SANTA BARBARA TEA FIRE MULTI-HAZARD MITIGATION
BENEFIT COST ANALYSIS

A Professional Project
presented to
the Faculty of California Polytechnic State university,
San Luis Obispo

In Partial Fulfillment
of the Requirements for the Degree
Master of City and Regional Planning

by
David S Flamm

June 2009

© 2009
David S Flamm
ALL RIGHTS RESERVED

COMMITTEE MEMBERSHIP

TITLE: Santa Barbara Tea Fire Multi-Hazard Mitigation Benefit Cost
Analysis

AUTHOR: David S Flamm

DATE SUBMITTED: June 2009

COMMITTEE CHAIR: Dr. Michael Boswell, Associate Professor

COMMITTEE MEMBER: Ken Topping, Lecturer

COMMITTEE MEMBER: Ken Worman, State Hazard Mitigation Officer

ABSTRACT

Santa Barbara Tea Fire Multi-Hazard Mitigation Benefit Cost Analysis

David S Flamm

This study examines the benefits and costs associated with the outright purchase of properties for hazard mitigation (“property acquisition mitigation”) in Santa Barbara, California which reduced four properties’ exposure to multiple hazards. The results indicate that the estimated overall benefit-cost ratio for property acquisition mitigation projects is 1.75:1 when the exposed properties meet a threshold of eminent threat for total loss. This study further suggests that when property acquisitions are performed in an area threatened by multiple hazards the mitigation becomes two to three times more beneficial than in an area threatened by a single hazard. Possible implications and future benefits associated with this mitigation and mitigations like this are also explored.

Multi-hazard mitigation is an action taken to reduce or eliminate long-term risks from natural or human-caused hazards. A hazard is any condition or event with the potential to cause fatalities, injuries, property damage, infrastructure damage, economic interruptions, environmental damage, or other loss. The study area for the Tea Fire BCA (Benefit Cost Analysis) is subject to multiple hazards, primarily landslides, wildfires, and earthquakes.

In an attempt to reduce the exposure to landslides a mitigation project was completed in 1998. This project included purchase of four properties by the City of Santa Barbara using federal and local funds. The undeveloped properties were left empty as open space to eliminate the exposure to risk. The project, originally intended to mitigate landslide risk, mitigated risk exposure to multiple hazards. The mitigation was put to the test during the Santa Barbara Tea Fire, a wildfire which burned approximately 2,000 acres of Santa Barbara County land in November, 2008.

The following steps were followed to determine the overall loss avoidance:

1. Obtain building values before mitigation
2. Obtain current comparable building values
3. Determine burn recurrence in study area
4. Obtain fire damage estimates from FEMA BCA tool based on “before mitigation” building and contents values
5. Calculate “loss avoidance” and adjust for inflation using FEMA BCA tool
6. Add additional avoided losses not considered in BCA (e.g., emergency management costs)
7. Subtract new losses resulting from the project
8. Determine multi-hazard recurrence in study area

Keywords: Hazard Mitigation, Benefit Cost Analysis, Loss Avoidance.

ACKNOWLEDGMENTS

I would like to thank James Langhorne, Division Chief and Fire Marshal of the Montecito Fire District for all of the assistance, time, resources, and guidance in support of my research. Your brief mentorship was greatly appreciated.

Sincere appreciation is also extended to the staff at the California Emergency Management Agency for their assistance and guidance.

TABLE OF CONTENTS

	Page
LIST OF TABLES	viii
LIST OF FIGURES	ix
PROJECT SUMMARY	1
CHAPTER	
I. STUDY INTRODUCTION	11
Study Description	11
Description of Area and Community	13
Description of Study Properties	17
Description of Development and Policy History	20
Description of Study Area Hazard Mitigation	24
II. DESCRIPTION OF HAZARD EVENT	28
Regional Event Description	28
Hazard Events At/Near Study Area	35
III. COST BENEFIT ANALYSIS	40
Methodology	40
Single Hazard Mitigation Findings	50
Multi-Hazard Mitigation Findings	52
SMART Findings	54
FEMA BCA Toolkit Findings	56
IV. IMPLICATIONS	60
BIBLIOGRAPHY	66
APPENDICES	
A. Governor Executive Order to Help Fire Victims	67

B.	Tea Fire Evacuation Press Release	72
C.	Proclamation of Local Emergency	74
D.	List of Homes Destroyed and Damaged	76
E.	Mitigation Data Reference	80
F.	Wildfire Mitigation Legislation History	82
G.	Summary of 1998 Landslide Property Acquisition	84

LIST OF TABLES

Table	Page
1. List of Major Wildfires in Santa Barbara County	16
2. Total Value of Mitigation Projects Funded by Fire Safe Councils	24
3. Benefit-Cost Analysis of Tea Fire Mitigation Project	49

LIST OF FIGURES

Figure	Page
1. Tea Fire Watershed Map	20
2. Slide Monitor Site	25
3. Landslide Effect on Street	26
4. Ealand Road Cul-de-Sac	26
5. Landslide Remediation Project	26
6. Morning Firefighting Effort	29
7. Tea Fire Bird's Eye View	29
8. Night Time Firefighting Effort	30
9. Tea Fire Building Remnants	32
10. Governor Schwarzenegger Tea Fire Address	33
11. Tea Fire Burn Progression Map	35
12. Property Neighboring Study Properties	36
13. Fire Progression Example	36
14. Parcel Map of Study Area	37
15. Santa Ynez Mountains from Study Properties	38
16. Study Property Image (29 Ealand Road)	38
17. Burn Damage on Study Property	39

Project Summary

The following is a summary of the methodologies, findings, implications, and challenges of the Multi-Hazard Mitigation Benefit Cost Analysis (BCA) of the Santa Barbara Tea Fire. The Tea Fire burned approximately 2,000 acres of land in Santa Barbara County during November, 2008. This summary is provided to allow quick reference to study findings. The numbers and figures provided below are elaborated upon within the body of the study.

Objectives of the Santa Barbara Tea Fire Multi-Hazard Mitigation BCA were to:

1. Determine the “loss avoidance” for the 1998 landslide property acquisition Project using a Rapid Assessment Approach;
2. Continue refining the State Mitigation Assessment Review Team procedures for gathering and entering field data.

The State Mitigation Assessment Review Team (SMART) is a loss avoidance tracking system being developed by the California Emergency Management Agency (CalEMA) with the help of the City and Regional Planning Department at Cal Poly.

The Tea Fire BCA met these objectives, and the results reported here. The Tea Fire subject property is located in Santa Barbara City just north of Highway 192 within a mountainous area of Santa Barbara County within a Wildland Urban Interface (WUI) area. Three reasons the Tea Fire property acquisition project was chosen for analysis include:

1. The subject properties, while purchased to avoid landslide damages, constituted an opportunity to assess a “loss-avoidance” for a multi-hazard mitigation project area due to the Tea Fire;
2. Being affected by a documented disaster, the mitigation project’s forecasted estimates of loss avoidance could be “tested” by a real-world event;
3. The relatively narrow project scope made it suitable for analysis by a single analyst.

The following describes the methodology used for property acquisition loss avoidance determination from the November 2008 Tea Fire event. Most of these involved use of the FEMA BCA Toolkit, a methodology for estimating benefits of mitigation projects. Steps included:

1. Obtain building values before mitigation and fire damage estimates from FEMA BCA Toolkit, based on “before mitigation” building and contents values
2. Obtain current comparable building values/adjust before mitigation building values for inflation
3. Determine burn recurrence in study area
4. Calculate “loss avoidance” and adjust for inflation using FEMA BCA Toolkit
5. Add additional avoided losses not assumed in FEMA BCA Toolkit (e.g., emergency management costs)

6. Subtract new losses resulting from the project
7. Determine multi-hazard recurrence in study area

A summary of findings related to each step follows. All data sources are documented and, where possible and applicable, validated by multiple sources.

(1) Obtain building values before mitigation and fire damage estimates from FEMA BCA Toolkit, based on “before mitigation” building and contents values.

The value of the buildings before the mitigation was \$1,040,000. Contents value associated with the properties was \$312,000. The total fire damage estimate and value of buildings, and their contents before mitigation was \$1,352,000 (City of Santa Barbara Cost Benefit Analysis Report, Chicago Title Company, County Assessor Data).

(2) Obtain current comparable building values/adjust before mitigation building values for inflation. The 2008 comparable building plus contents values for four buildings range from \$1,690,000 to \$2,366,000. Using the FEMA inflation calculator to determine current building values for comparable buildings based on the before-mitigation building values, the 2008 building value would be \$1,431,217. This is a per square foot cost of approximately \$275. Under this assumed building value, the contents value would be \$429,365. Altogether, the 2008 building plus contents value according to the FEMA inflation calculator is \$1,860,582. The FEMA inflation calculator amount is used as the estimated damage amount because it is at the lower end of the comparable building value

scale and complies with the FEMA BCA Toolkit calculations and assumptions (Chicago Title Company, County Assessor Data).

(3) Determine burn recurrence in study area. The burn recurrence frequency (how often an area burns over a given amount of time) for a chaparral fire regime is 25 years. However, this is a standard rate that does not take in to account changing environmental conditions such as global warming (FEMA standard recurrence intervals).

(4) Calculate “loss avoidance” and adjust for inflation using FEMA BCA Toolkit.

The FEMA BCA Toolkit calculates a total average annual damages and losses avoided benefit by determining the recurrence for a particular hazard and assigning it a ratio of probability for each year. It then divides the total values of the property and contents by that ratio. In this example, there is a burn recurrence of 25 years. This means there is a 1 in 25 chance that the area will burn with a total loss of the buildings and the property. With an estimated damage amount of \$1,860,582, coupled with average life loss and injury expenditures avoided, the total average annual benefit for damages and losses avoided is \$74,458. If the landslide project life of 100 years were assumed to be the recurrence ratio, then it can be assumed that instead of four wildfire events happening over the course of 100 years we would have five multiple hazard events happening within that 100 year range, making the recurrence ratio 1 in 20. That additional hazard increases the annual losses avoided estimate to \$93,064.

Figuring in the FEMA assumed discount rate and present value coefficient in to the total average annual damages and losses avoided benefit of \$74,458, the new total accrued benefits, or net present value of benefits equal \$1,062,455. However, the data show that the amount of expenditures actually avoided was much higher than the Toolkit's assumed benefits because the avoided expenditures actually equaled the full 2008 value of the buildings and their contents. Instead of a net present value of \$1,062,455, the present value of the benefits is the total assumed 2008 building and contents value of \$1,860,582.

(5) Add additional avoided losses not assumed in FEMA BCA Toolkit. In this particular scenario some of the costs avoided due to the mitigation effort include the costs of response to the project properties, evacuation and displacement of the property inhabitants, litigation, medical expenses for possible injuries, and, of course, loss of life. These costs were all avoided due to the 100 percent mitigation of exposure to risk resulting from the property acquisition. It is safe to say that whatever amount established as the total benefit is significantly less than the actual amount saved. A definitive number, however, cannot be established or assigned to this area due to the many considerations and possibilities involved.

(6) Subtract new losses resulting from the project. There are no new losses associated with the property acquisition project.

(7) Determine multi-hazard recurrence in study area. This area is susceptible to many different types of hazards. The City of Santa Barbara as a whole has endured a substantial history of fires, floods, earthquakes, landslides, toxic spills, and even tsunamis. In the project area wildfires, landslides, earthquakes, and other human caused disasters are common. It is difficult to accurately define the recurrence of landslides, but many have happened in this area, and these properties are in an area highly susceptible to landslides. Earthquakes are also frequent in this area and increase the possibility of the occurrence of other threat hazards. If the total destruction annual threat ratio or probability of recurrence for wildfire is 1 in 25 as discussed above, it would be safe to assume that this ratio could be increased significantly if combined with earthquakes and landslides and miscellaneous events. It might be a 1 in 20 or even a 1 in 15 probability. If this is the case, then it can be assumed that the total average annual damages and losses avoided benefit value would be much higher than the \$74,423 annual value currently assumed for this project. It is difficult to determine exactly what the frequency would be if all disasters were consolidated into a single hazard threat ratio.

Findings:

Single Hazard Mitigation-

- Possible range of ten year avoided expenditure benefit: \$1,690,000 - \$2,366,000
- Possible overall benefit ratio: 1.55:1 – 2.25:1

- Assumed annual avoided expenditure benefit: \$104,241
- Assumed overall ten year avoided expenditure benefit: \$1,860,582
- Assumed overall benefit ratio: 1.75:1

The numbers above do not include the additional non-assumed avoided expenditures discussed above. These numbers and ratios may be higher if all variables could be considered. Furthermore, these numbers are based heavily on building and property values as well as an inflationary economic climate. If all additional non-assumed avoided expenditures are included ratios and benefits likely will remain positive.

Multi-Hazard Mitigation-

- Benefit ratio likely increases to 3:1 or 4:1 if all variables considered
- Annual avoided expenditure benefit will increase due to a lower number of division for overall benefit. Instead of 1 to 25 for hazard recurrence it will likely be 1 to 20 or 1 to 15.
- FEMA BCA Toolkit is not best suited for multi-hazard mitigation analysis
- Evaluation of all variables difficult, even in retrospect. Benefits appear to increase significantly regardless.

SMART:

CalEMA is transitioning from its current approach for identifying loss avoidance to the State Mitigation Assessment Review Team (SMART), a new system and

strategy by which the State will assess completed mitigation actions and establish a record of the effectiveness (actual cost avoidance) of the mitigation actions (Governor's Office of Emergency Services,2007). The following are a list of findings related to the SMART system and its application to the project.

- Loss avoidance performance for this property acquisition mitigation based on a level of intensity consistent with a total loss.
- Identified the effectiveness of property acquisitions as 100 percent effective in this case.
- Loss avoidance performance ratio equaled 1.55:1 to 4:1 (or higher) with total possible single event expenditure avoidance of \$2,366,000.
- Primary benefactor of acquisitions is the insurance provider, whether private or public for single hazards.
- The appropriate scale of a property acquisition is difficult to asses. There are many factors to consider.
- Tea Fire provided unique opportunity to perform first time SMART analysis on project considered to be multi-hazard mitigation.
- Provided a chance to evaluate property acquisitions as multi-hazard mitigations through SMART methodologies.
- Provides California Emergency management Agency and CSU system framework for future multi-hazard analysis.

FEMA BCA Toolkit:

- A multi-hazard mitigation BCA toolkit should be developed to help thoroughly determine mitigation benefits.
- The Toolkit should delineate between benefits to the private side and the public.
- Option to remove Net Present Value and Discount Rate should be available to more accurately produce retroactive analysis results.

