REVIEW OF THE CITY OF BENICIA
WILDLAND URBAN INTERFACE ISSUES

LEADING COMMUNITY RISK REDUCTION

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Appendices Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.dhs.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.
ABSTRACT

This research project reviewed the City of Benicia Wildland Urban Interface (WUI) issues. The problem is that the number of homes built in the Wildland Urban Interface (WUI) areas within the City of Benicia has over doubled over the last 20 years. Although fire protection measures for homes in these areas are in place, there is not a formal WUI plan developed to deal with fire protection needs specific to homes constructed in WUI areas.

The purpose of this applied research project was to identify the WUI areas within the City of Benicia and provide the necessary information so a formal WUI plan could be developed and implemented. Ultimately, the research was a proactive step to mitigate the hazards and significantly decrease the potential of a catastrophic event.

A descriptive research methodology was used to: determine the availability of resources used to evaluate WUI areas, review what involvement the insurance industry has on WUI issues, review the essential elements necessary to develop a WUI plan, review the costs and political aspects of implementing a WUI plan, and to identify the WUI areas and mitigation efforts used by the City of Benicia.

The procedures used included reviews of articles, publications, standard operating procedures, evaluation tools, and City policies. Interviews were conducted with fire and business professionals to gain valuable insight on the WUI planning process. The results revealed the need to establish a formal WUI plan using a well thought out methodical approach.

The recommendations of this research included: updating the Fire Department Management team, updating the Fire Department base map, planning and implementing a pilot-grazing project, conducting education processes with the City Manager and key community leaders, and initiating a formal community Wildland Urban Interface plan.
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INTRODUCTION

The City of Benicia is a General Law City, located in the Southwest portion of Solano County, California. The City employs 212 full time employees in 11 major departments; Administration, Finance, Parks and Community Services, Fire, Police, Human Resources, City Attorney, City Clerk, Library, Public Works, and Community Development according to City of Benicia Human Resources (2004).

The City of Benicia Fire Department is a full service organization. It provides structural and wildland fire suppression, fire prevention, community service, fire based non-transport advanced life support, and fire based technical rescue services.

The problem is that the number of homes built in the Wildland Urban Interface (WUI) areas within the City of Benicia has over doubled over the last 20 years. Although fire protection measures for homes in these areas are in place, there is not a formal WUI plan developed to deal with fire protection needs specific to homes constructed in WUI areas.

The purpose of this applied research project was to identify the WUI areas within the City of Benicia and provide the necessary information so a formal WUI plan could be developed and implemented. Ultimately, the research is a proactive step to mitigate the hazards and significantly decrease the potential of a catastrophic event.

A descriptive research methodology was used to assist in answering the following questions:

Question 1. What resources are available to evaluate WUI areas?
Question 2. What impact does the insurance industry have on WUI areas?
Question 3. What essential elements are required in the development of a WUI plan?
Question 4. What are the fiscal impacts of implementing a WUI plan?
Question 5. What are the political impacts of implementing a WUI plan?

Question 6. What areas within the City of Benicia qualify as WUI areas?

Question 7. What existing programs does the City of Benicia utilize to mitigate the issues associated with its WUI areas?

BACKGROUND AND SIGNIFICANCE

In 1984, there were approximately 16 identified areas in the City of Benicia that could have been considered WUI areas, increasing to 23 in 1994. In 2004, there were 36 identified WIU areas. While the overall number of wildland responses has not dramatically increased, the number of responses in WUI areas has tripled in the last 20 years (G.Gantt, personal interview August 18, 2004).

Coupled with the encroachment of homes in the open spaces, three specific incidents over the past three years have caused the Benicia Fire Department to take a closer look at the mitigation efforts. First, a quarter acre vegetation fire next to a freeway caught a shake shingle roof on fire. The fire started as a small roadside vegetation fire and quickly engulfed dead dry bushes to the rear of the residence. The fire was on the rooftop by the time the first units arrived, within four minutes. Second, a one-acre vegetation fire on a hillside caught a shingle roof on fire. The fire was on a steep slope when the first fire unit arrived. According to the first officer on scene, the fire progressed from the base of the hill to the top of the roof within two minutes. There was significant damage to the second story of the house. Third, an amateur rocket started a vegetation fire, which engulfed 50 acres. The fire caught a shake shingle roof on fire, which was quickly brought under control by a firefighting helicopter. Resources from over 12 separate agencies were utilized to combat the fire. Vegetation fires are not uncommon in the City of
Benicia. However, the surge in responses to WUI areas in our community needs to be addressed (K. Hanley, personal interview June 8, 2004).

Since the amount of people living in WUI areas in City of Benicia have substantially changed over the past 20 years (G.Gantt, personal interview August 18, 2004), the next logical step was to assess the problem and prepare for the development of a plan. The information gathered in this research will be used in the development of the plan.

The results of this research will have a significant impact on the community by providing the critical information necessary to proactively develop a WUI plan for the City of Benicia. This research project was completed according to the applied research requirements of the National Fire Academy’s Executive Fire Officer Program. The problem addressed by this research related to Unit 1 of the Leading Community Risk Reduction (LCRR) course, “Getting Ready” (NFA, 2003), and Unit 2 of the LCRR course, “Assessing Community Risk” (NFA, 2003). The curriculum is designed “to enhance the skills needed by an executive fire officer to implement and lead a community risk-reduction process initiative” (NFA, 2003, p.SM 0-15). To that end, there is a direct correlation between the planning and implementation of a WUI plan and the skills taught and reinforced in the LCRR course.

LITERATURE REVIEW

For the literature review, the author started with an overview of the Firewise Website. On-line research was conducted from the National Fire Academy’s Learning Research Center (LRC), and from other Internet sources for the purpose of locating and reviewing current journal articles, prior research, and general information on the subject. City officials were interviewed to gain a clear understanding of any current WUI mitigation efforts being utilized. Finally,
interviews, both in person and by telephone, with experienced public and private business professionals were conducted to gain critical insight on WUI issues, trends, and practices.

