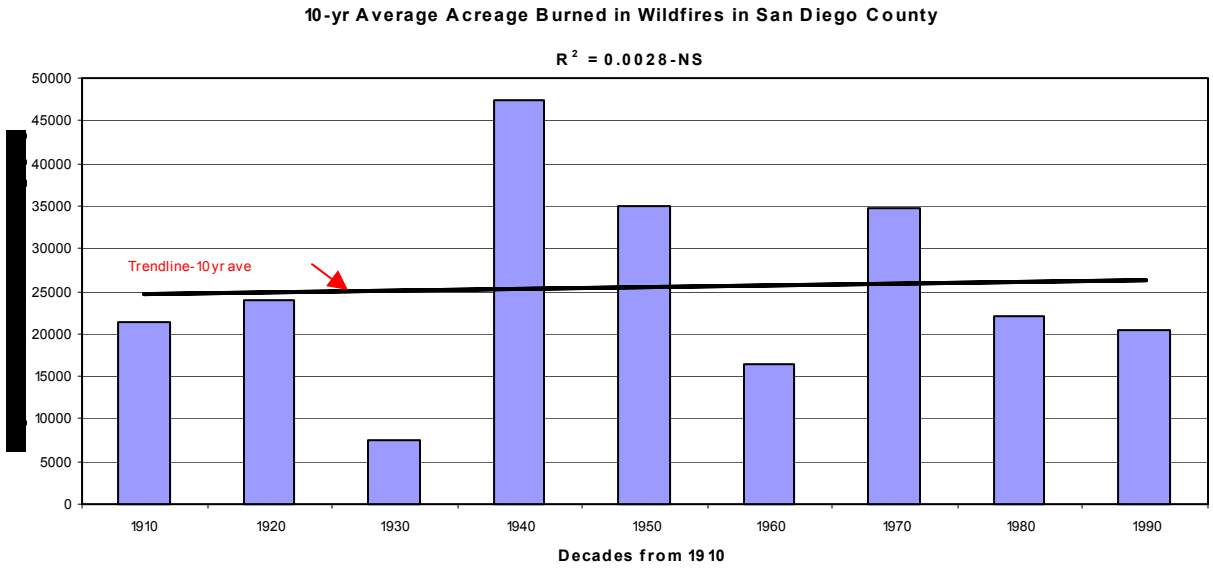


Figure 1. Note: There is no statistical significance to the slight upward slope of the trend line.

The following is a summary of major wildfires that have occurred in San Diego County in recent history. (See Figure 2.)

Examples of Major Wildfires in San Diego County

FIRE NAME	DATE	ACRES BURNED	STRUCTURES LOST	STRUCTURES DAMAGED	DEATHS
Conejos Fire	July 1950	62,000	Not Available	Not Available	0
Laguna Fire	October 1970	190,000	382	Not Available	5
Harmony Fire (Carlsbad, Elfin Forest, San Marcos)	October 1996	8,600	122	142	1
La Jolla Fire (Palomar Mtn)	September 1999	7,800	2	2	1
Viejas Fire	January 2001	10,353	23	6	0
Gavilan Fire (Fallbrook)	February 2002	6,000	43	13	0
Pines Fire (Julian, Ranchita)	July 2002	61,690	45	121	0

Figure 2.

COMPLEXITIES OF WILDLAND FIRE RISK FACTORS

Wildland fire spread is influenced by three primary factors – weather, topography, and fuel. In addition, other factors complicate the issues including diversified responsibility for wildland management, the wildland-urban interface, and destructive insects, diseases and parasites. All of these factors are addressed below.

Weather

Wind and drought are the major weather-related factors that increase wildland fire dangers. Many of the destructive fires of the past 50 years have occurred under fall and winter Santa Ana wind conditions, such as the Laguna/Boulder, the Viejas, and the Gavilan fires. Some fire experts believe that wind is the single most important factor in wildland fires. Dr. Jon Keeley, formerly of Occidental College and now with the National Park Service, describes fires as wind-driven, not fuel-driven, events.

However, many other destructive fires of the past 50 years have burned under normal winds in summertime conditions, such as the Conejos, the La Jolla, and the Pines fires. (See Figure 3.) Some experts assert that another factor, fuel, is demonstrated in these fires. Fuel is discussed below as one of the other factors in the complexities of wildland fire risk.

Conditions	Fire	Year	Acreage
Summer Heat Waves	Conejos	1950	62,000
	La Jolla	1999	7,800
	Pines	2002	61,690
Fall & Winter Santa Ana Winds	Laguna/ Boulder	1970	190,000
	Viejas	2001	10,353
	Gavilan	2002	6,000

Figure 3. Fires under differing climate conditions.

The recent four-year drought has impacted the potential fire problem by increasing the amount of dead fuel in the already dry forests and brush lands. Most vegetation is under stress from lack of water, which makes it vulnerable to attack from beetles and plant diseases.

Many people believe that annual rainfall has a significant impact on fire risks. However, annual winter rainfall has no statistical correlation with wildfire acres burned in the following fire season. (See Figure 4.)