Implications:

- Global warming will likely increase the overall benefits of an acquisition mitigation. Acquisitions may become more appealing as global warming effects persist.
- Increased frequency of multiple hazards in a given area may decrease the likelihood that private insurance companies will provide insurance. Federal disaster insurance may have to be established.
- Many stakeholders and parties from a myriad of fields and interests will find this study useful.
- A justification threshold for property acquisitions should be established before implementing as a primary mitigation tool.
- The relevancy of this study will increase with time and as more hazard events happen.

Several challenges and issues arose in completing the Tea Fire BCA loss avoidance assessment:

- Site visits and background research should have been completed immediately after the fire. Entrance could have been made within a week or two of the end of event.

- Since emergency management, response, costs of evacuation and displacement of the property inhabitants, and litigation costs are not documented or assumed in the BCA they are difficult to accurately determine.

- The FEMA BCA Toolkit does not have options for calculating multi-hazard mitigation benefit ratios or multi-hazard net present worth values.

- The number of variables involved in adjusting benefit ratios and net present values for global warming impacts were too many and too vague.

CHAPTER 1: STUDY INTRODUCTION

Study Description

Hazards are something we live with everyday. Hazards may impact our lives through our finances, our time, our relationships, our property, and our health. Some hazards are easily avoided and others are not. The best way to avoid the negative impacts of hazards is to mitigate the exposure to the hazard or risk associated with the hazard. But once a disaster happens and the damage is done how can one tell how successful a mitigation effort was? If a second or third disaster or hazard event happens how can one tell if the original mitigation continued to be a beneficial investment? This study intends to determine just that, the cost or benefit of a mitigation that was done on an area subject to multiple hazards.

Multi-hazard mitigation is an action taken to reduce or eliminate long-term risks from two or more natural or human-caused hazards. A hazard is any condition or event with the potential to cause fatalities, injuries, property damage, infrastructure damage, economic interruptions, environmental damage, or other loss.

The analysis area for the Tea Fire BCA (Benefit Cost Analysis) study is subject to multiple hazards including but not limited to: wildfires, landslides, and

earthquakes. A mitigation project was completed where four properties were purchased, any remaining developments removed, then left empty as open space in perpetuity thus removing the exposure to risk. This mitigation was performed with one type of hazard in mind, landslides, but the project ended up mitigating the exposure to risk from multiple types of hazards. The mitigation was tested during the Santa Barbara Tea Fire, a wildfire which burned thousands of acres of Santa Barbara County land in November, 2008.

This study determines the overall benefit of the mitigation project for this incident, and couples that with the benefits determined for the mitigation of exposure to all other possible hazards. Possible implications and future benefits associated with this mitigation and mitigations like this are also explored.

The objectives of the Tea Fire CBA project were twofold: 1.) determine the “loss avoidance” for the 1998 landslide property acquisition mitigation project using a rapid assessment approach; and 2.) to continue refining procedures for the State Mitigation Assessment Review Team (SMART) for entering the field and gathering data. The Tea Fire CBA met the above objectives.

There are three reasons the Tea Fire property acquisition project is analyzed. First, the properties, while purchased to avoid landslide damages, constituted an opportunity to assess a “loss-avoidance” for a multi-hazard mitigation project area due to the Tea Fire. Second, being affected by a documented disaster, the

mitigation projects' forecasted estimates of loss avoidance could be "tested" by a real-world event. Third, the relatively narrow project scope made it suitable for analysis by a single analyst.

Description of Area and Community

The study area is in the Santa Barbara City foothills located in the Santa Ynez Mountains west of the Montecito-Santa Barbara City boundary. The study properties lie between the Sycamore, Coyote, and Mission Canyons. This area is characterized by chaparral, dry brush, oak trees, and narrow, winding access roads. The area overlooks the city and has many ocean views. It has been one of the most sought after and expensive residential areas on the California coastline.

Santa Barbara is a city in Santa Barbara County, California, United States.

Situated on an east-west trending section of coastline, the only such section on the west coast, between the steeply-rising Santa Ynez Mountains and the sea, Santa Barbara has a Mediterranean climate. As of the census of 2000, the city had a population of 92,325 while the contiguous urban area, which includes the cities of Goleta and Carpinteria, along with the unincorporated regions of Isla Vista, Montecito, Mission Canyon, Hope Ranch, Summerland, and others, had an approximate population of 200,000 (City of Santa Barbara, 2001).

Historically, this area has been susceptible to many types of hazards. The City of Santa Barbara as a whole has endured a substantial history of fires, floods,

earthquakes, landslides, toxic spills, and even tsunamis. The first example is the powerful 1812 earthquake and tsunami, one of the strongest in California history, that completely destroyed the Mission as well as the rest of the town; water reached as high as present-day Anapamu Street, and carried a ship half a mile up Refugio Canyon. The next incident was the earthquake of June 29, 1925, the first destructive earthquake in California since the 1906 San Francisco quake, which destroyed much of Santa Barbara and killed 13 or 14 people. The low death toll is attributed to the early hour (6:23 a.m., before most people were out on the streets, vulnerable to falling masonry). While this quake, like the one in 1812, was centered in the Santa Barbara Channel, it caused no tsunami, and most of the damage was caused by two onshore aftershocks (Santa Barbara County, 1979).

An example of an environmental human caused disaster which resulted in State and federal policy was the blowout at Union Oil's Platform A on January 28, 1969. Approximately 100,000 barrels of oil surged out of a huge undersea break, fouling hundreds of square miles of ocean and covering the coastline from Ventura to Goleta, as well as the north facing beaches on the Channel Islands. Two legislative consequences of the spill in the next year were the passages of the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA); locally, outraged citizens formed GOO (Get Oil Out) (Santa Barbara, 2004).

One type of disaster in Santa Barbara that plagues developers and land owners is landslides. The Santa Ynez Mountains are notorious for slope creep and sediment stability issues. In Sycamore Canyon (near the border of Santa Barbara County and the City of Santa Barbara) in the late 1990's a mud flow ripped a home from its foundation and moved it several feet downhill (Santa Barbara, 2004). Just east of the study properties there was a landslide which covered a Caltrans construction area. Furthermore, the study properties themselves are in a landslide threat area.

Lastly, wildfires have plagued Santa Barbara and have done more damage to individual property owners in recent history than any other disaster in the area. Santa Barbara County was proclaimed a state of emergency due to fires four times between the years 1950 and 1997. For example, two separate fires in 1964 burned over 100 square miles of land; the 1964 Coyote Fire burned 67,000 acres of backcountry along with 150 homes; the smaller but quickly moving Sycamore Fire in 1977 burned 200 homes; the disastrous 1990 Painted Cave Fire, which incinerated over 500 homes in only several hours and scorched 7 square miles during an intense Sundowner wind event; and the 2004 Gaviota fires, which burned over 7,400 acres (Santa Barbara, 2004). The Santa Barbara County *Multi-Jurisdictional Hazard Mitigation Plan* places the study area, and much of the city of Santa Barbara in an extreme wildfire threat category. The following table (Table 1) lists nine major wildfires in Santa Barbara County.

Table1: Major Wildfires in Santa Barbara County

Fire	Date	Cause	Acres Burned	Structures Damaged or Destroyed	Deaths
Gaviota Fire	July 2004	Unknown	7,440	1	0
Painted Cave	June 1990	Wildland Arson	4,270	673	2
Wheeler	1985	Unknown	Not Available	26 (Ventura Co. on border)	0
Eagle Canyon Fire	September 1979	Unknown	4,529	N/A	0
Sycamore Fire	July 1977	Kite on power line	806	234	N/A
Romero Fire	October 1971	Incendiary	14,500	N/A	N/A
Polo Fire	March 1964	Power line	586	N/A	N/A
Coyote Fire	September 1964	Unknown	80,000	94	1
Refugio Fire	September 1955	Burning Building	85,000	20	N/A

Source: Santa Barbara, 2004.

These examples give a quick glimpse at the level of exposure to risk property owners have in this area to all types of disasters that include natural and man-made incidents. These examples also show how desirable the area must be given that people are so willing to except such exposure to live there and develop there. These examples however are examples on a large region scope. The examples of multi-hazard threat exposure to the study area in specific are seemingly just as numerous.

Description of Study Properties

The properties that are being studied are in the Santa Barbara City foothills approximately 200 meters west of the Montecito-Santa Barbara City boundary located where Conejo Road and State Highway 192 meet (see Figure 14). State Highway 192 runs near the properties and is one of the major response routes. The properties are on Ealand Place and Conejo Rd. (see Figure 14). The properties were built between 1965 and 1975 (Chicago Title Company, 2009). With overlooking views of the Pacific Ocean, the City of Santa Barbara, and Montecito these properties are in a highly desirable area for residential development. When built, these properties were zoned R-1 which is a designator for single family residential development rights (Tea Fire Updates, 2009). In 1985 a zoning ordinance was instated which deemed the properties undevelopable due to landslide hazard (Tea Fire Updates, 2009). The properties and the developments that continued to exist on them were considered a legal non-conforming use which simply means they were legal due to the fact the structures existed prior to the new ordinance restricting development and, thusly, maintained their existing development rights (Tea Fire Updates, 2009). In 1998, as a single hazard (landslide) mitigation effort, the City offered to purchase any properties in the area that were deemed at risk of landslide. The structures on the property were torn down and left open in perpetuity. Four property owners decided to accept the offer; these are the properties being focused on in this study. The property sizes ranged from 1150 square feet to 1350 square feet.

Comparable and surrounding properties in the area which still have structures on them are comparable in size and value to the study properties assumed current value (this will be discussed more in the mitigation section) (Chicago Title Company, 2009). The four properties have the addresses 21, 29, and 27 Ealand Rd and 494 Conejo Rd (see Figure 14) and are in the Santa Barbara City fire response jurisdiction.

The area that these properties are located in is susceptible to multiple types of hazards. The steep slopes and dry chaparral and oak landscape make it an area especially susceptible to wildfires and landslides. Historically there was a wildfire in the area where these properties were built in 1977 and a small landslide in the area in 1969. Furthermore, there was a landslide in 1997 near the properties (Santa Barbara County, 2004) and in 2006 a landslide just across the small valley (less than 200 meters from the study properties) covered a road which Caltrans was widening. This resulted in litigation and ultimately a payout to local property owners (Tea Fire Updates, 2009). The landslide hazard identified at the site of the study properties was the cause of a landslide monitoring project which resulted in a monitoring site being placed in the center of the cul-de-sac near the study properties (see Figures 2-5). This monitoring point has moved significantly in the past years causing the topography of the terrain and the street to shift significantly (Tea Fire Updates, 2009).

Many of the properties surrounding the study properties are also in landslide hazard areas and are susceptible to property damage in the event of a landslide (City of Santa Barbara, 2001). The property owners of these properties opted out of the offer to have their properties purchased in the 1998 mitigation project however and chose to maintain their properties. These properties, since the passing of the zoning ordinance in 1985 which limited future development on the properties, have been considered “distressed properties.” They cannot be developed on and are at risk to future hazards (City of Santa Barbara, 2001). This designation of “distressed property” decreased the values of the properties, which turned the properties from extremely expensive and unappealing to extremely appealing for those who greatly desired to own land in the area but were unwilling to pay the original asked prices. Many of these purchasers lost their properties in the Tea Fire as you can see in the map of destroyed or burnt properties in the mitigation description section (see Figure 14).

The map below (Figure 1) shows the study area in relation to the watershed in the Santa Ynez Mountains. The map also provides an outline of the burn area which covered areas in both the City of Santa Barbara and the unincorporated County. As displayed in the map the study properties lie in the Sycamore Canyon and are in the City limits.

Tea Fire

Legend

- Debris Basin
- Debris Basin to be Cleaned
- Self-Recording Station
- Alert Station
- Observer Station
- Channel Clearing
- ⊗ Sand Bags - 401 E. Yanonali St.

Watersheds	Acres	% of Burned Watershed
Mission Canyon	183	2%
Laguna	8	1%
Sycamore Canyon	1,686	67%
Montecito Creek	64	1%
City Boundary		
100 year flood plain		
BCA Study Area

Figure 1: Tea Fire Watershed Map. Source: http://www.countyofsb.org/uploadedFiles/ceo/oes/Tea_Fire_Map_11-19-08.pdf

Description of Development and Policy History

The City of Santa Barbara in 2009 has become a slow to no growth city. Many of its policies maintain a zero growth interpretation due to the fragile and unique environments in and around the City. These environments include coastline areas and foothill and mountainside areas which are either protected or sensitive areas. These boundaries and constraints have helped shape the policies and ordinances in the City and County (City of Santa Barbara, 2001).

Policies and ordinances in the study area have changed as hazard awareness has increased. Since the City's incorporation and eventual adoption of zone-

based planning the study properties have been zoned as R1 zoning (City of Santa Barbara, 2001). R1 zoning is generally designated as single family residential development area. During the time this zoning designation was in place the study properties were built (as well as the surrounding properties). At the time hazards were not a primary concern. In fact, at that time the idea and general practice of zoning in Santa Barbara was just getting its foothold. The idea that zoning could be utilized as a policy or ordinance tool to limit the exposure an average citizen or development may have to a given hazard or threat had not likely been heard of, much less utilized. It wasn't until 1985 that zoning in the area became a tool for mitigation.

In 1985 a zoning ordinance was established over many areas in the Sycamore Valley Area (as well as many other areas in the Santa Barbara foothills and mountains) which restricted any further development in landslide hazard areas (City of Santa Barbara, 2001). This left currently existing structures and developments in what is called a legal non-conforming use. This simply means, as stated previously, that there is a structure that legally exists because it was built under a different zoning ordinance, however it does not conform to current zoning restrictions.

Legal non-conforming uses are often difficult to remediate or change in regards to hazard exposure. Even when something like a wildfire or other major disaster destroys the structure there is still the matter of whether the landowner maintains

rights to redevelop. This became a point of contention immediately after the Tea Fire as residents sought to redevelop their parcels of land but found resistance due to current zoning restrictions (Tea Fire Updates, 2009). Remedies to these problems are rarely quick and easy and are often solved in court through litigation. This study does not seek to find a remedy for this dilemma; it is worth simply mentioning for the uninitiated reader.

In 2009, plans exist which help the City progress in such a way to reduce risk and mitigate future hazards. The primary plan used as the vehicle for such mitigation is the Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan. The emphasis of the plan is on the assessment and avoidance of identified risks, implementing loss reduction measures for existing exposures and insuring critical services and facilities survive a disaster (Santa Barbara County, 2004). Plans like this help to identify future risks so future development is not sought in such compromising areas.

In 2009, the concept of hazard mitigation planning has become far more common place in all aspects of planning and development. This will ideally lead to a safer future for all people and property. Additionally, as studies, like this one, are accomplished and the information is synthesized and utilized, programs can hopefully be put in place and implemented to reduce the risk of current development to future hazards.