The literature review will expand on local and National WUI issues; the required preparation for the development of a WUI plan, insurance company involvement, education, plan development, and mitigation programs.

Locally

Deputy Chief Gene Gantt has been the Fire Marshal in the City of Benicia for over twenty years. He indicated that the City of Benicia spends $75,000 per year on WUI mitigation. Since most of the problem areas are at the edge of large annual grass areas, or open spaces, the border of those areas is disced under four to twelve feet wide, depending on the location. $74,000.00 per year is spent on discing services while the remaining $1,000 is used for public education. The purpose for discing is to decrease the fuel load between the open space and private property. In addition, it provides reasonable access to fire department equipment and adds to the defensible space behind structures. Small access roads are present allowing a route of travel to many of the open spaces. However, topography, limited maintenance, and the encroachment of homes, particularly in the past 10 years, have made their use more difficult. The local newspaper prints an annual notice kicking off the dry season. In addition, from time to time, wildland fire safety information will show up in an employee newsletter (G. Gantt, personal communication, August 18, 2004)

Providing a historical perspective, Deputy Chief Gantt indicated that over the past 20 years several attempts to increase awareness in the WUI areas has not been successful. Staffing issues and budget shortfalls were cited as the primary concerns. In addition, there were very few homes in WUI areas compared to today. Fifteen years ago a public awareness program was
attempted but suffered major setbacks due to lack of funding and program oversight. Twenty-one years ago key parts of the open spaces were sprayed with herbicide in an effort to decrease the fire problem. However, council action due to citizen concerns halted the use of herbicide citing long-term environmental issues as the main concern (G. Gantt, personal communication, August 18, 2004).

Deputy Chief Tessier has been the Operations Chief in the City of Benicia for over 21 years. He indicated that in the mid 1980s shake shingle roofs were popular in the City. They were a significant concern at the time with major residential construction taking a foothold in the WUI areas. In the mid 1980s, the City of Benicia enacted an ordinance banning shake single roofs. Six months later the using of fireworks within the City limits was banned. Unfortunately, says Tessier, a significant number of houses were built prior to the ordinance. Although a number of residents replaced the shake shingle roofs with composition or tile roofing, there are still enough shake shingle roofs in the WUI areas to cause concern. Several homes in the WUI areas over the past few years sustained significant damage due to fire on shake shingle roofs (M.D. Tessier, personal interview, August 18, 2004)

With over 35 years of experience in the fire service, Jim Murphy is now a retired Deputy Chief for the United States Forest Service (USFS), State of Washington Branch. As a resident of Benicia for over 20 years, Murphy feels the WUI issues in Benicia are not as complex as those in forested areas or areas covered with chaparral or chemise. However, he was quick to point out that given the right set of circumstances, the results from wildfire in Benicia’s open spaces could be just as devastating. Benicia has houses built at the top of chutes and chimneys, just like those in other parts of the State, making the potential just as problematic as those experienced in Southern California last year. The only difference is the fuel type. In high hazard WUI areas
identified by the State, the issues surrounding mitigation efforts are much more difficult. The City of Benicia is not classified as a high-hazard area due to its fuel type. However, it still has a responsibility to the citizens to take every precaution to mitigate the existing issues (J. Murphy, personal interview, January 7, 2004).

An inspection of each open space was conducted in order to confirm the number of WUI areas and fire access roads. The inspection confirmed the presence of 39 separate and distinct WUI areas (P. Fiori, personal on-site inspection, December 2004). The precise location of each WUI area was confirmed using the City of Benicia Fire Department base map (City of Benicia Fire Department, 2004).

Not Just a Local Issue

According to an IAFC Wildland Fire Policy Statement, “The fastest growing problem in the Unites States is fire in the wildland urban interface” (IAFC, 2003, p.1). The primary issue is the increase in the number of homes built in high-risk interface areas. The statement attributes the WUI problem to “population growth, unmitigated growth of trees, and a changing climate” (p.1). The statement identifies four distinct challenges for suppression forces: The utilization of structural firefighters for WIU fires; the inherent danger of WUI fires; the coordination and communications needed for WUI fires; and the suppression costs associated with combating WUI fires. The IAFC committed to aggressively addressing the issues, however it stressed the need for everyone to get involved in the process.

Summerfelt (2003) elaborated on just how complex the problem actually is by breaking down the issues. He points out that not only are there multiple definitions of WUI, but even if people could agree on a definition they would continue to have a broad interpretation of what the term means to them personally. Many opinions exist on where the responsibility actually lies
with regard to people who make a conscious choice to live in high-risk WUI areas. Some feel the taxpayers should not be responsible for the costs associated with mitigation or suppression, where others feel government is part of the problem.

The specific issues are broken down into two distinct categories: “Immediate fire threats and secondary fire threats” (p.5). Immediate fire threats are broken down into five areas: “Structures/Infrastructure, public panic, public health, firefighter safety, and fire behavior” (Summerfelt, 2003, p.5). The obvious damage occurs to structures, but the bigger picture needs to incorporate fences, power poles, communication towers, watershed, etc. Any time a WUI fire of any magnitude occurs, there is chaos and confusion. People naturally want to know the status of their home or business and what’s being done to protect their assets. The panic created from such an incident overloads communication centers and makes it difficult to handle normal events. The smoke generated from fires in WUI areas creates health issues to those in the area, particularly to those with respiratory sensitivities. Hospitals see a substantial increase in patients during such events. Summerfelt cautions that while fire behavior during such incidents is impressive, it is dangerous as well.