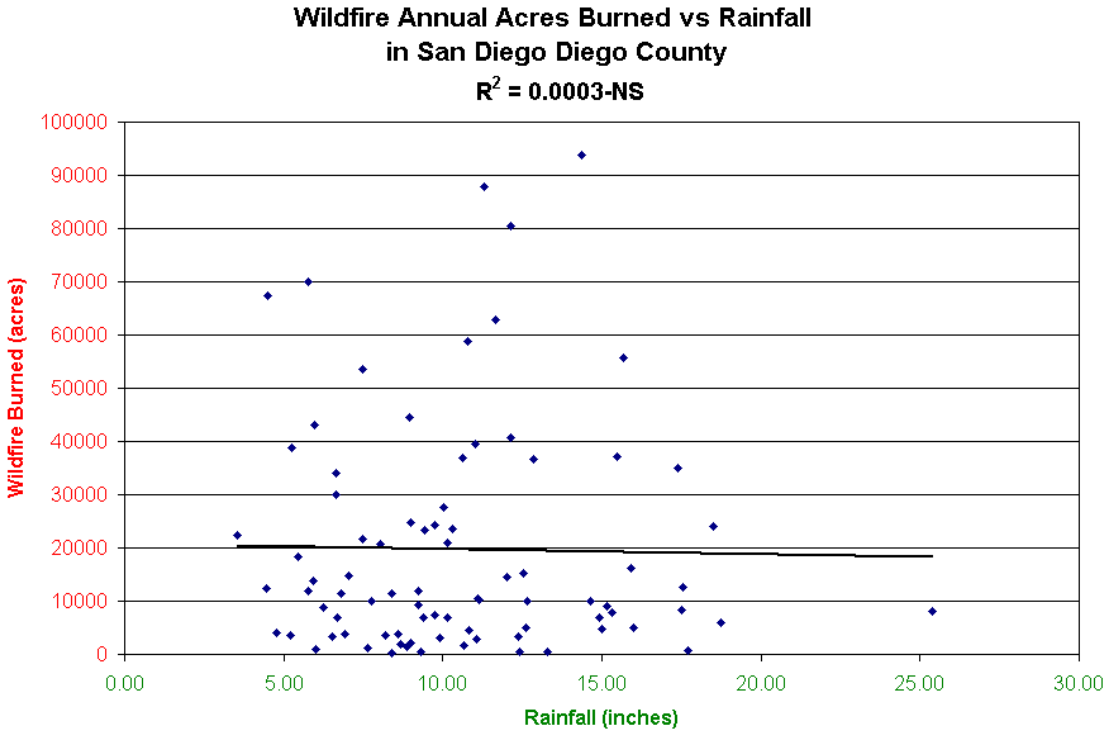


Figure 4.

Topography

Topography, or the "lay of the land," greatly influences fire intensity and the direction of spread. Fires generally spread much faster up hill because convective heat rises, preheating the vegetation ahead. Aspect, or the direction that a slope faces, determines the type and moisture content of the vegetation. South facing slopes are drier and consequently have lighter vegetation than north facing slopes. Therefore, southerly exposures generally burn faster but with less intensity. Canyons and saddles funnel winds, increasing wind speed and consequently increasing fire spread. Consequently, homes built in steep, narrow canyons and at canyon rims face an increased risk from fires.

Fuel

Dr. Jon Keeley, mentioned above, argues that fires are wind driven events and more frequent smaller fires are not ecologically necessary. However, the preponderance of evidence favors fuel as the limiting factor.

Studies conducted by Dr. Richard Minnich of UC Riverside and Dr. Thomas Bonnikson of Texas A&M conclude that fires in pre-European times were more frequent, less intense, and generally burned during the summer. They concluded that the age of fuel was the limiting factor in fire spread.

The vegetation in San Diego County's fire prone area is primarily chaparral with some coniferous forests and oak woodlands. These vegetation types are fire-adapted, that is, they have evolved with fire and require fire to maintain healthy, functioning ecosystems.

During the last century, greater emphasis was placed on fire prevention, and professional firefighting forces continued to improve fire suppression methods. One side effect of those efforts was that the average age of wildland vegetation increased, and as it aged, it became increasingly dense. Recent studies indicate that southern California forests currently have three to ten times the vegetation density that existed 100 years ago. The increase in fuel density adds to the problem of controlling fires because more fuel results in more intense wildfires.

Recently burned chaparral and trees will not carry fire for five years post fire. From six to 20 years, these fuels can burn during extreme weather conditions. From 21 to 50 years these fuels will burn well under normal summer and fall conditions, making strong uphill afternoon runs but generally slowing down at night, allowing fire crews to gain control. After 50 years, the amount of dead branches and shrubs exceeds 50% of the available fuel, resulting in very hot fires, extreme fire behavior, long range "spotting" (throwing off embers ahead of the fire) and increased resistance to control. Add Santa Ana conditions to old fuel and the result is the classic southern California firestorm.

At UCLA, two mathematicians (Peng and Schoenburg) analyzed the Los Angeles Malibu fire regime from a statistical and physics perspective. They were aware of the debate over fuel-driven fires versus wind-driven fires and they concluded that, statistically, fuel was the limiting factor. Their illustration below provides a dramatic illustration of the difference between a landscape shaped with almost no fire suppression activity in Baja California compared to San Diego County's landscape, where highly efficient fire suppression forces are employed. Fires in Mexico rarely exceed 10,000 acres although fire starts are abundant. (See Figure 5.)

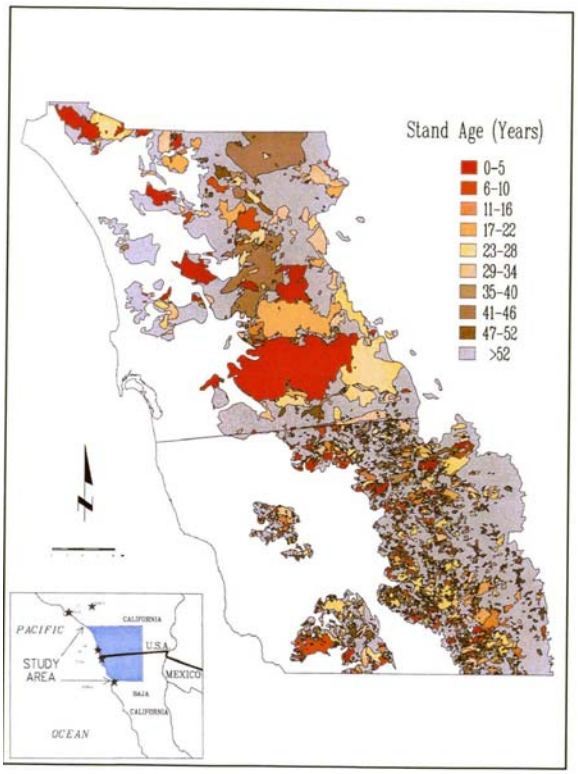


Figure 5. Map comparing fire size of San Diego County and Baja California 1971 (utilizing the most recent comparative data available).