Some examples of available funding for current wildfire mitigation projects are:

Watershed and Fuels Community Assistance Grants Program-

This program funds projects via Community Assistance Grants (CAG) that reduce wildland vegetation in the central Sierras. These projects are limited to State Responsibility Areas (SRA) for fire protection (Governor's Office of Emergency Services, 2007).

Vegetation Management Program-

The Vegetation Management Program (VMP) provides \$4 million in funds for removal of fuel beds and public benefit efforts. Cities and counties can apply for these funds that are provided annually in the general fund budget (Governor's Office of Emergency Services, 2007).

California Forest Improvement Program-

Funding is available for fuels reduction projects conducted under the California Forest Improvement Program (CFIP). Eligible forest landowners can be reimbursed up to 90% of their expenses for fuels reduction projects conducted under CFIP (Governor's Office of Emergency Services, 2007).

California Fire Safe Councils-

An additional fire mitigation program is operated through the California Fire Safe Councils. These are local councils made up of cross-sections of the community and can apply for grant funding from federal and private entities (such as PG&E) for fuel hazard reduction and education programs (Governor's Office of Emergency Services, 2007).

Table 2 summarizes the total value of projects selected for federal funding through California Fire Safe grant programs for years 2005-2007.

Table 2: California Fire Safe Council Funded Mitigation Project Total Values

Program	Total Value of Projects	
	2005 - 2006	2006 - 2007
Bureau of Land Management (BLM) Community Assistance	\$1,500,000	\$3,100,000
USDA Forest Service Community Protection (CP)	\$2,500,000	\$1,200,000
USDA Forest Service State Fire Assistance (SFA)	\$890,000	\$4,200,000
National Park Service (NPS) Community Assistance/WUI	\$250,000	\$150,000
Total	\$5,140,000	\$8,650,000

Source: The Fire Safe Council

For a more complete wildfire mitigation policy background, a history of wildfire mitigation legislation between the years 1933 - 2006 can be found attached as Appendix F.

Description of Study Area Hazard Mitigation

FEMA has a Pre-Disaster Mitigation Grant (PDM) program. This program allows applicants to compete, according to eligibility (established guidelines to be found in OMB Circular A-94 Guidelines), cost effectiveness, met deadlines, and prioritization, for pre-disaster mitigation project money. This money allows for the completion of mitigation projects that would not otherwise have available funding (Governor's Office of Emergency Services, 2007).

In 1998 a hazard mitigation project was undertaken by the City of Santa Barbara with funding assistance from FEMA (75 percent FEMA share, 25 percent local share) through the PDM program. The project consisted of an offer from the City to purchase properties in the landslide hazard area. The pictures below (Figures 2, 3, 4, and 5) show the landslide hazard in the area. After the property purchase the City would remove any existing structures and restrict any future development, thereby eliminating the landslide threat to property and life. The offer was made and four property owners accepted. The addresses of these properties are 21, 29, and 27 Ealand Rd, as well as 494 Conejo Rd. They were purchased for \$1,060,153.00 collectively at approximately \$200 per square foot (Conejo Slide Area Mitigation, 2009).

Figure 2: Slide Monitor Site. Landslide monitor placed in middle of Ealand Rd. cul-de-sac.

Figure 3: Landslide Effect on Street. Image of Ealand Rd. cul-de-sac looking towards study properties.

Figure 4: Ealand Road Cul-de-sac. View of Reuban Barajas' Property (left) and Ealand Rd. cul-de-sac.

Figure 5: Landslide Remediation Project. View from study properties across canyon to Caltrans landslide site.

When the Tea Fire burned the study area in November 2008, the single hazard mitigation project completed for landslide hazard mitigation in 1998 became a multi-hazard mitigation project due to the fact that the benefits of the project manifested themselves during a secondary hazard (the Tea Fire). It is evident that the project outcome, while intended for one hazard, was in fact beneficial for multiple hazard scenarios. Once the fire had done its damage the single hazard mitigation became a successful multi-hazard mitigation.

In the future, if/when hazards continue to impact this land, whether it be a landslide, an earthquake, or another wildfire, the project will be further solidified as a successful multi-hazard mitigation. This is just one example of how a hazard mitigation project can be more beneficial than ever originally imagined or intended. As the costs and benefits are explored further in this study one will find that this example of unintended multi-purpose benefits provides support and additional justification when proposing future hazard mitigation projects in multi-hazard threat areas.

CHAPTER 2: DESCRIPTION OF HAZARD EVENT

Regional Event Description

It is important to note the definition of wildfire. Wildfires can be classified as either a wildland fire or a wildland-urban interface (WUI) fire. The former involves situations where wildfire occurs in an area that is relatively undeveloped except for the possible existence of basic infrastructure such as roads and power lines. An urban-wildland interface fire includes situations in which a wildfire enters an area that is developed with structures and other human developments. In WUI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the *National Fire Plan* issued by the U.S. Departments of Agriculture and Interior, the urban-wildland interface is defined as "...the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels" (Santa Barbara County, 2004).

The Montecito Tea Fire is a wildfire that began on November 13, 2008, destroying 210 homes in the cities of Montecito and Santa Barbara, California. It was the first of several November 2008 wildfires that burned hundreds of homes November 13–15, 2008. Figures 6 and 8 below show some of the firefighting efforts taken during the Tea Fire. The Tea Fire ignited in the Cold Springs section of Montecito at approximately 17:50 PST on November 13, 2008. The fire started

at a historic structure called the "Tea House" above Mountain Drive, giving the fire its name. Spreading rapidly, it was fanned by offshore winds, known as "Sundowners" that blow down the Santa Ynez Mountains, gusting up to 70 mph. These winds caused the fire to spread into the city of Santa Barbara. Figure 7 below shows the fire progressing down the Santa Ynez Mountains. The fire was 40% contained on the 15th, 75% on the 16th, and by November 18, 2008 it was 95% contained after burning 1,940 acres (Tea Fire Information, 2008).

Figure 6: Morning Firefighting Effort. Source: <http://www.sbcfire.com/fp/hrp.html>

Figure 7: Tea Fire Bird's Eye View. View of the Tea Fire spreading over the mountains towards the city. Source: <http://www.sfgate.com/cgi-bin/object/article?f=/c/a/2008/11/15/mn8v144nus.dtl&o=17>

Figure 8: Night Time Firefighting Effort. Source: <http://www.sfgate.com/cgi-bin/object/article?f=/c/a/2008/11/15/mn8v144nus.dtl&o=17>

Cause

The cause of the fire was under investigation for the first four days when authorities determined on November 17th that it was "human caused". The following day, Santa Barbara County Sheriff's investigators announced that the fire was caused by a group of ten men and women, age 18 to 22, college students, who went to the abandoned Tea House on the night of Wednesday, November 12 and held a bonfire party at the location, through the early morning hours of Thursday, November 13. The students told investigators they had put the fire out, but authorities believe the fire smoldered until the heavy winds ignited the fire on Thursday afternoon (Tea Fire Updates, 2009).

On November 20, 2008, Dr. Andreea M. Serban, President of Santa Barbara City College, issued a statement noting that "nine of the ten individuals identified as

allegedly responsible for the Tea Fire have been confirmed as Santa Barbara City College students" (Tea Fire Updates, 2009) .

Injuries and Evacuations

Santa Barbara County officials stated that they had reports of 13 persons injured, including 10 who were treated for smoke inhalation and three with burn injuries, one of which was critical. There is a foundation for two burn victims of the fire, Lance & Carla Hoffman. Information on this foundation including benefits and donations can be found on the facebook.com group "Tea Fire Survivors: Lance and Karla Hoffman". The fire resulted in the evacuation of 5,400 homes with 15,000 residents. Approximately 2,700 evacuees were back home by November 16, 2008. There was one fatality amongst the evacuees, a 98-year-old man, though the county sheriff-coroner had not ascertained yet if the death was due to the fire or his multiple medical problems (Tea Fire Updates, 2009).

Destruction of 210 Homes

The Tea Fire resulted in the destruction of 210 homes in Montecito and Santa Barbara. Of the destroyed homes, 106 were in the city of Santa Barbara, the remainder were in Montecito (Tea Fire Information, 2008). Figure 9 below illustrates the damage done to homes in the Tea Fire.

Figure 9: Tea Fire Building Remnants. Rubble from one of the 210 homes destroyed by the Tea Fire. Source: <http://www.sfgate.com/cgi-bin/object/article?f=/c/a/2008/11/15/mn8v144nus.dtl&o=17>

Westmont College

The campus of Westmont College was heavily damaged, though no injuries were reported on the campus. The Physics Lab, Psychology Building, and many of the faculty homes were destroyed. The Clark residence hall was severely damaged. With the recovery phase initiated over the weekend, faculty and staff were allowed back on campus November 17th, but the school was scheduled to remain closed to students until December 1st (Tea Fire Information, 2008).

The Mount Calvary Retreat House and Monastery in Santa Barbara, part of the Order of the Holy Cross, was also destroyed (Tea Fire Information, 2008).

Response and Resources

California Governor Arnold Schwarzenegger (as seen in figure 10 below) declared a state of emergency for Santa Barbara County due to the Tea Fire. Schwarzenegger issued a statement that he was "making all state resources available to the fire commanders and was requesting assistance from the federal government as well" (Tea Fire Updates, 2009).

Figure 10: Governor Schwarzenegger Tea Fire Address. Source: http://www.countyofsb.org/ceo/oes/tea_fire_photos.aspx

On November 14, 2008, 1,141 personnel were on the scene, including 260 from CAL FIRE, and 25 fire crews. They were supported by 193 engines, 7 dozers, and 1 watertender. Resources were expanded on November 15 to include 2,235 firefighters and 9 helicopters with cost estimates of \$3.5 million, which increased to \$3.9 million the following day. (Tea Fire Information, 2008)

Staffed from 8 a.m. to midnight, a public information call center was established to provide updates and status reports. Information was made available on the County Government cable TV station, as well as specific AM and FM radios that provided Emergency Public Information. CSBTV Channel 20 ran Live Video Stream (Tea Fire Information, 2008).

San Marcos High School in Santa Barbara became an emergency shelter operated by the American Red Cross, Santa Barbara County Chapter. Earl Warren Showgrounds was opened for large animal evacuees, while small animals could be brought to the Santa Barbara Humane Society in Goleta (Tea Fire Information, 2008).

The map below (Figure 2) highlights the progression of the fire during the course of its four day burn cycle. Note that most of the burning occurred over the course of a single day. This highlights how fast and dangerous a wildfire has the potential to be.

Figure 11: Tea Fire Burn Progression Map. Source: Santa Barbara County, 2008.

Hazard Events At/Near Study Area

The Tea Fire, which had already spent an entire day burning, was well in to its climax when it reached the study properties. One eyewitness, Ruben Barajas, owned the property one parcel to the north of the study properties, 17 Ealand Pl (see figure 14 below). Mr. Barajas was attempting protect his property until it was no longer feasible or safe to do so, but he waited till the last possible moment to flee. Mr. Barajas, having seen the fire and having been a neighbor to the former residents of the study properties, believes that the fire would have absolutely engulfed any structures remaining on the study properties. He stated that, “there

is no way those places would have still been standing. This place was like a fire storm. The winds were so high, and it was so hot. It's a miracle that anything is still left standing." The figures below highlight the damage done by the fire on the study properties.

Figure 12: Property Neighboring Study Properties. Picture of Reuban Barajas Property located next to study properties

Figure 13: Fire Progression Example. Study property, fire progressed across property to hill side in background

During a February site visit it could be seen that the fire swept across most of the properties in the area sparing few. The study properties, which can be seen in the property burn map below (Figure 14), were covered in charred soils, shrubs, trees, and miscellaneous rubble. The pictures in this section highlight some of the extensive damage done to the area. Unfortunately, pictures can only convey a small idea of how bad the damage really was, a true appreciation of the extensiveness of the damage done by the fire could only be attained by a site visit. It is important to note that these pictures were taken two and a half months after the incident. New undergrowth had begun growing by the time these pictures were taken. It is still quite easy however to see a large amount of damage was done, and the study properties were fully engulfed in flames.

Figure 14: Parcel map of Study Area. Properties with dollar signs are the mitigation properties.

Figure 15: Santa Ynez Mountains from Study Properties, looking North.

Figure 16: Study Property Image (29 Ealand Rd)

Near the study area there are many high profile celebrity homes. Some of these celebrities were present during the events of the fire. Rob Lowe, a famous actor, was one of the many fleeing the fire. He stated on November 14th, 2008 during an interview with Oprah Winfrey (also a local property owner in the Montecito area):

"My wife called and said 'Montecito is on fire -- get out'. And I thought she was kidding. We got in the car, pulled out of the driveway and the entire mountain behind was flames 200 feet high - shooting into the air. Embers were raining down, they were in our shirts and in our hair, and the wind was easily 70 mile per hour... it was Armageddon!"

Governor Arnold Schwarzenegger, after visiting the impacted area near the study area was quoted as saying on November 15th, 2008:

"My family and I have come many, many times to the Santa Barbara area. We think it's the most beautiful area. But the area we walked around today looked like hell".

An example of these sentiments can be seen below in a picture (Figure 17) of one of the study properties and the burnt rubble left behind.

Figure 17: Burn Damage on Study Property

CHAPTER 3: COST BENEFIT ANALYSIS

Methodology

The following describes the methodology used for property acquisition loss avoidance determination from the November 2008 Tea Fire event. Most of these involved use of the FEMA BCA Toolkit, a methodology for estimating benefits of mitigation projects. Steps included:

1. Obtain building values before mitigation and fire damage estimates from FEMA BCA Toolkit based on “before mitigation” building and contents values
2. Obtain current comparable building values/Adjust before mitigation building values for inflation
3. Determine burn recurrence in study area
4. Calculate “loss avoidance” and adjust for inflation using FEMA BCA toolkit
5. Add additional avoided losses not assumed in FEMA BCA toolkit (e.g., emergency management costs)
6. Subtract new losses resulting from the project
7. Determine multi-hazard recurrence in study area

All data sources are documented and, where possible and applicable, validated by multiple sources. The findings related to each step follow:

(1) Obtain building values before mitigation and fire damage estimates from FEMA BCA Toolkit based on “before mitigation” building and contents values.

The value of the buildings before the mitigation is defined as 4 homes X 1300 square feet X 200 dollars per square foot (where 200 dollars a square foot was the median building cost obtained at the time of mitigation by the City of Santa Barbara) which equaled \$1,040,000.

Furthermore, there is a contents value associated with the properties defined as building value (\$1,040,000) X .3 equaling \$312,000. This value must be accounted for as it is considered part of the total compensation value after a disaster event.

The total fire damage estimate and the value of buildings, and their contents before mitigation equaled \$1,352,000 (See BCA Chart, Table 3).

Data Sources: City of Santa Barbara Cost Benefit Analysis Report, Chicago Title Company, County Assessor Data.

