
Lake Tahoe Basin Community Wildfire Protection Plan

This is version 5.2 of the CWPP draft dated July 21, 2015. This document has been delivered to the designer and can no longer be restructured with section additions, changes, or deletions. Content edits can still occur within sections.

Text <between angle brackets> indicates notes for the designer/editor.

Referenced pictures, presentations, and previous planning documents can be viewed or downloaded at the following link:

<https://www.dropbox.com/sh/o4ldtw0thajg6mi/AADe1mixf04vIcTVm4p73PuBa?dl=0>

Table of Contents

1	EXECUTIVE SUMMARY	5
2	BACKGROUND AND GOALS	6
2.1	BACKGROUND.....	6
2.2	GOALS	10
3	COMMUNITY DESCRIPTION.....	11
3.1	FIRE ENVIRONMENT	11
3.1.1	Fire Ecology.....	11
3.1.2	Wildfire History / Incidence.....	14
3.2	CURRENT CONDITIONS AND HAZARDS.....	15
3.2.1	Weather, Climate, and Topography	16
3.2.2	Wildland-Urban Interface Designation.....	17
3.2.3	West-Wide Wildfire Risk Assessment	19
4	MITIGATION STRATEGIES	20
4.1	FUEL REDUCTION PROJECTS	20
4.1.1	Thinning.....	21
4.1.2	Mastication and Chipping.....	23
4.1.3	Prescribed Fire.....	23
4.1.4	Multiple Resource Benefits of Fuel Reduction Projects.....	25
4.2	REDUCING STRUCTURE IGNITABILITY	26
4.2.1	Defensible Space	26
4.2.2	Ignition Resistant Construction Materials.....	27
4.2.3	Community Design	28
4.3	COMMUNITY PREPAREDNESS FOR AN EMERGENCY EVENT.....	28
4.3.1	Description of Fire Suppression Resources.....	28
4.3.2	Wildfire Response Capability.....	30
4.3.3	Notification and Emergency Alerts.....	30
4.3.4	Evacuation Preparation	33
4.4	FIRE PREVENTION	35
4.5	MULTI-JURISDICTIONAL COORDINATION	38
4.5.1	Tahoe Fire and Fuels Team / Multi-Agency Coordinating Group.....	38
4.5.2	Roles and Responsibilities.....	41
4.6	ENVIRONMENTAL REGULATIONS AND COMPLIANCE	47
5	PLANNING SUMMARY	50
5.1	REQUIREMENTS OF A CWPP	50
5.2	PREVIOUS PLANNING DOCUMENTS	52
5.2.1	2004 Community Wildfire Protection Plans	52
5.2.2	2007 Fuel Reduction and Forest Restoration Plan.....	52
5.2.3	2007 Multi-Jurisdictional Strategy.....	53
5.2.4	2008 Blue Ribbon Commission Report.....	54

5.2.5	2014 Multi-Jurisdictional Strategy.....	54
5.3	OTHER RELATED PLANS	55
5.3.1	Lake Tahoe Basin Management Unit Revised Land Management Plan	55
5.3.2	California Forest and Range Assessment.....	56
5.3.3	Nevada Natural Resource Assessment	56
5.3.4	California Unit Fire Plans	58
5.3.5	Local Hazard Mitigation Plans	59
5.3.6	Southern Nevada Public Lands Management Act Strategic Plan	59
5.4	PROJECT TEAM	60
5.5	PUBLIC INVOLVEMENT	61
6	MONITORING AND EVALUATION	62
6.1	REVIEW OF PROGRESS SINCE 2004.....	62
6.2	METHODOLOGY FOR MONITORING AND EVALUATING FUTURE PROGRESS.....	66
6.2.1	Monitoring Action Plans for Increasing Fire Adaptation.....	66
6.2.2	Monitoring, Tracking and Reporting Fuel Reduction Projects.....	68
7	FIRE ADAPTED COMMUNITY ASSESSMENTS AND PRIORITIZED FUEL REDUCTION PROJECTS.....	68
7.1	METHODOLOGY FOR FUEL REDUCTION PROJECT IDENTIFICATION AND PRIORITIZATION	69
7.2	METHODOLOGY FOR DEVELOPING FIRE ADAPTED COMMUNITY ASSESSMENTS	71
8	TAHOE DOUGLAS (NV) DIVISION PROJECTS AND ASSESSMENT	72
8.1	FUEL REDUCTION PROJECT MAPS AND TABLES.....	72
8.1.1	Tahoe Douglas Fire Protection District	72
8.2	FIRE ADAPTED COMMUNITY ASSESSMENT	73
8.2.1	General Info	73
8.2.2	Community Characteristics	73
8.2.3	Resources and Strategies.....	73
8.2.4	Outreach and Partnerships	73
9	SOUTH TAHOE (CA) DIVISION PROJECTS AND ASSESSMENT	73
9.1	FUEL REDUCTION PROJECT MAPS AND TABLES.....	73
9.1.1	Lake Valley Fire Protection District.....	73
9.1.2	City of South Lake Tahoe Fire Department.....	73
9.1.3	Fallen Leaf Fire Department.....	73
9.2	FIRE ADAPTED COMMUNITY ASSESSMENT	73
9.2.1	General Info	74
9.2.2	Community Characteristics	74
9.2.3	Resources and Strategies.....	74
9.2.4	Outreach and Partnerships	74
10	NORTH TAHOE (CA) DIVISION PROJECTS AND ASSESSMENT	74
10.1	FUEL REDUCTION PROJECT MAPS AND TABLES.....	74
10.1.1	North Tahoe Fire Protection District.....	74
10.2	FIRE ADAPTED COMMUNITY ASSESSMENT	74
10.2.1	General Info	74
10.2.2	Community Characteristics	74

10.2.3	Resources and Strategies.....	75
10.2.4	Outreach and Partnerships	75
11	MEEKS BAY (CA) DIVISION PROJECTS AND ASSESSMENT.....	75
11.1	FUEL REDUCTION PROJECT MAPS AND TABLES.....	75
11.1.1	Meeks Bay Fire Protection District.....	75
11.2	FIRE ADAPTED COMMUNITY ASSESSMENT	75
11.2.1	General Info	75
11.2.2	Community Characteristics	75
11.2.3	Resources and Strategies.....	76
11.2.4	Outreach and Partnerships	76
12	NORTH LAKE TAHOE (NV) DIVISION	76
12.1	FUEL REDUCTION PROJECT MAPS AND TABLES.....	76
12.1.1	North Lake Tahoe Fire Protection District.....	76
12.2	FIRE ADAPTED COMMUNITY ASSESSMENT	76
12.2.1	General Info	76
12.2.2	Community Characteristics	76
12.2.3	Resources and Strategies.....	76
12.2.4	Outreach and Partnerships	77
13	APPENDICES	77
13.1	TAHOE FIRE AND FUELS TEAM FUEL REDUCTION REPORTING AND DATA STANDARDS.....	77
13.2	TAHOE FIRE AND FUELS TEAM 2015 INCIDENT ACTION PLAN	77
13.3	PUBLIC SURVEY RESULTS	77
14	INFO BOXES.....	77
14.1	THE CHALLENGES OF FIGHTING WILDLAND FIRES IN THE LAKE TAHOE BASIN.....	77
14.2	RED FLAG WARNING DAYS	79
14.3	FIRE PIT.....	79
14.4	REMOTE AUTOMATED WEATHER SYSTEMS	81
14.5	COMMUNITY CHIPPING PROGRAMS	81
14.6	FIRE BEHAVIOR MODELING	82
14.7	GEOGRAPHIC INFORMATION SYSTEMS	82
14.8	FLAME LENGTH / ROS / HAULING CHART.....	82
14.9	FUEL MOISTURE / HUMIDITY / CLIMATE / SOLAR RADIATION	82
14.10	TREE SPECIES.....	82
14.11	WHITE PINE BLISTER RUST.....	82
14.12	THE MUCH-MALIGNED WHITE FIR	82
14.13	TREE IDENTIFICATION.....	82
14.14	BRUSH IDENTIFICATION	82
14.15	DWARF MISTLETOE.....	82
14.16	BARK BEETLES	82
14.17	NON-NATIVE INVASIVE SPECIES	82
14.18	COMSTOCK LOGGING, FLUMES, AND RAILWAYS	82
14.19	EVEN-AGED VS. UNEVEN-AGED MANAGEMENT.....	82

14.20	STAND-REPLACEMENT FIRE REGIMES, HIGHLIGHTING LODGEPOLE	82
14.21	STREAM ENVIRONMENT ZONES.....	82
14.22	THE WASHOE TRIBE’S ADAPTATION TO FIRE.....	82
14.23	WESTERN REGIONAL SUCCESS STORY FOR INCLINE	82
14.24	HIGHLIGHTS FROM DIVISION ACTION PLANS.....	82
14.25	TYPES OF MONITORING – EFFECTIVENESS MONITORING PROTOCOL	82
14.26	WILDLIFE EFFECTS, HIGHLIGHTS ON CERTAIN SPECIES	82
14.27	UNCE AND UCCE CONTRIBUTION TO TFFT	82
14.28	HISTORY OF THE LIVING WITH FIRE PROGRAM	82

1 Executive Summary

Wildfire is inevitable in the Lake Tahoe Basin. In fact, many of the region’s plant and animal species are dependent on the natural disturbance caused by wildfires. The disturbance creates opportunities for new growth, cycles nutrients through soils, and maintains biological diversity. Such species are fire-adapted, and have developed strategies to survive and thrive in the presence of wildfire.

Wildfires become disasters when they threaten lives, burn homes, destroy infrastructure, and damage watersheds. Developing and implementing strategies to make human communities more fire-adapted can prevent such disasters. This Community Wildfire Protection Plan provides strategies that can be implemented by fire agencies, land managers, policy makers, community leaders, residents, visitors, and others that will make Lake Tahoe Basin communities better prepared for the next inevitable wildfire.

Following widespread wildland fires in the summer of 2002, President George W. Bush proposed the Healthy Forests Initiative, which was enacted into law by the Healthy Forests Restoration Act of 2003 (Public Law 108-408). The Act encouraged thinning dense forests on federal, state, local, and private land to help protect communities from intense wildfires, improve fire suppression capabilities, and increase forests’ resistance to destructive insects. Communities were also encouraged to create a Community Wildfire Protection Plan (CWPP) to collaboratively designate areas in the Wildland-Urban Interface that were the most in need of thinning. The Healthy Forests Restoration Act also:

- Authorized fuel reduction projects in the wildland-urban interface;
- Required federal agencies to consider recommendations made by at-risk communities that have developed Community Wildfire Protection Plans; and,
- Gave funding priority to communities that have adopted Community Wildfire Protection Plans.

The Healthy Forests Restoration Act defined the minimum requirements for a CWPP. These are:

- **Collaboration:** Local and state government representatives, in consultation with federal agencies and other interested parties, must collaboratively develop a CWPP. For more information on the collaborative process used in the development of this CWPP, refer to <section 4.5> [Multi-Jurisdictional Collaboration](#) and <section 5.5> [Public Involvement](#)

< Background and pictures available in Mike Vollmer's governing board conference powerpoint about program history available on Dropbox. (GB Fire Prevention History.pptx) High quality source photos can be request from Mike.>

<Insert ½ page info box on community success story focusing on Skyland and detailing how community engagement and enthusiasm leads to good work getting done.>

Fire has shaped the landscape of the Sierra Nevada for millennia. Prior to European settlement, natural and Native American fire regimes created and maintained the forests of the Sierra Nevada. Fire plays an important role in the ecology of the region and plant and animal species have not just adapted to survive wildfire, in fact many have evolved to require its presence on the landscape.

The forests of Lake Tahoe provide many benefits including wildlife habitat, clean air, scenic beauty, and perhaps above all, clean water. Over the past several years, forest management activities have focused on fuel reduction in the wildland urban interface (WUI). WUI treatments have not only been successful in reducing fuel loadings around communities at risk, but also in building resilience to stand replacement wildfire, climate change, drought, insects and disease.

As the result of extensive logging during the Comstock era and 100 years of fire suppression, the forests of the Tahoe Basin today are largely overstocked and unhealthy. Too much accumulated flammable material (fuel) and vegetation competing for water and nutrients has left much of our forested areas at increased risk for insects, disease and high intensity wildfire.

During the 1990's there was very little attention given to Tahoe's forests. Two notable exceptions were a multi-agency effort called "Tahoe Re-Green" developed in response to a severe bark beetle outbreak and the North Lake Tahoe Fire Protection District's neighborhood defensible space program. Since 2001, attention and efforts have significantly increased, partnerships have been established, and great work has been accomplished toward the goals of protecting communities and creating a healthier, more resilient forest. The following is a brief history of these efforts.

On June 17, 2001, the Martis Fire burned more than 14,000 acres just north of Lake Tahoe. The smoke plume was clearly visible from South Lake Tahoe. This wildfire motivated Tahoe Basin agencies to begin discussions regarding a more coordinated approach to wildfire, forest management, and protecting communities. The following year, on July 3, 2002, a human caused wildfire started in South Lake Tahoe along the route of the Heavenly Resort gondola. The "Gondola Fire" was wind driven and advanced rapidly toward residential communities on Kingsbury Grade. Fortunately, due to a shift in the wind direction and a very responsive firefighting effort, the flames were stopped before reaching any structures. However, this near catastrophe was a "wake-up call" for all Tahoe communities and marked the beginning of a new era for wildfire awareness.

This new awareness brought land management, regulatory and fire agencies together to accelerate discussions regarding the need for greater ongoing collaboration to prevent wildfire and improve community protection. In 2003 a multi-agency group led by the UNR Extension *Living with Fire* program came together to create and adopt defensible space guidelines for the Tahoe Basin. On the National

stage, the need for coordinated wildfire prevention was also gaining attention. In December 2003, Congress approved the Healthy Forest Restoration Act (HFRA). As a requirement to access federal funding, the HFRA (PL 108-408) called for the creation of Community Wildfire Protection Plans (CWPPs). Because of our heightened awareness and early collaborative efforts, the Tahoe Basin was well positioned to pursue the goals of the HFRA.

In August of 2004, all seven Tahoe Basin local fire agencies completed and approved Community Wildfire Protection Plans. A timely Bureau of Reclamation grant supported this expedited task. The grant assisted with the cost of CWPP development and helped fund the larger basin-wide forest fuels reduction and forest restoration planning efforts over the next five years, including development of the first basin-wide Wildland Urban Interface Plan (WUI Plan) published in 2007.

Unfortunately, the HFRA failed to provide any new funding sources. Recognizing this need, the leadership of Lake Tahoe's Congressional delegation incorporated funding for forest fuels reduction and wildfire prevention into the so-called "White Pine Amendment" (White Pine County, Nevada, Lands bill of 2006) to the Southern Nevada Public Lands Management Act (Public Law 105-263). Lake Tahoe was named as one of the eligible areas for funding from this new source. Indeed, the "White Pine Amendment" provided the majority of fuels reduction funding for the Tahoe Basin for the next several years.

A provision in the White Pine legislation required a fuel reduction strategy in order to be eligible for funding. The United States Forest Service (USFS) took the lead to prepare the *Lake Tahoe Basin Multi-jurisdictional Fuel Reduction and Wildfire Prevention Strategy* (aka "The 10-year Strategy"). Given all of Tahoe's previous planning efforts, this new 'strategy' was essentially a compilation of the CWPPs, the WUI Plan and the 2007 USFS FireShed Assessment. Tahoe's first 10-Year Strategy was delivered in December 2007. Soon, priority fuel reduction projects began to receive much-needed funding. Of particular importance, Tahoe's local fire districts were eligible to apply for and receive funding based on the "White Pine" amendment.

While the 10-year Strategy was being created and other efforts were under way to address the wildfire threat, a dangerous, fast-moving wildfire broke out on June 24, 2007. The Angora Fire quickly consumed 254 residences and a total of 3,100 acres in the southwest corner of the Tahoe Basin. This shocking devastation became a catalyst that truly galvanized the public's attention and understanding of both the threat and consequences of wildfire. It underscored for fire agencies and local, regional and state leaders the importance of multi-agency collaboration.

On the heels of this emotionally charged event, the Governors of California and Nevada established the California-Nevada Tahoe Basin Fire Commission (August 2007). The panel met for eight months. The first two meetings were dedicated to listening to fire responders, agency directors and staff, technical experts, and, most of all, the public and residents of the Tahoe Basin as they explained their problems, concerns, and hopes in the wake of the disaster. Consistent with their assignment, the Commission spent little time on analyzing the Angora Fire itself (that was the task of others) and much more on efforts that had gone into preparing for inevitable Tahoe wildfires, whenever and wherever they might

occur. The Commission considered at length how the requirements of environmental protection interplayed with public safety. Three primary areas of discussion emerged and committees were created to further explore the multitude of topics in each of these: Wildland Fuels Management, Community Fire Safety, and Legislation and Funding Policies. Based on their work, the Commission developed a set of findings and recommendations, including collaborative solutions for regulatory reform and an even greater consolidation and coordination of fuels project planning and wildfire prevention efforts. These were published as part of *The Emergency California-Nevada Tahoe Basin Fire Commission Report* (May 2008). This report helped create changes in regulations for forest management and defensible space and set the course for the strong inter-agency partnerships that have been working together to address wildfire issues Basin-wide since that time.

Along with the positive regulatory changes that aided homeowners in creating defensible space and permit streamlining for fuel reduction projects in the wildland urban interface, another transformational outcome of the report was the formation of the multi-agency Tahoe Fire and Fuels Team (TFFT). The TFFT marked a watershed moment for the Tahoe Basin. Coordination at a Basin-scale became a functional reality for the first time, bringing together fire agencies, land managers, implementers, regulatory agencies, and other stakeholders to address forest health and wildfire issues. The TFFT has become the forum for all issues related to wildfire as well as the primary impetus for informed permit streamlining.

One of the early organizations that played an important role in wildfire education and community outreach was the Nevada Fire Safe Council (NVFSC). The council organized communities in the Tahoe Basin (and throughout Nevada) into Community Fire Safe Council Chapters. The Council provided technical assistance and funding for community projects. The role of the NVFSC was integral to the success of the larger wildfire awareness campaign and, though the organization no longer exists, the NVFSC laid the foundation for the community engagement role that is currently being advanced through the Fire Adapted Community (FAC) initiative.

Wildfire is not a matter of "if", but when and where and we cannot simply assume that someone else will take care of it. Wildfires have become more destructive, larger and harder to control, as most recently illustrated by the Rim Fire and King Fire (South and west of Lake Tahoe, respectively). The solution to being prepared is working together toward the common goal of being "fire adapted." There are many aspects to the Fire Adapted Community (FAC) approach including, but not limited to, creating a fire resistant built environment, increasing the amount of defensible space in Tahoe's communities, expanding fuels reduction treatments, and improved efficiency in the use of prescribed fire. The TFFT and fire agency leadership have embraced the Fire Adapted Community approach and are currently working to educate the community at large on the program's benefits and value. This Tahoe Basin Community Wildfire Protection Plan recognizes the value and fully supports implementation of the Fire Adapted Community program throughout the Tahoe region.