Summerfelt (2003), identified eight distinct fire threats: “Financial loses, transportation, recreation, rebuilding, environmental costs, public confidence/support, scenic, and emotional/spiritual” (p.5-7). Loss of revenue to businesses could cripple a community. Transportation services can be shut down, not only paralyzing a locality, but by preventing those who must travel through fire areas from reaching their businesses as well. Many fires occur in recreation areas. In some cases, the recreation area may be the livelihood for everyone who lives there. Notwithstanding the costs, the physical rebuilding may be the easiest part. Other factors,
such as rezoning, building code changes, improving access, and environmental concerns may be the most complicated and controversial.

Murphy agreed with Summerfelt’s comments citing the many long-term issues surrounding the Oakland Hills Firestorm of 1991. He added that one of the biggest problems with managing the aftermath of these large incidents is the coordination of how the problem is dealt with. The environmental concerns conflict with the property owners concerns. Public Works wants to widen the streets while property owners don’t want to give up the expensive land. The water systems need to be updated, but at whose expense. The buildings need to be brought up to code, but insurance companies wouldn’t cover upgrades in many cases. “The problem is absolutely larger than the fire itself, and the many issues surrounding the aftermath of such incidents are complex and not well understood by many” (J. Murphy, personal interview, January 7, 2004).

Hunt (2003) referenced that many influences contribute to the WUI problem. With regard to what needs to happen to fix the problem he stated, “It seems that, in some communities, certain environmentalists, community planners, local politicians, developers and building industry lobbyists are in the drivers seat rather than the Fire Chief” (p.15)

Preparation

The City and County of Napa, California instituted a cooperative WUI plan in 2004. The WUI plan is a comprehensive five-year plan. As the WUI Program Manager, Battalion Chief Dargan, described the process leading up to the implementation of the plan, strongly emphasizing the need for preparation. She was quick to point out that the plan was implemented in January of 2004, but the planning and preparation for the plan was conducted two years prior to formal plan implementation (K. Dargan, personal interview, December 29, 2004).
Dargan elaborated further indicating there were two primary reasons for the two-year preparation process: First, it was important for the people working on the plan to be educated on the process, the issues and the end product. Second, it was equally important to take proactive steps in an effort to reduce, or eliminate surprises to anyone in the community. She went on to explain that, “nothing will kill a new program faster than surprising the people who will be, or who have the potential to be, impacted.” Dargan closed stating that, “the preparation prior to the development of the plan is equally important to the plan itself” (K. Dargan, personal interview, December 29, 2004).

On a larger scale, Dombrowski (2004) reiterates that agencies and communities need to look beyond their individual borders and work together to establish a cooperative WUI system. The article discusses the success of its plan in an area with multiple fire jurisdictions, emergency service organizations, and local and State law enforcement. One of the keys to the success of the Boulder County plan was the partnership formed by the multiple agencies to plan and implement a WUI program. Each agency involved came to the conclusion early in the planning process that “because wildland fires do not respect jurisdictional boundaries, fire defenses require a cooperative effort” (p.36).

The IINC (2004b) emphasizes preparation on a more personal level, asking the question, “What is prepared” (p.2). The answer: “To truly protect your family against wildfires or any catastrophe, homeowners must prepare both physically and financially” (p.2). Physical preparation is broken into four areas: Defensible space, emphasizing vegetation management; a household evacuation plan, emphasizing meeting locations and contact phone numbers; home improvement, emphasizing fire safe modifications; and encouragement in joining or forming fire
safe councils in high risk areas. Financial preparation is broken into two areas: An up-to-date insurance policy and an inventory of possessions kept in a safe place.

Insurance Company Involvement

The insurance industry has a responsibility to educate people on WUI issues, according to Tully Lehman, Communications Specialist for the Insurance Information Network of California (IINC). Comprised of 16 insurance companies, one of the IINC’s primary responsibilities is to “help consumers understand insurance and safety issues.” He reviewed at least six IINC programs from planning guides to personal responsibility (T. Lehman, telephone interview, December 10, 2004).

Battalion Chief Dargan commented that the insurance industry might be a future catalyst for change. Five years ago she received one or two calls per month from residents asking for clarification or assistance with WUI questions with regard to their personal insurance companies. Today, she receives at least one call per week. A response from an aggressive WUI plan with insurance company involvement, the phone calls may represent a new line of communication involving fire departments, insurance companies, general public, and entire communities (K. Dargan, personal interview, December 29, 2004).

A recent example of what could be an emerging insurance industry trend is found in Insurer Demands Payback for Wildfire Costs (2004), where the Allstate Corporation has alleged “gross malfeasance” (P.14) by a city, county, and CDF. The insurance company is demanding it be reimbursed for expenses. The IINC is quoted in the same article stating, “San Diego is the only city or county to face such a claim and Allstate is the only company to file such a claim” (p.14). The article suggests that, “even if Allstate does not pursue its claim in court, the insurance company is sending a clear message” (p.14). Lehman confirmed the claim by Allstate,
and indicated that other insurance companies are watching closely (T. Lehman, telephone interview, December 10, 2004).

In a guest editorial article, They Dare to Second-Guess the Hundreds of Firefighters who Confronted the 100’ Flames in Impenetrable Vegetation Within an Hour of the Fire’s Start (2004), Allstate’s decision to file a claim is sharply scrutinized. The author suggests that while insurance companies are in the business of taking calculated risks, they don’t want to take responsibility for paying claims. Instead, the author alleges the insurance companies are looking for someone else, taxpayers in this case, to be responsible.

Insurance companies can also be an excellent source of information with regard to wildland fire mitigation. An example is found in the article, Wildfires Tamed by Homeowners’ Preventive Strike (IINC, 2004a), which outlines the steps homeowners should follow to protect their homes against the dangers of fast moving wildfires. The article discusses eight key areas a homeowner can do on their own to protect their homes and themselves from wildfires. Topics include: a 30 foot defensible space; fire resistant landscaping; spaced trees and shrubs; branch removal; removal of dead vegetation; swimming pool use during a wildfire; home inventories, and an evacuation plan. The article suggests that several neighborhoods were saved in the Southern California fires in 2003, citing homeowner preparation.