(2) Obtain current comparable building values/Adjust before mitigation building values for inflation.

The 2008 comparable building values range from 250 dollars per square foot to 350 dollars per square foot. At the lowest value of 250 dollars per square foot

multiplied by 1300 square feet (average project home size) multiplied by four properties the 2008 value of these buildings would be \$1,300,000.

The building value combined with the value of the contents associated with the properties is defined as building value (\$1,300,000) X .3 which equals \$390,000.

The total value of the buildings, and their contents at 250 dollars per square foot, is \$1,690,000.

However, at the highest value of 350 dollars per square foot multiplied by 1300 square feet (average project home size) multiplied by four properties the 2008 value of these buildings would be: \$1,820,000.

The building value combined with the value of the contents associated with the properties is defined as building value (\$1,300,000) X .3 which equals \$546,000.

The total value of the buildings, and their contents at 350 dollars per square foot, is \$2,366,000.

Using the FEMA inflation calculator to determine the current building values for comparable buildings based on the before-mitigation building values one gets a 2008 building value of \$1,431,217. This is a per square foot cost of approximately \$275. Under this assumed building value the contents value would

then be \$429,365. All together, the 2008 building plus contents value according to the FEMA inflation calculator is \$1,860,582.

For this study, the FEMA inflation calculator amount of \$1,860,582 is used as the estimated damage amount because it is at the lower end of the comparable building value scale and complies with the FEMA BCA Toolkit calculations and assumptions.

Data Sources: Chicago Title Company, County Assessor Data.

(3) Determine burn recurrence in study area.

The burn recurrence frequency (how often an area burns over a given amount of time) for a chaparral fire regime is 25 years. However, this is a standard rate that does not take in to account changing environmental conditions such as global warming

Data Sources: FEMA standard recurrence intervals.

(4) Calculate “loss avoidance” and adjust for inflation using FEMA BCA Toolkit.

The FEMA BCA Toolkit calculates a total average annual damages and losses avoided benefit by determining the recurrence for a particular hazard and assigning it a ratio of probability for each year. It then divides the total values of the property and contents by that ratio. In this example, there is a burn

recurrence of 25 years. This means there is a 1 in 25 chance that the area will burn with a total loss of the buildings and the property. In this case the total values of the property and contents during the fire would have been \$1,860,582. Divided by 25 this amount equals an average annual damage and loss expenditures avoided amount of \$74,423. When this number is coupled with the average annual deaths and value of life lost programmed in to the FEMA Toolkit (See BCA Chart, Table 3 on page 49), as well as the injuries, the total average annual damage and loss expenditures avoided benefit is \$74,458. Since the mitigation was performed in 1998, in 2008 at the time of the Tea Fire if you were to multiply the total average annual damages and losses avoided amount by the number of years that had passed which was ten, then there would be an assumed avoided expenditures amount of \$744,580.

If the landslide project life of 100 years were assumed to be the recurrence ratio, then it can be assumed that instead of four wildfire events happening over the course of 100 years we would have five multiple hazard events happening within that 100 year range, making the recurrence ratio 1 in 20. That additional hazard increases the annual losses avoided estimate to \$93,064. The Toolkit does not take this in to account however.

The assumption of assumed avoided expenditures, accumulated or annual, does not take in to account inflating or deflating property values, or yearly inflation. Knowing that the building values in 1998 were less than they were when the Tea

Fire event happened one would have to make an annual adjustment for inflation for each year that had passed to find the annual avoided benefits through 2008 and the total net present value of benefits. The FEMA BCA toolkit assumes a discount rate of 7 percent as well as a present value coefficient of 14.27. Figuring this discount rate and coefficient in to the total average annual damages and losses avoided benefit of \$74,458, the new total accrued avoided expenditures, or net present value of benefits equal \$1,062,455.

However, the data show that the amount of expenditures actually avoided was much higher than the Toolkits' assumed benefits because the avoided expenditures actually equaled the full 2008 value of the buildings and their contents. Instead of a net present value of \$1,062,455 the present value of the benefits is the total 2008 building and contents value of \$1,860,582. However, one will find that the actual amount saved is much greater when ancillary and non-assumed costs are incorporated into this amount.

(5) Add additional avoided losses not assumed in FEMA BCA Toolkit.

While it is difficult to assume an exact monetary value for things like displacement or response, there are a myriad of additional expenditures associated with any type of disaster that cost stakeholders money. Whether it's a week in a hotel for a property owner evacuated, tax dollars spent to provide fire fighting resources in a wildfire, medical expenses for those injured in any

incident, or any other miscellaneous expense there are incalculable costs for all stakeholders when it comes to disasters.

In this particular scenario some of the costs avoided due to the mitigation effort include the costs of response to the project properties, evacuation and displacement of the property inhabitants, litigation, medical expenses for possible injuries, and, of course, loss of life. These costs were all avoided due to the 100 percent mitigation of exposure to risk resulting from the property acquisition. It is safe to say that whatever amount established as the total benefit is significantly less than the actual amount saved. A definitive number, however, cannot be established or assigned to this area due to the many considerations and possibilities involved.

Litigation, which can often cost municipalities a great deal, is completely avoided for property owners that would have otherwise been occupying properties acquired in a mitigation effort. Whether or not the local government has culpability or not is not necessarily known or determined here. Regardless of the party at fault in a given scenario, the costs of litigation are avoided when acquisitions are completed.

(6) Subtract new losses resulting from the project.

Due to the fact that there were no improved, changed, or significantly modified infrastructure or buildings (besides the removed buildings, which actually

reduced the fire fuel load in the project area thus reducing the intensity of the fire in the project area) there are no new losses associated with the property acquisition project.

(7) Determine multi-hazard recurrence in study area.

This area is susceptible to many different types of hazards. The City of Santa Barbara as a whole has endured a substantial history of fires, floods, earthquakes, landslides, toxic spills, and even tsunamis. In the project area wildfires, landslides, earthquakes, and other human caused disasters are common. It is difficult to accurately define the recurrence of landslides (the Toolkit default of 1% annual probability is not accurate), but many have happened in this area, and these properties are in an area highly susceptible to landslides. Earthquakes are also frequent in this area and increase the possibility of the occurrence of other threat hazards.

If the total destruction annual threat ratio or probability of recurrence for wildfire is 1 in 25 as discussed above, it would be safe to assume that this ratio could be increased significantly if combined with earthquakes and landslides and miscellaneous events. It might be a 1 in 20 or even a 1 in 15 probability. If this is the case, then it can be assumed that the total average annual damages and losses avoided benefit value would be higher than the \$74,423 annual value currently assumed for this project. In fact, if the landslide project life of 100 years were assumed to be the recurrence ratio then we can assume that instead of 4

wildfire events happening over the course of 100 years we would have 5 multiple hazard events happening within that 100 year range which would make the recurrence ratio 1 in 20. That one additional hazard increases the annual losses avoided estimate to \$93,064.

It should also be noted that there are many studies, some of which performed by the Climate Assessment Team (discussed in the implications section), which assert that there will be an increase in frequency of all of these types of disasters as a result of global warming (California Climate Action Team, 2009). Under this assumption the benefit value will once again increase and the probability of incident increase as well.

Another study, completed by the Burn Area Response Team in December 2008 on the Tea Fire site, determined that disasters, like the Tea Fire, drastically increase the severity and frequency of subsequent disasters of all different types (Burn Area Response Team, 2008). This also increases the benefit of a mitigation designed to mitigate for multiple disaster events. These costs are also not calculated by the FEMA BCA Toolkit.

Table 3: Benefit-Cost Analysis of Tea Fire Mitigation Project

Benefit-Cost Analysis of Fire Mitigation Projects			
Beta Version 06.1, March 6, 2006			
Project	Santa Barbara Tea Fire Property Buy Out BCA		
Project Number	1		
Applicant			
Analyst	David S Flamm		
Scenario Run ID	#1	File Name	SBTF
Date	3/15/2009		
Project Description	Calculating the benefits of acquiring homes that would have burned in the Santa Barbara Tea Fire Project Cost = Approx \$200/sf x 1300 sf/house x 4 houses + Misc costs= 1.06M The burn Recurrence interval for chaparral fire regime is 25years		
FIRE HAZARD DATA			
3	Sample area (square miles) of similar fire hazard		
2,000	Sample area (acres) of similar fire hazard		
2,000	Total acres burned in sample area in defined time period		
25	Number of years for above acres burned data		
80	Average acres burned per year		
0.04	Annual Probability of Burn	Burn Recurrence Interval	25 years
		User-defined Burn Recurrence Interval	25 years
		Burn Recurrence Interval Used in Calculations	25 years
	User-defined burn recurrence intervals must be FULLY documented.		
	Insert notes below and attach full documentation of methods and data.		
Documentation	4 homes x 1300 sf x \$200/sf= \$1.04M (adjusted for inflation = \$1,431,217) Content = \$1,431,217 x .3= \$429,365 Death and Injury is FEMA Default 2.5 Residents/structure x 4 structures = 10 residents		
DAMAGES AND LOSSES PER FIRE BEFORE MITIGATION			
\$1,431,217	Building Value	NOTE: all entries in this section are ONLY for area directly affected by the proposed mitigation project Acquisition has a project life of 100 years Project effectiveness for acquisition is 100%	
\$429,365	Contents Value		
\$0	Infrastructure		
\$0	Timber Value		
\$0	Fire Suppression Costs		
\$0	Other		
\$1,860,582	TOTAL		
10	Number of Residents		
\$74,423	Average Annual Damages and Losses	Annual Death Rate per 1,000,000	
0.0001000	Average Annual Deaths	1.00	See Guidance
0.00010000	Average Annual Injuries	Statistical Values	
\$33	Dollar Value of Annual Deaths	\$3,332,958	
\$1	Dollar Value of Annual Injuries	\$10,552	(average of minor, major injuries)
\$74,458	Total Annual Losses Before Mitigation		
EFFECTIVENESS OF MITIGATION MEASURE			
100%	Percent reduction in damages, losses, and casualties		
\$0	Total Annual Losses After Mitigation		
BENEFIT-COST RESULTS			
\$74,458	Annual Benefits		
100	Mitigation Project Useful Lifetime (years)		
7.00%	Discount Rate		
14.27	Present Value Coefficient		
\$1,062,455	Net Present Value of Benefits		
\$1,060,153	Mitigation Project Cost		
\$0	Annual Maintenance Cost		
\$0	Net Present Value of Annual Maintenance Cost		
\$1,060,153	Total Mitigation Project Cost		
\$2,302	Net Benefits		
1.002	BCR		

(FEMA, 2006)

Single Hazard Mitigation Findings

In regards to single hazard (wildfire) mitigation, the project resulted in an annual avoided expenditure of approximately \$74,458 for every year a fire didn't occur. If the acquisition had been done with the intention of avoiding wildfire expenditures the anticipated breakeven date would have been approximately 14 years after the project had been completed. At this 14 year point the annual expenditures avoided would have equaled the original mitigation cost of \$1,060,153. However, since a wildfire burnt the properties only ten years after the acquisition had been completed the project paid for it self 4 years early. This resulted in 4 years of the annual avoided expenditure of \$74,458 becoming an additional avoided expenditure of \$297,832 for the ten years between the mitigation and the fire, or, if broken down annually, an additional \$29,783 of annual avoided expenditures.

The overall ten-year benefit, or avoided expenditure, for this mitigation is \$1,860,582 as that is the assumed value of the buildings and the contents of the buildings at the time of the fire. The cost of the mitigation was \$1,060,153 so the overall benefit ratio for this one event is 1.75:1 (1.75 being the benefit and 1 being the cost). However, as mentioned above, this does not include additional non-assumed avoided expenditures such as dislocation costs, evacuation costs, tax dollars spent to provide fire fighting resources in a wildfire, medical expenses for those injured in any incident, litigation costs, loss of life costs, or any other miscellaneous expense. It is easy to see how a 1.75:1 ratio could quickly become

a 2:1 or 3:1 ratio, or even greater. It should be assumed that the total amount of avoided expenditures definitely exceeds the expenditures of property damage avoided alone.

Furthermore, since the assumed building value for the overall mitigation avoided expenditure was \$275 per square foot, but the comparable building values in the area range from \$250 to \$350 per square foot, it is important to evaluate the benefit ratio at these lowest and highest ends of the building value scale (contents values included). At the low end of the comparable building value scale of \$250 per square foot the overall avoided expenditure amount is \$1,690,000 with a benefit ratio of 1.55:1. While at the high end of the comparable building value scale of \$350 per square foot the overall avoided expenditure amount is \$2,366,000 with a benefit ratio of approximately 2.25:1. These ratios and dollar figures however do not include the additional non-assumed avoided expenditures discussed above however.

It appears that the overall benefit ratio of this mitigation ranges between 1.55:1 at the very lowest end, to 2.25:1 at the highest, based purely off of building value and content value expenditures avoided. These ratios however do not take in to account any of the additional non-assumed avoided expenditures discussed above. If one were to try to account for all avoided costs not considered the benefit ratio would most certainly be closer to 3:1 or 4:1. Adam Rose, et al. (2007) conclude in a benefit-cost assessment for Hazard mitigation grants that,

“The benefits from mitigation grants are greater than just the benefits that can be measured and valued in monetary terms.” This continues to highlight the fact that many non-assumed or assumed but uncalculated benefits exist in any mitigation project.

It should be noted that the primary reason the ratios above appear to be so beneficial is due to the rising building costs, property values, and inflation during the years between the mitigation completion and the Tea Fire. However, had the housing, building, and property markets began declining and the economy assumed a deflationary cycle after the mitigation was completed the ratios would most certainly be less appealing. If one were to take in to account all of the non-assumed avoided expenditures discussed above however, the benefit ratio may still remain positive even in a deflationary market.

Multi-Hazard Mitigation Findings

The findings from the BCA show that there is a substantial amount of expenditures avoided when property buyouts are performed in areas subject to single hazards. The benefits are on the order of a 1.55:1 ratio at the very least, and as much as 3:1 or 4:1. However, in an area subject to multiple types of hazards this ratio may be increased, especially when the hazard events tend to happen relatively frequently. In an area subject to multiple hazards the benefits begin to compound quite quickly for all stakeholders. Adam Rose, et al., (2007)

state that most FEMA grants studied during a ten year period had benefits four times greater than the costs. The findings reflected in the Rose studies are similar to those reflected in this study.

The Tea Fire property acquisition mitigation is considered a multi-hazard mitigation because firstly, it was originally intended to reduce the exposure to risk that the buildings on the properties had to landslide hazards, but ended up reducing the exposure the buildings on the properties had to wildfire thus making it a mitigation for two types of hazards. Secondly, the mitigation being a property acquisition which completely removed the buildings actually reduced the exposure of said buildings completely, from any type of hazard. In a way it is the ultimate multi-hazard mitigation.