With agencies working collaboratively, wildland urban interface projects being completed, defensible space around homes being more diligently pursued, more engaged community involvement, and the evolution to fire adapted communities, we believe, and there is evidence to support, that the Tahoe

Basin is moving in the right direction and dramatically increasing our odds of surviving the next wildfire. We recognize much work remains to be done. We know that the work of fuels reduction, defensible space, wildfire prevention, disaster planning, and public education is, and must remain, ongoing.

2.2 Goals

<Insert sidebar for What is a Fire Adapted Community by C. Anthony>

<Insert sidebar for Fire Adaptations of Jeffrey Pine>

Wildfire is inevitable in the Lake Tahoe Basin. In fact, many of the region's plant and animal species are dependent on the natural disturbance caused by wildfires. The disturbance creates opportunities for new growth, cycles nutrients through soils, and maintains biological diversity. Such species are fire-adapted, and have developed strategies to survive and thrive in the presence of wildfire.

Wildfires become disasters when they threaten lives, burn homes, destroy infrastructure, and damage watersheds. Developing and implementing strategies to make human communities more fire-adapted can prevent such disasters. This Community Wildfire Protection Plan provides strategies that can be implemented by fire agencies, land managers, policy makers, community leaders, residents, visitors, and more that will make Lake Tahoe Basin communities better prepared for the next inevitable wildfire.

Implementing this plan will help to protect the lives, property and environment of the Lake Tahoe Basin from wildfire. The goals of the plan are to:

- **Create fire-adapted communities:** This plan provides mitigation strategies and community-driven action plans to help create communities where citizens are engaged and active in preparing for wildfire. It facilitates interagency cooperation and strengthens communication and support between agencies and the public.
- **Restore and maintain fire-resilient landscapes:** This plan provides prioritized locations for fuel reduction treatments, to enable land managers to effectively work across jurisdictions and to address risks to ecosystems and communities at a landscape scale.
- **Provide effective and efficient wildfire response:** This plan provides strategic treatments on the landscape that will facilitate safer and more successful suppression. This plan provides for tracking, reporting, and sharing of both fuel reduction accomplishments and homeowner/community initiatives, and will inform risk-based management decisions and tactical actions.

Whether you are a resident, a business owner, an elected official, or an agency employee, every community member has a role to play in a Fire Adapted Community. This plan provides a common frame of reference for engaging in finding common solutions, implementing actions, and monitoring progress.

Chapter 3, Community Description, discusses the fire environment of the Lake Tahoe Basin by examining fire ecology and fire incidence. It also describes the Lake Tahoe Basin's Wildland-Urban Interface and the assessment methodology used to quantify risk within it.

Chapter 4, Mitigation Strategies, discusses the methods that Lake Tahoe communities can use to prepare for wildfire. The strategies include methods for forest fuel reduction, guidelines for interagency cooperation and community engagement, as well as steps that residents can take to ready themselves, their homes, and their family for the next wildfire event.

Chapter 5, Planning Summary, discusses how this plan was created, and provides information on previous planning documents and related plans where additional information can be obtained.

Chapter 6, Monitoring and Evaluation, provides a process for regularly assessing progress on fuel reduction and community action plans.

Chapter 7, Fire Adapted Community Assessments and Prioritized Fuel Reduction Projects, describes the process that was used to develop fuel reduction priorities, and background information on the Fire Adapted Community Assessments and Action Plans that were collaboratively developed for five regional divisions around the Lake Tahoe Basin.

Chapters 8 through 12 contain maps of prioritized fuel reduction projects for each of the five Lake Tahoe Basin divisions. A Fire Adapted Community Assessment and Action Plan is also included for each division, and contain local contextual information and actions that will prepare communities for wildfire.

3 Community Description

This chapter discusses the fire environment of the Lake Tahoe Basin by examining fire ecology and fire incidence. It also describes the Lake Tahoe Basin's Wildland-Urban Interface and the assessment methodology used to quantify risk within it.

3.1 Fire Environment

3.1.1 Fire Ecology

<Reference Pictures folder, 2004 CWPPs and 2007 FRFP for pictures>

This discussion of forest ecology and historic fire return intervals includes a description of historical changes in the fire regime and the current fuel hazards in the Lake Tahoe Basin. Fire ecology is concerned with the natural processes connecting the frequency and effects of fire in an ecosystem. It is important to understand that fire is a natural component within the Tahoe ecosystem. Many plant species require fire to germinate, establish, or to reproduce. Additionally, low-intensity fires replenish soils with nutrients and reduce competition among trees in a landscape.

Over the years, however, fire suppression has disrupted this natural regime. This has led to a build-up of flammable forest fuels, the advent of less frequent but much larger and more destructive wildfires, and dense stands of unhealthy trees more susceptible to insects, diseases and drought. In response, many agencies in the Basin, in partnership with the public, have teamed up to work towards establishing a

forest that is more resilient to the effects of wildfire while seeking to protect life, property and the natural resources within the Basin.

3.1.1.1 Historic Fire Regime and Fuel Hazards

Extensive work has been completed analyzing and reconstructing historical fire regimes in the coniferous forests surrounding the Lake Tahoe Basin. When fire moves through a forested landscape, it can leave a mark or scar that is permanently stamped in the tree ring chronology. Analysis of these tree stump rings can provide a historical narrative of how often fire burned through a landscape prior to European settlement.

Fire return interval is dependent on a number of factors including elevation, slope, soils, vegetation types and human activity. Historic fire return intervals vary from 5 to 128 years throughout the Basin. At lower elevations, where most of the Washoe Indian camps were located and current communities are situated, historic fire-return intervals were the shortest. As examples, mean fire return interval on the East Shore, between Zephyr Cove and Marlette Lake, ranged from 3 to 9 years. In other areas around the edge of the Lake, and in the Meyers area, historic intervals ranged from 5 to 18 years. Above this elevation, fire return intervals increased and averaged 19 to 32 years.

Prior to European settlement, large, widely spaced trees with little understory vegetation characterized lower elevation montane forests in the Basin. Because frequent fires reduced surface and ladder fuels, fire intensities were low and there was little mortality of mature trees. However, as Europeans settled in the Basin the fire regime and fuel hazards changed. Between 1875 and 1895, large-scale timber harvesting resulted in most of the old growth forests in the Lake Tahoe Basin being clear-cut. Additionally, large numbers of livestock removed herbaceous vegetation and fires set by ranchers at the end of the summer grazing season probably killed tree seedlings that were regenerating in some of the clear-cuts. By 1900 the forests in the Basin were comprised of individual stands of seedlings, smaller trees, brush and some remaining old growth forests.

Livestock grazing was reduced significantly by 1930, allowing vegetation to regenerate. The drought period that lasted from 1929 to 1934 most likely limited regeneration and increased tree mortality as well as fuel hazards in the Basin. Fewer acres burned during this time period however, because the federal government had adopted a fire exclusion policy in 1924 and few people visited the Basin during the Great Depression and World War II. Although the number of visitors to the Basin steadily increased after World War II, the number of acres burned by wildfires still remained low.

3.1.1.2 Current Fire Regime and Fuel Hazards

Although forest stands have successfully regenerated since the Comstock era, decades of effective fire suppression and reduced attention on the need for ongoing forest management on public and private lands resulted in denser forests. Recent estimates indicate that lower montane forests have four times the density of trees and upper montane forests have twice the density of trees when compared to forest conditions prior to 1870. As a consequence, current forest stands exhibit a 70% higher disease incidence and a 5% greater mortality rate than remnant old growth stands in the Basin.

Since the 1970s, public sentiment and management strategies increasingly emphasized the protection and preservation of natural resources. Without sources of disturbance such as fire or active forest management, conifer trees and shrubs continued to grow. Forests became overcrowded and there were a large number of small, understory trees that created a ladder of flammable vegetation from the ground to the overstory canopy. Conifer trees invaded meadows and other openings. Additionally, drought periods contributed to increased mortality in forest and riparian vegetation. As a result, fuel hazards increased along with the size and severity of fires in the Lake Tahoe Basin.

3.1.1.3 Photographic Chronology of Ecological Change

Author George E. Gruell, a retired US Forest Service biologist, describes additional evidence of changes in vegetation structure and fuel hazards from conditions prior to the Comstock era. Gruell's 2001 book *Fire in Sierra Nevada Forests: A Photographic Interpretation of Ecological Change Since 1849*, compares historic photographs taken throughout California and portions of Nevada with more contemporary photographs of the same locations. The first pair of photographs is of Slaughterhouse Canyon, just north of Glenbrook, Nevada (Figure A).

In the 1873 photograph the foreground and area adjacent to the railroad had been logged; however, the open stands of large trees with little understory on steeper ground beyond the railroad tracks are consistent with other photographs from that period of unlogged stands. Compare this to the same area photographed 120 years later. A dense thicket of trees, many of which died during a bark beetle outbreak in the 1980's, replaced the previous open stands.

The second pair of photographs is of Fallen Leaf Lake in California (Figure B). Note the low shrubs in the foreground and large scattered Jeffrey pines and open meadow in the middle of the photograph taken in 1873. Compare this to the 1992 photograph, where the low shrubs were replaced by taller sagebrush and bitterbrush in the foreground and dense trees, mostly white fir, surround the almost obscured meadow.

[Figure A] Slaughterhouse Canyon, NV in 1873 (above) and 1993 (below). Note the widely spaced large trees in 1873 compared to the dense forest 120 years later. Source: Gruell 2001.

[Figure B] Fallen Leaf Lake, CA in 1873 (above) and 1992 (below). Note change in shrub cover around the rock in the foreground and substantial increase in the number of trees near the lake compared to 119 years later. Source: Gruell 2001.

3.1.1.4 Conclusion

The description of historic fire regime is intended to describe how the forest reacted to fire in the recent past, and why the management objectives described in this document attempt to achieve forested landscapes and fire behavior similar to that of the historic era. This text should not be viewed as a comprehensive scientific assessment of fire regime in the Tahoe Basin. As a public document, it is intended to illustrate that current forest stand conditions in Tahoe differ from historic conditions.

This understanding is necessary for the public to play an active role in defining the future conditions of the public and private lands in the Tahoe Basin. Recommended management activities seek to attain forest stand conditions found prior to European settlement. The land management prescriptions contained in this document should not be viewed as the only land management solution. Any land management approach that results in the desired fire behavior and forest resiliency is appropriate.

While fire management organizations and local fire agencies have been effective at containing most wildland fires in the Basin, it is evident from the more recent wildfires, such as Angora and Gondola, that the potential for large and damaging fires is a clear, present and on-going threat. Such fires have the ability to quickly escape the control of initial attack resources and spread into residential and riparian areas threatening life, property, and natural resources.

Given the potential for prolonged periods of drought, warmer temperatures, and reduced snow pack around the Basin, conditions are still conducive to large fire growth. It is critical that public and private organizations in the Lake Tahoe Basin continue to seek ways to reduce ignitions, increase forest resiliency, and decrease potential fire severity through fuel hazard treatments that achieve multiple resource benefits.

3.1.2 Wildfire History / Incidence

The number of acres burned by wildfires in the Lake Tahoe Basin has increased in each decade since 1973, including a ten-fold increase during the last decade (Figure A). Although the majority of fires were small, three recent fires grew larger than fires of the past 50 years. These were the 2002 Gondola and Showers fires (673 and 294 acres, respectively) and the 2007 Angora Fire. Angora, which burned 3,100 acres and destroyed or damaged more than 254 homes, was the largest fire ever recorded in the Basin.

[Figure A] Wildfire acres burned in the Lake Tahoe Basin by decade (1973-2010) Data from FAMWEB (<http://famtest.nwcg.gov/fam-web/>) data warehouse: queries and reports—Fire Causes and Acres Burned by Year

[Figure B] Lake Tahoe Basin Ignitions 1973-2014 <Note misspelling of Ignitions on map, will need to add a text heading to correct this>

The Lake Tahoe Basin recorded 2741 fires during the period from 1973-2014. Tahoe has a significant number of residents and visitors for a forested environment creating a complex wildland urban interface. Historically fires were primarily lightning caused, however since fire causes have been recorded, human caused fires have exceeded natural ignitions every year. Fires tend to occur in high use areas near the Lake, along trails, and near recreation areas at higher elevations. Overall, prevention efforts have had a positive impact, as fire occurrence has shown a slightly downward trend in the number of starts annually.

The number of starts varies greatly from year to year from less than 10 to over 160. Suppression efforts are relatively effective during initial attack at keeping fires small. Ninety percent of fires are kept at one-quarter acre or less, and greater than 99% are kept at less than 10 acres. The success of suppression operations has been improved through the interagency coordination of all agencies involved in fire

protection and emergency response. This coordination is facilitated through several different groups including the Lake Tahoe Regional Fire Chiefs Association, Sierra Front Wildfire Cooperators, and the Lake Tahoe Basin Multi-Agency Coordinating Group. Another factor supporting efforts to keep fires small is the success of the Tahoe Fire and Fuels Team (TFFT). The team coordinates fuel reduction work throughout the Basin based on the *Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy*. Fuels reduction treatments in the Wildland Urban Interface have greatly reduced fuel loadings and moderated fire behavior in a way that allows for a more successful initial attack.

Fire season typically begins in May and ends in October. The highest percentage of starts occurs from July to September, however large fires have occurred outside of that time frame. Between 1998 and 2014, overall fire occurrences increased. Smoking, lightning and campfires caused a large percentage of the recorded fires.

From 2005-2014, the number of fires per year ranged from a low of 22 to a maximum of 60. The fires still predominantly occurred from May to October, however more fires began during the winter months. During this period ignitions sparked by both lightning and smoking showed significant decreases while starts due to campfires increased. This increase in human caused fires throughout California and Nevada led to the “One Less Spark, One Less Wildfire” campaign. In addition to increased public messaging, increased patrol activity also began to detect unplanned ignitions and prevent them from becoming wildfires.

Due to the exceptional drought over the last few years, starts were analyzed for the years 2012-2014. During this period, fire occurrences ranged from 40 to 50 a year. Lightning ignitions increased to over 20 percent of the starts and campfires increased to over 40 percent. This occurred while starts caused by smoking noticeably declined. Over 10 percent of all ignitions over the last three years occurred outside of the traditional May through October fire season. Interagency training has increased in an effort to be prepared for wildfires throughout the year when staffing levels are not as high as peak season levels. This training has improved the ability of resources to respond to more effectively to “off season” wildfire fires.

[Figure C] Percent of Fires by Cause Class, 1973-2014

3.2 Current Conditions and Hazards

Prior to European settlement, low intensity fires burned approximately every 5 to 18 years in lower elevation pine and mixed conifer forests of the Lake Tahoe Basin. As a result, these forests had large, widely spaced conifer trees with a poorly developed shrub understory (few individuals and low growth forms). Between 1875 and 1895, large-scale timber harvesting removed most of the large, widely spaced trees around Lake Tahoe. Although the forest stands successfully regenerated, the past 50 years of fire suppression and a reduced focus on forest management on public lands in the Tahoe Basin has resulted in denser forests and increased fuel hazards. Recent estimates indicate that lower elevation forests in the Lake Tahoe Basin have four times the density of trees and higher elevation forests have twice the density of trees when compared to forest conditions prior to 1870. Higher density increases the competition for nutrients and triggers higher tree mortality rates. Current forest stands exhibit a 70

percent higher incidence of disease and a 5 percent greater mortality than remnant old growth stands in the Basin. High rates of mortality, particularly in white fir trees, have increased the number of standing dead trees and downed logs. Smaller mid-story trees create fuel ladders that allow fires to readily move into dense crowns. The lack of frequent low intensity fires has resulted in accumulations of dead fuels, increased understory shrubs, and dense young trees. As a result, flame lengths and rates of fire spread have increased.

In the 1960's, developments were increasingly being situated to best capture views of surrounding peaks and magnificent lake vistas, but without consideration of the environment, or emergency response. Many neighborhoods were developed with inadequate emergency access and evacuation routes. During the 1960's and 1970's, when most of the communities in the Tahoe Basin were subdivided, there was not a focus on wildland fire because large loss fires were nearly unheard of in the northern Sierra Nevada Mountains. The result is that many developments are situated on steep slopes completely surrounded by wildland fuels, with only a single road in and out for emergency response and evacuation. From a wildland firefighting perspective these communities are sited mid-slope and isolated in the most dangerous location for suppression, as there will likely be unburned fuels both above and below the initial attack forces.

Today there is limited new development in the Tahoe Basin, however there are still instances where single homes or small subdivisions are being proposed. All new developments must have adequate access, adequate defensible space and ignition resistant construction. The challenging wildland firefighting situation caused by past development practices illustrates the importance of proper land use zoning in determining the location of development and in developing mitigation measures that are based on the best available science.

3.2.1 Weather, Climate, and Topography

Climate

The Lake Tahoe Basin lies east of the northern Sierra Crest and west of the Carson Range. This location causes significant variation in precipitation patterns between the "rain shadow" on the east side of the Basin, and the crest of the west slope where orographic lift produces more substantial precipitation events. The Tahoe Basin generally represents the typical high elevation Sierra Nevada ecosystem, however subtle differences between the west and the east shore cause substantial differences in vegetative composition, fuel moistures, and growth rates.

Tahoe's West Shore is situated very close to the highest peaks in this region of the Sierra. This proximity can produce substantial precipitation as storms are pushed over the crest. This orographic lifting process is what causes the crest to have some of the highest snow packs in the Continental United States. As storms continue to move eastward over the Lake, the lifting process ceases and precipitation totals drop dramatically. As a result, the Nevada side of Lake Tahoe receives approximately half the precipitation as compared with the west in a given year. This "rain shadow" effect is quite pronounced and easily seen by observing the changes in vegetation as one travels from west to east.

Weather

The lowest elevations within the Lake Tahoe Basin are just below lake level. In typical years this level is held around 6,225 feet. The highest elevation is Freer Peak, rising to over 10,800 feet.

Mean annual precipitation ranges from over 55 inches for watersheds on the west side of the Basin to about 26 inches near the Lake on the east side. Most of the precipitation falls as snow between November and April, and rainstorms combined with rapid snowmelt can cause flooding. There is a typically a pronounced annual runoff of snowmelt in late spring and early summer, the timing of which varies from year to year. In some years, summertime monsoon thunderstorms from the Great Basin bring intense rainfall, especially to high elevations on the northeast side of the Tahoe Basin. These thunderstorms often bring lightning. They occasionally bring lightning with very little rainfall, known as dry lightning, which can cause multiple wildfire ignitions in a short time period.

August is normally the warmest month with an average maximum temperature of 78 °F and an average minimum of 40 °F. January is the coldest month with an average maximum of 41 °F and an average minimum of 15 °F. Temperatures generally exceed 90 °F several days per year.