**Education**

“In order to successfully institute a WUI program, educating the people involved is the most significant step” (K. Dargan, personal communication, December 29, 2004). B/C Dargan outlined the process she followed when developing and implementing the City and County of Napa WUI plan in January of 2003. In order to educate the community, or the stakeholders, the people involved in developing the plan must be educated. In addition to the aspects of the plan
itself, the developers must be educated on who the stakeholders are. Stakeholders may include
the governing bodies, political leaders, property owners, and anyone else who may be part of the
process, or who may be impacted by the program. Dargan emphasized the need for one-on-one
communication stating, “Fliers are a good follow-up, but nothing is more effective than personal
one-on-one contact.” In order to become educated, the Napa WUI team conducted interviews,
via telephone, and in person with people who had established plans in their respective

Dargan continued explaining that even though the five-year plan was implemented last
year, WUI team members continue to keep up on current information. In November of 2004, an
entire group from the WUI team went to the Firewise conference, “Backyards and Beyond” in
Denver, Colorado. In January, several of us will be traveling to Springfield, Colorado to discuss
further developments in the plan. It is important to keep educated on what is going on. Locally,
we continue to hold educational meetings with City and County officials, contractors, citizens,
property owners, and other Stakeholders. Personal contact is essential throughout the entire
process. Sending out fliers is easy, but not effective without personal contact to follow-up on
questions, issues, and concerns (K. Dargan, personal interview, December 29, 2004).

DiMauro (2004) points out that before communities can implement mitigation, there
needs to be a clear understanding of the problem, the danger, the associated hazards, and the
applicable responsibility. Of course, in order to obtain a clear understanding, everyone must be
educated. The public is not the only people who need to be educated. City employees,
departments, councils, community leaders, and contractors need proper education as well. She
goes on to explain that in order to gain community involvement, an aggressive public education
program must be in place. Finally, recognition is given to the importance of working together as
a team to accomplish the desired goal. She stressed that all the players must be informed, and must work together.

An aggressive public education program proved essential in the success of the Los Alamos program, where “over 70% of eligible property owners participated” (DiMauro, 2004, p.29). Finally, she commented on the delivery of the education citing the need for one-on-one contact. The one-on-one meetings with property owners were “a critical component to the success of the project” (p.30). She went on to explain that, “nearly every property owner who received specific, personalized information agreed to have mitigation work done around their homes” (p.30).

Research by Parkinson, Force, & Smith (2003) extensively reviewed the effectiveness in teaching adults about fire safety stating, “To gain public trust regarding fire management, it is important to narrow the knowledge gap between scientists, managers, and the public (p.23).” B/C Dargan added that the education component was the most essential component of the plan, not only to gain the trust of the public, but to gain the trust of the public officials and business professionals as well (K. Dargan, personal communication, December 29, 2004).

The Plan

Deputy Chief Murphy stated “while each community has specific issues with regard to WUI areas, the process to assess those issues is the same.” He referenced Firewise as a primary source of information for specific information on WUI plan details. However, he did comment on what he believed were the essential elements of a good plan. First, a city or jurisdiction must make WUI mitigation a priority. The problem is that many cities need a disaster or near miss before they get serious about taking action. In order to make WUI a priority, proper education must be provided to councils, department heads, city officials, and governing authorities. Of
course, the staff preparing the education must be educated as well (J. Murphy, personal communication, January 7, 2004).

Murphy also indicated that broad program goals needed to be agreed upon ahead of time. In order to do that, the community needs direct involvement in the process. To ensure effective communication, he stated that “direct contact with citizens and businesses were essential in the development of those goals.” The governing body responsible for the project must allocate financial resources so a proper assessment can occur. At that point, a risk assessment needs to occur using a person or company specifically trained to assess WUI issues. While grants may become available, the jurisdiction must be committed to funding the project. That is why good communication during the process is paramount. Once recommendations are received from the analyst, a plan needs to be developed with clear and concise objectives. Again, citizens, businesses, and civil leaders must be involved in the process so there are no surprises. Finally, Murphy reminds us that in addition to mitigation, capital expenditures may be needed, such as firefighting apparatus, protective equipment, chippers, weed removing tools, etc. How capital equipment gets paid for must be addressed as well (J. Murphy, personal communication, January 7, 2004).

Dougherty (2004) cites the need for a plan to include changes in building codes and ordinances as a proactive step to mitigate the problem. Focusing on defensible space and vegetation management are important aspects of a good plan. However, construction techniques are often overlooked in the process. “The greatest number of opportunities for implementing advances in mitigation techniques is in the area of building construction itself” (p.29). A few examples of techniques include stucco systems, which provide a one-hour rating; redesigned eves to prevent or reduce flying bran penetration; fire resistive roofing materials; non-
Battalion Chief Dargan discussed the significant elements of the Napa County Firewise plan, citing the education component as the most vital. Once the plan was developed, it addressed five critical elements: Firewise education, Firewise infrastructure, fuel/vegetation management, Firewise land use planning, and emergency response procedures. The goal of the plan was to “Comprehensively manage the ecological, risk, and damage effects of wildfire to create a safe and healthy human and natural environment”. Each major milestone was mapped out in the five-year plan (K. Dargan, personal communication, December 29, 2004).

In an article, *Preventing Firestorms* T.M. Bonnicksen (2004), the necessity for prevention is spelled out in detail by official government reports, and findings from the California Blue Ribbon Fire Commission, established after the Southern California fires of 2003. Bonnicksen refers to “a safer mix” (p.7) as the basis for an effective prevention effort. He describes the need for replacing old growth chaparral, which is highly flammable, with younger chaparral, which is harder to burn. He notes “prescribed fire may be the only tool available to do it until we find an economic value for chaparral, such as biomass energy” (p.7).