To highlight the increased benefits of a property acquisition in a multi-hazard threat area it is key to mention the annual benefits calculation in the FEMA BCA tool kit. To determine the annual benefits or avoided expenditures the tool kit divides the estimated total losses by the recurrence rate for the specific type of disaster. So for wildfire in the study area the recurrence frequency is 25 years meaning it is likely to happen once every 25 years. So, if the total estimated expenditure avoided is \$1,860,582 one would divide by 25 to determine the annual benefit (this is explained in more detail in the methodology section). Doing this calculation one finds the annual benefit to be \$74,458. However, if one were to evaluate the frequency of any or all types of disasters happening in the area,

which is subject to multiple types of hazards as discussed above, the frequency would increase from once in 25 years to some more intensified amount not specified, it would probably be more like once every 20 or 15 years. This increases the total annual benefit of the mitigation.

SMART Findings

CalEMA is transitioning from its current approach for identifying loss avoidance to the State Mitigation Assessment Review Team (SMART), a new system and strategy by which the State will assess completed mitigation actions and establish a record of the effectiveness (actual cost avoidance) of the mitigation actions. The SMART system is modeled after the in-place CalEMA Safety Assessment Program (SAP) system, which provides preliminary damage estimates after disaster and the recently completed FEMA “Loss Avoidance Study: Southern California Flood Control Mitigation,” HMTAP Task Order 393 (April 2007) (Governors Office of Emergency Services, 2007).

SMART system objectives are to assess the outcome of previously funded mitigation projects in a disaster area by: 1) ascertaining loss avoidance performance at a given level of intensity of an event and 2) identifying effectiveness of mitigation practices. This is to be done by on-site review and documentation of loss avoidance based on the project Benefit-Cost Analysis (BCA). The SMART system will also have value in assisting CALEMA to prepare

new Governor's proclamations and request federal declarations by including loss avoidance data as part of those processes. (Governors Office of Emergency Services, 2007).

This project met the SMART objective by using the SMART methodologies to determine the loss avoidance performance for this property acquisition mitigation based on a level of intensity consistent with a total loss. This project also met the objective by identifying the effectiveness of property acquisitions as a whole. The findings for single and multi-hazards show that the loss avoidance for this project is high, ranging between 1.55:1 and 2.25:1 for a single hazard mitigation and as high as 4:1 (or higher) for a multi-hazard mitigation. The effectiveness of the mitigation practices used on this site is relatively easy to determine, as there is no new structure or development to evaluate. The effectiveness of this type of mitigation and this mitigation in general is 100 percent effective.

It is important to note that the effectiveness of this type of mitigation may be dependant on scale. While this project was a 100 percent success, the same type of mitigation in a large or different area may not be as effective. A threshold for property acquisition justification may need to be established.

Recommendations are made for justification thresholds in the implications section.

It is also important to note that the private vs. public benefits issue would have to be evaluated in much greater detail before taking on an acquisition mitigation on a larger scale. In fact, this issue should always be evaluated when considering property acquisitions as a mitigation measure. There may be significant negative public sentiment if it is determined that the primary benefactor for a property acquisition is a private agency. This is why multi-hazard mitigation analysis tools should be made available for SMART analysts. In the case of this study the primary beneficiary for single hazards is the private insurance provider, while the public becomes a justifiable beneficiary after multiple hazards are evaluated.

The Tea Fire provided a unique opportunity to do a first-time SMART analysis on a project considered to be a multi-hazard mitigation. It also provided a chance to evaluate property acquisitions as multi-hazard mitigations. The opportunity to analyze a multi-hazard mitigation using the SMART method presented opportunities to the program and challenges to the analyst. Most importantly, however, it provides the California Emergency Management Agency and the CSU system a framework for future multi-hazard analysis and for improvement through the SMART methodologies to reach its objective in future studies.

FEMA BCA Toolkit Findings

The FEMA BCA toolkit used to help evaluate the net present values and benefit ratios is a fantastic tool for evaluating the benefits of a future conventional

mitigation project pertaining to a single hazard. However, it proved to be less useful for evaluating and calculating benefit ratios and net present values for property acquisitions in a multi-hazard threat area, for a historic hazard event, and a historic mitigation project. To alleviate some of these shortfalls it would be useful if FEMA, or other agency, would create a tool kit specifically designed to evaluate the benefits of a multi-hazard mitigation project. Furthermore, it seems plausible that a mitigation for one hazard generally, in some form or another, will reduce exposure to at least one other type of hazard. If this assumption is at all valid then the FEMA BCA tool kit is currently assuming net present values and benefit ratios that are probably lower than they actually are. This may not always be the case, but it bears looking in to if one is considering pursuing a mitigation effort.

The toolkit does not delineate between benefits to the private side and the public side which seems to be a huge deficit in the benefits of this toolkit. This is a problem whether one is doing an analysis on a future project or a cost benefit analysis on a past project. It is important to know who is receiving the benefits from a given project to determine who has the largest stake, and possibly who should provide assistance or funding for the project. For example, the study properties, if evaluated on a private vs. public benefit basis, would prove to be a huge benefit to private insurance companies, in regards to a single hazard mitigation. The FEMA BCA Toolkit doesn't highlight this important fact however.

The toolkit does not take in to account inflationary building costs or values. Furthermore, it calculates a discount rate which ends up reducing the overall benefit, or avoided expenditures. So, while running the tool kit as an evaluation tool of the success of a mitigation project which was tested during an actual event it was difficult because it was calculating net present value instead of actual amount of total expenditures avoided, which resulted in a significantly lower benefit cost ratio and total value than the mitigation actually provided. In other words, it is a powerful tool for prediction and future estimation; however, it is not the best tool for retroactive benefit cost analysis. It would be nice if an analyst could turn off the net present value and discount rate calculations in the CBA Toolkit to more accurately determine the actual avoided expenditures.

The FEMA BCA tool kit does not evaluate the possible benefits of a multi-hazard mitigation. There is no program calculation that determines the total benefit ratio or the net present worth of a mitigation project which reduces risk exposure to multiple hazards. This makes it difficult to determine what the value is for a mitigation project proposed which reduces risk to multiple threats. It is safe to assume that any project which reduces risk to multiple types of disasters has a greater value than that of a project that reduces risk and exposure to only one type of hazard.

Another issue with the toolkit is that it doesn't calculate all of the "social benefits" involved with a mitigation project. In the FEMA BCA Toolkit there is a guidance

document titled “What is a Benefit?.” This document helps to define “social benefit” by stating:

The goal of FEMA’s hazard mitigation program is to reduce the impacts of natural disasters on affected communities. In this context, it is very important to note: The benefits considered in benefit-cost analysis are the benefits to the community, not just the benefits to FEMA or the federal government. (FEMA,2006)

This same document also references the Office of Management and Budget (OMB) Advisory Circular A-94 (Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs) which provides explicit guidance on what benefits to count:

Analyses should include comprehensive estimates of the expected benefits and costs to society based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the federal government, should be the basis for evaluating Government programs or policies that have effects on private citizens or other levels of Government. (FEMA,2006)

This OMB guidance means that benefits must always be counted from the perspective of the affected community, not from the perspective of FEMA or the federal government. Thus, for benefit-cost analysis of hazard mitigation projects, a broad range of benefits may legitimately be counted, even if Federal programs do not address or actually compensate for the damages when they occur. It is interesting that this guidance document defines what benefits should be included in a Benefit Cost Analysis but the toolkit itself doesn’t give the analyst any opportunity to include these benefits in the BCA analysis.

CHAPTER 4: IMPLICATIONS

The implications of this study broach many topics. When looking at the impacts of a study or the benefits of a project of this scope it is wise to ask one's self questions about the study and the process to maintain focus during the course of progress. The questions that are most germane to this study seem to be: Who will be using or reading this study? Who stands to benefit from this mitigation? Who stands to benefit from this study? How will this information change policy? How will it change day to day operations? What possible future events may change the results of this study? How long are the results of this study relevant? Is the scope of the study applicable on a macro and micro scale? How effective were the tools used in this study? And how can these tools be refined or improved? These questions, and the answers to them, will affect the way a person uses and synthesizes the information in this study. It is for this reason that they will all be addressed in this section.

The first question of who will be using and/or reading this study is a question of target audience. This study addresses issues that urban and regional planners, emergency managers, policy makers, insurance companies and agencies, environmental engineers, civil engineers, landscape architects, response personnel, and homeowners should all be aware of. Accordingly, the target audience is anyone that associates themselves with any of these parties loosely or strictly. Reviewing this study prior to embarking on a mitigation project,

planning for development, preparing for response and prioritizing key response facilities and areas, or just purchasing a home can be a beneficial endeavor. Furthermore, policy makers reviewing or creating policy in regards to hazards, development, or mitigation will find this study particularly beneficial.

There are many beneficiaries when a property acquisition mitigation project is undertaken. The primary benefactor or stakeholder receiving benefits from this type of project is the insurance provider, when evaluated on a single hazard or event scale. This brings up a moral dilemma, should public tax dollars be invested to provide financial benefits to private insurance companies?

Furthermore, should the majority of tax payers in a given area have to pay higher taxes so that the City can provide emergency services to the few people living in particularly hazardous areas? Should the hazardous property owners have to pay a higher tax amount? Should the private insurance companies have to pay a portion of the mitigation project costs? These are the types of questions that need to be asked when dealing with property acquisitions. It is important to note that the insurance provider may actually be the American taxpayer depending on where the properties are (FEMA reimburses insurance providers in flood zones and flood events). Furthermore, as more and more events, or types of events happen in one area the response costs, displacement costs, avoided litigation costs, and other non-assumed avoided expenditures saved end up adding up to a significant amount of money which taxpayers aren't burdened with over time. After just a few events the mitigation will have paid for itself in tax dollars alone.

Adam Rose, et al. (2007) conclude that, “Federal investments in mitigation benefit society. Societal benefits of Grants made between 1993 and 2003 were four times greater than the cost.” The same study also concludes, as stated in the findings, “The benefits from mitigation grants are greater than just the benefits that can be measured and valued in monetary terms.” These findings and conclusions support the idea that there are many beneficiaries in relation to a given mitigation project, some of which may not even realize they are benefiting.

In areas proven to be subject to multiple hazard types and events property acquisitions may become more appealing to insurance companies, as well as federal, state, and local governments. Property owners will likely find acquisitions more agreeable as their exposure to threats is more clearly identified as well. This study in comparison with federal studies completed by FEMA (Rose, et al. 2005) shows that property acquisitions are comparably beneficial with most other mitigation projects and activities completed. Other studies show that, “for every dollar spent on hazard mitigation, four dollars are provided in future benefits.” (Rose, et al. 2005). This is a comparable amount to the overall future benefit, or avoided expenditure, of this property acquisition when evaluated on a multi-hazard platform.

While it is difficult to predict exactly how much more frequent hazards will be, or exactly what type and in what areas, it is largely agreed upon that global warming

will intensify the scope, devastation, and frequency of hazards. As this frequency increases private insurance companies may begin to consider it too risky or not lucrative enough to offer property owners in high hazard threat areas coverage, much like the current circumstances in high flood threat areas where FEMA subsidizes the private insurance companies so that they can provide insurance to property owners. Eventually, the public may be subsidizing insurance in all types of high hazard development areas which will make property acquisitions far more justifiable. The implications of this prospect are vast, which is why mitigation projects, like the Santa Barbara property acquisitions, are going to become more and more lucrative and sought after. In the future it may make sense to make large scale purchases of properties in threat areas to reduce the necessity to maintain response personnel, infrastructure, and resources, as well as reduce continual response costs, and most importantly, reduce exposure of people to the threat of loss of life. The benefits to multi-hazard mitigation, and in some cases property acquisitions, are many and the cost of not doing them is vast.

The California Climate Action team released a draft report in March 2009 addressing climate change issues and effects in California. The study highlights many areas where disasters and hazards will become much more intense and frequent. In regards to wildfires in specific the study states:

“Westerling et al. (2008) constructed a statistical model of wildfire as a function of climate and land surface characteristics in California. Their model predicts the monthly probabilities of large fires occurring on a one-eighth degree latitude/longitude grid

(approximately 7.5 by 7.5 miles) over California. This work expands on an analysis by Westerling and Bryant performed for the 2006 Assessment that considered the effects of climate change on California wildfire and wildfire-related damages ... Model results suggest increases in wildfire, although the range of outcomes is large and expands with time. The long-term increase in fire occurrence associated with the higher emissions pathway is substantial, with increases statewide ranging from 58 percent to 128 percent by 2085. Likewise, estimated burned area increased 57 percent to 169 percent ... The results show that fire probability is likely to increase multiple times in the extreme North and Northwest of the State, as well as in the Central California Coastal Ranges, the high Sierra, and different regions in southern California.” Climate Action Team, (2009).

This assessment shows how frequency for wildfires and associated hazards may increase dramatically due to global climate change effects. The study addresses other types of hazards with similar results. These results highlight the increased benefit stakeholders may find through mitigation endeavors (Climate Action team, 2009).

The relevancy of this study will increase as hazards become more frequent, populations become larger and denser, and climate change continues to take affect. Furthermore, as mitigation becomes more widely practiced, understood, and utilized examples like this will serve as the foundation for which future mitigation projects are based on. Policy makers will rely heavily in the future on such studies to establish policies that address all the stakeholder needs and the welfare of future development and infrastructure.

A topic of scale needs to be addressed when discussing acquisitions. Whether acquisitions would work on a large scale level, like a neighborhood perhaps, is difficult to say. There are many more factors to analyze like local economic impact and dislocation costs. There are many types of hazard mitigation strategies, all of which should be explored before choosing property acquisitions as the primary mitigation strategy in a given area. Acquisitions should be considered in areas where property has a threat exposure which would result in eminent total loss from at least one type of disaster, ideally multiple types of disasters. While the single hazard benefit cost ratio for fire properties in the area may be higher than that of landslides, it may be difficult to justify acquiring all the properties subject to fire damage. However, if one were to evaluate all the properties in the area subject to multiple hazards, fires *and* landslides for example, someone may then be able to find a justifiable number of properties to acquire; this would be a good example of a threshold for justification.