Tahoe's proximity to the Sierra Crest and high elevation leads to significant winds throughout the year. Generally winds prevail from the south, however westerly winds will also blow frequently. During major wind events, wind speeds along or above the Lake and over higher terrain often exceed 60 miles per hour, and occasionally exceed 80 miles per hour. Much of the populated portions of the Tahoe Basin are heavily forested causing reduced wind speeds at ground level.

Topography

Tahoe Basin topography is variable with gently sloping areas near the Lake's edge surrounded by tall Sierra Nevada Mountains. Most of the residential and commercial development is found in gently sloping areas near the lakeshore and river valleys. Slopes quickly increase moving away from these areas, and many neighborhoods have been developed on the middle of the slope, often with steep drainages nearby. The area beyond is typically difficult to traverse with few roads, presenting challenges for wildfire suppression.

3.2.2 Wildland-Urban Interface Designation

In the early 2000's federal wildfire suppression policy began to shift in response to the exponential growth in suppression costs being paid by federal land managers at a time when timber revenues had dwindled. Under this shift, state and local jurisdictions were to be held accountable for the costs of protecting the community while federal land managers would pay the cost of suppression on their land. While this change in policy created a greater financial responsibility for state and local government, it also gave communities the right and responsibility to delineate their wildland-urban interface (WUI) and provide input into fuels reduction projects within their area.

The WUI is defined in the Healthy Forest Restoration Act of 2003 (Public Law 108-148) as “an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a Community Wildfire Protection Plan.” The Act specified that Federal agencies be required to use the wildland-urban interface defined in the Community Wildfire Protection Plan (CWPP) development process. Communities categorized as “at-risk” are identified in Federal Register 66(160): 43384-43435. Most of the communities in the Tahoe Basin are listed as “at risk.”

In the Tahoe Basin there is generally no clear boundary between wildland fuels and developed communities. Wildland fuels exist throughout Tahoe with sufficient continuity that a wildland fire would readily burn through one or more of the Lake’s communities as though it were burning solely in wildland areas. Only the presence of roads and impervious surfaces mitigates fire hazard; however, in dry windy conditions, spot fires would cause flames to travel through the area regardless of the presence of homes or roads.

The Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy of 2014 contains an updated wildland-urban interface map. The map includes developed areas within the defense zone to recognize the lack of a distinct boundary between communities and wildland fuels. Improvements in mapping technology, fire behavior modeling, and local knowledge and experience now provide a much more comprehensive and inclusive wildland-urban interface that better identifies areas to be considered for priority treatment based upon adopted CWPPs and the updated 2015 US Forest Service Lake Tahoe Basin Management Unit Land and Resource Management Plan.

Defense and Threat Zones

The Healthy Forest Restoration Act provided guidance to communities as to where the interior boundary of the wildland-urban interface should be located, but did not provide guidance for communities to determine the outer boundary of the WUI. The HFRA left these decisions to the local communities so that local fire managers could take into account fuel loading, topography, and local weather when planning the location of fuels reduction projects. This plan identifies two zones within the WUI.

- **Defense Zone:** The defense zone includes an at-risk area extending into the wildland for at least 0.25 miles beyond the community. All areas within the defense zone are a priority for fuels reduction; specifically fuels reduction in wildland areas and defensible space within the built areas. The intent of fuels reduction within the defense zone is to reduce fuels so that fire occurring during extreme fire weather will burn with 4-foot flame lengths or less as it approaches the community. This helps provide an adequate area for firefighters to engage the fire before it can reach the built environment. Buildings and the defensible space around them form a critical component of the defense zone.
- **Threat Zone:** The threat zone is an extension of the defense zone with the important distinction being that not every area within the threat zone may be a priority for treatment. Area treatments within the threat zone are designed to reduce fuels in target areas where fires are known to start, where a fire start is likely to grow and threaten communities.

- General Forest: General forest areas are all other lands outside of the identified wildland-urban interface that are not in wilderness. These areas are not specifically addressed in the Healthy Forest Restoration Act; however, treatments can be implemented there for fuels reduction, forest health, and ecosystem resiliency, and to address emergency needs (such as, windthrow, salvage, forest insects and disease, etc.) in addition to other management considerations.

Wildland-Urban Interface Acres by Zone

The total acres of each zone in the Wildland-Urban Interface are shown in the Table below.

Zones	Acres
Wildland-Urban Interface	117,954
Defense Zone	69,158
Threat Zone	48,796
General Forest	63,865

3.2.3 West-Wide Wildfire Risk Assessment

Agencies and organizations throughout the Lake Tahoe Basin frequently assess their areas of responsibility for current conditions and changes in conditions that influence fire management decisions. Fire district and department personnel gain understanding of their communities through defensible space assessments, fire code enforcement, and local property owner partnerships. Personnel from land management agencies have developed protocols for inspecting and assessing the fire hazard of both small conservation lots and larger forest holdings. Multi-jurisdictional collaboration through the forum of the Tahoe Fire and Fuels Team has facilitated the sharing of this information between organizations and with the public.

The analyses completed by individual organizations are area-specific, and tailored to each organization's mission. Systematic assessments that span the entire Tahoe Basin across all land ownerships are less common, and more difficult to implement. In order to complete a Basin-wide objective assessment of fire risk, the plan development team utilized data from the West Wide Wildfire Risk Assessment processed and customized for the Lake Tahoe Basin.

The *West Wide Wildfire Risk Assessment* (2013) is a report prepared for the Oregon Department of Forestry, Western Forestry Leadership Coalition, and the Council of Western States Foresters that was funded by the USDA Forest Service. Its purpose was to quantify the magnitude of the current wildfire threat in the Western United States. The approach allows for comprehensive comparisons within regions and across states. The report clearly identified the level of risk to communities and other areas of interest. It provided multiple spatial datasets for use in Geographic Information Systems software, including relative indices for evaluating fire threat, fire effects, and fire risk.

The Fire Threat Index represents the likelihood of an acre burning in a wildland fire, using calculations based on weather, topography, and vegetation variations that affect predicted fire behavior, as well as likely ignition sources and historical fire ignition data.

The Fire Effects Index represents the potential negative effects should a wildfire burn on a particular acre. This is calculated based on the presence of and potential impacts to key assets, including residences, businesses, watersheds, and infrastructure.

The Fire Risk Index is a composite of the Fire Threat Index (the potential for wildfire to burn an area) and the Fire Effects Index (the potential consequences if the analyzed area should burn). The Fire Risk Index is included in this Community Wildfire Protection Plan because it enables independent evaluation of local experts' understanding of current conditions. Assessment results are provided within each division's set of project maps (later in this document), and were used to assign priority scores to projects as shown in the Tables of Completed and Future Treatments.

The Fire Risk Index data was processed for use in the Tahoe Basin CWPP by regionally leveling the data across four zones: the North Shore (in Nevada), the East Shore (in Nevada), the South Shore (in California) and the West Shore (in California). The leveling allowed for in-depth comparison and prioritization among projects in each region, and eliminated differences in relative ratings that were due to small differences in methodologies between Nevada and California. Areas outside of the wildland-urban interface were not included in the process.

Unprocessed Fire Risk Index data is provided as a unit-less index with a non-normal distribution. The index was converted into a priority score for each zone by splitting the Wildland-Urban Interface into four equal areas based on the fire risk index. Within the defense zone, the areas with the highest risk index were assigned a priority score of 1. The areas with the second highest risk index were assigned a priority score of 2. The areas with the third highest risk index were assigned a priority index of 3. The areas with the lowest risk index were assigned a priority score of 4. Within the Threat Zone, the areas with the highest risk index were assigned a priority score of 3, and the remaining areas were assigned a priority score of 4.

4 Mitigation Strategies

This chapter discusses the methods that Lake Tahoe communities can use to prepare for wildfire. The strategies include methods for forest fuel reduction, guidelines for interagency cooperation and community engagement, as well as steps that residents can take to ready themselves, their homes, and their family for the next wildfire event.

4.1 Fuel Reduction Projects

The 2014 *Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy* (Strategy) included an update to the defined locations of Tahoe's wildland-urban interface (WUI) and an update to the project areas that will be treated to reduce fuels and ultimately potential fire behavior near communities. All existing planning efforts were reviewed and additional proposed wildland fuel reduction treatments were synthesized into the 2014 Strategy. There is now consensus that reducing fuels in the proposed project areas will best protect communities while limiting the scale of fuels treatments to those areas most likely to result in fire risk reduction.

<Insert fuel strata info box>

All projects are designed to change vegetation conditions to modify fire behavior and reduce the potential for wildfire by altering three primary fuel conditions as necessary: surface fuels, ladder fuels, and overstory crown fuels. This is accomplished through the implementation of a variety of treatments, commonly using more than one treatment type on the same piece of ground to achieve the desired condition. The following discussion describes the most common treatment types that are currently being used in the Tahoe Basin. It is important to note that the vegetation conditions that pose a fuels hazard are dynamic, with continued growth, needle-cast, litter-fall, and new growth of understory vegetation continually occurring. As such, future treatments will need to occur over time on the same area to sustain the benefits of the previous treatments.

Initial treatments have been completed on about half of the proposed projects identified in plans from 2007. The 2014 Strategy increased the size of the wildland-urban interface in the Tahoe Basin, however, there is a need to consider how and when to return to previously treated areas to maintain the efficacy of these treatments. Treatments completed to date have focused on the highest priority areas, primarily those closest to communities. As initial entry treatments begin to age, it will be necessary for land managers to weigh the risk reduction benefits to be obtained by conducting the initial entry on a new project that is further from a community versus reentering a treatment unit that is closer to a community. Developing competent data collection and analysis protocols will assist with future project prioritization.

4.1.1 Thinning

Mechanical and hand thinning are used to remove ladder fuels and reduce tree densities that contribute to extreme fire behavior. Initial entries generally reduce the density of smaller trees on the site that typically create ladder fuels and can wick fire into the overstory. Overall tree densities are also decreased to reduce the likelihood of crown fire and to increase overall forest resilience to natural disturbances such as fire or insect infestation.

Depending on the fuels reduction treatment prescribed and equipment used, very large volumes of limbs and small diameter trees can be generated on site, particularly from an initial entry. It has long been recognized that leaving excessive slash on site substantially increases surface fuels and resultant fire intensity. Therefore, slash must be reduced or reconfigured by mechanical removal, chipping on site, or burning. Slash that can be removed by mechanical means can be transported to a biomass facility where electrical energy, heat, or landscaping material can be produced. Thus, mechanical removal of biomass will also reduce the amount of pile burning and resulting smoke. However mechanical systems can only be used on slopes with less than a 30 percent grade and where there is access to a landing or processing site where the biomass and timber can be processed, sorted and hauled. For the majority of Tahoe Basin forests, hand thinning and pile burning will be employed because of the steep slopes and challenging access.

4.1.1.1 Hand Thinning

<Insert info box and illustration for “What is DBH?”>

Hand thinning is conducted with crews of approximately 10-30 individuals who cut trees with chainsaws and pile the resulting slash. Hand thinning is generally used to cut smaller trees (less than 10-14 inches diameter) on steep slopes where machines cannot operate, or in environmentally sensitive areas where the wrong machines could have a significant environmental impact. Hand thinning is not as effective as mechanical thinning at restoring tree densities to pre-European colonization conditions because many of the suppressed trees in a stand can be greater than 14 inches diameter. However hand thinning is very effective at removing sufficient fuel to modify fire behavior.

Production rates with hand crews vary with fuel type and density, however in general, a 10-person crew can treat .5 to 2 acres daily, depending on the type and amount of material that is removed. Unlike mechanical thinning, hand thinning only describes how the vegetation will be cut and does not address how the material is disposed. Hand thinning may be the appropriate method for vegetation cutting, but some other mechanical means may be necessary for removal of the cut material from the site. One or more of the following disposal treatments must be applied in combination with hand thinning to remove the fuels from the forest.

4.1.1.2 Mechanical Thinning

Mechanical thinning utilizes equipment with hydraulically driven saws to cut and remove trees (generally under 24 inches diameter). Mechanical thinning equipment is confined by regulations in the Tahoe Basin to slopes less than 30 percent and outside of stream environment zones except when approved by TRPA and the Lahontan Regional Water Quality Control Board (LRWQCB) in California and TRPA or the Nevada Division of Forestry (Nevada Revised Statute [NSR] 528.053) in Nevada.

The two major mechanical thinning systems used in the Tahoe Basin include cut-to-length carry the logs to the processing site, and whole tree removal systems that typically skid or drag the logs to the processing site. Cut-to-length systems use a harvester to cut trees and to remove the branches before automatically cutting trees into predetermined log lengths. This is known as processing at the stump. The branches from the trees can be distributed across the forest floor or laid to form a path that is used for travel by the cut-to-length equipment depending on soil sensitivity. In either case, the slash must be processed into chip or removed from the site in order to effect real fuels reduction. In cut-to-length systems the slash is typically masticated on site. The masticator can both treat the slash from the tree falling operations and can also treat dead and down fuels and brush or other finer fuels on the site. In some cases where it is preferable to completely remove all of the cut material, whole tree chippers can be used to drive to the slash and chip it on site.

Whole tree systems are the most common for logging in the West. In whole tree logging, a man or machine cuts the trees to be harvested and then a skidder pulls the tree and limbs to the processing site. This is known as processing at the landing as all slash is removed and either hauled for biomass or burned in landing at a later date. Whole tree logging is very inexpensive compared to cut-to-length but does initially cause more soil disturbance.

<Include the following in a call-out box>

Over the Snow

Both cut-to-length and whole tree systems can be operated over-the-snow to minimize or completely negate any impact to the ground. Over the snow logging has been done in the Tahoe Basin; however the weather is rarely cold enough to provide good conditions for a long enough period of time to complete a project. Over the snow logging requires very cold temperatures during the day to prevent the snow from becoming rotten during operations and allowing the machines to penetrate to the ground. Night operations have been used, but most project work takes place in proximity to communities and running heavy equipment at night is prohibited. Thus, over the snow operations will likely be used in Lake Tahoe on an infrequent basis.

4.1.2 Mastication and Chipping

Mastication

Mastication uses excavators with purpose built grinding heads to grind small trees (up to 10 inches DBH), surface fuels and dead and down wood into chip. Mastication provides a quick and cost effective method to modify the fuel structure and reduce flame length and therefore potential fire intensity. Mastication is a very useful tool in brush fields and for thinning small trees and roadside maintenance. Cutting, processing and disposal of material occur in a single action. Chips are left on the ground where decomposition will take place. Like other mechanical methods, rocky sites, sites with heavy downed logs, and sites dominated by large trees are difficult places to operate mastication equipment. Additionally, sparks from mastication heads have the potential to start fires and, when working on public land, these machines are subject to the same activity-level restrictions that apply to most other machines.

Chipping

<Insert info box on community chipping programs and Cabin Creek biomass facility>

Chipping may be used as an alternative to pile burning for removing cut vegetation. However, its usefulness is greatly reduced because of the necessity to carry material to the chipper. There are currently two mobile tracked chippers in the Tahoe Basin that can operate in the forest; however, these machines are subject to the same regulations as other mechanical systems. Material that is chipped can either be removed from the site or broadcast onto the forest floor. Chips that are removed from the site can be transported to a biomass facility where they can be converted to electricity, heat, landscaping material, or other products.

4.1.3 Prescribed Fire

There are two types of prescribed burning: pile burning, which is a typical component of hand thinning operations, and broadcast/understory burning. Pile burning is used where hand thinning is employed for

the initial treatment of a forest where large volumes of cut debris must be disposed of. Broadcast/understory burning is intended to thin trees while also consuming surface fuels. Prescribed burning is a primary tool in the Tahoe Basin because it reduces the loading of fine fuels, duff, large woody fuels, shrubs, and other live surface fuels. Burning reduces horizontal fuel continuity (shrub, low vegetation, woody fuels), which reduces the intensity of surface fires, limits rates of spread, and reduces ember production. These changes, together with increased fuel compactness and reduced fuel continuity, modify the fuel profile to pre-European settlement conditions. Thus reintroducing fire to Lake Tahoe forests is viewed as the most effective strategy for maintaining fuel reduction projects through time.

4.1.3.1 Pile burning

Pile burning is done to remove fuels from forests, typically following hand thinning. During hand thinning projects, crews cut small trees, brush, and surface fuels and stack them into piles that are typically four to eight feet in diameter and height. Piles are allowed to cure, generally at least one year, and then burned when conditions are favorable. The single largest difference between pile burning and broadcast/understory burning is that snow or very wet conditions can be conducive to pile burning where the same conditions would prevent the use of broadcast/understory fire. Pile burning is very effective at removing fuels from the project site; however it comes with its own challenges. In the winter in Lake Tahoe, inversions frequently form where relatively cold air is trapped in a boundary layer near the ground. Inversions prevent the disbursement of smoke resulting in dense smoke remaining near the ground for days at a time. Thus it is critical for burn bosses to not only evaluate the weather on the day of ignition; they must also evaluate potential weather for days after ignition. The other primary limitation with pile burning is the size of the material that can be burned. Hand thinning projects generally limit the size of the trees being cut to 10-14 inches diameter. Material in the 8-14 inch classes typically can create a great deal of smoke due to incomplete combustion. Limiting the volume of large material in the piles greatly reduces smoke production, but can also reduce the efficacy of the overall project.

Pile burning will continue to be an important tool for fuels managers in the Tahoe Basin because steep slopes and difficult access prevent the use of other systems. However, pile burning will become less common as the initial entries into project areas are completed.

4.1.3.2 Understory burning

Understory burning involves igniting a prescribed fire under the forest canopy to consume surface fuels. Broadcast burning is used in areas without a forest canopy. Understory and broadcast burning have been applied by mankind to control vegetation throughout known history. Historically in the Lake Tahoe Basin, frequent low intensity fires prevented the buildup of surface fuels, thinned lower branches from trees, and prevented the growth of small trees that today form ladder fuels and contribute to crown fire behavior. Understory burning however cannot typically be used as an initial treatment as fuel loading on site would burn with undesirable fire behavior. Accordingly, understory burning is primarily confined to maintenance on previously treated projects. Understory burning is also challenging to schedule primarily because the prescribed weather conditions for ignition are relatively limited when compared

to pile burning. It can therefore take several years to complete burns. This can be a challenge for funding which may have a limited time window for expenditure. Restoring fire to the forests of Lake Tahoe will both reduce the potential for damaging large fires and restore ecosystem function over the long term.

4.1.4 Multiple Resource Benefits of Fuel Reduction Projects

The benefits of fuel reduction projects are more-fully realized when implemented using an “all-lands” approach. This approach requires understanding the role that each project plays within the broader landscape ecologically, socially, and economically. When considering all-lands within the Lake Tahoe Basin, projects can be designed that span multiple ownerships and accomplish landscape scale fuel reduction and forest restoration.

By engaging with multiple stakeholders and gaining a full understanding of a region at the landscape scale, fuel reduction projects can be developed that will provide multiple resource benefits, including the enhancement of water quality, wildlife habitat, forest vegetation, recreation and scenic resources, and carbon sequestration. The 2014 Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy (Strategy) focuses on the multiple benefits that can be achieved through landscape scale fuel reduction.