“Implementing a plan is a necessity, but it will not be easy,” says Jim Murphy of Fire Science Systems. As a consultant involved in the Oakland Hills Firestorm of 1991, and the Cedar Incident of 1993, “I can assure you that everyone has a different perspective on what constitutes a WUI plan, and how that plan should be implemented.” Murphy commented that each jurisdiction was criticized for how they fought the fire, and how they should have been better prepared for what happened. After the Oakland Hills Firestorm lawsuits were filed against the City of Oakland for not doing their job correctly. When the City of Oakland tried to enact tougher mitigation measures, lawsuits were filed because residents didn’t want to change the
surroundings. After the Cedar incident, a claim by an insurance company was filed to recover costs based on the assertion that a number of agencies didn’t fight the fire properly and should have enacted more stringent mitigation efforts prior to the incident. However, attempts to institute certain mitigation efforts prior to the fire were not successful due to political influence, environmental quagmires, or lack of funding (J. Murphy, personal interview, January 7, 2004).

The California Fire Plan Workgroup (CFPW) developed a Community Fire Plan Template Outline for use by communities or Fire Safe Councils (Appendix A). The CFPW was a collaborative effort between the California Fire Alliance and the California Fire Safe Council. It contains definitions, resource lists, template sources, and an entire section on where to obtain additional information. The template contains categories referencing the fire problem: fire safety programs, the planning process, community descriptions, the current fire environment, risk assessment information, and mitigation strategies. It is an essential reference for anyone considering the development of a WUI plan (The California Fire Plan Workgroup, 2004).

Although there are many minute details contained in a WUI plan, the essential elements are outlined in the document, A Framework for Community Fire Plans (Appendix B), where eight critical elements of a plan are identified: Establishing a community wildfire committee; identifying goals and objectives; gathering information on wildfire programs; reviewing of current capabilities and household needs; conducting community meetings; identification and prioritization of activities; drafting of the community fire plan; and the implementation, monitoring, and evaluation of the plan. Each activity has a specific set of tasks associated with it. The program was a collaborative effort and is listed as a primary resource by the Firewise organization, the Fire Safe Council, the California Fire Plan Workgroup, and the California Fire
Programs and Mitigation

“There are a number of programs used by communities for mitigation”, says CDF Battalion Chief Kate Dargan. Examples include: grazing programs, which reduce fuel density; biomass programs, which assist property owners in reducing brush; educational programs, which are used to inform citizens, business professionals, and technical staff; and community based focus groups, which assist in the delivery of programs to name a few (K. Dargan, personal communication, December 29, 2004).

Other programs include: community assistance programs, such as the loaning of weed thinning equipment, where citizens can check out specific equipment for fuel reduction; green waste programs, where citizens bring brush to a site for chipping; volunteer fuel reduction services, where young adults volunteer their time to assist homeowners with fuel reduction activities; or fire resistive plant consultation, where nurseries of businesses provide education on what types of fire resistive vegetation to plant (J. Murphy, personal interview, January 7, 2005).

“Grazing programs, such as the use of goats or cattle is an excellent way to accomplish fuel reduction and add to the defensible space says” Patrick Kobernus, Senior Biologist with Thomas Reid Associates. “Managed grazing has tremendous benefits.” It allows native vegetation a better chance to grow; is significantly less expensive then traditional removal methods; doesn’t require the hauling of material from the site and is environmentally friendly. In San Luis Obispo area, goats and cattle were used around the oaks. The very next year there was a significant surge of sapling growth. This type of managed grazing is based on the specific vegetation. For example, grasslands may need a combination of goats and sheep to do the job.
They are placed and then rotated through particular areas two or three times per year. Kobernus pointed out that managed grazing, not just grazing is an effective tool for fuel reduction. Overgrazing can add to the problem by causing erosion, and the elimination of plant species not intended for eradication. In closing, he pointed out that goat and cattle grazing are not a fix-all for fire prevention in WUI areas. Additional tools, such as herbicides, prescribed burns, or human follow-up must occur to obtain the maximum benefit (P. Kobernus, telephone interview, December 28, 2004).

Summary

Even though the number of WUI areas has more than doubled, the existing mitigation efforts for WUI areas in the City of Benicia has not significantly changed in the past 20 years (G. Gantt, personal interview, August 18, 2004). In addition, the adoption of two ordinances; the banning of shake single roof coverings; and the banning of the use of fireworks in the City limits has been a positive step toward WUI mitigation (M.D. Tessier, personal interview, August 18, 2004).

A WUI plan must be cooperative, well planned, understood by the Stakeholders and be reflective of the jurisdiction’s demographics and specific needs. In addition, it must have a proactive education component to be successful (K. Dargan, personal interview, December 29, 2004). Homeowners must be prepared, both physically and financially in order to be truly protected from the catastrophic effects of wildfire (IINC, 2004b). The insurance industry can have a tremendous influence in an area developing a WUI plan, particularly in the area of educating the public (T. Lehman, telephone interview, December 10, 2004). Education at all levels is essential before, and during the development of a WUI plan (K. Dargan, personal
There needs to be a clear understanding of the problem, with a corresponding aggressive public education program to deal with the problem (DiMauro, 2004).

A number of available resources should be utilized in the development of a WUI plan. The Community Fire Template Outline (Appendix A) should be one of the first resources used when looking for additional resources and contacts (CFPW, 2004). *A Framework for Community Fire Plans* (Appendix B) is an excellent companion document for the development of a plan (Program for Watershed and Community Health, University of Oregon, 2004). There are a number of programs used by communities for WUI mitigation, such as, Grazing and Biomass programs. Each community must decide which programs to implement based on a comprehensive risk assessment (K. Dargan, personal interview, December 29, 2004). While the most extensive plans can be implemented, utilizing the most up-to-date planning process, they are worthless unless the city or jurisdiction makes WUI mitigation a priority (J. Murphy, personal interview, January 7, 2005).