BIBLIOGRAPHY

- 1.) California Climate Action Team. 2009. Biennial Report. Draft.
- 2.) City of Santa Barbara. 2001. *Santa Barbara General Plan*. City of Santa Barbara, California.
- 3.) Chicago Title Company. 2009. Cyberhomes.com Profile Report. Offered by Chicago Title. <http://ctt.sitexdata.com/CyberprofProxy.asp?RepMask=2-1>
- 4.) Conejo Slide Area Mitigation. 2009. City of Santa Barbara.
- 5.) Governor's Office of Emergency Services. 2007. State Hazard Mitigation Plan. OES. Sacramento, California.
- 6.) Governor's Office of Emergency Services. (2007). State Hazard Mitigation Plan. OES. Sacramento, California. Wildfire Hazard Mitigation Legislative history (1933-2006)
- 7.) Federal Emergency Management Agency. 2006. CBA Toolkit.
- 8.) Santa Barbara County. 2004. Multi-Jurisdictional Hazard Mitigation Plan
- 9.) Santa Barbara County. 2008. Burn Area Response Team (BART) Report.
- 10.) Santa Barbara County. 2008. Fire Progression Maps.
- 11.) Santa Barbara County. 1979. Comprehensive Plan. Safety Element.
- 12.) Santa Barbara County. 2009. Assessor Parcel Data for Study Properties.
- 13.) Rose, Adam et al. "Benefit-Cost Analysis of FEMA Hazard Mitigation Grants". *Natural Hazards Review*. ASCE. November 2007
- 14.) Rose, Adam et al. "Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities". Multihazard mitigation Council. National Institute of building Sciences. 2005.
- 15.) Tea Fire Information. 2008. Tea Fire.
<http://www.countyofsb.org/ceo/oes0.aspx?id=2332>
- 16.) Tea Fire Updates. 2009. The Santa Barbara Independent. Tea Fire.
<http://www.independent.com/news/tea-fire/>

APPENDIX A: GOVERNOR EXECUTIVE ORDER TO HELP FIRE VICTIMS

Office of the Governor

ARNOLD SCHWARZENEGGER
THE PEOPLE'S GOVERNOR

PRESS RELEASE

11/18/2008 GAAS:788:08 FOR IMMEDIATE RELEASE

Governor Schwarzenegger Issues Executive Order to Help Fire Victims

Governor Arnold Schwarzenegger today signed an executive order to waive fees and help recovery efforts for the victims of the devastating fires in Los Angeles, Orange, Riverside and San Bernardino and Santa Barbara counties.

Yesterday, the Governor announced that a one-stop local assistance center will open in Orange County today to provide services from local, state and community based agencies to those affected by the Freeway Fire. The Governor also sent a letter to the President yesterday requesting a Federal Disaster Declaration to help Californians cope with the effects of these unprecedented wildfires.

The Governor declared a state of emergency yesterday in San Bernardino County and on Saturday in Orange and Riverside counties as a result of the Freeway Fire. He also declared a state of emergency in Los Angeles County as a result of the Sayre Fire. On Friday, the Governor declared a state of emergency in Santa Barbara County as a result of the Tea Fire.

The full text of the executive order follows:

EXECUTIVE ORDER S-15-08 By the Governor of the State of California

WHEREAS due to the destruction caused by the wind-driven wildfires beginning on November 13, 2008, I proclaimed a State of Emergency to exist in the Counties of Santa Barbara, Los Angeles, Orange, Riverside and San Bernardino; and

WHEREAS these fires caused harm to people and property, burned thousands of acres, damaged or destroyed homes and other structures, caused evacuations, and caused damage to resources and watershed; and

WHEREAS these fires caused the loss of valuable personal and business records; and

WHEREAS the people who lost or sustained damage to their homes, property, businesses or places of employment, may need to obtain or replace important government records such as certificates of birth, death, fetal death, or marriage, as well as marriage dissolution records, driver's licenses, identification cards, vehicle registration certificates, and certificates of title, to obtain assistance from federal, state and local governmental agencies, make claims for and collect insurance, find new employment, and for other purposes related to losses suffered in the

fire; and

WHEREAS those who need to obtain or replace important government records to mitigate their losses and rebuild their lives as a consequence of the fires require immediate assistance from state and local governmental agencies to replace those records; and

WHEREAS existing law requires the Office of Vital Records of the Department of Public Health, along with local registrars, county recorders and county clerks, to impose fees upon persons requesting copies of certificates of birth, death, fetal death, and marriage, and marriage dissolution records, and existing law requires the State Department of Motor Vehicles to impose fees upon persons requesting replacement driver's licenses, identification cards, vehicle registration certificates, and certificates of title; and

WHEREAS existing law requires the State Department of Motor Vehicles to impose late fees on persons who are late in renewing their vehicle registration or late in transferring ownership of a vehicle; and

WHEREAS the State Department of Housing and Community Development administers the Manufactured Housing Act pursuant to which the Department has adopted regulations imposing fees for plan checking, inspections and related fees; and

WHEREAS the State Department of Housing and Community Development administers the Mobilehome Parks Act pursuant to which the Department has adopted regulations imposing fees for inspections and related fees; and

WHEREAS the suspension of statutory and regulatory requirements for imposition of fees would assist fire victims; and

WHEREAS the State Employment Development Department and my Office of Emergency Services estimate that numerous workers are, or will be, unemployed as a result of the fires and are in need of immediate financial assistance; and

WHEREAS the suspension of the statutory one-week waiting period for unemployment insurance applicants who are unemployed due to the fires would provide these unemployed workers with immediate financial assistance; and

WHEREAS the fires have created a substantial amount of structural and vegetation debris, and the potential for erosion and contamination of important watersheds; and

WHEREAS I have ordered the California National Guard to provide support to fire fighting efforts and the California Military Department, through the California National Guard, has the capability to protect the lives and property of the people of the state during periods of natural disaster and civil disturbances, and to perform other functions required by the California Military Department or as directed by the Governor.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of

California, in accordance with the authority vested in me by the Constitution and statutes of the State of California, including the Emergency Services Act and in particular Government Code sections 8567 and 8571, do hereby issue this Executive Order, effective immediately, to mitigate the effects of the emergency due to the wildfires in the Counties of Santa Barbara, Los Angeles, Orange, Riverside and San Bernardino (hereafter referred to as the "Counties"):

1. The provisions of Health and Safety Code sections 103525.5 and 103625, and the provisions of Penal Code section 14251, requiring the imposition of fees, are hereby suspended with regard to any request for copies of certificates of birth, death, fetal death, and marriage, or marriage dissolution records by any resident of the Counties who have suffered a loss of a family member, or who suffered loss or damage to property, business, or employment, as a result of the wildfires. Copies of certificates of birth, death, fetal death, and marriage, and marriage dissolution records, shall be provided to such persons without charge.
2. Health and Safety Code section 18031 and California Code of Regulations Title 25, section 4044, requiring the imposition of fees, are hereby suspended for any registered owner of a manufactured home whose home was damaged or destroyed as a result of the wildfires, and it is hereby ordered that the required inspections or plan checking be performed without charge by the State Department of Housing and Community Development.
3. Health and Safety Code section 18503 and California Code of Regulations Title 25, section 1020.1, requiring the imposition of fees, is hereby suspended for any registered owner of a manufactured home located in a jurisdiction for which the State Department of Housing and Community Development is the enforcement agency and whose home was damaged or destroyed as a result of the wildfires, and it is hereby ordered that the required inspections or plan checking be performed without charge by the Department.
4. Health and Safety Code section 18114, requiring the imposition of fees, is hereby suspended with regard to any late renewal of registration certificate or certificate of title for a manufactured home by any registered owner who lost these documents as a result of the wildfires. Those documents shall be replaced without charge.
5. The provisions of Vehicle Code sections 9265(a), 9867, 14901, 14902 and 15255.2, requiring the imposition of fees, are hereby suspended with regard to any request for replacement of a driver's license, identification card, vehicle registration certificate or certificate of title by any resident of the Counties who suffered a loss of such documents as a result of the wildfires. A replacement driver's license, identification card, vehicle registration certificate, or certificate of title shall be provided to such persons without charge.
6. The provisions of Vehicle Code sections 4602 and 5902, requiring the timely registration or transfer of title, are hereby suspended with regard to any registration or transfer of title by any resident of the Counties who suffered a loss of such registration or title documents as a result of the wildfires. The time covered by this suspension shall not be included in calculating any late penalty pursuant to Vehicle Code section 9554.
7. The provisions of Unemployment Insurance Code section 1253 imposing a one-week

waiting period for unemployment insurance applicants are suspended as to all applicants who are unemployed as a result of the wildfires in the Counties, who apply for unemployment insurance benefits during the time period beginning November 18, 2008 and ending on the close of business on December 18, 2008, and who are otherwise eligible for unemployment insurance benefits in California.

8. My Office of Emergency Services shall coordinate assistance programs offered by all relevant federal, state and local agencies and departments, including, but not limited to, the Federal Emergency Management Agency, the California Conservation Corps, the Department of Public Health, the Department of Health Care Services, the Department of Mental Health, the Department of Social Services, the Department of Consumer Affairs, the Employment Development Department, the Department of the Highway Patrol, the Department of Forestry and Fire Protection, the Department of Veterans Affairs, the Department of Aging, the Department of Transportation, the Department of Insurance, and the Franchise Tax Board.

9. All State agencies with responsibility, regulatory authority or expertise related to recovery efforts in connection with these fires shall cooperate fully and act expeditiously in coordination with the California Resources Agency and the California Environmental Protection Agency, to facilitate the mitigation of the effects of the fires and the environmental restoration of the affected areas.

10. State agencies shall, as necessary for the protection of public health and the environment, assist local governments to enter into contracts and arrange for the procurement of materials, goods, and services necessary to quickly remove dangerous debris, repair damaged resources, and restore and protect the impacted watershed. Because strict compliance with the provisions of the Government Code and the Public Contract Code applicable to state contracts would prevent, hinder, or delay these efforts, applicable provisions of those statutes, including, but not limited to, advertising and competitive bidding requirements, are suspended to the extent necessary to address the effects of the fires.

11. State statutes, rules, regulations and requirements are hereby suspended to the extent they apply to the following activities: (a) removal, storage, transportation, and disposal of hazardous and non-hazardous debris that result from the fires and that are subject to the jurisdiction of agencies within the California Environmental Protection Agency and the California Resources Agency, (b) necessary restoration, and (c) related activities. Such statutes, rules, regulations and requirements are suspended only to the extent necessary for expediting the removal and cleanup of debris from the fires, and for implementing any restoration plan. The Secretary for the California Environmental Protection Agency, and the Secretary for the California Resources Agency, shall use sound discretion in applying this suspension to ensure that the suspension serves the purpose of accelerating cleanup and recovery, while at the same time protecting public health and the environment. Individuals who desire to conduct activities under this suspension of statutes, rules, regulations, and requirements shall first request of the appropriate Agency Secretary a determination that the proposed activities are eligible to be conducted under this suspension. The Secretaries shall maintain a public list of all statutes, rules, regulations, and requirements that are suspended, and shall post the list prominently on their websites. This order shall apply to, but is not necessarily limited to, solid waste facility permits, and other

requirements for waste storage and disposal; requirements for emergency timber harvesting, stream environment zones, and emergency construction activities; and waste discharge requirements and/or Water Quality Certification for discharges of fill material or pollutants. To the extent it is within their administrative authority and discretion, the boards, departments and offices within the California Environmental Protection Agency shall expedite the granting of authorizations, waivers or permits necessary for the removal, storage, transportation and disposal of hazardous and non-hazardous debris resulting from the fires, and for other actions necessary for the protection of public health and the environment.

12. State agencies and departments within my administration shall work with local officials to assist them in putting into place and implementing comprehensive structural debris removal plans.

13. The Department of Forestry and Fire Protection, the California Department of Corrections and Rehabilitation, and the California Conservation Corps, shall use employees, corps members, inmate and ward labor, where appropriate, to protect public health, safety, and water quality on public lands or where otherwise requested by private property owners.

14. The California National Guard shall continue to be mobilized under California Military and Veterans Code section 146 (mobilization in case of catastrophic fires) to support disaster response and relief efforts and coordinate with all relevant state agencies, including my Office of Emergency Services, and all relevant state and local emergency responders and law enforcement within the impacted areas. Sections 147 and 188 of the Military and Veterans Code are applicable during the period of participation in this mission, exempting the California Military Department from applicable procurement rules for emergency purchases.

IT IS FURTHER REQUESTED THAT the Franchise Tax Board and the Board of Equalization consider using their administrative powers where appropriate to provide those individuals and/or businesses impacted by the wildfires with extensions for filing, audits, billing, notices, assessments and relief from subsequent penalties.

IT IS ALSO REQUESTED THAT the Public Utilities Commission direct utility companies with transmission lines in the affected areas to ensure that all dead and dying trees and vegetation are completely cleared from their utility right-of-ways to mitigate the potential threat to human health and safety and public property. This Executive Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT THAT, as soon as hereafter possible, this Order shall be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 18th Day of November 2008.

ARNOLD SCHWARZENEGGER
Governor of California

ATTEST:
DEBRA BOWEN
Secretary of State

<http://www.countyofsb.org/uploadedFiles/ceo/GovExecOrderToHelpFireVictims.p>

df

APPENDIX B: TEA FIRE EVACUATION PRESS RELEASE

JOINT NEWS RELEASE FOR IMMEDIATE RELEASE

SBC Tea Fire 08-29
November 26, 2008
12:00pm

News Media Contact:

William Boyer, Santa Barbara County Communications Director, (805) 896-1056

Eric Boldt, Meteorologist, National Weather Service, Los Angeles/Oxnard, (805) 988-6623

Nina Johnson, Public Information Officer, City of Santa Barbara, (805) 564-5307

County, City Downgrade Evacuation Order to Evacuation Warning

Sycamore Canyon, Eastside & Tea Fire Area Residents Urged to Remain Vigilant

Santa Barbara County and City emergency officials have downgraded the Evacuation Order to an Evacuation Warning allowing residents to return to homes. This warning will remain in effect until 10:00pm November 26 to coincide with the end of the Flash Flood Watch period issued by the National Weather Service.

Santa Barbara County originally initiated the County's Reverse 9-1-1 call system to alert residents in both the county unincorporated area and within the City of Santa Barbara. Emergency officials were particularly concerned with the situation because this is the first rain event after the Tea Fire occurred. Immediately after a fire, the soil geology can be very unstable and can become easily disturbed by rain.

An Evacuation Warning means residents should be prepared to leave should conditions change. The Evacuation Warning area includes:

In the County (unincorporated) area, the Evacuation Warning area is bounded by:

- East and West Mountain Drive from Cold Springs Road to El Cielito
- Gibraltar Road from El Cielito to East Camino Cielo, including the Mount Calvary Road burn area
- Chelham Way along Westmont Creek and Chelham Creek

In the City of Santa Barbara, the Evacuation Warning area includes:

- Sycamore Canyon North from APS/Montecito Street to Stanwood
- Stanwood Drive west to El Cielito
- Conejo Road from Stanwood to Las Alturas
- Conejo Lane, Camino Alto, Orizaba Lane, Orizaba Road, Sherman Road, Eland Place and Mountain Drive east of El Cielito

An Evacuation Warning in the Eastside south of the 5 points roundabout has been lifted. A warning is no longer in effect for:

- The Area bordered by Salinas Street on the east to Highway 101.
- Highway 101 on the south to Quinientos Street.