Frequent smaller fires result in a mosaic of differing aged vegetation, so fires become somewhat self-limiting. San Diego's huge areas of aged fuel, on the other hand, can lead to vast acreages burning in a single summertime event like the 61,690 acre Pines Fire of 2002 or the 62,000 acre Conejos Fire of 1950. Santa Ana winds and old fuel can result in conflagrations like the record-setting 190,000 acre Laguna/Boulder Fire of 1970.

Presently, almost one-half of the vegetation in San Diego County's wildland is over 50 years old. Another 30% is over 20 years old. This means that almost 80% of the wildland areas in San Diego will burn

explosively under typical periods of high fire danger. (See Figures 6 and 7.)

San Diego County Fuel Age Classes		
Age	**Wildland Acres**	**Percent of Wildland Acres**
0-20 years	290,508	21.54%
21-50 years	413,113	30.63%
51+ years	645,009	47.83%
Total	1,348,630	100.00%

Figure 6.

Wildland Management Responsibility

One of the significant complexities of wildland management is the multiplicity of owners and land managers. Because land management responsibilities are divided between these groups, effective public education and ongoing interagency coordination are critical for effective fire mitigation efforts countywide.

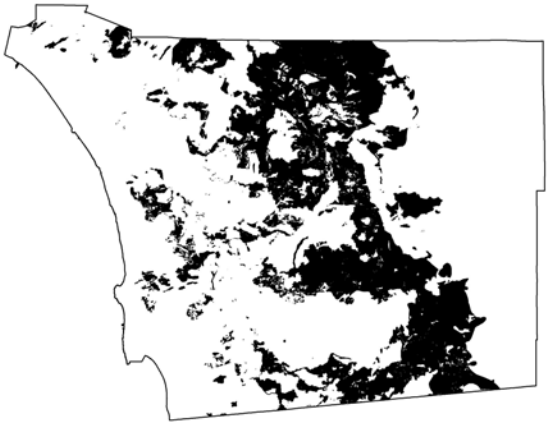


Figure 7. Vegetation older than 50 years.

The chart below shows responsible parties and the number of wildland acres with 50+ year-old vegetation under their control. (See Figure 8.)

Ownership of land with fuels over 50 years old*			
OWNERSHIP	**ACRES**	**SQ_MILES**	**PERCENT**
Private	246,592	384.56	38.23%
U.S. Forest Service	122,205	190.86	18.95%
Tribal Lands	73,213	114.39	11.35%
California Department of Parks and Recreation	66,856	104.46	10.37%
Bureau of Land Management	65,508	102.34	10.16%
Water Districts	26,188	40.78	4.06%
Cities	12,214	18.93	1.89%
Military Reservations (Camp Pendleton, Miramar)	12,242	19.11	1.90%
County Parks and Open Space	12,106	18.84	1.88%
State	4,775	7.46	0.74%
State (CalTrans)	1,126	1.66	0.17%
California Department of Fish and Game	931	1.46	0.14%
U.S. Fish & Wildlife Service	331	0.52	0.05%
Other	720	1.02	0.11%
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Totals	645,009	1006.41	100.00%

Figure 8. * Based on the most recent GIS layer.

The set of four maps below shows the geographic distribution of wildlands with fuel over 50 years old in San Diego County by responsible land manager. (See Figure 9.)