This plan supports prioritized hazardous fuel reduction and forest health improvement treatments across multiple jurisdictions on a landscape scale to maximize realized co-benefits.

Environmental co-benefits provided by the projects include the protection and enhancement of water quality, wildlife habitat, and forest vegetation. Socioeconomic benefits include the protection of community assets from wildfire, improved public health and safety, and increased institutional capacity for future projects providing greenhouse gas emission and carbon sequestration benefits.

High-intensity wildfires have extraordinary effects on ecosystem processes and human communities. The projects in this plan will substantially reduce potential fire intensity by altering ground fuels and reducing stand density, serving as a surrogate for the frequent, low-intensity wildfire that frequently burned Lake Tahoe Basin forests prior to Comstock logging and fire suppression that began in the late 1800s. Selective thinning will reduce competition among desired tree species, and improve resistance to insects and disease. Thinning will favor the retention of, and provide regeneration opportunities for fire-tolerant tree species, such as Jeffrey and ponderosa pine, to promote a structurally diverse forest stand better suited for a wide variety of species.

The reduced potential fire behavior within treated areas will prevent resource impacts associated with high-intensity wildfires. Water quality will be protected by preventing significant vegetation loss that can result in flooding, erosion, mass wasting, and the rapid transport of nutrient loaded sediment into surface waters. Suitable habitat for special-status wildlife species such as the Sierra Nevada yellow-legged frog, California spotted owl, and osprey will be protected from damage and loss. Forest vegetation will be protected by preventing stand-replacing wildfire, which would make the area vulnerable to infestation by invasive species.

In addition to protection of environmental assets, reduced potential fire intensity will help prevent damage to high-value community assets, including homes, businesses, municipal watersheds, and utility infrastructure. Wildfires can also impact the tourism-based economy of the Lake Tahoe Basin by damaging recreation and scenic resources. Following the implementation of this plan, wildfires will be less likely to threaten communities, and the fires will be more easily controlled, enhancing the safety of the public and emergency responders.

In 2010, the Lake Tahoe Biomass Working Group developed the Lake Tahoe Biomass Utilization Strategy to identify barriers and develop recommendations to increase biomass utilization from forestry projects. The primary barrier at the time was transport costs to move biomass material to power generation facilities. Today, with the construction of the Cabin Creek Biomass facility imminent just outside of the Lake Tahoe Basin, the primary barrier will be overcome, and organizations are now focusing on building implementation capacity.

The collaborative approach to fuel reduction in this plan provides an opportunity to increase capacity by acting as a model approach to implementing multi-jurisdictional greenhouse gas emission benefit projects at the landscape scale. The fuel treatments will provide new employment opportunities and build regional expertise and capacity, allowing the model to be refined and adapted for use throughout the Lake Tahoe region.

4.2 Reducing Structure Ignitability

Wildland fire prevention programs in the Tahoe Basin are intended to reduce the chances of home ignition by reducing wildland fuels and reducing opportunities for structure ignition, and then by increasing the resilience of the structure. First, it is important to understand how homes typically ignite. Fires can ignite structures through radiation, convection or conduction. Wood is very resistant to ignition from radiation. This means that the heat from a fire is very unlikely to ignite a home. Convection occurs when heat is carried by hot air. In wildland fire, this is known as pre-heating. Pre-heating can make the home and landscape far more vulnerable to fire, but rarely, by itself, ignites a home. Conduction is the primary ignition source for homes, generally through direct flame impingement or by the accumulation of burning embers that then ignite a receptive fuel bed.

Recognizing the methods of home ignition then leads to a strategy to protect against structure fire. The approach is three-pronged, and includes building with ignition resistant construction, creating defensible space, and reducing wildland fuels within the wildland-urban interface.

4.2.1 Defensible Space

People who build and live within the wildland urban interface or intermix have made a conscious decision and have an obligation to manage their defensible space, and limit the ignition sources around their homes and properties. Some residences are located away from the main roadway network and create difficult challenges for protecting structures during a wildland fire.

Developed properties in communities within the wildland-urban interface, including homes and businesses, are required to implement and maintain rigorous standards for defensible space. When structures are present, fuels should be modified consistent with the standards identified in state and local regulations. The “Fire Adapted Communities” booklet published by the University of Nevada Cooperative Extension is a useful guide for homeowners to better understand the defensible space options for their homes and community. The booklet describes the following three areas around the home where property owners can reduce the likelihood:

- **Noncombustible Area:** This area extends from the structure out to 5 feet. In this area no combustible vegetation or ground covers are permitted. Examples of nonflammable vegetation would be well-irrigated flowers or succulent plants. Compost may be used; however, flammable mulches such as pine needles, shredded bark, bark, and woodchips are prohibited.
- **Lean, Clean, and Green Area:** This area extends from the noncombustible area out to 30 feet. In this area single isolated specimens of flammable plants are permitted and plants are to be kept healthy and free of dead material. Combustible mulches may not be used as a widespread ground cover and may not be used in a manner that would carry fire (that is, a fire must self-extinguish in this area).
- **Wildland Fuel Reduction Area:** This area extends from the lean, clean, and green area out to the wildland. In general it is recommended that homeowners complete at least 100 feet of defensible space, but that distance may be increased up to 300 feet depending on slope and fuel types. In the wildland fuel reduction area there must not be horizontal and vertical fuel continuity. Isolated patches of native shrubs, trees, and some patches of flammable ground covers are allowed; however, they cannot be continuous or capable of carrying fire to or from the home. Vertical fuel continuity (ladder fuels) is a condition where surface fuels are under small or medium-sized trees that are then directly under the larger trees that compose the forest canopy. Ladder fuels enable surface fire to travel into the forest canopy and produce flame lengths far greater than what firefighters can safely engage.

4.2.2 Ignition Resistant Construction Materials

Ignition resistant construction means using materials and building methods that resist ignition. All plans for new construction and substantial remodels must be reviewed by a Fire Marshal’s office to ensure compliance with regulations for construction and materials. During this process, the elements of building structure are evaluated to ensure that they limit ember intrusion into the structure and resist ignition from direct flame contact. There are two questions and standards that must be addressed: 1) Are the materials fire resistant indicating a Class A rating, and; 2) Is the structure built with ignition resistant construction techniques?

The intent of ignition resistance requirements is to armor the structure against the penetration of embers or flame and for the building envelope to resist ignition from direct flame contact. Vulnerable construction elements on the exterior structure envelope are the roofing, siding, venting, windows and decking or attached structure features. Gutters can be particularly vulnerable as they can hold light flashy fuels and catch embers. Decks, walkways and fencing that are combustible can act much like a

fuse and wick fire to the structure. Building these attached structures with non-combustible or flame resistant materials can greatly reduce the likelihood of ignition.

How the home is constructed is also as important as the products used in construction. Common features where construction methods are as important as construction materials include the gables, gutters, eaves, and venting. These areas of the home can either resist fire intrusion, or can actually funnel heat and embers into the building envelope. An example is the gable end of a structure and the vents used. The eave overhanging the gable can trap heat and wick embers and heat into the attic. Inside corners are also particularly vulnerable to fire, as winds tend to swirl in the corner, effectively creating a vortex of fire that can reach beyond the roofline.

4.2.3 Community Design

Ideally, all efforts to protect communities in high fire hazard areas should begin with appropriate community design and layout. In the Tahoe Basin today, with limits on land use and development, it is not likely that many new communities will be built where contemporary design features can be employed. More likely, given the trend toward the redevelopment of existing properties, it is possible to retrofit at least some elements of safe community design into existing communities.

The basics of fire adapted community design include:

- Encourage or require individual preparation for each structure in the community: Design guidelines required by homeowners associations can be stricter than applicable state defensible space laws. Require ignition resistant landscapes and building materials/methods.
- Prevent wildfire incursion into the community: Design a reduced fuel zone around the community that will be maintained to prevent extreme fire behavior and to provide a safe zone for firefighters to engage an approaching wildfire.
- Facilitate evacuation: Design the community with at least two access roads and provide adequate space to turn large equipment. Many communities in the Lake Tahoe Basin have only a single road for ingress and evacuation. While building additional roads in the Tahoe Basin is unlikely, it may be possible to access forest roads in emergency situations.
- Facilitate emergency response: Fire engines used for structure and community protection are typically greater than 30 feet in length and 10 feet in width. An engine must be able to enter the community, quickly turn and prepare to retreat to a safe zone and then begin operations. Turnarounds provide engine crews with the ability to safely maneuver equipment and allow them to maintain access to escape routes.

4.3 Community Preparedness for an Emergency Event

<Insert full page info box (see last section) containing “The challenges of fighting wildland fires in Lake Tahoe”, a perspective from South Lake Tahoe Fire Chief Jeff Meston.>

4.3.1 Description of Fire Suppression Resources

<Clarify jurisdictional suppression responsibilities in California vs Nevada>

The Tahoe Basin is a unique area when it comes to wildland/vegetation fire suppression. It is a region comprised of two states, five counties, with private, state and federal land intermixed. Eight local fire districts/departments, two state fire departments and one federal agency (US Forest Service) protect these lands.

Those departments consist of:

- Carson City Fire Department (NV)
- North Lake Tahoe Fire Protection District (NV)
- Tahoe Douglas Fire Protection District (NV)
- South Lake Tahoe Fire Department (CA)
- Lake Valley Fire Protection District (CA)
- Fallen Leaf Fire Department (CA)
- Meeks Bay Fire Department (CA)
- North Tahoe Fire Protection District (CA)
- Nevada Division of Forestry
- California Department of Forestry and Fire Protection (CAL FIRE)
- USDA – USFS Lake Tahoe Basin Management Unit

Local fire districts and departments protect private property. State and Federal lands are protected by their respective agencies. All of these entities have their own set of policies and procedures for day-to-day operations but one mission is common: fire suppression.

Fire knows no boundary. It frequently burns across jurisdictional lines, complicating cost factors and sometimes suppression tactics. In an effort to address these complications, mutual aid and automatic aid agreements have been developed and signed by agencies throughout the greater Lake Tahoe region. The parent agreement is that of the Lake Tahoe Regional Fire Chiefs Association (LTRFCA) (see ltrfca.org). The signatory agencies agree to assist each other for the first 24 hours without charge. This agreement is activated not only by the need for wildland/vegetation suppression, but with “all-risk” incidents as well, such as structure fires, medical calls or any call for service that requires a multi-jurisdictional response. The agreement covers all ground resources (e.g., engines, other equipment and overhead personnel, that is personnel to manage the incident). Air resources are all coordinated through state or federal agencies, depending on the fire/incident location. All ground resource response comes under the “closest resource response” concept. As an example, this means that no matter who owns a fire (the agency with immediate jurisdiction where the fire started is considered the owner), the closest fire agency responds. This is consistent with the mutual goal of suppressing the fire as soon as possible.

There are also working agreements and partnerships in place with local, state and federal law enforcement and search and rescue agencies. Law enforcement plays a significant role with traffic control, search and rescue operations, as well in any evacuation, be it from a wildland fire or other incident that puts a community in peril. Some agencies have developed Community Emergency Response Teams or similar programs that provide interested citizens with disaster training. These

typically volunteer programs provide additional resources when agency resources have been allocated and the emergency response would benefit from trained, organized volunteers.

All of these agreement and partnerships are engaged frequently, whether it be in a training exercise or an actual emergency. Joint training is particularly vital in suppressing a wildland/vegetation fire, as it allows each agency's personnel to get to know one another's capabilities and equipment. This preparation makes for a more effective emergency response.

4.3.2 Wildfire Response Capability

In the Tahoe region, there is a good quantity of wildland fire engines (commonly referred to in the fire profession as Type III engines). There are also four hand crews, and various experienced overhead personnel. Overhead personnel are needed to manage an incident with respect to firefighter and homeowner safety. They order resources and direct overall suppression efforts. In the event initial resources are deployed but more assistance is needed, local, state and federal agencies have the ability to use other agreements to request and secure additional response capabilities. The State of Nevada has a Nevada Master Mutual Aid (NMMA) agreement that allows Nevada fire suppression resources from across the state to respond anywhere in the state, including the Tahoe Basin. The Nevada Department of Emergency Management governs this agreement. California uses a similar approach, the California Fire Assistance Agreement (CFAA), governed by California Office of Emergency Services. At the federal level the US Forest Service has access to resources from across the nation that can be engaged through "National Ordering," a process governed by the National Interagency Fire Center in Boise, Idaho.

As noted earlier in this planning document, the US Forest Service manages 78 percent of the lands within the Lake Tahoe Basin. Accordingly, the Forest Service has the largest area of responsibility for fire suppression. Additional resources can be ordered through the federal system with the first tier starting at the local dispatch center or Emergency Command Center (ECC) located in Camino, California. From there, resource orders the go to a state level, using the closest resource available concept. In addition to the Federal ordering process, local government can utilize "friends and neighbors" agreements to acquire the closest resources.

In addition to these agreements, every agency in the Tahoe Basin has the capability to communicate on a common radio channel as they work to keep personnel safe, develop and implement incident objectives, and to ensure efforts and resources are not duplicated.

4.3.3 Notification and Emergency Alerts

The Tahoe Basin has unique challenges when it comes to evacuation planning and conducting an evacuation during a wildfire. Historically, fire departments and offices of emergency services have relied on reverse 911 to notify residents when an evacuation has been ordered in their area. With the proliferation of mobile phone services and given Tahoe's significant number of visitors and vacation/second home ownership, reverse 911 may result in communications with only a limited number of residents and visitors. Further, the use of cell phones in this mountainous environment is frequently unreliable; there are many areas in which cell phone coverage is poor or not available. Cell

phones are rendered even more ineffective when large numbers of people try to use them at once and exceed carrier capacity.

Lake Tahoe is a popular tourist destination so it is not unusual to have visitors from other states and countries who may be unfamiliar with the risks and hazards of wildland fires. Many visitors stay in hotels or motels, while others are in rented vacation homes. They may not be familiar with disaster evacuation routes. There are also language challenges. Not all residents and visitors speak English, so effective messaging must typically be in multiple languages, English and Spanish at a minimum.

The Tahoe Basin consists of many communities scattered throughout the forest. Main travel routes are primary state highways (with one US Highway – Highway 50), with the feeder roadway network under the control of Tahoe's local jurisdictions. Due to peaks of peak traffic congestion, it is often difficult if not hazardous for emergency responders to navigate their vehicles and equipment on Tahoe's roads. If the response must be on the region's network of forest roads and trails, steep terrain and unstable ground are additional challenges.

Many visitors are not familiar with the region, the main highway network, or the streets in residential or other areas where they may be staying or recreating. Panic may be triggered if evacuation routes are not clearly communicated during an emergency.

Another challenge is that every county and fire district within the Tahoe Basin has its own systems and plans for emergency notifications and evacuation. This makes it difficult when emergencies involve multiple jurisdictions where the method and channels of communication are different. Consistency in communications and messaging is vital to the prompt notification and evacuation of communities at risk.

Preplanning for evacuation is important to the safety of the public. As pointed out in the lessons learned publication *FACES: The Story of the Victims of Southern California's 2003 Fire Siege*, even areas such as San Diego County, where wildfires requiring evacuations are trending toward becoming annual events, they were not adequately prepared for an evacuation that year and lives were lost.

<Include the following in a call-out box>

Community and stakeholder meetings held during the development of this plan identified the confusion that can be created for emergency alert and evacuation planning where multiple states and counties meet. Recommendations to improve communications to residents and visitors resulted from these discussions:

Recommendations:

- Determine what system for emergency public notification or method of notifications would be the best fit and implement it throughout the Tahoe Basin. Then proactively get information about the system to the public. A coordinated regional approach would make it easier for anyone in the Tahoe Basin to be notified of an emergency and be advised as to what actions to

take in the event of an evacuation order. This is particularly important as it applies to electronic notification on mobile phones or computers.

- Present to the public a consistent message of what to do to prepare for an emergency. Several fire districts use a similar document but some are out of date and should be updated. Again, it would be important that the evacuation preparation message is consistent throughout the Basin. There should be one preparedness guide for all Basin fire districts, departments, and agencies that could be periodically updated and is conveniently available on the Internet and through other publication and distribution channels.
- Evacuation planning is critical and scenarios for evacuation should be run periodically with law enforcement, fire personnel, and local community members. More community evacuation practice opportunities should be conducted in the most populated areas, so that residents understand the importance of evacuation planning and law enforcement and emergency personnel can understand potential evacuation challenges. More also needs to be done to inspire community members to prepare their own evacuation plans.

4.3.3.1 Evacuation systems used in the Tahoe Basin

North Lake Tahoe Fire Protection District, Washoe County, State of Nevada

Washoe County utilizes an emergency alert system. Registration for the system is available at:
<http://www.readywashoe.com>.

The Fire District has a disaster preparation booklet that can be downloaded at:
<http://www.nltfpd.net> > "Community Outreach" > "Emergency Preparedness"

Tahoe Douglas Fire Protection District, Douglas County, State of Nevada

Douglas County utilizes an emergency alert system. Registration for the system is available at:
<http://www.douglascountynv.gov> > "Receive Notifications"

The Fire District has a disaster preparation booklet that is used by other fire districts in the South Lake Tahoe area. It is available at:
<http://www.SouthTahoeEmergencyGuide.com>

Lake Valley Fire Protection District, El Dorado County, State of California

El Dorado County utilizes an emergency alert system. Registration for the system is available at:
<http://ready.edso.org>

The Fire District has a disaster preparation booklet that is used by other fire districts in the South Lake Tahoe area. It is available at:
<http://www.SouthTahoeEmergencyGuide.com>

South Lake Tahoe Fire Department, City of South Lake Tahoe, El Dorado County, State of California

El Dorado County utilizes an emergency alert system. Registration for the system is available at:
<http://ready.edso.org>

The Fire District has a disaster preparation booklet that is used by other fire districts in the South Lake Tahoe area. It is available at:
<http://www.SouthTahoeEmergencyGuide.com>

Meeks Bay Fire Protection District, El Dorado County, State of California

El Dorado County utilizes an emergency alert system. Registration for the system is available at:
<http://ready.edso.org>

A disaster preparation booklet is currently under development and will be used by North Tahoe Fire Protection District and Meeks Bay Fire Protection District. It will be available by late 2015 at:
<http://www.meeksbayfire.com> and <http://www.ntfire.net>

Fallen Leaf Fire Department, Fallen Leaf Lake Community Services District, El Dorado County, State of California

El Dorado County utilizes an emergency alert system. Registration for the system is available at:
<http://ready.edso.org>

The Fire District has a disaster preparation booklet that is used by other fire districts in the South Lake Tahoe area. It is available at:
<http://www.SouthTahoeEmergencyGuide.com>

North Tahoe Fire Protection District, Placer County, State of California

Placer County utilizes an emergency alert system. Registration for the system is available at:
<http://www.placer-alert.org>

The Fire District has a disaster preparation booklet that can be downloaded at:
<http://www.ntfire.net> > "Emergency Preparedness and Evacuation Planning"

An updated disaster preparation booklet is currently under development and will be used by North Tahoe Fire Protection District and Meeks Bay Fire Protection District. It will be available by late 2015 at:
<http://www.meeksbayfire.com> and <http://www.ntfire.net>

4.3.4 Evacuation Preparation

Planning for evacuation from fire is challenging because fire emergencies are dynamic with the location and direction of spread varying depending on start location, weather, topography, and fuel. With flood and earthquakes, the area that will be most greatly impacted is typically better understood and residents can plan their evacuation knowing where the high water will be over the roads or where the areas of most likely earthquake damage will occur. In these situations, the location of the emergency evacuation centers will be relatively stable.