On the west side:

- Quinientos Street north to Voluntario Street
- Voluntario Street west to Mason Street
- Mason Street north to Soledad Street
- Soledad Street west to Yanonali Street
- Yanonali Street north to Montecito Street
- Montecito Street north to Alameda Padre Serra/Salinas Street (Five Points)

In addition, the area south of the above, across Highway 101, is further described:

- Bordered by Highway 101 on the North.
- Por La Mar Drive on the west.
- Cabrillo Boulevard on the south and east to Los Patos Street.

Several roads previously closed as a result of the evacuation have also been reopened to allow residents to return to the area. These include:

- Highway 192 between Orizaba and Conejo Road
- Sycamore Canyon Road between Stanwood Drive and Five Points

Roads which will remain closed for an additional period include:

- Mountain Drive between El Cielito and Cold Springs Road will reopen at 2:00 pm
- Gibraltar Road remains closed at El Cielito
- The Sycamore Canyon Gates will remain closed due to the dangerous landslide potential in the area.

The Call Center previously activated by the County will close at 3:00pm on November 26.

Residents should pay attention to local National Weather Service (NWS) information, which provides Flash Flood Watches and Warnings both on the NOAA Weather radio, and on the NWS website at www.weather.gov/losangeles.

In the event of a large emergency or disaster, the County will work with all bona fide news organizations to distribute emergency public information. The County's "Stations of Choice" for emergency news currently include the following AM stations—KTMS-990; KZSB-1290; KUHL-1410; KINF-1440, plus the San Marcos Pass Radio Station 1040—and the following FM stations—KCSB-91.9; KSYV-96.7; KTYD-99.9; KSBL-101.7 and KRAZ-105.9. In addition, the Spanish language FM stations, KSPE-94.5 and KIST-107.7 are also designated "Stations of Choice" in the cooperative agreement with the County.

For more information regarding the emergency preparedness, go online to www.CountyofSB.org, or the cities' websites at www.santabarbaraca.gov. For emergency preparedness tips go to www.Ready.gov.

http://www.countyofsb.org/uploadedFiles/ceo/Tea_Fire_Press_Release08-29.pdf

APPENDIX C: PROCLAMATION OF LOCAL EMERGENCY

PROCLAMATION OF LOCAL EMERGENCY BY DIRECTOR OF EMERGENCY SERVICES REQUESTING GOVERNOR TO PROCLAIM A STATE OF EMERGENCY

WHEREAS, Chapter 12, Section 6 (b) of the Santa Barbara County Code, empowers the County of Santa Barbara, Director of Emergency Services, to proclaim a local emergency if the Board of Supervisors is not in session; and

WHEREAS, Section 8558 (c) of the Government Code defines a "Local Emergency" as: "the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the territorial limits of a county, city and county, or city, caused by such conditions as air pollution, fire, flood, storm, epidemic, riot, drought, sudden and severe energy shortage, plant or animal infestation or disease, the Governor's warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy, which are or are likely to be beyond the control of the services, personnel, equipment, and facilities of that political subdivision and require the combined forces of other political subdivisions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission"; and,

WHEREAS, the Director of Emergency Services finds that conditions of extreme peril to the safety of persons and property as a result of the Tea Fire necessitate the proclamation of the existence of a local emergency within the County of Santa Barbara; and,

WHEREAS, the Tea Fire began on November 13, 2008 at approximately 1550. By 1900 hours it had grown to approximately 300 acres, lead to mandatory evacuations, loss of structures, personal injuries and power outages ; and,

WHEREAS, major populated areas are burning and threatened to burn. The Tea Fire has required extensive local and state fire resources. These conditions constitute a local emergency as defined in Government Code Section 8558, subdivision (c); and,

WHEREAS, the Board of Supervisors of Santa Barbara County is not in session;

1. **NOW, THEREFORE, IT IS HEREBY PROCLAIMED** that a local emergency now exists in the County of Santa Barbara; and,
2. That all the recitals set forth herein above are true, correct, and valid; and,
3. That conditions of extreme peril to the safety of persons and property within the County of Santa Barbara have arisen as a result of the Tea Fire, commencing on November 13, 2008. The Tea Fire has grown to over 300 acres and is burning in populated areas, critical power lines have been compromised, structures have been lost, individuals have suffered burn injuries, and mandatory evacuations are in place. The Board of Supervisors of Santa Barbara County is not in session and said conditions constitute a local emergency as defined in Government Code Section 8558, subdivision (c); and,

4. These conditions of extreme peril are not the results of labor controversy; and,
5. That in furtherance of this proclamation of local emergency, there is hereby invoked in the County of Santa Barbara all of the powers and mechanisms set forth in the California Emergency Services Act (Government Code sections 8550 et seq.), Santa Barbara County Code, Chapter 12, Section 6 and all other applicable laws, as said powers and mechanisms may hereafter be used by authorized personnel of the County of Santa Barbara; and,
6. That, pursuant to Santa Barbara County Code, Chapter 12, Section 6(a)(6)(C) and (D), the Director of Emergency Services is empowered to require the emergency services of any county officer or employee and to requisition necessary personnel or material of any county department or agency; and,
7. That a copy of this Proclamation of Local Emergency shall be posted on all outside public access doors of the County Administration Building in Santa Barbara. Personnel of said County shall make copies of this Proclamation available to news media and available on the County's web site (www.countyofsb.org); and,
8. That this Proclamation of Local Emergency shall be effective immediately and shall remain in effect for a period of seven (7) days from the date hereof, unless ratified by the Board of Supervisors, and extended, or unless sooner terminated.

IT IS ORDERED that a copy of this proclamation be forwarded to the State Director of Emergency Services and the Governor of California with a request that the Governor proclaim Santa Barbara County to be in a State of Emergency.

Dated: November 13, 2008

Time: 2:40

County Executive Officer
Director of Emergency Services
County of Santa Barbara

<http://www.countyofsb.org/uploadedFiles/ceo/oes/TeaFireProclamation.pdf>

APPENDIX D: LIST OF HOMES DESTROYED AND DAMAGED

Tea Fire Damage Assessment - List of Homes Destroyed and Damaged

	APN	Address	Building Area on Lot in Square Feet	Damage Assessment Percent*
1)	019-282-009	19 ALISAL RD	1,372	2%
2)	019-312-009	20 ALISAL RD	2,496	100%
3)	019-150-013	120 CAMINO ALTO	2,487	25%
4)	019-150-018	130 CAMINO ALTO	2,714	100%
5)	019-042-009	150 CAMINO ALTO	1,723	100%
6)	019-142-009	20 CAMINO ALTO	2,411	100%
7)	019-130-028	30 CAMINO ALTO	3,175	100%
8)	019-150-017	44 CAMINO ALTO	5,189	90%
9)	019-282-003	14 CAMINO VERDE	2,205	90%
10)	019-142-013	17 CAMINO VERDE	3,124	100%
11)	019-142-012	19 CAMINO VERDE	3,717	90%
12)	019-282-027	20 CAMINO VERDE	3,996	100%
13)	013-122-002	684 CIRCLE DR	2,283	100%
14)	013-102-003	706 CIRCLE DR	1,406	5%
15)	013-102-004	710 CIRCLE DR	1,534	100%
16)	013-101-006	715 CIRCLE DR	2,435	100%
17)	019-042-008	114 CONEJO RD	2,358	100%
18)	019-043-001	123 CONEJO RD	1,792	100%
19)	019-041-033	217 CONEJO RD	2,722	100%
20)	019-041-021	219 CONEJO RD	3,209	100%
21)	019-041-022	223 CONEJO RD	2,248	100%
22)	019-041-023	225 CONEJO RD	2,606	100%
23)	019-041-014	241 CONEJO RD	1,442	100%
24)	019-041-008	265 CONEJO RD	1,468	100%
25)	019-050-025	317 CONEJO RD	1,618	100%
26)	019-050-026	327 CONEJO RD	1,643	100%
27)	019-050-031	331 CONEJO RD	2,406	100%
28)	019-050-030	333 CONEJO RD	1,300	100%
29)	019-050-028	345 CONEJO RD	1,363	100%
30)	019-061-001	350 CONEJO RD	1,056	100%
31)	019-061-030	352 CONEJO RD	1,296	100%
32)	019-050-029	357 CONEJO RD	1,122	100%
33)	019-050-008	403 CONEJO RD	1,144	100%
34)	019-050-009	407 CONEJO RD	1,747	100%
35)	019-061-011	428 CONEJO RD	960	100%
36)	019-050-013	430 CONEJO RD	1,200	100%
37)	019-061-012	434 CONEJO RD	1,161	100%
38)	019-061-013	438 CONEJO RD	800	100%
39)	019-061-029	444 CONEJO RD	1,298	100%
40)	019-050-017	447 CONEJO RD	2,000	100%
41)	019-061-037	450 CONEJO RD	1,216	100%
42)	019-061-036	456 CONEJO RD	1,216	100%
43)	019-061-016	462 CONEJO RD	1,000	100%
44)	019-061-017	468 CONEJO RD	1,153	100%
45)	019-061-018	474 CONEJO RD	960	100%
46)	019-061-019	478 CONEJO RD	1,153	100%
47)	019-061-020	486 CONEJO RD	1,076	100%
48)	019-062-011	501 CONEJO RD	1,161	100%
49)	019-062-010	507 CONEJO RD	1,161	100%
50)	019-062-009	515 CONEJO RD	1,628	100%
51)	019-062-008	523 CONEJO RD	2,114	100%
52)	019-062-004	525 CONEJO RD	933	100%

*90% is home destroyed and garage still standing.

H:\Group Folders\EVERYONE\Tea Fire\Damage Assessment List Homes all.rpt 100% is all structures on lot destroyed.

Page 1 of 4
11/20/2008

	<u>APN</u>	<u>Address</u>	<u>Building Area on Lot in Square Feet</u>	<u>Damage Assessment Percent*</u>
53)	019-062-007	529 CONEJO RD	1,161	100%
54)	019-062-003	533 CONEJO RD	1,500	100%
55)	019-062-005	535 CONEJO RD	1,142	100%
56)	019-062-002	545 CONEJO RD	2,248	100%
57)	021-061-003	1001 COYOTE RD	800	100%
58)	021-062-001	1002 COYOTE RD	2,500	100%
59)	021-141-004	669 COYOTE RD	1,168	5%
60)	021-141-038	695 COYOTE RD	2,927	100%
61)	021-061-013	931 COYOTE RD	2,239	100%
62)	021-061-014	935 COYOTE RD	3,618	100%
63)	021-062-006	940 COYOTE RD	3,643	100%
64)	021-061-009	945 COYOTE RD	1,200	100%
65)	021-062-005	950 COYOTE RD	2,084	100%
66)	021-061-008	955 COYOTE RD	1,639	100%
67)	021-061-020	963 COYOTE RD	2,094	100%
68)	021-061-006	981 COYOTE RD	3,286	100%
69)	021-062-002	988 COYOTE RD	1,766	10%
70)	021-061-007	999 COYOTE RD	586	100%
71)	019-061-026	10 EALAND PL	960	100%
72)	019-061-034	11 EALAND PL	1,188	100%
73)	019-061-027	16 EALAND PL	952	100%
74)	019-061-035	17 EALAND PL	1,188	100%
75)	021-151-002	145 EL CIELITO RD	400	50%
76)	021-084-003	272 EL CIELITO RD	5,300	100%
77)	021-083-006	289 EL CIELITO RD	2,087	100%
78)	021-081-011	352 EL CIELITO RD	2,766	100%
79)	021-081-010	356 EL CIELITO RD	3,196	100%
80)	021-083-004	1944 GIBALTAR RD	2,315	100%
81)	021-050-028	2108 GIBALTAR RD	3,553	100%
82)	021-050-035	2220 GIBALTAR RD	2,292	100%
83)	021-051-031	2222 GIBALTAR RD	5,533	100%
84)	021-180-004	2224 GIBALTAR RD	2,973	2%
85)	019-333-001	20 LAS ALTURAS CIR	1,561	100%
86)	019-122-002	30 LAS ALTURAS CIR	2,558	20%
87)	019-130-013	44 LAS ALTURAS CIR	3,222	1%
88)	019-130-032	1050 LAS ALTURAS RD	2,050	100%
89)	019-130-031	1052 LAS ALTURAS RD	2,019	100%
90)	019-113-020	1105 LAS ALTURAS RD	3,213	100%
91)	019-113-022	1117 LAS ALTURAS RD	1,869	100%
92)	019-113-031	1121 LAS ALTURAS RD	2,978	100%
93)	019-113-030	1131 LAS ALTURAS RD	2,972	100%
94)	019-312-020	370 LAS ALTURAS RD	2,325	10%
95)	019-312-021	376 LAS ALTURAS RD	2,708	100%
96)	019-282-010	444 LAS ALTURAS RD	1,188	100%
97)	019-282-011	446 LAS ALTURAS RD	1,790	25%
98)	019-282-033	638 LAS ALTURAS RD	2,427	100%
99)	019-282-007	642 LAS ALTURAS RD	2,784	100%
100)	019-282-006	646 LAS ALTURAS RD	1,340	100%
101)	019-282-005	656 LAS ALTURAS RD	2,581	100%
102)	019-282-026	660 LAS ALTURAS RD	2,461	100%
103)	019-282-001	752 LAS ALTURAS RD	3,299	10%
104)	019-142-005	900 LAS ALTURAS RD	1,080	100%
105)	021-081-009	2114 MOUNT CALVAR	4,826	100%
106)	021-040-016	2140 MOUNT CALVAR	2,928	100%

*90% is home destroyed and garage still standing.

H:\Group Folders\EVERYONE\Tea Fire\Damage Assessment List Homes all.rpt 100% is all structures on lot destroyed.