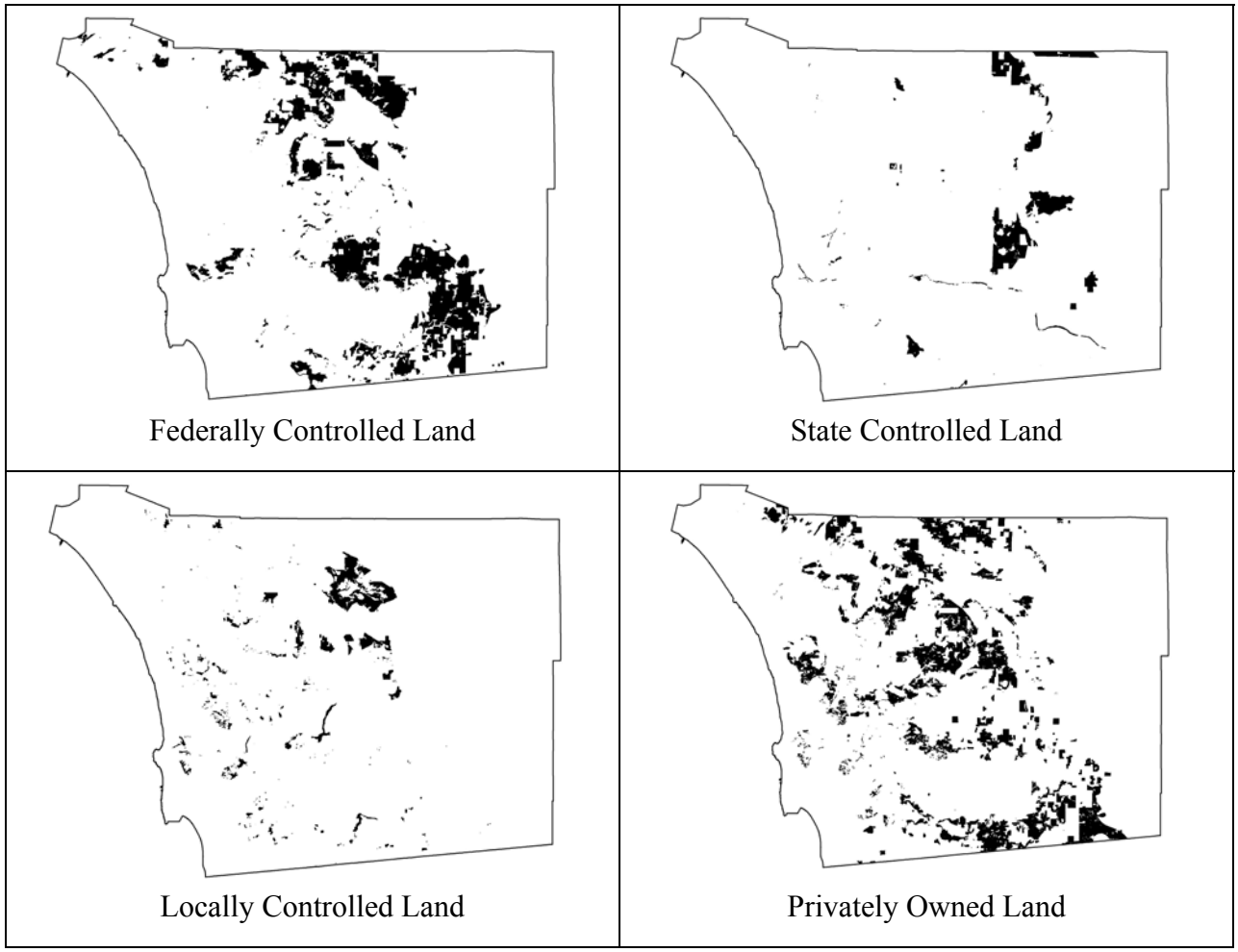

Figure 9. Wildlands with fuel over 50 years old.

Wildland-Urban Interface

The addition of hundreds of new houses each year to "wildland-urban interface" areas adds to the complexity of wildland fire mitigation. These structures may limit the ability of fire managers to pick the most effective location to stop wildland fires and may require firefighters to limit perimeter control activities in order to concentrate on defending homes. The situation is further complicated when homeowners have not maintained an area of reduced vegetation around their homes. This "defensible space" around structures allows firefighters a safe place to operate under the extreme fire conditions that accompany many recent wildfires.

Flammable roofing material is perhaps the most significant factor in the loss of homes in wildland-urban interface fires. Shingles not only catch fire easily, they break free and sail upward to be deposited as fire-starting embers downwind. Conclusions below regarding major factors in wildland-urban fires put flammable roofing material at the top of the lists. Fortunately, building

codes have been updated in recent years to prohibit the wood shingle roofs that caused so many homes to be lost in the past.

Oakland Hills Wildland-Urban Interface Fire Issues in 1923

The state's first wildland-urban interface fire occurred in the Oakland Hills of Berkeley, California in 1923. This fire destroyed 584 structures. In the past 80 years there have been fourteen large-scale fires in the Oakland Hills, eight of them in the same Parkland canyon including the 1991 Oakland firestorm.

After the 1923 fire, a committee was formed to identify the factors that contributed to the structure loss, in an effort to prevent future structure loss in wildland fires. The committee identified six major factors. In order of significance they were:

1. Flammable roofing materials
2. Inadequate clearance between combustible vegetation and structures
3. Extreme wind conditions
4. Inadequate access – narrow winding roads
5. Inadequate water supplies
6. Lack of modern fire fighting equipment

San Diego County Wildland-Urban Interface Fire Issues

The 1970 Laguna Fire was the most deadly and destructive wildland-urban interface fire in San Diego County history. The fire burned 190,000 acres over seven days, killing five people and destroying 382 homes. The more recent 1996 Harmony Grove Fire was also extremely destructive. The fire injured many firefighters and took the life of one resident. It burned 8,600 acres, destroyed 122 residences and damaged an additional 142 residences in less than eight hours. Task Force members agreed that the major reasons for structure loss in both of these fires and other recent fires were:

1. Flammable roofing materials
2. Inadequate clearance between combustible vegetation and structures
3. Extreme wind conditions
4. Inadequate access – narrow winding roads
5. Inadequate water supplies
6. Improper structure design

Comparing this list with the 1923 Berkeley Fire, most of the major factors have remained the same over the 80-year period. Only 1923 factor number 6 has changed from "Lack of modern fire fighting equipment" to "Improper structure design." Over the past 80 years incremental improvements have occurred but the primary problems remain the same.

Insects, Diseases and Parasites

Decades of active fire suppression have created overstocked forests. Four years of drought have weakened those forests, leaving them stressed and at risk for insect attack, disease or parasites. Whereas a healthy tree may be able to recover from these threats, the combination of these destructive agents with drought greatly increases tree mortality. Local forests are riddled with root rot, parasites and at least three different types of bark beetles. In fact, US Forest Service experts estimate that 35% of the trees in San Diego's forests are dead or dying.

VEGETATION MANAGEMENT

This subcommittee agreed that fuel or vegetation management is probably the single most effective tool available to mitigate fires. Prescribed burning, chemical treatment, mechanical treatment, biological treatment, fuel breaks, and defensible space around structures are all forms of vegetation management.

Methods of Reducing Vegetation

Prescribed Burning

Prescribed burning is the intentional introduction of fire, under favorable weather and fuel conditions, in order to remove old vegetation (fire fuel). Some experts believe that prescribed burns, set under carefully monitored conditions, can safely remove old fuel and present a barrier to the spread of wildfire while minimizing erosion potential and improving habitat. However, other experts believe that any man-imposed action upon wildlands is unnecessary and possibly detrimental.

Proponents of prescribed burning observe that in areas with more frequent fires, especially forests and woodlands, vegetation tends to consist of fewer but larger trees, enhancing drought survival capabilities. In addition, some studies have shown that more frequent, smaller, and less intense fires favor animal populations by increasing plant and habitat diversity.

The U.S. Forest Service has successfully conducted prescribed burns on lands north of Pine Valley and on the eastern slopes of Palomar Mountain. However, private landowners sometimes are reluctant to allow projects on their lands due to liability concerns. Therefore, some large beneficial projects are halted because one landowner refuses permission to allow his/her land to be burned.