With a fire evacuation, the location and direction of the fire may change rapidly, so the evacuation route must be determined specific to the incident. Emergency evacuation centers will also be established based on the location of the fire, the size of the incident, and area ordered to evacuate. Being prepared to evacuate before the fire is the single most important action people can take to safely evacuate.

Each household or other group should prepare or review their Emergency Family Evacuation Plan and prepare a To-Go Bag. An Emergency Evacuation Plan should contain the following elements:

- Meet with household members. Explain dangers to children and work as a team to prepare your family or household for emergencies.
- Discuss what to do about power outages and personal injuries.
- Post emergency phone numbers near phones.
- Learn how to turn off the water, gas and electricity at your home.
- Select a safe meeting point. During an emergency, you may become separated from family, household or other group members.
- Choose an out-of-town contact because it is often easier to make a long-distance phone call than a local call from a disaster area. Everyone must know the contact's phone number.
- Complete a family/household communications plan. Your plan should include contact information for family members, work and school.
- Teach children how to make long-distance phone calls.
- Complete an inventory of household contents and photograph/videotape the house and landscape. Place files in your to-go bag. A second copy of these files should be stored in a location away from your community.
- Identify escape routes and safe places. In a fire or other emergency, you may need to evacuate very quickly. Be sure everyone in your family/household knows the best escape routes out of your home and where safe places are in your home for each type of disaster. Draw an escape plan with your family/household highlighting two routes out of each room.
- Prepare EVACUATED signs and if you have an emergency water source (pool, pond or hot tub), WATER SOURCE HERE signs. Select sites to post the signs where they will be clearly visible from the street. After planning, the family/household is encouraged to prepare to evacuate and plan to leave within minutes. Pre-packing relieves the stress of sudden evacuation and enables the family/household to focus on evacuating.

The To-Go Bag enables a household to grab important paperwork, pictures and enough personal effects that the family can focus on learning the safe evacuation routes and evacuate. When a wildfire is approaching, evacuees may only have enough time to retrieve this bag. At a minimum this should contain:

- Clothing and personal toiletries.
- Inventory of home contents and photographs/videotape of the house and landscape.
- Flashlight, portable radio tuned to an emergency radio station and extra batteries. Change batteries annually.

- Extra set of car and house keys.
- Extra pair of eyeglasses.
- Contact information for family, friends and physicians.
- Evacuation checklists available from www.livingwithfire.info/tahoe

Evacuation plans are intended to organize a family or household actions during an emergency so that everyone can safely evacuate and reunite. Grouped together at the community level, the elements of the family evacuation plan can be incorporated into a community evacuation plan. The community evacuation plan should consider the evacuation of persons with special needs, such as the elderly or those with medical conditions. Consider the following when preparing evacuation plans for those in need:

- If the family/household member is dependent upon medications or equipment, or has special dietary needs, plan to bring those items with you. Documentation about insurance and medical conditions should also accompany the person.
- Transportation available to the general public during an emergency evacuation may not be suitable for family members with special needs. Plan ahead for their transportation.
- Many special-needs persons are easily upset and stressed by sudden and frightening changes. Your plans should ensure that a caregiver or trusted family member is able to stay with them at all times during an evacuation.

Pets always have special needs during an evacuation and many evacuation centers cannot accommodate pets. It is therefore imperative that people consider how their pets can be cared for during the entire period of the evacuation. Plan to take your animals with you or have other arrangements in place. Never simply turn them loose. Contact your county's animal services department for advice on animal evacuation.

- Make sure dogs and cats wear properly fitted collars with identification, vaccination, microchip and license tags.
- Your pet evacuation plan should include routes, transportation needs and host sites. Share this plan with trusted neighbors in your absence.
- Exchange veterinary information with neighbors and file a permission slip with the veterinarian authorizing emergency care for your animals if you cannot be located.
- Make sure all vehicles, trailers and pet carriers needed for evacuation are serviced and ready to be used.
- Assemble a pet to-go bag with a supply of food, non-spill food and water bowls, cat litter and box, and a restraint (chain, leash or harness). Additional items to include are newspaper, paper towels, plastic bags, permanent marker, bleach/disinfectant solution and water buckets.

4.4 Fire Prevention

Fire prevention in the United States was first created following a series of fires that rocked the consciousness of the nation. These large loss fires were exclamation points on the loss of nearly 8,000 civilians that were dying in fires on an annual basis. The fires listed below were so tragic that the public demanded action:

- December 30, 1903 – Iroquois Theatre Fire – 602 Fatalities
- January 12, 1908 – Rhodes Opera House – 170 Fatalities
- August 20, 1910 – Great Fire of 1910 – 87 Fatalities
- March 4, 1908 – Lakeview Grammar School – 175 Fatalities
- March 25, 1911 – Triangle Shirtwaist Factory Fire – 145 Fatalities
- April 10, 1917 – Eddystone Ammunition Company – 133 Fatalities

President Calvin Coolidge was determined to take action to reduce the unnecessary losses. He declared the first National Fire Prevention Week on October 4-10, 1925, telling the country: “This waste results from the conditions which justify a sense of shame and horror; for the greater part of it could and ought to be prevented ... It is highly desirable that every effort be made to reform the conditions which have made possible so vast a destruction of the national wealth.”

Since that time, fire codes have been developed, first in response to fatality fires and today due to scientific study and a greater understanding of the factors involved. The promulgation and adoption of fire codes has had a steady effect on fires with incremental reductions in the number of fires and a reduction in the average number deaths per fatality fire.

Fire prevention is now also having a significant impact in the wildland fire arena. Since 2003 and the passage of the Healthy Forest Restoration Act (P.L. 108-148), fire prevention has played an increasingly important role in reducing wildland fire starts. Another outcome of the HFRA was shifting more of the responsibility for fire protection to state and local jurisdictions as well as increasing personal responsibility. The law in many Western states now requires defensible space and ignition resistant construction. These regulations appear to be having a material effect on limiting property damage from wildland fires. The Western United States has been in the grips of extreme drought for the four years since 2011, setting the stage for some of the largest wildfires in recent times; however these fires are causing less structural damage than would be anticipated. Note the following examples:

- American Fire – August 10, 2013 – 27,440 acres burned – 4 residences destroyed
- Rim Fire - August 13, 2013 – 257,314 acres burned – 11 residences destroyed
- King Fire – September 13 – 2014, 97,717 acres burned – 12 residences destroyed

These fires all occurred in heavy timber during extreme fire weather and in areas with homes intermixed into public lands. Fire personnel working these fires credit defensible space and ignition resistant construction with creating safer environments for firefighters to protect structures and fight fire.

Finally the public is playing a more informed role in preventing fires. Fire prevention education has effectively reshaped awareness and attitudes. Today, the general public is demanding tighter regulation of such obviously dangerous items as private fireworks, target shooting on public lands, and cigarettes

that don't self-extinguish. Today, fire districts in the Tahoe Basin are reporting fewer illegal fireworks than in years past, likely because the public simply won't tolerate illegal fireworks or campfires anymore. They recognize the danger from these ignition sources.

Wildfire Prevention

The focus of wildfire prevention is on actions that lead to a reduction in the loss of life, property and natural resources while at the same time reducing the cost of suppression. More elected officials and community leaders are recognizing the value of prevention and the importance of more funding for fuels reduction and creating healthier, resilient forests, rather than using resources simply to try and keep up with the cost of fire suppression alone.

Specific to Wildfire Prevention within the Lake Tahoe Basin, the mission of mitigating unwanted wildfire ignitions is accomplished through focused administration, education, engineering, and enforcement. These activities are being coordinated in a manner that results in an efficient and effective approach to protecting and conserving our nation's greatest natural resources: our public and private lands, our ecosystems, and our communities.

Administration

Administration applies to long-term efforts to reduce the risk of wildfire. This includes such activities as planning, fire risk analysis, the development of early warning systems, and the training of wildfire prevention personnel. Planning now takes an "all lands, all voices approach," by engaging communities, cooperating agencies and local governments. We work with the public to develop wildfire protection plans and undertake other initiatives designed to promote public and personal responsibility for fire prevention in the wildland-urban interface.

Education

Education is a measure in which we seek to increase public awareness, understanding and participation in the prevention of unwanted ignitions. This includes education about the beneficial role and uses of fire in our ecosystem. We recognize the best approach in solving wildfire prevention challenges comes from working with community organizations, agencies and governments at all levels, civic groups, community leaders, and the general public.

Wildfire ignitions can be mitigated through knowledge sharing and capacity building within the community using specific cooperative programs like Fire Adapted Communities. Other successful examples of wildfire prevention education programs are the Smokey Bear Ad Council Campaign and "One Less Spark, One Less Wildfire", both of which seek to modify human behavior through education involving printed materials, news media, websites, social media, group presentations and general public contact.

Successful wildfire prevention education programs have shown the greatest return in values for fire management. According to a 2010 study, for every dollar invested in wildfire prevention the average cost savings or return is valued at \$35.00.

Engineering

Engineering is a fire mitigation strategy used to remove or reduce ignition sources from what can ignite or readily burn. Some examples of “Engineering,” include the planned placement and installation of fire prevention signs, hazardous fuels reduction and prescribed fires, and engineered facilities, like campgrounds and fire-safe campfire rings. Engineering also includes research and the development of Fire Prevention Plans using statistical data related to a specific geographic area, and risk/hazard mitigations through the inspection of equipment, homes and structures using state and local building and zoning regulations. The implementation of fire restrictions and closures is another tool used to minimize risk and ignitions in any given area when there is an increase of fire danger or activity.

Enforcement

Enforcement is a strategy used primarily when compliance with fire regulations and mitigation measures has not been achieved through Education and Engineering. Enforcement is an integral component of fire prevention and includes compliance checks for campfire permits, building and zoning code inspections, mechanical equipment and spark arrestor use/inspections, and the Origin and Cause Investigation of Wildfires. Accurate methods of wildfire investigation are critical as they contribute to the analysis of ignition factors. This in turn is necessary to develop a successful fire prevention program intended to mitigate future ignitions. For example, the US Forest Service provides investigative expertise for human caused fires on or which threaten public land. This information informs enforcement as well as other fire prevention programs and further underscores the need to build capacity with other agency partners.

4.5 Multi-Jurisdictional Coordination

4.5.1 Tahoe Fire and Fuels Team / Multi-Agency Coordinating Group

The Tahoe Fire and Fuels Team (TFFT) was formed in 2007 to implement the *Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy* (Strategy) for the Lake Tahoe Basin. The original Strategy was updated and endorsed by the executives of TFFT member agencies in August 2014.

The organizational structure of the TFFT utilizes the Incident Command System (ICS) familiar to fire professionals and emergency management personnel. Staffing is provided by TFFT member organizations on an as-needed basis. Basic staffing typically includes an Incident Commander (IC), a Planning Section Chief, an Information Officer, and an identified lead for each geographic division. Additional staffing is provided as dictated by resource availability and incident complexity, and typically includes an Operations Section Chief, Finance Section Chief, a Fire Adapted Communities Coordinator, and a Data/GIS Specialist.

A Multi-Agency Coordinating Group (MAC) provides oversight of the Tahoe Fire and Fuels Team (TFFT). The MAC is comprised of the chief executives of the signatory agencies to the Multi-Jurisdictional Strategy. Each member agency has a single vote. The MAC provides general direction and political leadership for the TFFT, approves annual operations plans, and assists with identifying funding

opportunities. With input from the TFFT, the MAC approves an annual integrated calendar of TFFT and MAC meetings.

TFFT Mission

To protect lives, property and the environment within the Lake Tahoe Basin from wildfire by implementing prioritized fuels reduction projects and engaging the public in becoming a Fire Adapted Community.

Lake Tahoe's Multi-Jurisdictional Strategy

The "Strategy" has been the guiding document for partner agencies involved in fuels reduction at Lake Tahoe since 2007. It was initially developed in response to Congressional passage of the White Pine County Conservation, Recreation, and Development Act of 2006 (Public Law 109-432) ("Lands Act"). This legislation codified the basic principles that guide collaborative fuels reduction in the areas eligible to received funding from the Act, including Lake Tahoe. Specifically the Act requires the:

...development and implementation of comprehensive, cost-effective, multijurisdictional hazardous fuels reduction and wildfire prevention plans (including sustainable biomass and biofuels energy development and production activities for the Lake Tahoe Basin (to be developed in conjunction with the Tahoe Regional Planning Agency), the Carson Range in Douglas and Washoe Counties and Carson City in the State, and the Spring Mountains in the State, that are (I) subject to approval by the Secretary; and (II) not more than 10 years in duration.

Six months following passage of the "Lands Act," a devastating wildfire broke out on the southwest shore of Lake Tahoe. Ignited by an illegal campfire and whipped by "Red Flag" condition winds, the Angora Fire quickly raged through residential neighborhoods and torched thousands of acres of private and public lands. Significant evacuations were ordered. At its peak, some 2,180 firefighters were involved in battling the flames. Thanks to the heroic efforts of these firefighters, full containment of the fire was announced on July 2, two days before the 4th of July holiday.

The final statistics were shocking. Angora destroyed 254 homes, damaged another 35 homes, and burned more than 3,100 acres of Lake Tahoe's treasured watershed.

In response to Angora, the governors of Nevada and California created the California-Nevada Tahoe Basin Fire Commission (Fire Commission) to examine the regulatory and social environments that influence forestry and fuels reduction in the Lake Tahoe Basin. Federal and state land managers worked with local fire districts and regulatory agencies to formalize the structure and operational guidelines for the MAC and TFFT in time for presentation to the Fire Commission and inclusion into *The Emergency California-Nevada Tahoe Basin Fire Commission Report* of May 2008. In their final report, the Commission recognized that the MAC and TFFT represented an:

...unprecedented level of dialogue among agencies to identify new pathways for collaboration on issues such as air quality, biomass utilization, permit streamlining, defensible space, fuels project implementation, and science and technology.

The Commission's report went on to state about the collaborative efforts:

One example is the Tahoe Fire and Fuels Team (TFFT), which consists of representatives from the Basin's local, state, and federal fire agencies, the TRPA, the Army Corps of Engineers, the Cooperative Extensions from both states, and others. The TFFT serves as the forum where project implementers and project regulators can come together and develop mutually beneficial processes for reducing wildfire vulnerability while protecting the environment. In just a few months, the TFFT has developed protocols for prioritizing fuel reduction projects and funding under the auspices of the "10-Year Plan". It has begun to develop an integrated educational outreach program designed to deliver a single, consistent message throughout the Basin on implementing defensible space in compliance with water quality "best management practices"—something that was sorely missing in the past.

The multijurisdictional cooperation and collaboration exemplified by the TFFT also supports efforts at the national level to foster stronger working partnerships between fire services and the communities threatened by wildfire. In response to requirements spelled out in the Federal Land Assistance, Management, and Enhancement Act of 2009 (Flame Act), the Wildland Fire and Leadership Council developed and published the *National Cohesive Wildland Fire Management Strategy*. The following three goals of this national strategy have been embraced by the TFFT partner agencies and are integrated into all work plans and fire threat reduction activities:

1. Restoring and maintaining fire-resilient landscapes with recognition that many ecosystems currently lack health and vitality.
2. Creating fire adapted communities in areas of high wildfire threat.
3. Responding to wildfires with the full capacity of interagency cooperation.

To assist the TFFT in achieving these goals, several working groups that provide specialized services to the team have been organized including public information, technology and FAC development. The Fire Public Information Team (PIT) is the public information arm of the TFFT. The Fire PIT coordinates all aspects of wildland fire prevention public education including press releases, media campaigns, Wildfire Awareness Month and community events from simple neighborhood barbecues to regional events with hundreds of attendees. The Fire PIT's "Get Defensive" campaign included social media, website development, internet advertising, print advertising, promotional events, public relations, direct mail, and cable television advertising. The direct mail piece was widely applauded for its compelling imagery and simple but compelling messaging. The campaign received a Golden Addy Award for creativity and design in 2010.

The TFFT also has an Information Technology Working Group that makes continuous improvements to the Tahoe Basin's fire modeling analysis capabilities, defensible space database management, and

Geographic Systems (GIS). Currently the technical team is working with researchers to create custom fuel models for the Lake Tahoe Basin that can be analyzed by the suite of fire modeling applications available through the Interagency Fuels Treatment Decision Support System (IFTDSS). Comparing data collected in a Fuels Treatment Effectiveness Project with model outputs will complete “ground truthing” and monitoring of the system. The Fuels Treatment Effectiveness Project is currently in the final stages of development by foresters at the North Lake Tahoe Fire Protection District. Past projects include programming a defensible space database used to store homeowner defensible space inspection data and the creation of complete project GIS files for all TFFT member agencies, as well as annual Basin-wide reporting on accomplishments compiled by the TFFT.

As a central goal, the national strategy endorses the critical importance of a fully engaged and prepared human community working in partnership with all fire services to achieve effective life, structure, and natural resource protection. Accepting responsibility to do their part in preparing themselves, their property, and the structure they call home for the inevitable presence of fire is fundamental to community survival and firefighter safety. To this end the TFFT has adopted the following role in support of Fire Adapted Communities:

Provide encouragement and support to revive community-based action groups and expand community involvement to create a Basin-wide organization of Fire Adapted Communities.

Each TFFT Division is responsible for promoting, recruiting and assisting in the organization of Fire Adapted Community partners. To support this effort, the TFFT has approved a primary staff position of Fire Adapted Community Coordinator. This staff position will support Division efforts and provide leadership for the development of a Basin-wide organization of like-minded citizens and Fire Adapted Communities.

The collaborative process for the TFFT is formalized through the development of an annual Incident Action Plan (Annual Plan). The Annual Plan is organized by Division and shows the type, size, funding source and location of fuels reduction activities that are planned for the year. The Annual Plan includes typical forest thinning projects and goals for the number of defensible space consultations, community chipping requests, and community educational events. Using this approach, the Plan reflects the annual prioritized actions described in the Strategy and CWPPs. Monitoring the achievements of the TFFT is accomplished by preparing an annual report that is presented to the public, elected officials, and community leaders at the annual Lake Tahoe Summit. The report and materials produced each year documents that TFFT member organizations continue to make progress on achieving the goals of the Lake Tahoe Multi-Jurisdictional Strategy and with applicable national initiatives such as the National Cohesive Strategy and the Ready, Set, Go Program.