Page 2 of 4
11/20/2008

APN	Address	Building Area on Lot in Square Feet	Damage Assessment Percent*
107)	021-040-017 2190 MOUNT CALVAR	1,713	100%
108)	021-040-013 2220 MOUNT CALVAR	2,486	100%
109)	021-040-049 2400 MOUNT CALVAR	4,553	100%
110)	021-050-063 1000 W MOUNTAIN DR	12,000	100%
111)	021-061-021 121 W MOUNTAIN DR	1,402	100%
112)	021-050-039 1301 W MOUNTAIN DR	3,400	100%
113)	021-050-027 1325 W MOUNTAIN DR	770	100%
114)	021-050-014 1510 W MOUNTAIN DR	1,336	100%
115)	021-050-033 1600 W MOUNTAIN DR	3,553	100%
116)	021-050-047 300 W MOUNTAIN DR	175	100%
117)	021-050-046 328 W MOUNTAIN DR	150	100%
118)	021-050-047 350 W MOUNTAIN DR	900	100%
119)	021-050-020 850 W MOUNTAIN DR	1,804	100%
120)	021-050-019 860 W MOUNTAIN DR	1,788	100%
121)	021-050-018 874 W MOUNTAIN DR	2,828	100%
122)	021-050-034 885 MOUNTAIN DR	2,000	100%
123)	021-180-002 933 W MOUNTAIN DR	3,543	100%
124)	019-041-034 1 ORIZABA LA NE	800	100%
125)	019-311-002 8 PUEBLO VISTA RD	3,767	20%
126)	019-282-022 31 RINCON VISTA RD	2,180	20%
127)	019-282-014 34 RINCON VISTA RD	0	1%
128)	019-282-020 47 RINCON VISTA RD	2,367	100%
129)	019-282-019 50 RINCON VISTA RD	2,672	100%
130)	019-050-022 305 SHERMAN RD	960	100%
131)	019-050-003 306 SHERMAN RD	2,299	100%
132)	019-050-023 311 SHERMAN RD	1,620	100%
133)	019-050-004 312 SHERMAN RD	1,781	100%
134)	019-050-005 318 SHERMAN RD	1,543	100%
135)	019-050-006 324 SHERMAN RD	1,875	100%
136)	019-050-007 330 SHERMAN RD	1,682	100%
137)	019-050-024 331 SHERMAN RD	1,856	100%
138)	021-141-034 1865 STANWOOD DR	1,128	100%
139)	019-050-001 1957 STANWOOD DR	1,800	100%
140)	019-050-002 1967 STANWOOD DR	1,352	100%
141)	019-041-030 1985 STANWOOD DR	2,756	100%
142)	019-041-031 2001 STANWOOD DR	2,816	100%
143)	019-041-027 2109 STANWOOD DR	2,207	100%
144)	019-041-026 2111 STANWOOD DR	2,773	100%
145)	019-041-024 2121 STANWOOD DR	1,762	100%
146)	019-041-029 2131 STANWOOD DR	2,320	100%
147)	019-041-031 2101 STANWOOD DR	2,000	100%
148)	013-163-001 595 SYCAMORE VISTA	1,978	100%
149)	013-070-059 1014 WESTMONT RD	1,719	100%
150)	013-070-067 1031 WESTMONT RD	1,649	100%
151)	013-070-065 1049 WESTMONT RD	2,165	100%
152)	013-070-064 1103 WESTMONT RD	1,734	100%
153)	013-070-083 1108 WESTMONT RD	1,725	100%
154)	013-070-080 1116 WESTMONT RD	1,638	2%
155)	013-070-082 1124 WESTMONT RD	1,725	1%
156)	013-070-075 1125 WESTMONT RD	1,725	100%
157)	013-070-081 1132 WESTMONT RD	1,725	100%
158)	013-102-007 725 WESTMONT RD	1,586	2%
159)	013-102-006 733 WESTMONT RD	1,751	100%
160)	013-103-001 762 WESTMONT RD	1,677	100%

*90% is home destroyed and garage still standing.
 H:\Group Folders\EVERYONE\Tea Fire\Damage Assessment List Homes all.rpt 100% is all structures on lot destroyed.

Page 3 of 4
 11/20/2008

	<u>APN</u>	<u>Address</u>	<u>Building Area on Lot in Square Feet</u>	<u>Damage Assessment Percent*</u>
161)	013-070-043	802 WESTMONT RD	1,725	100%
162)	013-070-046	824 WESTMONT RD	1,725	100%
163)	013-070-077	825 WESTMONT RD	1,725	100%
164)	013-070-048	840 WESTMONT RD	1,878	100%
165)	013-070-073	849 WESTMONT RD	1,725	100%
166)	013-070-049	850 WESTMONT RD	1,863	100%
167)	013-070-054	928 WESTMONT RD	1,716	100%
168)	013-070-057	952 WESTMONT RD	1,716	100%

<http://www.countyofsb.org/uploadedFiles/ceo/oes/DamageAssessListAllHomes11202008.pdf>

APPENDIX E: MITIGATION DATA REFERENCE

<p><i>Santa Barbara, City of</i></p> <p><i>Conejo Slide Area</i></p> <p><i>1203 - 1013</i></p> <p><u>GRANT TYPE: HMGP</u></p> <p><u>NEMIS #:</u> <u>FIPS#:</u> 083-69070</p> <p>Project Managed by: Mather</p>					
Lead Reviewer:		Analyst:		Manager: Marcia Rentschler	
Phone:		Phone:		Phone: (626) 683-6700	

Executive Summary

Applicant Information

Project Information

Application Review

Project Monitoring

Financial

Financial Status:	Grant Closed	As of: 05/01/2003	By: Manuel Mercado
Percent disbursed:	100%		
Percent complete:	100%		
Other Linked HMGP Projects :			
Funding Source:			

Application Review Statuses:	
Application Status:	Approved
Payment Status:	Not Suspended
Scope of Work:	Approved
Work Schedule:	Approved
Budget:	
Appeal:	

ORIGINAL					
APPLICANT REQUEST		OES REQUEST		FEMA OBLIGATION	
FED	MATCH	FED	MATCH	FED	MATCH
\$1,184,925.00	\$394,975.00	\$1,097,208.00	\$365,699.43	\$1,237,173.00	\$412,349.76

Date:	Total Project Costs: \$1,060,153.00
-------	-------------------------------------

APPENDIX F: WILDFIRE MITIGATION LEGISLATION HISTORY

State of California Multi-Hazard Mitigation Plan Appendix

Table 2.3.4D Wildfire Hazard Mitigation Legislation, 1933-2006

Legislation	Adoption Date	Subject	Type of Legislation	General Provisions	Citation
Organic Act	1887			Set aside National Forest Reserves	
State Fire Responsibility Act	1965	State Areas of Responsibility	Policy	Requires State Board of Forestry to classify all lands in state in which financial responsibility of preventing and suppressing fires is primarily the responsibility of the state; defines SRA land	PRC §4125
Z'berg Nejedly Forest Practice Act	1973	Forest resource improvement	Policy	Restores, enhances, and maintains productivity of timberlands while giving consideration to their varied public benefits; exempts certain vegetation management practices related to fuel reduction and establishing fuel breaks	PRC §4511, et seq., 4584(j)
California Forest Improvement Act of 1978	1978	Forest resource improvement	Program	Allows (DFW) to enter into agreements with eligible landowners to undertake forest resource improvement work; establishes practices that will improve long-term quality of forested lands in terms of timber productivity, retention of soil cover and value for wildfire	PRC §§4790-4799.05

Legislation	Adoption Date	Subject	Type of Legislation	General Provisions	Citation
Designate Hazardous Fire Areas [SB 1972 - Campbell]]	1979	Fire hazard zone designation	Policy / Regulation	Designates hazardous fire areas, regulates the use of fireworks and other hazardous materials within these designated areas; fire prevention reduction standards on railroad right of way	PRC §§4254, 4255, 4258, 4259, 4260, 4296.5
SB 78 - Ayala	1981	Fire hazard classification; building regulations	Policy / Regulation	Establishes State Area of Responsibility (SRA) fire hazard classification and zoning, roof and attic openings, and HCD roofing regulations	PRC §4291.5; HSC §13108.5
SB 799 - Mello	1981	Firework regulation	Regulation	Bans the use of fireworks in SRA Fire Hazard Zones	PRC §§4254-4255, 4258-4260
	1989	Safety element review	Policy / Regulation	Requires State Board of Forestry to review the safety element of counties which contain state responsibility areas and make appropriate recommendations	PRC §4128.5
Natural Hazard Disclosure requirements [AB 1812 - Cortese]	1989	Natural hazard disclosure	Policy / Regulation	Requires Natural Hazard Disclosure for wildfire in SRA	PRC §4291, et seq.
Minimum fire safety regulation in SRA [SB 1075 - Rogers]]	1991	Minimum fire safety	Policy / Regulation	Sets minimum fire safety regulation in SRA	PRC §4290
Very High Fire Hazard Severity Zones; Fire Hazard Zoning in Local Area of Responsibility (LRA) [AB 337 - Bates]	1992	Fire hazard zone designation	Policy / Regulation	Establishes designation of Fire Hazard Zoning in Local Area of Responsibility (LRA)	GC §§51178-51188; HSC §13108.5

Legislation	Adoption Date	Subject	Type of Legislation	General Provisions	Citation
AB 3819 - Brown	1995	Fire hazard building safety	Policy / Regulation	Class A roof and Model Ordinance for defensibility of space and structures	GC §§51178.5, 51189; HSC §§13108.5, 13132.7; PRC §42205
AB 747 - Brown	1995	Fire hazard building safety	Policy / Regulation	Sets timeline for testing of Class A, B, C roof and shingles	HSC §13132.7
AB 1195 - Torlakson	1997	Fire hazard zone designation	Institution	Requires local agencies to designate Very High Fire Hazard Severity Zones upon recommendation from CAL FIRE; creates the Emergency Response Training Advisory Committee	Civil Code §§2079.11, 1102.6c, GC §§8589.3-8589.5, 51179, 51183.5, PRC §§2621.9, 2694, 2696, 4125, 4136
Natural Hazard Disclosure for wildfire in LRA and Very High Fire Hazard Severity Zones [AB 6X, AB 1195]	1998	Natural hazard disclosure	Regulation	Establishes disclosure obligations of seller or agent of seller of property in LRA and Very High Fire Hazard Severity Zones; facilitated by Natural Hazard Disclosure Statement	Civil Code §1103, et seq.; GC §51183.5
AB 423	1999	Fire hazard building safety	Policy	Lists wood roofing materials that have passed at least five years of the ten-year weather test; insurance companies honor replacement cost coverage for increased cost of fire retardant roofing materials	HSC §13132.7
California Clean Water, Clean Air, Safe Neighborhood Parks and Coastal Protection Act of 2002 [Proposition 40, AB 1602]	2002	Fuel reduction program	Program	Establishes program with goal to reduce wildland fuel loadings that pose threat to watershed resources and water quality	PRC §5096.3

Legislation	Adoption Date	Subject	Type of Legislation	General Provisions	Citation
AB 1216	2002	Fire hazard building safety		Expand fire safety building standards in areas with high fire risk to various components (not listed)	PRC §4291, GC §51189
Governor's Blue Ribbon Fire Commission	2003	Review of fire response	Program	Review firefighting effort of Southern California wildfires; present recommendations to policy makers that will promote fire safe environment in WUI	
Defensible Space regulations [SB 1369]	2004	Fire hazard building safety	Regulation	Requires persons in SRA to maintain additional firebreak by removing all brush, flammable vegetation or combustible growth located 30 to 100 feet from building or structure or to property line	PRC §4291(b)

Governors Office of Emergency Services, 2007, Wildfire Hazard Mitigation Legislative History (1933 – 2006)

APPENDIX G: SUMMARY OF 1998 LANDSLIDE PROPERTY ACQUISITION

In an attempt to reduce the exposure to landslides a mitigation project was completed in 1998. This project included the governments' purchase and acquisition of four properties. A study conducted by David S Flamm, a California Polytechnic State University graduate student in the City and Regional Planning department, examined the benefits and costs associated with the outright purchase of the properties for hazard mitigation ("property acquisition mitigation") in Santa Barbara, California. The developments were removed and the properties left empty as open space to eliminate the exposure to risk. The project, originally intended to mitigate landslide risk, mitigated risk exposure to multiple hazards. The mitigation was put to the test during the Santa Barbara Tea Fire, a wildfire which burned approximately 2,000 acres of Santa Barbara County land in November, 2008.

The Tea Fire provided a unique opportunity for the State Mitigation Assessment Review Team (SMART), a new system and strategy by which the State will assess completed mitigation actions and establish a record of the effectiveness (actual cost avoidance) of the mitigation actions. It provided the opportunity to do a first time SMART analysis on a project considered to be a multi-hazard mitigation. It also provided a chance to evaluate property acquisitions as multi-hazard mitigations. Most importantly, however, it provided the California Emergency Management Agency and the CSU system a framework for future multi-hazard analysis and for improvement through the SMART methodologies to reach its objective in future studies.

The findings of this study are as follows:

Single Hazard Mitigation-

- Possible range of ten year avoided expenditure benefit: \$1,690,000 - \$2,366,000
- Possible overall benefit ratio: 1.55:1 – 2.25:1
- Assumed annual avoided expenditure benefit: \$104,241
- Assumed overall ten year avoided expenditure benefit: \$1,860,582
- Assumed overall benefit ratio: 1.75:1

The numbers above do not include additional non-assumed avoided expenditures. These numbers and ratios may be higher if all variables could be considered. These numbers are based heavily on building and property values as well as an inflationary economic climate. If all additional non-assumed avoided expenditures are included ratios and benefits likely will remain positive.

Multi-Hazard Mitigation-

- Benefit ratio likely increases to 3:1 or 4:1 if all variables considered

- Annual avoided expenditure benefit will increase due to a lower number of division for overall benefit. Instead of 1 to 25 for hazard recurrence it will likely be 1 to 20 or 1 to 15.
- FEMA BCA Toolkit is not best suited for multi-hazard mitigation analysis
- Evaluation of all variables difficult, even in retrospect. Benefits appear to increase significantly regardless.

SMART:

- Loss avoidance performance for this property acquisition mitigation based on a level of intensity consistent with a total loss.
- Identified the effectiveness of property acquisitions as 100 percent effective in this case.
- Loss avoidance performance ratio equaled 1.55:1 to 4:1 (or higher) with total possible single event expenditure avoidance of \$2,366,000.
- Primary benefactor of acquisitions is the insurance provider, whether private or public for single hazards.
- The appropriate scale of a property acquisition is difficult to assess. There are many factors to consider.
- Tea Fire provided unique opportunity to perform first time SMART analysis on project considered to be multi-hazard mitigation.
- Provided a chance to evaluate property acquisitions as multi-hazard mitigations through SMART methodologies.
- Provides California Emergency management Agency and CSU system framework for future multi-hazard analysis.

FEMA BCA Toolkit:

- A multi-hazard mitigation BCA toolkit should be developed to help thoroughly determine mitigation benefits.
- The Toolkit should delineate between benefits to the private side and the public.
- Option to remove Net Present Value and Discount Rate should be available to more accurately produce retroactive analysis results.

Implications:

- Global warming will likely increase the overall benefits of a acquisition mitigation. Acquisitions may become more appealing as global warming effects persist.
- Increased frequency of multiple hazards in a given area may decrease the likelihood that private insurance companies will provide insurance. Federal disaster insurance may have to be established.
- Many stakeholders and parties from a myriad of fields and interests will find this study useful.
- A justification threshold for property acquisitions should be established before implementing as a primary mitigation tool.
- The relevancy of this study will increase with time and as more hazard events happen.