Currently, in San Diego County, all land management agencies annually perform prescribed burns on less than 3,000 acres total. Proponents estimate 27,000 acres annually would be needed to have a significant impact on the fire situation.

Chemical Treatments

Herbicides have been successfully used to convert some chaparral-covered areas to grasslands and to reduce the understory vegetation load in forests. They may have some use in maintaining clearance around structures and in reducing the cost of maintaining fuel breaks. Herbicides can provide advantageous affects when applied to cut brush stumps to maintain clearance around structures. However, the policies of many land management agencies preclude pesticide use in quantities large enough to have any significant impact on the overall fuel problem.

Mechanical Treatment

Mechanical methods of vegetation management include bulldozing, crushing, chaining, large brush crushers, other specialized devices, and hand clearing. Many of these methods rely on burning the crushed brush in the winter during periods of damp weather. Hand cutting or "chipping," with the chips being reapplied to the site, is feasible for small areas but

becomes prohibitively expensive on large projects.

Biological Treatment

Goats, sheep, and cattle have been suggested for years as a means of reducing the fuel load, especially near developed areas. Cattle and sheep are an economical and effective method of reducing the annual grass crop, but they do not eat chaparral. Grazed lands are less likely to ignite and the intensity and spread-rate of fires are greatly reduced. However, history has shown that the chaparral and forest fire regime is driven by the age of the fuel rather than ignition sources.

Fuel Breaks

Fuel breaks are generally strips of land many miles long and 200 to 400 feet across where the vegetation is greatly reduced but not completely removed. They are designed to be places where a fire's intensity will be greatly reduced, giving fire fighters an opportunity to halt its progress. Fuel breaks may be covered in grasses and low growing shrubs found in chaparral. Within a forest, they may be constructed by removing the lower branches of trees and clearing the understory vegetation.

Fuel breaks can be helpful as locations to control prescribed burns or wildfire flanks. However, they have not proven particularly successful in directly stopping wind or fuel-driven fires, since these fires spread by throwing embers up to ½ mile in front of the flame front, starting new "spot" fires.

Following World War II, great emphasis was placed on constructing fuel breaks as a proactive way to limit the size of wildfires. In the 1960s, the Sunrise Fuel Break was constructed from Banner Grade to Cuyamaca Lake to protect Julian. Due to costs and development, this fuel break is no longer maintained. At this time, only one fuel break is being maintained, the International Fuel Break, which lines the American side of the border from Otay Mountain to Jacumba. This provides an opportunity to halt fires at the International Border.

The fuel break system was envisioned as a grid so that fires would be limited in size by running into a break where they would be controlled. Fuel breaks proved helpful along the flanks of a fire but were not effective in stopping the frontal assault of a wildfire, where the fire-building effects of topography and prevailing winds overcame the limiting effects of the firebreaks. Fuel breaks are labor intensive and, therefore, expensive. In recent years wildland agency monies have been directed away from fuel breaks toward prescribed burning across large tracts of old fuel or vegetation.

Defensible Space

Inadequate clearance around structures has been repeatedly identified as a major factor in the destruction of homes in wildfires. Defensible space is an area around a structure where vegetation is treated, cleared or reduced to slow the spread of wildfire toward the structure. The reduced volume of fuel results in a reduction in fire intensity, allowing fire fighters to remain with the structure during a wildfire.

Recommendations for adequate defensible space vary depending on factors such as proximity to wildland vegetation, type and age of the wildland vegetation and slope of the land. Within San Diego County, most

jurisdictions require a fire "clearance" area around homes. Clearance is defined as the removal of native shrubs and grass within 30 feet of a structure. Irrigated ornamental plants are allowed within the 30-foot clearance zone. Most jurisdictions also require trimming, pruning, mowing, and selective removal of non-irrigated shrubs in the area between 30 and 100 feet from the structure, which is called the fuel modification zone. Figure 10 shows the 30-foot clearance zone and the 100-foot fuel modification zone. This drawing illustrates the required clearance zones around a house.

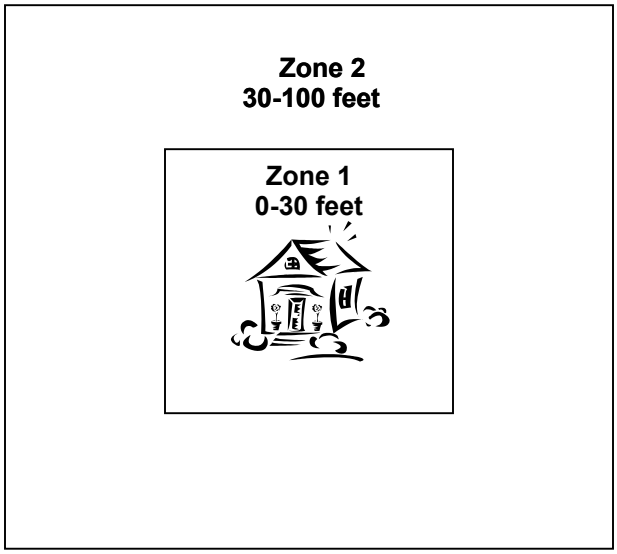

Figure 10. Defensible Space

Unfortunately, many homeowners ignore the need for defensible space, because they misunderstand the "clearance" concept. They believe it to mean the complete removal of any vegetation on the land around their homes. Other homeowners do not want to touch any native vegetation for environmental or aesthetic reasons. Other homeowners do not have the time or money to remove and dispose of vegetation, which could involve costly tree trimming and landfill charges. Prescribed burning is a less costly option for creating defensible space, but smoke can be a nuisance, especially in the more densely populated areas.

Chipping

Chipping is the mechanical reduction of large vegetation into small pieces. Chipping the brush and returning the chips to the area is an ecologically sound method of disposal. Chippers are complex and potentially dangerous machines that require a skilled operator. They are also expensive, and are not generally available at rental yards.