4.5.2 Roles and Responsibilities

Roles and Responsibilities for Creating Fire Adapted Communities

Wildfire is an inevitable occurrence in the Lake Tahoe Basin, but catastrophic wildfire can be prevented when entire communities work together to take action and reduce risk. Every agency, organization, group or individual that would be affected by a wildfire has a role to play in creating a fire-adapted community.

Residents and Residential Landowners

Residents of the Lake Tahoe Basin have one of the most important roles in creating a fire-adapted community. Residential structures are given a high priority during wildfire suppression, and are often directly in the line of fire. By implementing defensible space around homes, and by taking steps to reduce vulnerability to ember ignition, residents can drastically reduce the damage done by a wildfire in the wildland-urban interface.

Residents can also take steps to protect themselves, their families and their pets by signing up for emergency alerts and preparing a household evacuation plan and To-Go Bag. These items help residents evacuate quickly and safely, to allow emergency resources to focus on fire suppression.

Community Leaders

Within communities, individuals with an understanding of the wildland fire threat and a passion for reducing risk are the key element that allows neighborhoods to make substantial progress toward becoming fire-adapted. Community leaders partner with their local fire service and land management agencies to inform community priorities, and receive support for reaching neighbors, and funding for completing projects. Community leaders are often individual homeowners, and sometimes take a leadership role in other volunteer groups, such as Homeowner Associations or Citizens Emergency Response Teams.

Visitors

On most days, there are more visitors in the Lake Tahoe Basin than year-round residents. Like residents, visitors enjoy the natural setting and recreation opportunities throughout the Basin, but are sometimes not aware of the wildland fire threat and are less likely to have taken steps to prepare for an emergency. Visitors can help the community become more fire-adapted by understanding and observing fire restrictions, and by knowing where to get evacuation information.

Land Managers

Whether a land manager is a private landholder, a local government, a state agency, or a federal agency, each must recognize the important role they play in land stewardship. They should partner with neighboring land managers to help create a landscape that is resilient to wildfire and helps to protect community assets. Private and local land managers often partner with local fire services to pursue funding and implement projects.

Local Government

Local governmental entities like cities and counties provide a wide range of public services, including law enforcement, emergency services, road and right-of-way maintenance, and animal services. They play a critical role in emergency planning, evacuation, and emergency management.

Local officials and decision makers can help to create a widespread culture of wildfire awareness and concern by putting fire “on the agenda”. Civic leaders can ensure that wildland fire preparedness programs are funded and supported, provide assistance to volunteer organizations, and adopt codes and ordinances that reduce communities’ vulnerability.

State Government

State land management agencies own and manage high use recreational areas in the Lake Tahoe Basin, as well as small conservation lots within neighborhoods. State forestry and emergency management agencies provide technical and financial support to private landowners and local government entities implementing fuel reduction, defensible space, and outreach projects.

Federal Government

The US Forest Service Lake Tahoe Basin Management Unit (LTBMU) has many neighbors. It manages 78 percent of the land within the Lake Tahoe Basin, including small conservation lots in neighborhoods and the forested areas between communities and the Basin rim. The Unit also staffs prevention and suppression forces.

The federal government is an important funding source for fuel reduction, wildfire prevention, and outreach projects. The US Forest Service and Bureau of Land Management provide a vital source of grant funding for wildfire preparedness projects in the Lake Tahoe Basin.

Service Organizations

Non-profit organizations focused on environmental protection have partnered with communities and land managers to plan and implement fuel reduction, forest restoration, and fire recovery projects throughout the Lake Tahoe Basin. Service organizations such as Red Cross and Community Emergency Response Teams train frequently, and provide essential disaster assistance during emergency events.

Water Purveyors

The availability of water is a critical concern when fighting a wildland fire in residential areas, or when firefighters must keep a fire from spreading from one house to another. High intensity wildfire can harm watersheds and source water quality and destroy critical infrastructure. Water purveyors can and do partner with fire services, land managers and local government to pursue funding and develop projects that protect infrastructure and improve fire flow.

Fire Protection Districts and Departments

The fire protection districts and departments in the Lake Tahoe Basin provide emergency services for many different types of emergencies, but recognize that wildfire suppression and mitigation is a key

element to reduce losses in communities. Fire districts and fire departments are well positioned to establish partnerships with both communities and cooperating organizations, and assist in engaging diverse groups in the development of wildfire preparation plans and actions.

Local Business Community

Many stakeholders in the local business community rely on tourism and recreation. Some industries, such as real estate and construction, depend on healthy home and property values. Others, such as insurance companies, must focus on managing risk. Some companies, like tree services and defensible space contractors, work on projects that directly reduce risk. Resort operators, such as casinos, mountain resorts, campgrounds, and hotels, can host hundreds or thousands of visitors every day. In the event of a large wildfire, these businesses will play a key role in information delivery and evacuation.

Regulatory Agencies

Regulatory agencies have a responsibility to enforce environmental laws and regulations. In the Lake Tahoe Basin, these agencies have recognized that inaction in the face of the wildfire threat would ultimately result in greater environmental harm. Accordingly, they have partnered with land managers and fire services to develop regulatory processes for the review of fuel reduction projects. This approach includes regulatory considerations early on in project development, and efforts to ensure that multiple environmental resource benefits are being achieved with project implementation.

Research and Educational Organizations

Schools and colleges in the Lake Tahoe Basin provide one of the most important venues for community engagement in environmental issues, for both students and parents. These educational institutions can partner with local agencies and organizations to create curricula that foster engagement and interest in environmental and community issues.

Organizations dedicated to conducting research and providing educational products help to increase the understanding of fire mitigation science among implementers and the public. The Universities of Nevada and California both support Cooperative Extension and research programs that help guide Fire Adapted Community outreach and fuel reduction project implementation. By building close partnerships with land managers, these organizations can help deliver new solutions for land management challenges.

Resource Conservation Districts

Resource conservation districts are well suited to working with landowners, organizations, and local government entities to support fuel reduction and environmental restoration projects. The Tahoe Resource Conservation District in California and the Nevada Tahoe Conservation District in Nevada can provide information, education, and technical assistance for implementing projects and managing grant funding.

Roles and Responsibilities for Implementing Fuel Reduction Projects

USDA Forest Service Lake Tahoe Basin Management Unit

The USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU) is responsible for managing approximately 78 percent of the lands within the Lake Tahoe Basin. The Lake Tahoe Basin Management Unit Land and Resource Management Plan (2105) governs all management activities conducted by the LTBMU.

California State Parks

There are nine park units under the management of California State Parks within the Lake Tahoe Basin (listed from north to south): Kings Beach State Recreation Area, Burton Creek State Park, Tahoe State Recreation Area, Ward Creek, Edwin L. Z'berg Sugar Pine Point State Park, D.L. Bliss State Park, Emerald Bay State Park, Washoe Meadows State Park, and Lake Valley State Recreation Area. In addition, California State Parks and Nevada State Parks jointly manage Van Sickle Bi-State Park located along the state line south of the casino resort district in Stateline/South Lake Tahoe.

The mission of California State Parks is to provide for the health, inspiration, and education of the people of California by helping to preserve the State's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. California State Parks seeks to maintain natural ecosystem processes that form and maintain natural resources, including reintroduction of fire when feasible and safe to help manage and maintain healthy forests.

California Tahoe Conservancy

The California Tahoe Conservancy (Conservancy) is an agency within the Natural Resources Agency of the State of California. Its jurisdiction is exclusively on the California side of the Lake Tahoe Basin. The Conservancy was established to develop and implement programs through acquisitions and site improvements to improve water quality in Lake Tahoe, preserve the scenic beauty and recreational opportunities of the region, provide public access, preserve wildlife habitat areas, and manage and restore lands to protect the natural environment.

The properties managed by the Conservancy within the Basin consist of about 4,800 parcels, the average size of which is one-third acre or less. Most of these parcels are within the wildland-urban interface (WUI). The Conservancy is responsible for planning and implementing projects on the lands they manage that restore ecosystem health by reducing fuel hazards. They are responsible for ensuring their plans are consistent with Federal, state, regional, and local laws, regulations, and policies.

Nevada Division of Forestry

The Nevada Division of Forestry manages all forestry, nursery, endangered plant species, and watershed resource activities on certain public and private lands within the Basin. The Division also provides fire protection of natural resources through fire suppression and prevention programs. The Nevada Division of Forestry is responsible for enforcing Nevada Revised Statutes (NRS) 528, dealing with forest practices and reforestation.

Nevada State Parks

The Nevada Division of State Parks administers and manages the Lake Tahoe Nevada State Park, which includes beaches, fishing, and camping, and over 13,000 acres of backcountry recreation. Lake Tahoe Nevada State Park includes the iconic beach at Sand Harbor and the Spooner Backcountry area.

Nevada Division of State Lands

Nevada Division of State Lands manages 490 urban parcels in the Lake Tahoe Basin from Crystal Bay to Stateline, Nevada. The Nevada Tahoe Resource Team conducts the “on the ground” management activities. The State Lands forester manages urban parcels. There are 141 urban parcels (115 acres) in Douglas County and 349 urban parcels (110 acres) in Washoe County. These conservation areas are managed in accordance with a Tahoe Regional Planning Agency Memorandum of Understanding, and Nevada laws on Forestry and Fire, and Nevada Revised Statutes 472, 527 and 528 that pertain to forest restoration and the watershed protection of trees and flora through accepted forest practices.

The Nevada Tahoe Resource Team, an interagency team within the Department of Conservation and Natural Resources, is responsible for implementing forest health and fuel reduction projects on all State of Nevada property in the Lake Tahoe Basin.

Local Fire Protection Agencies

The local fire protection agencies of the Tahoe Basin have agreed to represent local government and private landowners who seek to create defensible space or who wish to thin forests adjacent to communities. While there is no statutory requirement for the fire agencies to actively manage private and local lands, all of the agencies have agreed to do so. Accordingly, the local fire agencies manage the largest landmass in the defense zone when considering defensible space and fuels reduction in the wildland-urban interface. In Nevada, the International Wildland Urban Interface Code adopted by the state does not include the building construction provisions found in Chapter 5. The populated counties in the Basin have adopted the Wildland Urban Interface Code including Chapter 5 (with amendments).

Tahoe Regional Planning Agency

The Tahoe Regional Planning Agency (TRPA) has planning and regulatory jurisdiction throughout the Lake Tahoe Basin authorized by Public Law 96-551, the Tahoe Regional Planning Compact. TRPA is required to achieve and maintain adopted Environmental Threshold Carrying Capacities (“Thresholds”) in nine environmental categories, including Vegetation and Soil Conservation. TRPA is a key collaborator and active member of the Tahoe Fire and Fuels Team.

Lahontan Regional Water Quality Control Board

The Lahontan Regional Water Quality Control Board (LRWQCB) is responsible for water quality and enforcing California State Water Code. Lahontan regulates forest management practices and activities on stream environment zones.

California and Nevada Air Quality Regulatory Agencies

Air quality in the Tahoe Basin is managed by state and county agencies. In California, the California Air Resources Board determines if burning is allowed on a daily basis. County Air Pollution Control Districts are responsible for issuing burn permits and enforcing state air quality regulations.

The Nevada Division of Environmental Protection regulates burning in Douglas County. The Washoe County District Board of Health regulates burning in Washoe County.

California Department of Forestry and Fire Protection (CAL FIRE)

The California Department of Forestry and Fire Protection (CAL FIRE) is dedicated to the fire protection and stewardship of over 31 million acres of California's privately owned wildlands. CAL FIRE's mission emphasizes the management and protection of California's natural resources.

CAL FIRE oversees enforcement of California's forest practice regulations, which guide timber harvesting on private lands and is responsible for enforcing the Z' Berg-Nejedly California Forest Practice Act of 1973 on non-Federal timberlands in California. CAL FIRE is also responsible for providing input and/or enforcing pre-development fire protection stands (PRC §4290), performing inspections and enforcing defensible space law (PRC §4291), and the California Wildland Urban Interface Building Code.

In addition, CAL FIRE works with other internal functions, such as the California Office of the State Fire Marshal, California State Board of Forestry and Fire Protection, and CAL FIRE's Fire and Resource Assessment Program. The mission of the State Fire Marshal is to protect life and property through the development and application of fire prevention engineering (such as the Wildland Urban Interface Building Standards), education, and enforcement. The California State Board of Forestry and Fire Protection's mission is to provide policy leadership and to generate public interest and support in those matters key to the future of the State's forest and rangelands, including but not limited to PRC §4291, the California Forest Practice Act, and PRC §4290. The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and identifies alternative management and policy guidelines.

Nevada Department of Environmental Protection (NDEP)

The NDEP administers statutes and implements rules and regulations intended to maintain the quality of the water resources of Nevada. Regarding forest management and fuels reduction activities, the protection of the quality of waters of the state is accomplished in coordination with the Nevada Division of Forestry and other state and local agencies as specified in the Nevada Forest Practice Act, NRS 528.010 to .090, and in the Diffuse Sources section of NAC 445A.305 to 445A.340. These regulations specify and limit activities near water bodies and require use of best practices and erosion control methods to prevent significant degradation of water quality. NDEP also issues air quality permits for prescribed fire activities in the Nevada portion of the Basin.

4.6 Environmental Regulations and Compliance

CWPP projects designed to reduce fuel hazards that are proposed by public agencies, funded by public agencies, or that require Federal, state, local, or local discretionary approval are subject to Federal, state, or regional environmental regulations. These regulations shape the scope, location, implementation methodologies, timing, and the cost of proposed fuel reduction treatments in the Basin.

Environmental regulations (such as the Clean Water Act, Clean Air Act, California Forest Practices Act, Nevada Forest Practices Act, Endangered Species Act, and the Tahoe Regional Planning Agency Code of Ordinances) set forth the standards by which fuels and other forest health projects are analyzed. The purpose of the analysis is to determine, disclose, and propose mitigation for any identified environmental impacts. The process of preparing Environmental reviews allows the public to participate in agency decision-making that may affect the environment. Below is a list of the major federal, state and local regulations, followed by an overview of agencies responsible for environmental compliance in the Lake Tahoe Basin.

National Environmental Policy Act (NEPA)

All fuel reduction projects funded by the Federal government that occur on Federal land, or require a Federal agency to issue a permit, must comply with the NEPA. NEPA requires agencies to prepare environmental impact statements, environmental assessments, or categorical exclusions, to evaluate potential impacts of proposed projects on environmental values, promote efforts that prevent or eliminate damage to the environment, and encourage productive harmony between man and the environment. The Healthy Forest Restoration Act (H.R. 1904, December 2003) simplified the NEPA process by limiting the range of alternatives required to be considered in an environmental document for fuel reduction or forest health projects designed to protect communities, watersheds, or endangered or threatened species from wildfire.

California Environmental Quality Act (CEQA)

Fuel reduction projects on privately owned and non-Federal publicly owned lands in California that require environmental approvals from a local or state agency must comply with CEQA or a functionally equivalent program (such as the California Forest Practice Act as in the case of commercial timber harvesting). In some cases, a California Forest Practice Act harvesting document, such as a timber harvest plan, is required to be prepared in lieu of a traditional CEQA document when harvested material has a commercial purpose. The harvesting document must be prepared and signed by a California registered professional forester before submittal to CAL FIRE for review and approval or denial. Furthermore, in such circumstances, a California licensed timber operator must conduct timber operations. Some projects not resulting in ground disturbance, such as clearing for defensible space and non-commercial hand thinning fuel reduction work, are generally exempt from CEQA or a functionally equivalent program. In addition, there are opportunities to complete CEQA and NEPA documents using a joint analysis.

Tahoe Regional Planning Agency Code of Ordinances

The Tahoe Regional Planning Agency (TRPA) primarily regulates tree removal through Chapter 61 of its Code of Ordinances. The removal of all live trees greater than 14 inches in diameter (DBH) requires a tree removal permit; however, TRPA has delegated authority to issue tree removal permits to the local fire agencies for defensible space treatments. A tree removal permit must be approved by TRPA for all projects that require a substantial removal of trees, which is defined as removing more than 100 trees greater than 14 inches in diameter.

Lake Tahoe Basin Management Unit Land Management Plan

The 2015 Lake Tahoe Basin Management Unit Land and Resource Management Plan (Forest Plan) guides all management activities on federal land in the Basin. The Plan recognizes the excessive buildup of fuel hazards in the Sierra Nevada Mountains surrounding the lake and established that the highest priority for fuels treatments would be in the wildland-urban interface areas.

California Forest Practice Act

The California Forest Practice Act and its rules and regulations are the provisions in state laws that regulate timber harvesting on non-Federal timberlands. The practice of cutting or/and removing native conifer trees for commercial purposes, as well as the conversion of timberland to a non-growing use on non-Federal timberlands in California, requires the preparation and approval of a harvesting document as per California Public Resource Code §4527. Nearly all harvesting documents submitted to CAL FIRE for approval must be prepared and signed by a California registered professional forester. A licensed timber operator who must also conduct harvesting operations must sign all harvesting documents.

California Public Resource Code §4291 applies to all landowners who own or maintain structures on State Responsibility Area (SRA) lands. §4291 requires these landowners to maintain a defensible space around all structures each year to reduce the risk of damage or destruction caused by wildfire. CAL FIRE personnel assigned to Lake Tahoe and California local fire agencies conduct inspections and are responsible for the enforcement of California Public Resource Code §4291.

Lahontan Regional Water Quality Control Board Basin Plan

The California State Water Quality Resources Control Board sets California policy for the implementation of state and Federal clean water laws and regulations. The Lahontan Regional Water Quality Control Board is responsible for protecting water quality and enforcing the California Water Code and the Clean Water Act within the Lahontan Region, which includes Lake Tahoe. Activities in the forest subject to Lahontan review and enforcement include fuels reduction projects and timber waivers.

Nevada Revised Statutes 528

Nevada Revised Statutes (NRS) section 528 created the Nevada Forest Practice Act that regulates forest practices and reforestation on private and state lands in Nevada. Commercial forest thinning projects, or projects that propose removing trees from within 200 feet of a designated stream, must comply with the provisions of the Nevada Forest Practice Act (Act). The purpose of the Act is to ensure that: (1) the timber resources in the State of Nevada are adequately protected; (2) water resources are protected

during harvesting activities; and (3) project best management practices are followed. Any forest thinning project that takes place in Nevada that has a commercial component must apply for a logging permit and will likely have to issue a performance bond to cover the cost of any potential remediation that could be prescribed by the Nevada Division of Forestry.

Nevada Revised Statutes 477.030

In 2009 the State of Nevada adopted rules requiring the State Fire Warden to cooperate with the local fire districts on the Nevada side of the Tahoe Basin to create and enforce defensible space regulations. The State of Nevada then adopted the provisions of the International Wildland Urban Interface Code that prescribe defensible space standards. These can be found in Nevada Administrative Code 477.281.

5 Planning Summary

This chapter discusses how this plan was created, and provides information on previous planning documents and related plans where additional information can be obtained.