**PROCEDURES**

**Definitions**

Defensible Space: An area, typically a width of 30 feet of more, between an improved property and a potential wildfire where the combustibles have been removed or modified (Firewise, 2004, p.1).

Open Space: A term used by the City of Benicia Fire Department. For purposes of this research, Open Space is interchangeable with Wildland Urban Interface.

Fire-Resistive Landscaping: Plants that have moist and supple leaves, little dead wood, tend not to accumulate dry, dead material within the plant, and the sap is water-like and does not have a strong odor (California Fire Plan Workgroup, 2004, p.3).
Fuel modification: Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control (Firewise, 2004, p.4).

Stakeholders: A stakeholder is any individual or group, which can affect or is affected by an organization’s activities (SustainAbility, 2004, p.1).

Biomass: Any biological plant or plant by-product that accumulates in quantities great enough to create a hazard or disposal problem or plants that are grown as an energy or feedstock crop (Shelly, 2004, p.1).

Chaparral: Dense vegetation in the coastal and mountainous regions of California (Mediterranean, 2004, p.1)

Mitigation: Action that moderates the severity of a fire hazard or risk (Firewise, 2004, p.5).

Wildland: Any area in which development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered (Firewise, 2004, p.7).

Wildland Urban Interface (WUI): Any area where wildland fuels threaten to ignite combustible homes and structures (Firewise, 2004, p.7).

Research Methodology

The desired outcome of this research was to provide recommendations for the development of a WUI plan for the City of Benicia. The descriptive research method was used to review existing programs within the City of Benicia; to review past WUI incidents within the City of Benicia and the State of California; to review written documents, articles, and case studies which pertain to WUI mitigation; and to conduct interviews with fire and business
professionals to gain critical insight on the planning and implementation process with regard to developing a WUI plan.

The research procedures used in preparation of this document began with an informal discussion with City of Benicia Fire Chief Ken Hanley in June of 2004, where he suggested the Department look into establishing a long-term WUI plan. From a risk reduction standpoint, he was asked to expand on what he felt the most significant challenge would be in the City of Benicia with regard to risk reduction. He indicated that due to the number houses in open space areas, and the increased number of responses in the open space areas of the City, a plan must be formulated to mitigate the problem (K. Hanley, personal interview, June 8, 2004).

In July of 2004, an extensive literature review was conducted utilizing the resources available through the Learning Resource Center (LRC) at the National Emergency Training Center (NETC). Literature was also obtained through the use of the Interlibrary Loan Program (ILP), through the use of the City of Benicia Public Library in Benicia, California. Additional literature was obtained through the following: an in-depth search of the Internet; a review of professional journals, publications, and trade magazines; and personal interviews with fire and business professionals.

Although there are numerous resource materials available, the Community Fire Plan Template Outline (Appendix A), and a Framework for Community Fire Plans (Appendix B) were used as the primary written reference documents. Both documents were highly recommended during the interview process as being valid and reliable resources of information. Therefore, much of the additional research stemmed from information contained in both documents.
Interviews were conducted with key people to gain insight on the development of a WUI plan and the process and issues surrounding the implementation of a WUI plan. In addition, the discussions included points on how to implement a WUI plan in a community. Finally, each person interviewed was asked to provide resources for review. The following people were interviewed based on their vast knowledge, experience, and insight on WUI issues:

Patrick Kobernus, Senior Biologist with Thomas Reid Associates for 9 years was selected because of his extensive involvement with grazing consultation in Northern California. He was asked to describe the benefits of grazing programs, clarify environmental concerns, and comment on the effectiveness of grazing programs (P. Kobernus, telephone interview, December 28, 2004).

With over 25-years of experience, Kate Dargan, is a Battalion Chief with the California Department of Forestry and Fire Protection (CDF), Lake Napa Ranger Unit. She is the Fire Marshal for CDF Napa County; the lead staff person in charge of the Napa City and County WUI program; and a member of a CDF Type 1 Incident Management Team. She also serves as the Co-Chair of the NorCal Fire Prevention Officers WUI committee, and the Co-Chair of the California Urban-Wildland Interface Building Standards Committee. She was selected because of her vast experience, and her recent development of a WUI plan for the City and County of Napa, California. She was asked to describe the process used in the development of the Napa WUI plan, with special emphasis on the essential elements needed for successful implementation. She was also asked to discuss her interaction with the insurance industry; to review the WUI program costs; and to review the political issues surrounding the planning an implementation of the plan (K. Dargan, personal interview, December 29, 2004).
Gene Gantt is a Deputy Fire Chief, and Fire Marshal for the Benicia Fire Department. Since most of the WUI issues within the City of Benicia have arisen in his tenure, he was selected to give a historical accounting of the WUI problems within the City of Benicia. In addition, he was asked to clarify the WUI programs being used currently (G. Gantt, personal interview, August 18, 2004).

Michael Tessier is a Deputy Fire Chief, and Operations Chief for the Benicia Fire Department. Deputy Chief Tessier has over 21 years of service with the Benicia Fire Department. He was asked to elaborate on the City Ordinances enacted to decrease the threat of wildfire, or the effects of wildfire (M.D. Tessier, personal interview, August 18, 2004).

Jim Murphy, PhD, is a retired Deputy Chief for the United States Forrest Service. A 35-year veteran, Chief Murphy served in the Administrative and Research section of the USFS Washington State branch. He served as a Type 1 Incident Commander numerous Overhead Teams, and has assisted communities in preparing WUI plans. At present, he is the President of a private consulting business, which assists communities and jurisdictions with the development of WUI plans. Chief Murphy was selected because of his vast experience with WUI planning, and his familiarity with local conditions. He was asked to describe the WUI issues in the City of Benicia, contrasted to the problems in other parts of the State. He was asked to describe the most important components of a WUI plan, and make recommendations on how the plan should proceed. Finally, he was asked to comment on what makes a WUI program successful (J. Murphy, personal interview, January 7, 2005).