In February 2002, the Fire Safe Council, in cooperation with the Resource Conservation District of Greater San Diego, began to provide a free residential chipping service, funded by a federal grant from the Bureau of Land Management. The response was overwhelming and they could not begin to meet the demand. Over 640 sites, a total of 3,300 acres, were chipped. The cost was $208,513 or about $325 per site. The majority of the chipping was done by a contractor with paid crews. Chip disposal was not a problem. Most residents wanted the chips spread on their property for erosion control and/or mulch. In the few instances where the owner did not want the chips, neighbors were more than happy to accept them.

The Fire Safe Council's pilot chipping program revealed several issues. Scheduling chipping crews over the entire county was an enormous task. Limited staff made it impractical to prioritize locations based on need, fire danger, and other factors, so crews were dispatched on a first call, first serve basis. Many residents were disappointed when they called for a chipper, only to find out that the program had expended the grant and could not respond to their needs.

One of the lessons learned from the pilot program is to prioritize the limited chipper availability based on risk factors. Local fire districts or the local wildland agency would be better positioned to set community priorities for chipping services.

Options for future chipping programs include:

- Purchasing chippers with grant funds for individual fire districts or community-based groups. Issues of operator training and liability would need to be addressed if the machine were not operated by district personnel.

- Using grant funds to contract with private companies to provide community "chipper days." Days would be scheduled, community groups and members notified, and residents would cut and stack for chipping ahead of time.

- Developing and implementing a system of partial cost sharing, with residents paying a portion or all of the costs. Government would provide the service directly or with contracted help, charging on a cost recovery basis. Economies of scale would allow efficient use of resources, reducing costs to residents. Reduced costs may encourage residents to maintain their vegetation in a fire-safe manner.

- Some combination of all of the above could be implemented. San Diego County is diverse geographically and biologically. One method that would work in a mountain community may not be successful in an inland valley community.

Recommendations

Recommendation 1. At the end of each fire season, evaluate the status of fire risks for San Diego County, and as appropriate, prepare a status report of mitigation efforts accomplished in the prior year for the Board of Supervisors.

Recommendation 2. Continue to enforce legal requirements for defensible space (fuel modification zones) around structures.

Recommendation 3. Develop model weed abatement and fuel modification ordinances for existing structures located in wildland areas.

Recommendation 4. Continue to seek grant funds for chipping while exploring the various cost-saving chipping program options listed above.

Recommendation 5. Research options for providing low cost insurance to cover landowners who allow prescribed burning on their lands.

Recommendation 6. If wildland fire damages personal property, continue to assist residents whose property has been damaged or destroyed by providing a rapid response multi-departmental damage assessment team.

CODES AND ORDINANCES

County codes relating to wildfires include building codes and vegetation clearance requirements around structures located in areas of wildland-urban interface.

The wildland-urban interface fire problem is a national, state, and county issue. Local regulatory agencies must meet state and federal mandates and standards for issues ranging from biological preserves to fire protection. However, the issues are different from area to area. To resolve the wildland fire problem, the regulatory codes and standards must address the issues for the specific areas where they are enforced.

San Diego County has been a leader in both the state and nation regarding wildland–urban interface fire safety. Board actions in 2001 and 2002 have fostered strategic partnerships with the stakeholders of the region and a wide range of improvements have been realized. San Diego County continues its longstanding effort to upgrade regulatory codes and standards as they relate to fire. (See Figure 11.)

Regulatory Codes And Standards Improvements

YEAR	REGULATORY CODE /STANDARD
1991	Adopted County Fire Code - Revised every 3 years.
1996	Adopted County Building Code - Class "A" roof requirement
1997	Approved Memorandum of Understanding between county fire agencies and wildlife agencies.
1998	Developed "Fire, Defensible Space and You" brochure.
	Developed list of suggested plants for fire-prone areas and added to county website: http://www.sdcounty.ca.gov/cnty/cntydepts/landuse/plantlist.html.
1999	Updated San Diego County fire-related standards for private roads – Increased access width from 20 to 24 feet and reduced grade from 25% to 20%.
	Established 100-foot fuel modification zone around structures and a variable width fuel modification zone along county roads.
2000	Completed the LAFCO fire response standards for the unincorporated area of San Diego County.
2001	Ratified Consolidated Fire Code incorporating Ordinances of the 17 Fire Districts in San Diego County.

Figure 11.

Recommendations

Evaluate for amendment of county codes and standards as follows:

Recommendation 1. Review the County's Zoning Ordinance for all setbacks on large parcels and setbacks from edge of slopes to structures.

Recommendation 2. Review the County's Building Code. Recent fires have highlighted some deficiencies in the venting and glazing requirements for new construction.

Recommendation 3. Review and update the County's Weed Abatement Ordinance to mirror standard Fire Districts' ordinances.

Recommendation 4. Evaluate feasibility of a new ordinance or revisions to existing weed abatement ordinance to declare dead or substantially dead orchards, groves, vines, and trees as fire hazards.

Recommendation 5. Review existing County-owned, operated, or controlled properties for compliance with existing regulatory codes and standards for wildland fire protection.

BARK BEETLE MANAGEMENT

In November 2002, the County Board of Supervisors declared that a state of emergency existed in the forested areas of San Diego County due to the risk to lives and property from the overwhelming number of dead and dying trees. Similar declarations were made in Riverside and San Bernardino Counties. In March of 2003, the Governor declared that a state of emergency exists in these southern California counties.

In researching the possibilities for eradicating bark beetles, the Task Force learned that, according to U.S. Forest Service health experts, bark beetles are native, usually present, and only abundant now because of the large number of dying trees available for colonization. According to forest health experts, a bark beetle infestation is a symptom of an unhealthy forest, not the cause. The Task Force, therefore, concluded mitigation efforts should focus on the removal of dead and dying trees.

The USDA Natural Resource Conservation Service, in cooperation with the County of San Diego, has applied for a $30 million watershed protection grant for emergency tree removal. Similar applications were filed in Riverside and San Bernardino Counties. Awards for these grants are expected by the end of 2003.