5.1 Requirements of a CWPP

The Healthy Forests Restoration Act of 2003

Following widespread wildland fires in the summer of 2002, President George W. Bush proposed the Healthy Forests Initiative, which was enacted into law by the Healthy Forests Restoration Act of 2003 (Public Law 108-408). The Act encouraged thinning dense forests on federal, state, local, and private land to help protect communities from intense wildfires, improve fire suppression capabilities, and increase forests' resistance to destructive insects. Communities were also encouraged to create a Community Wildfire Protection Plan (CWPP) to collaboratively designate areas in the Wildland-Urban Interface that were the most in need of thinning. The Healthy Forests Restoration Act also:

- Authorized fuel reduction projects in the wildland-urban interface;
- Required federal agencies to consider recommendations made by at-risk communities that have developed Community Wildfire Protection Plans; and,
- Gave funding priority to communities that have adopted Community Wildfire Protection Plans.

"Community At-Risk" is an official designation indicating a community that is within the wildland-urban interface, and is within the vicinity of federal lands. The communities included in this CWPP are among those specifically identified in the Federal Register list Communities At-Risk (66 FR 160, 2001). The communities are:

- Incline Village, NV
- Crystal Bay, NV
- Sand Harbor, NV
- Glenbrook, NV

- Kingsbury, NV
- Lake Tahoe Highway 50 Corridor, NV
- Spooner State Park, NV
- South Lake Tahoe, NV
- South Lake Tahoe, CA
- Homewood, CA
- Tahoe Pines, CA
- Sunnyside, CA
- Tahoe City, CA
- Carnelian Bay, CA
- Tahoe Vista, CA
- Kings Beach, CA
- Alpine Meadows, CA
- Meeks Bay/Tahoe Hills, CA
- Tahoma, CA

The Healthy Forests Restoration Act defined the minimum requirements for a CWPP. These are:

- ***Collaboration:*** Local and state government representatives, in consultation with federal agencies and other interested parties, must collaboratively develop a CWPP. For more information on the collaborative process used in the development of this CWPP, refer to [Public Involvement](#) and [Multi-Jurisdictional Collaboration](#).
- ***Prioritized Fuel Reduction:*** A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. For more information on these projects, refer to [Mitigation Strategies](#), [West Wide Wildfire Risk Assessment](#) and [Prioritized Fuel Reduction Projects](#).
- ***Treatment of Structural Ignitability:*** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan. For more information on recommended mitigation, refer to [Reducing Structure Ignitability](#).

The Federal Land Assistance, Management and Enhancement Act of 2009

In the late 2000's, the federal costs for fighting wildland fires continued to increase. In response, the US Congress passed the Federal Land Assistance, Management, and Enhancement Act of 2009 (FLAME Act). FLAME provided new funding flexibility for federal wildfire suppression agencies. It also required federal agencies to work with partners at the local and state level to develop a cohesive strategy to address wildland fire problems. The resulting *National Cohesive Wildland Fire Management Strategy* (Cohesive Strategy) was developed with active involvement of wildland fire organizations, land managers, and policy making officials representing federal, state, and local governments, tribal interests, and non-governmental organizations (NGOs). The Cohesive Strategy represents a shift in wildland fire management policy that emphasizes collaborative work across landscapes that:

- Restores and maintains fire-resilient landscapes;
- Creates fire-adapted communities; and,
- Provides effective and efficient wildfire response.

Visit <http://www.forestsandrangelands.gov/strategy> to learn how the Cohesive Strategy is affecting wildland fire management across the United States.

5.2 Previous Planning Documents

5.2.1 2004 Community Wildfire Protection Plans

The Healthy Forest Restoration Act (HFRA) began a fundamental shift in wildfire policy to move the costs of fire suppression and the responsibility for pre-fire planning to the communities at-risk for fire. Prior to the Act there was very little discussion between at-risk communities and federal land managers about the threat of wildfire, and when there was a fire, the federal government typically paid the bill for suppression. However, as the frequency of large disaster fires increased through the 1990's, suppression costs to the federal government increased exponentially and reached levels considered unsustainable.

The HFRA created a national policy that at-risk communities are responsible for wildfire planning and required that federal land managers consider the input of local communities when planning fuels reduction projects. The Act also created a requirement that communities prepare Community Wildfire Protection Plans (CWPPs) prior to being eligible for federal fuels reduction grants that were becoming available through National Fire Plan (NFP).

Lake Tahoe's Congressional Delegation embraced the HFRA policy requiring local wildfire planning. On March 13, 2004, California US Senator Dianne Feinstein challenged the Lake Tahoe Basin to complete the CWPPs prior to the annual Lake Tahoe Environmental Summit scheduled that year for August 5, 2004. The agencies responded to the challenge and completed their CWPPs in time to be recognized at the Summit. Project implementation consistent with the CWPPs soon followed.

Lake Tahoe's CWPPs provided an in-depth look at the entirety of the wildfire problem throughout the Tahoe watershed. Community and forest surveys and inventories were included that documented the need for more defensible space. This information was used to develop project lists, cost estimates, and fuels reduction prescriptions. This was the first time multi-jurisdictional projects were developed for the Basin along with cost estimates and prescriptions for treatment. The original CWPPs proved extremely valuable as a tool for engaging the community and informing the planning and implementation of fuels reduction projects. In the last 10 years, many of the initially identified fuel reduction projects have been completed, and this updated plan has been developed to identify new projects, and to provide a new set of collaborative actions that can be taken to improve landscapes, communities, and wildfire response.

5.2.2 2007 Fuel Reduction and Forest Restoration Plan

With each evolution of wildland fire planning and management in the Tahoe region, coordination and efficiency improved. In 2007, existing CWPPs were combined into a single document with a list of

proposed projects and budgets. Regulatory agencies assisting in this effort included the Tahoe Regional Planning Agency (TRPA), Lahontan Regional Water Quality Control Board, and the California Department of Forestry and Fire Protection (CAL FIRE), which also has regulatory and enforcement capabilities. The combined document was published as the *Lake Tahoe Fuels Reduction and Forest Restoration Plan*. While largely a restatement of plans that existing at that time, the Plan was updated to include an analysis of the multiple benefits of fuel reduction and forestry health projects. The process of updating the plans provided a timely opportunity for implementers and regulators to come to basic agreements about how and where fuels reduction would take place in the Tahoe Basin. The combined Plan also resulted in the first cost analysis ever performed for completing the work in the WUI. The result was that implementers and regulators were prepared to commence the next round of projects once funding became available on a larger scale.

5.2.3 2007 Multi-Jurisdictional Strategy

Dating back to the year 2000, several studies and plans had been completed that identified and addressed the wildland fire risk in the Lake Tahoe Basin. These studies and plans included documents prepared by the U.S. Forest Service Pacific Southwest Research Station, U.S. Forest Service Lake Tahoe Basin Management Unit (LTBMU), Tahoe Regional Planning Agency (TRPA), California Department of Forestry and Fire Protection (CAL FIRE), Nevada Division of Forestry (NDF), California Tahoe Conservancy (CTC), California State Parks and local fire protection districts. In 2006, the Lake Tahoe Congressional Delegation led the passage of legislation that would ultimately fund a large portion of the fuels reduction that has taken place over recent years. That legislation required that agencies responsible for planning and implementing fuels reduction projects first produce a strategic plan that would, to the extent possible, “erase” property boundaries in order to ensure the most comprehensive projects would receive funding and do the most for protecting communities and watershed values.

The White Pine County Conservation, Recreation, and Development Act of 2006 (Public Law 109-432 [H.R.6111]), which amended the Southern Nevada Public Land Management Act of 1998 (Public Law 105-263) required the following:

*“The development and **implementation** [emphasis added] of comprehensive, cost-effective, multijurisdictional hazardous fuels reduction and wildfire prevention plans (including sustainable biomass and biofuels energy development and production activities) for the Lake Tahoe Basin (to be developed in conjunction with the Tahoe Regional Planning Agency), the Carson Range in Douglas and Washoe Counties and Carson City in the State, and the Spring Mountains in the State, that are—*

(I) subject to approval by the Secretary; and

(II) not more than 10 years in duration”

In 2007, the Lake Tahoe Basin Management Unit led the development of the *Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy* (Strategy). This Strategy further unified prior planning efforts, adding updated project schedules and budgets. Projects proposed in the Strategy provided the framework for a 10-year plan to reduce the risk of catastrophic wildfire in the Lake Tahoe

Basin. Funding authorized by the “White Pine” legislation would come from the amended Southern Nevada Public Land Management Act (SNPLMA) and function as a primary vehicle to accomplish the fuels reduction and wildfire prevention work. The 2007 Strategy was signed by 17 partner agencies, each with a role in wildland fuels or fire management in the Lake Tahoe Basin. This approach was considered a significant success because it was a comprehensive strategy designed to simultaneously protect communities and benefit the Lake Tahoe environment. To further advance implementation, SNPLMA funds were supplemented with substantial funding provided through State Fire Assistance grants, the U.S. Forest Service, State of California and local fire protection districts. The result of the planning effort was the implementation of fuels reduction projects on 24,000 acres of land in the WUI for a cost of approximately \$90 million.

5.2.4 2008 Blue Ribbon Commission Report

The Emergency California-Nevada Tahoe Basin Fire Commission (Blue Ribbon Commission) was formed in August 2007 following the devastating effects of the Angora fire. The Commission included representatives from public, private, local, state and federal entities. Meetings were dedicated to listening to fire professionals, agency directors and staff, technical experts, and the public, residents, and second homeowners in the Lake Tahoe Basin.

Over the course of eight months, the Commission considered at length how the elements of environmental protection interplay with public safety. As a result, three primary areas of discussion emerged, and committees were created to further explore the multitude of topics in each of these areas: Wildland Fuels Management, Community Fire Safety, and Legislation and Funding Policies.

In order to allow as much public input as possible into the final report, any individual or organization was allowed to submit a ‘Finding and Recommendation’ suggestion that would eventually be analyzed and considered by one of the three committees. Altogether, 120 proposed findings and nearly 200 recommendations were submitted, reviewed and analyzed. Ultimately 90 recommendations were formulated by the Commission to be forwarded to the Governors of California and Nevada and incorporated into the final report.

The Commission’s final report (May 2008) provides the basis for much of the work that is being accomplished in the Lake Tahoe Basin. As a result of the consensus-based process demonstrated by the Commission, public and private entities in the Lake Tahoe Basin work collaboratively to address the significant threat wildland fire poses, knowing this is the most effective and efficiency way to protect lives, property and the natural resource values of the Lake Tahoe Basin.

5.2.5 2014 Multi-Jurisdictional Strategy

Beginning in 2013, the U.S. Forest Service took on a leadership role to update the 2007 Strategy. The updated *Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy* was completed and formally unveiled at the Lake Tahoe Environmental Summit held August 19, 2014. The U.S. Forest Service funded the work and provided a team of Forest Service experts to support the process, with in-kind contributions of staff expertise and other resources provided by member agencies of the Tahoe Fire and Fuels Team.

Additions to the 2014 Strategy of particular importance include:

- An updated wildland-urban interface map, to recognize the lack of a clear boundary between communities and wildland fuels.
- A formal process for collaboratively planning, tracking, and reporting fuels reduction projects.
- The inclusion of previously treated areas in the prioritization process, to recognize the need for additional or maintenance treatments to meet fire behavior modification objectives.

The 2014 Strategy also embraced and integrated the goals of the *National Cohesive Wildland Fire Management Strategy* developed by the Wildland Fire Leadership Council as required by the Federal Land Assistance, Management, and Enhancement Act of 2009 (FLAME Act).

The 2014 Strategy includes updated budgets based on new forest product market conditions. The treatment of hazardous fuels in the wildland-urban interface is projected to cost between \$144 million and \$156 million from 2014 through 2024, with an additional \$25 million to \$35 million anticipated to implement phased treatments on previously treated areas. The 2014 Strategy also identifies the need to develop and maintain a stable pool of staff and contractor resources to ensure timely project implementation.

5.3 Other Related Plans

5.3.1 Lake Tahoe Basin Management Unit Revised Land Management Plan

The National Forest Management Act of 1976 (NFMA) establishes standards for how the Forest Service manages national forest lands. It requires the development of land management plans for national forests and grasslands. The Forest Service Lake Tahoe Basin Management Unit (LTBMU) updated its Land Management Plan in 2015. The purpose of the Land Management Plan—also known as the Forest Plan—is to provide strategic guidance to the LTBMU for forest management until approximately the year 2030. The Land Management Plan guides the restoration and/or maintenance of the health of the land and forest to promote a sustainable flow of uses, benefits, products, services, and visitor opportunities.

The Forest Plan provides a framework for informed decision making, while guiding resource management programs, practices, uses, and projects. It does not include specific project and activity decisions. Specific decisions are made separately following more detailed analysis and public involvement.

The Forest Plan is adaptive in that it can be amended when appropriate, to update the management direction based on new knowledge and information. The Forest Plan is strategic in nature and does not attempt to prescribe detailed management direction to cover every possible situation. While all the components necessary for resource protection and restoration are included, the plan also provides flexibility needed so the responsible official can respond to uncertain or unknown future events and conditions such as fires, floods, climate change, changing economies, and social changes that may be important to consider at the time decisions are made for projects or activities.

5.3.2 California Forest and Range Assessment

In 2008, the U.S. Farm Bill directed the U.S. Forest Service to coordinate with states on forest and rangeland assessments. The first coordinated report for California was completed in 2010 and was titled *California's Forests and Rangelands, 2010 Strategy Report*. This report seeks to provide a long-term, comprehensive, and coordinated framework for investing state, federal and stakeholder resources to address the management and landscape priorities identified in the assessment. Many federal, state, and local agencies, as well as landowners and other stakeholders are involved in the assessment process.

Under state law, the State Board of Forestry and Fire Protection (BOF) is charged with maintaining an adequate forest policy for the state. Forest and range policies must strike a balance between promoting the goods and services that are produced by these lands while protecting and enhancing the underlying ecosystems. Sustainable use of these lands require a broad set of strategies that places investments in priority areas to maintain, restore, and enhance productive forest and rangelands.

CAL FIRE's Fire and Resource Assessment Program (FRAP) and USFS Region 5 are preparing for the 2015 assessment. The 2015 Assessment will revisit the topics of the 2010 Assessment as well as revive the inclusion of Montreal Process Criteria and Indicators to assess progress toward or away from sustainable forests.

5.3.3 Nevada Natural Resource Assessment

In 2010, Nevada Division of Forestry, with input from many other local, state and federal agencies, compiled a *Nevada Natural Resource Assessment and Nevada Natural Resource Strategy*. These documents are collectively known as the *Nevada Forest Action Plan*, which identifies priority forest landscapes, threats to Nevada's natural resources, and current forest conditions in Nevada. It also provides a long-term, comprehensive, coordinated plan for investing state, federal, and leveraged partner resources to address the management and landscape priorities identified in Nevada's Assessment. This document will be revised every 5 years, with the next update scheduled for 2015.

Within the 2010 version document, the Tahoe Basin is considered a priority landscape. The threats related to natural resources within the Basin include:

- **Forest Health** (overstocked stands, aspen stand declines, excessive fuel accumulations, high levels of pathogens, drought, climate change, low species diversity, and low age class diversity)
- **Forest Fragmentation** (Community development, wildfires increasing in size and frequency)
- **Impaired Watershed** (increasing fuel accumulations, increasing tree densities, destructive wildfires, post-fire water quality degradation)
- **Sensitive/Threatened Species**

Within the Basin on the Nevada side, there are two Community Wildfire Protection Plans (CWPPs) with the following communities and associated risk levels: Incline Village and Crystal Bay rank as extreme, Glenbrook, Logan Shoals, Cave Rock/Skyland, Kingsbury, Elk Point/Zephyr Heights/ Round Hill rank as a high, and Stateline ranks as moderate.

General strategies to address threats above include:

Implement forest management plans that improve forest conditions across landscapes

- Conduct timber stand improvement to regulate stocking levels appropriate for site carrying capacities.
- Use timber stand improvement to increase structural, age class and species diversity where appropriate.
- Access federal cost-share programs administered by Natural Resource Conservation Service (NRCS)-Environmental Quality Incentives Program (EQIP) to encourage landowner implementation of management plans.
- Implement management activities that promote establishment and maintenance of aspen.
- Implement insect and disease control projects when appropriate.
- Maintain desired conditions using prescribed fire.
- Integrate the use of Forest Stewardship, Forest Health and Biomass Utilization Programs to achieve comprehensive, multi-disciplinary solutions.
- Pursue opportunities for collaborative planning and project implementation on landscape scale with federal, state and local government land managers and private landowners.
- Work towards developing long term, sustainable wood supplies to support new business development.
- Promote new and continued biomass utilization opportunities/businesses to facilitate land management.

Implement fuel reduction projects that reduce high intensity wildfires

- Consider and use all appropriate tactics for fuel reduction projects – hand cutting, machine mastication, fire, etc.
- Maintain fuel levels with prescribed burning.

Develop and Improve inventory data of forest conditions

- Fully Implement Forest Inventory and Analysis program in Nevada to provide data for the entire state and across all capabilities
- Continue aerial detection surveys for insect and disease conditions.
- Increase forest stewardship planning.
- Conduct surveys of conditions in aspen stands.

Increase agency expertise and capacity in prescribed fire.

Continue landowner information and education (I&E) programs.

Implement the Wildland Fire Risk Assessments and Community Wildfire Protection Plans

- Continue working with collaborative and local chapters of FIREWISE and other organizations to implement CWPPs.
- Develop grant proposals and provide funding for local fuel reduction projects.
- Add a maintenance requirement for fuel management projects.
- Coordinate fuel management projects with local fire departments to broaden treated areas for enhanced effectiveness.
- Provide fuel management plans for subdivisions in NDF fire protection districts and encourage/assist with similar planning in subdivisions outside NDF's FPDs.

Increase public awareness of fire safety

- Continue prevention education programs (Smokey Bear, FIREWISE, Get Defensive, etc.).
- Continue collaboration on education with agency partners (local fire protection districts, USFS, BLM, etc).

5.3.4 California Unit Fire Plans

The California side of the Lake Tahoe Basin lies within the CAL FIRE administrative and operational boundaries of the Amador-El Dorado Unit (AEU) and Nevada-Yuba-Placer Unit (NEU). Each Unit is responsible for annually implementing a Unit Fire Plan. The goal of the Unit Fire Plan is to reduce the loss of life, property, watershed values, and other assets at risk from wildfire through a focused pre-fire management program and increased initial attack success. These plans assess fire potential within a Unit and identify strategic opportunities for proactive project-based solutions identified by people who live and work within the fire threat areas. Additionally, the plan coordinates CAL FIRE's pre-fire activities with adjacent CAL FIRE Units, National Forests, and local collaborators. Unit Fire Plans are the foundation for planning, prioritizing and funding projects within a Unit's sphere of influence.

Unit Fire Plan implementation involves collaboration between stakeholders and communities who have different complexities as it relates to project implementation and priorities regarding the threat of a wildland fire. It is critical that a Unit Fire Plan provide adequate direction to CAL FIRE staff and communities within the Unit to direct resources and personnel commitments towards implementation of the Unit Fire Plan.