Assumptions and Limitations

The review of WUI mitigation programs utilized by the City of Benicia was limited to formal programs managed by the Benicia Fire Department. Road maintenance by the Public
Works Department leading to City water facilities accessed through WUI areas was not considered as access.

RESULTS

Answers to research questions:

Research Question 1: The most comprehensive resource in print on WUI issues is the Community Fire Plan Template Outline (CFPW, 2004). It contains specific information on just about every aspect of a WUI plan. In no particular order, the document references the: Fire Safe Council; Firewise Organization; National Wildfire Coordinating Group; California Department of Forestry and Fire Protection; Safnet Organization; Federal Emergency Management Agency; Wildfire Organization; California Fire Alliance; University of California Extension; Josephine County Integrated Fire Plan; and the Trinity County Fire Plan to name a few.

Firewise workshops are given in a number of locations. The advantage of attending these workshops is that a person has the opportunity to receive instructions on process and implementation. In addition, Firewise information and how to become a Firewise community, can be discussed with people who have been successful in setting up programs (K. Dargan, personal interview, December 29, 2004).

Insurance companies can be helpful in providing information and financial support. Organizations, such as the Insurance Information Network of California, have been established to assist in providing accurate information to communities on WUI issues and insurance information in general. The IINC is also an excellent resource for statistical information. Examples include numbers of people displaced, numbers of houses destroyed, or associated costs can be obtained (T. Lehman, telephone interview, December 10, 2004).
Research Question 2: Insurance companies can be an excellent source of information with regard to wildland fire mitigation. Examples of information provided include: defensible space specifications; fire resistant landscaping tips; spacing guidelines; brush or dead vegetation removal; swimming pool uses during a wildfire; home inventories; and evacuation plans (IINC 2004a). The insurance industry has a responsibility to educate people on WUI issues. There are established programs for use at any time for those who wish to use them (T. Lehman, telephone interview, December 10, 2004).

Although insurance companies have the ability to provide good information, there is still skepticism from those who do not feel the insurance industry has the consumer in mind. Some insurance companies are questioning fire suppression and prevention activities, leading to the questioning of insurance company motives with regard to the bottom line (Insurer Demands Payback for Wildfire Costs, 2004).

The insurance industry may be a catalyst for future changes. Insurance companies are more active when insuring property, which has caused residents to become more active with local fire officials. New lines of communication are being established between the insurance industry, communities, the public, and fire protection organizations (K. Dargan, personal interview, December 29, 2004).

Research Question 3: Formally, there are eight critical elements of a WUI plan: Establishing a community wildfire committee; identifying goals and objectives; gathering information on wildfire programs; reviewing of current capabilities and household needs; conducting community meetings; identification and prioritization of activities; drafting of the community fire plan; and the implementation, monitoring, and evaluation of the plan. Each activity has a specific set of associated tasks (Program for Watershed and Community Health,
University of Oregon, 2004). Murphy commented that each element of a formal plan was essential, but emphasized the need for direct contact with citizens and business owners (J. Murphy, personal interview, January 7, 2004). Dargan added, “fliers are a good follow-up, but nothing is more effective than personal one-on-one contact” (K. Dargan, personal interview, December 29, 2004). Murphy also emphasized the importance of buy-in from community officials, reiterating the necessity of strong communication between the plan developers, elected officials, the community, and other Stakeholders (J. Murphy, personal interview, January 7, 2004).

Dargan commented, “the preparation prior to the development of the plan is equally important to the plan itself.” She pointed out that the Napa plan was implemented in January of 2004, but the planning and preparation for the plan was conducted two years prior to formal implementation (K. Dargan, personal interview, December 29, 2004). The IINC added that Physical preparation and financial preparation were essential elements to the plan (IINC, 2004b).

DiMauro (2004) pointed out that before communities can implement mitigation, there needs to be a clear understanding of the problem, the danger, the associated hazards, and the applicable responsibility. Also pointed out was the need for an aggressive public education program. Parkinson, Force, & Smith (2003) emphasized the importance of gaining public trust. Dargan added that it is not only important to gain the trust of the public, but to gain the trust of the public officials and business professionals as well (K. Dargan, personal interview, December 29, 2004). Dogherty (2004) cited the need for aggressive changes in building code standards as a proactive step in mitigating WUI issues.

Research Question 4: When reviewing the literature, there was no way to accurately assess the costs of developing or implementing a WUI plan. Each person interviewed shared
plan development and mitigation costs for specific programs. However, an estimate of fiscal impact cannot be accurately stated without a set of specific goals and objectives for a specific area or community. Fiscal impacts could not be determined or estimated at this part of the process.

Research Question 5: Referring to the Napa, California WUI plan, Dargan made a clear point commenting that the best way to deal with political issues is through the education and planning process. She detailed the process identifying that all the Stakeholders must be educated before and during the WUI planning process (K. Dargan, personal interview, December 29, 2004). DiMauro (2004) agreed, adding that departments, councils, community leaders, and contractors need proper education as well. Dougherty (2004) added that building industry leaders should be involved. Hunt (2003) stated, “It seems that, in some communities, certain environmentalists, community planners, local politicians, developers and building industry lobbyists are in the drivers seat rather than the Fire Chief” (p.15).

Implementing mitigation is not an easy talk. Citing at least two large-scale WUI incidents, Murphy commented that one of the biggest problems with managing the aftermath of these large incidents is the coordination of how the problem is dealt with. He cited examples where cities wanted to make much needed improvements to WUI areas, but were caught-up in litigation when the public did not want to be responsible for the improvements. “The problem is absolutely larger than the fire itself, and the many issues surrounding the aftermath of such incidents are complex and not well understood by many” (J. Murphy, personal interview, January 7, 2004).