In response to the declared State of Emergency in San Diego, Riverside and San Bernardino due to bark beetles, drought and other conditions, the U.S. Senate has approved $25 million for emergency actions to reduce the danger of catastrophic fire from dead and dying trees. The funds are to go toward clearing of evacuation routes, clearing around emergency shelter locations, clearing around emergency communication sites and clearing buffer zones around highly populated communities in order to prevent fire from sweeping through such communities.

After months of research and discussion by members of the Bark Beetle Management Subcommittee, in June 2003, the California Department of Forestry sponsored the formation of the San Diego Forest Area Safety Task Force (FAST). To avoid duplication of effort, members of the County Bark Beetle Management Subcommittee agreed to merge into FAST.

Recommendations

Recommendation 1. Continue to seek additional grant funding to remove dead and dying trees.

Recommendation 2. Establish a set of priorities for tree removal efforts emphasizing public safety factors such as maintenance of mass evacuation and emergency response routes, protection of emergency communication infrastructure, etc.

PUBLIC EDUCATION

This subcommittee explored public education concerns, because almost 40% of San Diego's wildlands with 50+ year-old fuel are privately owned.

The need for public education regarding wildland fire issues is not unique to San Diego. In 2001, the U.S. Congress directed the Secretaries of the Interior and Agriculture to work with the nation's Governors to develop a strategy for reducing wildland fire risks to communities. A 10-year comprehensive strategy developed from that directive, recommending a collaborative approach to reducing wildland fire risks. The comprehensive strategy includes the following action items:

- Promote public knowledge and understanding of wildland fire, including risks and the role of fire in natural ecosystem processes.

- Increase incentives for private landowners to address defensible space and fuels management needs on private property through local use policies.

Rural Migration

As people migrate from cities to rural areas, they bring with them expectations of city-type infrastructure and support services. Many do not realize the role of fire in the natural ecosystem around them and the increased need for personal responsibility relating to fire in wildland-urban interface areas. They often do not understand that their homes and possibly their lives are at stake. The public needs to understand that creating survivable homes and protecting the environment in a wildland-urban interface area is a partnership between fire agencies and homeowners, a partnership that requires not only homeowner participation but also financial commitment.

Defensible Space

The County has produced a brochure entitled, "Fire, Defensible Space, and You" that provides local residents important information on how to landscape in a fire-safe manner. The term "defensible space" describes an area where the vegetation is planned or modified to act as a barrier to an advancing fire.

Currently, the 100-foot standard for defensible space around wildland structures is uniform throughout the unincorporated area. In the past, differing standards have contributed to public confusion over defensible space. Historically, the 17 fire districts in San Diego County had varying standards for defensible space clearance. Some required 30 feet, some 50 feet some 60 feet and others 100 feet of clearance. Therefore, residents received a mixed message in newspapers, television news and public service announcements. Often, residents would take recommended action and then find out that their efforts did not meet the local standard. In 1999, fire districts arrived at an agreed upon standard of 100 feet of defensible space, removing much of the confusion. However, the California Department of Forestry and Fire Protection maintained a standard of 30 feet defensible space until 2002. Continuing public education is needed to ensure all residents are aware of the 100-foot standard.

Many fire districts have an effective enforcement program for defensible space. They regularly inspect properties, issue notices of non-compliance and contract for

clearance on non-compliant properties. Fire district ordinances give them the authority to clear properties that do not comply with the 100-foot standard and then add the cost of clearance to the owners' property tax bills. However, some geographically large fire districts do not have adequate staffing to conduct needed inspections. Therefore, public education is needed to convey to homeowners that creating defensible space is in their own best interest.

Vegetation Management

San Diego's concentrations of old wildland vegetation (fire fuel) pose a significant danger to rural and wildland interface communities. Public education is needed to ensure the public understands that old, dense vegetation becomes stressed, diseased, and dying vegetation, which, if ignited, fuels explosive wildfires. It is hoped that an informed public will voluntarily increase vegetation management efforts. As public policy makers move toward promoting the environmental benefits and cost efficiencies of prescribed burning, public education is also needed to offset misconceptions caused by the rare but sensational media stories of prescribed burning gone awry.

Bark Beetle

There is also a critical need to educate the public to ensure they understand that once a tree's needles turn brown from a bark beetle infestation, the infested tree will not survive. Some homeowners have objected to the prompt removal of infested trees, because the tree still showed signs of life. Failure to remove all bark beetle infested trees at the same time drives up the mitigation costs and prolongs wildfire risks for that property and neighboring properties.

Following the Laguna fire of 1970 that burned 190,000 acres, the University of California Cooperative Extension created a fulltime position to address wildland fire issues and develop an education program for citizens and land managers. Unfortunately, that position was vacated during the 1991 budget dilemma and was never reactivated. Since 1991, the need to manage the wildlands for public safety and the obligation to comply with the myriad environmental laws and regulations has become much more complex.

Recommendations

Recommendation 1. Promote educational efforts to inform the public about forest health issues.

Recommendation 2. Support public education efforts by citizen based groups such as the Fire Safe Councils to increase the level of public and government understanding of the risks of living in the wildland-urban interface and their responsibilities in protecting their property.

Recommendation 3. Expand efforts to educate the public regarding the benefits of and guidelines for defensible space.

Recommendation 4. Prepare a request to the University of California Cooperative Extension to reactivate the position dedicated to wildlands fuel management and education.

SUMMARY OF RECOMMENDATIONS

The following recommendations have been made by the **Vegetation Management Subcommittee** of the Task Force:

Recommendation 1. At the end of each fire season, evaluate the status of fire risks for San Diego County, and as appropriate, prepare a status report of mitigation efforts accomplished in the prior year for the Board of Supervisors.

Recommendation 2. Continue to enforce legal requirements for defensible space or fuel modification zones around structures and seek a minimum distance of 100 feet.

Recommendation 3. Develop model weed abatement and fuel modification ordinances for existing structures located in the wildland areas.

Recommendation 4. Continue to seek grant funds for chipping while exploring the various cost-saving chipping program options listed above. (Options are listed on page 15 of this report.)

Recommendation 5. Research options for providing low cost insurance to cover landowners who allow prescribed burning on their lands.

Recommendation 6. If wildland fire damages personal property, continue to assist residents whose property has been damaged or destroyed by providing a rapid response multi-departmental damage assessment team.

The following recommendations have been made by the **Codes and Ordinances Subcommittee** of the Task Force:

Evaluate for amendment county codes and standards as follows

Recommendation 1. Review the County's Zoning Ordinance for all setbacks on large parcels and setbacks from edge of slopes to structures.

Recommendation 2. Review the County's Building Code. Recent fires have highlighted some deficiencies in the venting and glazing requirements for new construction.

Recommendation 3. Review and update the County's Weed Abatement Ordinance to mirror standard Fire Districts' ordinances.

Recommendation 4. Evaluate feasibility of a new ordinance or revisions to existing weed abatement ordinance to declare dead or substantially dead orchards, groves, vines, and trees as fire hazards.

Recommendation 5. Review existing County-owned, operated, or controlled properties for compliance with existing regulatory codes and standards for wildland fire protection.

The following recommendations have been made by the **Bark Beetle Subcommittee** of the Task Force:

Recommendation 1. Continue to seek additional grant funding to remove dead and dying trees.

Recommendation 2. Establish a set of priorities for tree removal efforts emphasizing public safety factors such as maintenance of mass evacuation and emergency response routes, protection of emergency communication infrastructure, etc.

The following recommendations have been made by the **Public Education Subcommittee** of the Task Force:

Recommendation 1. Promote educational efforts to inform the public about forest health issues.

Recommendation 2. Support public education efforts by citizen based groups such as the Fire Safe Councils to increase the level of public and government understanding of the risks of living in the wildland-urban interface and their responsibilities in protecting their property.

Recommendation 3. Expand efforts to educate the public regarding the benefits of and guidelines for defensible space.

Recommendation 4. Prepare a request to the University of California Cooperative Extension to reactivate the position dedicated to wildlands fuel management and education.

ATTACHMENTS

Attachment I

Glossary

Defensible Space. An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources.

Fire Break. Any natural or constructed discontinuity in a fuelbed utilized to segregate, stop, and control the spread of fire or to provide a control line from which to suppress a fire.

Fuel. Any vegetation (including ornamental) that will burn during a wildfire, including grass, brush, trees, and structures.

Fuel Break. A fuel break is generally a strip of land many miles long and 200 to 400 feet across where the vegetation is greatly reduced but not completely removed.

Prescribed Burn: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and National Environmental Policy Act (NEPA) requirements must be met, prior to ignition.

Santa Ana Winds. Warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California. Santa Ana winds often blow with exceptional speed. Forecasters usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots (28.8 mph).

Spotting. Embers generated from an intense wildfire are carried up in the smoke column and dropped back to earth in front of the main fire body, starting new “spot” fires.

Wildland-Urban Interface. That line, area, or zone where structures and other human development meet, or intermingles with undeveloped wildland or vegetative fuels.

Attachment II.

Participating Agencies and Other Stakeholders

The following agencies and other stakeholders participated in the Wildland Fire Task Force:

California Department of Fish and Game
California Department of Parks and Recreation
California Department of Forestry and Fire Protection
California Native Plant Society
City of Carlsbad, Fire Department
City of San Diego, Fire Department
County of San Diego, Air Pollution Control District
County of San Diego, Board of Supervisors, District 2 (Dianne Jacob)
County of San Diego, Board of Supervisors, District 5 (Bill Horn)
County of San Diego, Department of Agriculture, Weights and Measures
County of San Diego, Department of Parks and Recreation
County of San Diego, Department of Planning and Land Use
County of San Diego, Department of Public Works
County of San Diego, Office of Emergency Services
East County Fire Protection District
Fire Safe Council - San Diego
The Nature Conservancy
North County Fire District
Palomar Mountain Volunteer Fire Department
San Diego County Fire Protection Districts Association
San Diego Gas and Electric
San Diego County Fire Chiefs Association
California State Senate District 38 (Bill Morrow)
Resource Conservation District of Greater San Diego
US Border Patrol – San Diego Sector
US Department of Agriculture, Forest Service, Descanso District
US Department of Agriculture, Forest Service, Palomar District
US Department of Agriculture, Natural Resource Conservation Service
US Department of Defense, Naval Facilities Engineering Command
(Camp Pendleton and Miramar)
US Department of Interior, Bureau of Land Management
University of California Cooperative Extension
Watershed Fire Council of Southern California

Attachment III.

Meetings

September 18, 2002	General Meeting
October 12, 2002	Education Subcommittee meeting
October 16, 2002	Vegetation Subcommittee meeting
October 30, 2002	Vegetation Subcommittee meeting
October 31, 2002	Codes and Ordinances Subcommittee meeting
October 31, 2002	Education Subcommittee meeting
November 18, 2002	Education Subcommittee meeting
November 20, 2002	Vegetation Subcommittee meeting
December 17, 2002	Codes and Ordinances draft report
January 8, 2002	Tri-County Bark Beetle meeting
January 16, 2003	Bark beetle meeting with State Office of Emergency Services
January 22, 2003	Bark beetle meeting –Temecula
January 30, 2003	Tri-County Bark Beetle meeting
February 12, 2003	Education committee draft report
February 26, 2003	Bark beetle meeting with Riverside and San Bernardino County
March 5, 2003	Beetle meeting with OES, Riverside. & San Bernardino
April 9, 2003	Beetle meeting -Mt Laguna
April 10, 2003	Beetle meeting- CDF, NRCS, and 2nd District Supervisor's staff
April 15, 2003	Emergency Watershed Protection Grant
May 14, 2003	Beetle Subcommittee Meeting
June 19, 2003	F.A.S.T. meeting
July 24, 2003	F.A.S.T. meeting

Attachment IV.

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