When reviewing the literature and conducting interviews, an accurate assessment of all the political implications was not possible. The specific WUI problems must be clearly
identified, and an education process must be conducted. Although interviews conducted revealed a number of concerns with regard to political implications, a planning process must be implemented before a full determination of the Political impacts can be realized.

Research Question 6: A personal on-site visit to each open space in the City of Benicia confirmed the presence of 39 separate and distinct WUI areas (P. Fiori, personal on-site inspection, December 2004). The precise location of each WUI area was confirmed using the City of Benicia Fire Department base map (City of Benicia Fire Department, 2004).

Research Question 7: The City of Benicia maintains 39 accesses to open spaces. The open space accesses provide a point for fire crews and equipment to enter and perform firefighting activities. At a cost of $74,000.00, a discing program is in place to add to the defensive space behind homes. In addition, the disc lines slow the progression of fire by turning the dead fuel under. They also provide limited access by fire department equipment. In addition to discing, approximately $1,000.00 is spent annually on public education. These programs have been in place for years, and have been marginal in their success (G. Gantt, personal interview, August 18, 2004).

Two significant ordinances have made a profound effect with regard to WUI mitigation, and the number of fires in WUI areas. The enactment of an ordinance in the mid 1980s effectively banned the use of shake single roof coverings. It is important to note that there is no record of a roof fire occurring as a result of a wildland fire in the last 20 years. In addition, a fireworks ban in the mid 1980s has reduced the number of vegetation fires (M.D. Tessier, personal interview, August 18, 2004).
DISCUSSION

Conducting this research was a necessary step in the planning process. Attempting to develop a WUI plan on this level without the proper background and education would have been a monumental mistake. Dargan made the point that education and planning occurred prior to the formal planning process when developing the Napa County, California WUI plan (K. Dargan, personal interview, December 29, 2004). After the completion of this research, there is no question about why Dargan emphasized prior preparation.

Also crystal clear is the necessity for anyone involved in the planning process to become intimately familiar with process itself. The National Fire Academy, LCRR course outlined the necessary planning process to the letter by defining, not only the steps necessary to implement a risk reduction plan, but to perform the steps in a specific order (NFA, 2003). The curriculum is designed “to enhance the skills needed by an executive fire officer to implement and lead a community risk-reduction process initiative” (NFA, 2003, p.SM 0-15). To that end, there is a direct correlation between the planning and implementation of a WUI plan and the skills taught and reinforced in the LCRR course.

While there are numerous resources available for WUI planning, it is essential to use credible sources. Well over 75 individual pieces of literature was reviewed for this research. However, less than half of the literature was of any value. The problem is that most of the literature was based on speculation, not factual evidence. The most comprehensive resource in print on WUI issues is the Community Fire Plan Template Outline (Appendix A). It contains specific information on just about every aspect of a WUI plan (CFPW, 2004). In addition, the essential elements of a WUI plan are best outlined in the document, A Framework for Community Fire Plans (Appendix B). Although there are other similar documents available, this
one appears to summarize the key points the best (Program for Watershed and Community Health, University of Oregon, 2004).

The insurance companies who insure homeowners in the City of Benicia have not been active with WUI intervention. However, the agents in the area absolutely are aware of the WUI issues on a State level. It is the opinion of the author that the inactivity of the insurance industry locally is due to the fact that a catastrophic event has not occurred in Solano County for at least 20 years or more. Insurance companies do provide information and financial support if approached. Organizations, such as the IINC, have been established to assist in providing accurate information to communities on WUI issues, insurance information, and statistical analysis (T. Lehman, telephone interview, December 10, 2004).

While there are eight critical elements of a WUI plan, as defined by (Program for Watershed and Community Health, University of Oregon, 2004), the education component is one of the most important. As a Training Officer, it is well understood that nothing occurs unless people are properly educated. There is not a new program on the planet that will be successful if prior education on the reasons for change has not taken place before the program was implemented. Even more important is the need for active participation in the planning process. DiMauro (2004) cited the need for one-on-one contact when delivering education programs. Dargan added that it is just as important to educate all the Stakeholders, before and during the process. Not only do the Stakeholders need to be educated, they need to participate in the process. (K. Dargan, personal interview, December 29, 2004). DiMauro (2004) also pointed out the importance of gaining the trust of the public, public officials, and business professionals.

While each WUI area was inspected (P. Fiori, personal on-site inspection, December 2004), a comprehensive risk assessment needs to occur to identify and validate the issues.
Two significant ordinances have made a profound effect with regard to WUI mitigation, and the number of fires in WUI areas. The enactment of an ordinance in the mid 1980s effectively banned the use of shake single roof coverings. It is important to note that there is no record of a roof fire occurring as a result of a WUI incident in any newly constructed home built after the ordinance was enacted. In addition, a fireworks ban in the mid 1980s has reduced the number of vegetation fires. (M.D. Tessier, personal interview, August 18, 2004).

In conducting this research, the one-on-one interaction with fire and business professionals was a profound experience. Documents, studies, articles, and official reports are valuable, but they do fully represent the detailed critical insight necessary for the development of a plan. There is no substitute for experience.

RECOMMENDATIONS

1. Review this research with the Fire Department Management Team.
2. Update the Fire Department base map to reflect the current number of WUI areas.
3. Plan and implement a pilot-grazing project funded by private industry in key WUI areas.
4. Conduct an education process for the City Manager and selected key leaders.
5. Establish a community wildfire committee.
6. Identify goals and objectives.
7. Initiate the planning process.
8. Conduct a community profile
10. Address emergency operations.
11. Develop a mitigation action plan.
REFERENCES


They Dare to Second-Guess the Hundreds of Firefighters who confronted the 100’ Flames in Impenetrable Vegetation Within an Hour of the Fire’s Start. (2004, November). *Wildland Firefighter*. Copy Editor, 8.