Locally, Unit Fire Plans are prepared with the following objectives:

- Support project work and planning efforts that encourage the development of safe ingress and egress routes for emergency incidents.
- Continue to provide operational training that will support safe and successful suppression operations.
- Utilize CAL FIRE and community resources to mitigate large and damaging wildfires with defensible fuel zone/fuels reduction projects at critical operational locations.
- Continue to support the implementation of fire safe clearance around structures.

- Shared vision among communities and the multiple fire protection jurisdictions including county-based plans and community-based plans such as Community Wildfire Protection Plans (CWPP).
- Shared vision among multiple fire protection jurisdictions and agencies.
- Support implementation of the 2008 WUI Building standards through cooperation with local government planning departments.
- Conduct incident analysis to evaluate Unit success in achieving the 95% threshold of keeping fires less than 10 acres in size.
- Educate the community on their role in the wildland and support Fire Safe Council and Fire Adapted Community activities.
- Utilize prevention operations to reduce ignitions within the Unit.
- Nurture and build relationships with local public and private industries to develop cooperative project plans.
- Continually reassess local mitigation projects and annually update the Unit Fire Plan to meet current conditions.

5.3.5 Local Hazard Mitigation Plans

The United States has a long history of disaster response and assistance that was born from a rural necessity that one neighbor helps another. By the mid-1970's however, the size of disasters and the scope of necessary recovery efforts was overwhelming informal disaster response efforts. In 1974 Congress passed the Disaster Relief Act of 1974, later amended by the Robert T. Stafford Act of 1988 (Public Law 93-288) that established the now familiar system of Presidential Emergency Declaration and associated responses. These Acts provide for the orderly assistance to state and local governments who have experienced a disaster. However, these laws did not require local governments to create credible plans and programs to lessen the exposure to hazards.

This changed when Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) (Public Law 106-390). This law requires states, tribes, and local governments to formally plan and implement mitigation actions that reduce community exposure to a hazard or hazards. DMA 2000 emphasizes the need for state, tribal, and local emergency managers to closely coordinate mitigation planning and implementation efforts. DMA 2000 also continues the requirement for a State Mitigation Plan as a condition of disaster assistance.

Currently all of the fire agencies in the Lake Tahoe Basin are signatories to Local Hazard Mitigation Plans, which recognize wildfire as a hazard and provide for mitigation actions to reduce the risk of catastrophic fire. Thus the local jurisdictions in the Tahoe Basin are eligible to apply for Fire Management Assistance Grants which can cover up to 75 percent of firefighting costs. This may include expenses for field camps; equipment use, repair and replacement; tools, materials and supplies; and mobilization and demobilization activities.

5.3.6 Southern Nevada Public Lands Management Act Strategic Plan

With the passage of the Southern Nevada Public Land Management Act (SNPLMA) (Public Law 105-263) in 1998, the Congress and the President set into motion a program of work that has resulted in an unprecedented level of funding for important projects, crucial economic development, and new employment opportunities through the sale of public land in the Las Vegas Valley. The Act allows for the creation of local parks, trails, and natural areas; the acquisition of environmentally sensitive lands; capital improvements on Federal lands; and conservation, restoration, and fuels treatment projects in Nevada and throughout the Lake Tahoe Basin. These projects are implemented by the eligible partner agencies to benefit communities and public lands throughout the State of Nevada.

SNPLMA funds have provided a substantial portion of funding for fuel reduction and defensible space projects in the Lake Tahoe Basin since 2007. In 2014, the SNPLMA executive committee updated its five-year strategic plan to focus the implementation of the program on three values: sustainability, connectivity, and community.

This CWPP promotes sustainability by facilitating the implementation of cost-effective hazardous fuel reduction treatments that help protect life, property, and the environment from the effects of catastrophic wildfire. The projects will help to restore forest health because they serve as a surrogate for frequent, low-intensity wildfire that frequently burned Lake Tahoe Basin forests prior to Comstock logging in the late 1800s and decades of fire suppression. The implementation of projects identified in local CWPPs will introduce heterogeneity across the landscape, increasing ecosystems resilience to both natural and human-caused disturbance.

This CWPP promotes connectivity by building on the successes of the Tahoe Fire and Fuels Team in delivering collaboratively developed and prioritized wildfire prevention and fuel reduction programs that protect the people, property, and values of the Lake Tahoe Basin. The CWPP development process unites diverse ownerships to connect federal, state, local, and private fuel reduction and defensible space treatments.

This CWPP promotes community by protecting public health and safety, and by providing engagement opportunities that strengthen communication and support between agencies and the public. It will help create Fire Adapted Communities that can withstand a wildfire without the loss of life or property.

5.4 Project Team

The Tahoe Fire and Fuels Team developed this CWPP, in conjunction with Wildland Rx Inc. and Deer Creek GIS. The Lake Tahoe Basin Multi-Agency Coordinating Group (MAC) provided review and oversight.

The Tahoe Fire and Fuels Team utilizes the Incident Command System to collaboratively plan and implement fuel reduction and other wildfire threat reduction programs. The Incident Command System is typically used by emergency response organizations to manage complex incidents, but has been adapted by the team for use in implementing Community Wildfire Protection Plans. For more information, refer to section <4.5>, Multi-Jurisdictional Coordination.

The Tahoe Fire and Fuels Team forms the core decision making team for the Community Wildfire Protection Plan, which includes representatives from the follow organizations:

- CAL FIRE Amador-El Dorado Unit
- CAL FIRE Nevada-Yuba-Placer Unit
- California State Parks
- California Tahoe Conservancy
- Fallen Leaf Fire Department
- Lahontan Regional Water Quality Control Board
- Lake Valley Fire Protection District
- Meeks Bay Fire Protection District
- Nevada Division of Forestry
- North Lake Tahoe Fire Protection District
- North Tahoe Fire Protection District
- Tahoe Douglas Fire Protection District
- City of South Lake Tahoe Fire Department
- Nevada Division of State Lands
- Tahoe Regional Planning Agency
- Tahoe Resource Conservation District
- University of California Cooperative Extension
- University of Nevada Cooperative Extension
- US Forest Service, Lake Tahoe Basin Management Unit

Additionally, each Division represented in this CWPP has completed an Action Plan for Increasing Fire Adaptation with a sub-group of key partners. Refer to [Fire Adapted Community Assessments](#) for a list of key partners in each Division.

5.5 Public Involvement

The development of this plan began with two public scoping meetings for north shore communities, and an online survey for south shore communities. The surveys and meetings focused on identifying ways that agencies and communities can better work together to prepare for wildfire:

1. What are the roles and responsibilities of the public (residents, homeowners, business owners, and community leaders) that are the most important for preparing your community for wildfire?
2. What are the roles and responsibilities of government agencies (land managers, fire services, and regulatory agencies) that are the most important for preparing your community for wildfire?
3. How can government agencies best help the public to achieve their roles and responsibilities?
4. How can the public best help government agencies to achieve their roles and responsibilities?

Responses were similar for both public meetings and online surveys, and they are summarized in <Appendix X>. The most common responses for public roles and responsibilities focused on taking

personal responsibility to create defensible space and prepare for evacuation. Government roles and responsibilities seen as most crucial are having clear processes for defensible space enforcement and providing community outreach and engagement.

Respondents felt that agencies can best help the public by cooperating with other governmental entities to provide simple and consistent messaging, objectives, and rules. Respondents felt they could help agencies by understanding the issues, and by getting involved in neighborhood and community initiatives.

Community specific information and actions for each Lake Tahoe Basin division are contained in Chapters 7-12, Fire Adapted Community Assessments and Prioritized Fuel Reduction Projects. Five Fire Adapted Community Assessments were completed. The associated action plans were developed by small stakeholder groups composed of individuals representing diverse groups, including residents, landowners, agencies, condominium associations, the insurance industry, business owners, property managers, real estate, water suppliers, recreation managers, volunteer action groups, and others.

6 Monitoring and Evaluation

This chapter provides a process for regularly assessing progress on fuel reduction and community action plans.

6.1 Review of progress since 2004

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

Successful CWPPs should:

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

It is likely that new developments and new sources of money in fire safety will change from year to year. It is recommended that this plan be reviewed on an annual basis by the fire districts with updates every 5 years or sooner if necessary.

The 2004 CWPPs recommended monitoring progress in the following categories:

1. Partnerships and Collaboration

The agencies in the Tahoe Basin continue to work together and collaborate on making the Tahoe Basin safe from Wildfires. The *Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire prevention Strategy* involves the following agencies:

- California Tahoe Conservancy
- California Department of Forestry and Fire Protection
- California State Parks
- Fallen Leaf Fire Department
- Lake Valley Fire Protection District
- Meeks Bay Fire Protection District
- Nevada Division of Forestry
- Nevada Division of State Lands
- Nevada Division of State Parks
- Nevada Tahoe Resource Team
- North Tahoe Fire Protection District
- North Lake Tahoe Fire Protection District
- USDA Forest Service, Lake Tahoe Basin Management Unit
- South Lake Tahoe Fire Department
- Tahoe-Douglas Fire Protection District
- Tahoe Regional Planning Agency

The original Plan, the *Multi-Jurisdictional Fuels Reduction and Wildfire Prevention Strategy* (Strategy), was approved and adopted by all of the cooperating agencies within the Basin in December 2007. It provided the vision to collaborate on projects, promote cross-boundary cooperation, and integrate actions to reduce fuels throughout the Basin. The updated Strategy was adopted in 2014, again through the collaboration of the listed agencies.

This type of collaboration exists across the board from suppression activities to fuels project development and implementation. The Tahoe Fire and Fuels Team (TFFT) was created to implement cross-jurisdictional fuel reduction projects among the fire districts in the Tahoe Basin. TFFT also functions as a forum for Tahoe agencies to be kept informed of anything that could affect their ability to get projects accomplished and to share the accomplishments of success as well as to learn from challenges and mutual concerns.

The following is taken from the Operating Charter of the Tahoe Fire and Fuels Team:

"The Tahoe Fire and Fuels Team (TFFT) was formed in 2007 to implement the Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy (Strategy) for the Lake Tahoe Basin. Following the Angora Fire of 2007, the governors of Nevada and California created the California-Nevada Tahoe Basin Fire Commission to examine regulatory and social environments that influence fuels reduction in the Lake Tahoe Basin. In their final report (May 2008), the Commission recognized the necessity of multi-jurisdictional collaboration to accomplish fuels reduction projects, obtain and

manage funding, and to plan and implement projects consistent with the Strategy and identified in geographically based community wildfire protection plans. The original Strategy (2007) was updated and endorsed by the executives of TFFT member agencies in August 2014.

The organizational structure of the TFFT utilizes the Incident Command System (ICS) familiar to fire professionals and emergency management personnel. Staffing is provided by TFFT member organizations on an as-needed basis. Basic staffing typically includes an Incident Commander (IC), a Planning Section Chief, an Information Officer, and an identified lead for each geographic division. Additional staffing is provided as dictated by resource availability and incident complexity, and typically includes an Operations Section Chief, a Finance Section Chief, a Fire Adapted Communities Coordinator, and a Data/GIS Specialist.

A Multi-Agency Coordinating Committee oversees the TFFT. From the TFFT charter:

The Multi-Agency Coordinating Group (MAC) provides oversight of the Tahoe Fire and Fuels Team. The MAC is comprised of the chief executives of the signatory agencies to the Multi-Jurisdictional Strategy. Each member agency has a single vote. The MAC provides general direction and political leadership for the TFFT, approves annual plan of work (Incident Action Plan), reviews and approves the annual accomplishment report, and assists with identifying funding opportunities. With input from the TFFT, the MAC approves an annual integrated calendar of TFFT and MAC meetings.

Communication is critical to the success of the TFFT and implementation of the Multi-Jurisdictional Fuels Reduction and Wildfire Prevention Strategy (Strategy) and will occur at multiple levels among participating agencies. Although TFFT members will communicate informally with agency technical staff through ordinary Basin and regional discourse, it is the responsibility of each member to ensure that pertinent information regarding the needs of the TFFT and the Strategy is fully committed from the agency executives to the technical staff and from technical staff to executives within his/her agency. All members have the responsibility to communicate TFFT activities and priorities and to solicit input from contemporary groups and any other stakeholders, as agreed to by the TFFT."

2. Risk Assessment

A current Risk assessment was completed using data from the West-Wide Risk Analysis Project and is included in this CWPP.

3. Reducing Hazardous Fuels

Between 2000 and 2007, an average of 2,362 acres were treated annually in the Lake Tahoe Basin <Table 8>. Since 2008, the acres treated annually have almost doubled. The total acres treated do not completely portray the amount of work that has been accomplished because a substantial number of treatments occurred on small urban lots <Table 9>. Significant work has been accomplished within the

interior of communities by treating small urban lots and undeveloped areas adjacent to private lands. These urban lots, many less than 1 acre in size, are challenging and expensive to treat, but are some of the highest priority for treatment due to their location and proximity to residences. The acres displayed in <Table 8> and <Table 9> show the land area treated to meet desired fire behavior conditions and fuels characteristics. <Table 10> displays the total acres of treatment types that were used to achieve the desired condition. For many areas, more than one treatment type was required to achieve the final desired result.

<Table 8>. Fuel reduction acres (footprint acres) completed (2000 - 2013)

Years	USDA Forest Service LTBMU	Private and Local	California State Parks	California Tahoe Conservancy	State of Nevada ¹	Total	Average per Year
2000-2007	13,447	2,331	424	942	1,753	18,897	2,362
2008-2013	17,678	2,979	919	1,274	1,418	24,268	4,045
Total	31,125	5,310	1,343	2,216	3,171	43,165	

¹ Includes Nevada State Lands and Nevada State Parks.

<Table 9>. Number of project units treated by size (2008 - 2013)

Project Size	USDA Forest Service LTBMU	Private and Local	State of California ¹	State of Nevada ²	Total
1 acre or less	807	82	730	195	1,814
Greater than 1	267	242	200	79	788
Total	1,074	324	930	274	2,602

¹ Includes California State Parks and California Tahoe Conservancy.

² Includes Nevada State Parks and Nevada State Lands.

<Table 10>. Treatment acres accomplished (2008 - 2013)

Treatment Types	USDA Forest Service LTBMU	Private and Local	California State Parks	California Tahoe Conservancy	State of Nevada ¹	Total
Mechanical	4,164	999	416	631	171	6,381
Hand thinning	12,910	1,826	492	630	1,392	17,250
Chipping	412	548	18	6	0	984
Mastication	1,429	270	319	512	1	2,531
Pile burning	6,060	1,261	211	188	1,202	8,922
Understory	604	162	13	0	44	823
Total	25,579	5,066	1,469	1,967	2,810	36,891

¹ Includes Nevada State Lands and Nevada State Parks.

4. Reducing Structural Ignitability

A program to reduce the number of flammable roofs on homes in the Basin has been implemented by several fire districts. This program has facilitated changes to building codes within the districts as well as grant funding to encourage homeowner participation in replacing flammable roofing.

California has adopted the California Wildland-Urban Interface Code, and both fire protection districts in Nevada have adopted the International Wildland-Urban Interface Code. These codes require that new construction in the wildland-urban interface use building materials and techniques that provide resistance to ignition by embers and wildfires.

5. Education and Outreach

In the past 10 years, agencies have worked with communities to develop consistent and coordinated community outreach. This includes the development of standard defensible space recommendations through the *Living With Fire* program, and ongoing communications through the TFFT Fire Public Information Team.

6. Emergency Management

The jurisdictions of the Lake Tahoe Basin have emergency plans in place, but there is no simple way for a resident or visitor to access plans and notification information for the entire region. The current CWPP update addresses the need for more work in this area. <Section 4.3.3>, Notification and Emergency Alerts, identifies some of the findings and recommendations for improving progress in this area.

6.2 Methodology for monitoring and evaluating future progress

6.2.1 Monitoring Action Plans for Increasing Fire Adaptation

TFFT member organizations recently participated in the development of forest management practices designed to protect water quality. The stepwise process used to develop the new practices is called outcome-based management. This process, while simple to understand, is challenging to practice. However, with dedication and engagement, TFFT member organizations look to monitor fuel reduction project success using this process.

TFFT member organizations believe that the outcome-based management will also help measure our success towards increasing Fire Adaptation. Below is a description of outcome-based management as described in *the Forest Management Toolkit - An Outcome-Based Approach to Water Quality Protection*, followed by a brief discussion of how outcome-based management might be used to monitor action plans for development of a Fire Adapted Community.

Outcome-Based Management

[Figure A]

Outcome-based management embraces the fact that we do not fully understand the range of complex variables within a forest. It is based on the notion that you must adapt or adjust a project as you discover how various components of the project are responding to the treatment. Outcome-based management differs from current regulatory framework by focusing on outcomes instead of plans, and is also complimentary. Outcome-based management is relatively flexible, but requires engagement and commitment on behalf of the project managers. It also requires accountability while supporting innovation.

Steps to Achieve Outcomes

These outcome-based management steps are the guiding principles that shape the framework. The five main steps include: 1) Aiming, 2) Gaining Understanding, 3) Doing, 4) Achieving, and 5) Improving. These steps describe an applied outcome-based management approach to project planning, implementation, monitoring, and ongoing improvement that encourages a direct approach.

How to Use Outcome-Based Management

This process is intended to assist and guide, rather than prescribe. Success is seldom attained by a first-time practitioner, but instead tends to evolve over many years of experience, education, and information sharing. These steps are not intended to be a substitute for actual field experience. Successful forest improvement projects usually require an adequate understanding of the setting in which one is working. However, these steps will help first-time as well as experienced project planners and implementers ask appropriate questions and take actions that have a higher probability of success.

Outcome-Based Management for Monitoring of Action Plans

The Fire Adapted Communities – Learning Network provided the Self-Assessment Tool as described in Section 6, is designed to help communities assess their level of fire adaptation and track their capacity to live safely with fire over time. Wildfire mitigation risk reduction strategies or programs as listed in Section 4 include:

- Fuel Reduction Projects
- Reducing Structure Ignitability
- Community Preparedness for Emergency Event
- Multijurisdictional Coordination
- Environmental Regulations and Compliance

These risk reduction strategies or programs require setting targets and goals or “Aiming.” As an example, for residential chipping programs, we may target 500 homes and 3,000 cubic yards of material be cleared by every TFFT member organization. “Gaining understanding” requires that we look at how that might best be achieved. For example, for chipping, does providing tools such as pruning shears and pole saws encourage more requests? Next comes the “Doing” and for the chipping example it means offer homeowners a residential chipping service. For “Achieving,” after a season of chipping, it is time to count the properties chipped and yards of material cleared. Finally, we must look at “Improving.” Did

one chipping program have more success than another? What made the difference? How can we improve the outcome next season?

With outcome-based management, TFFT member organizations will determine success, measure success, own it, and improve future outcomes. As with the forest management practices, outcome-based management gives TFFT member organizations tools for improving and increasing success in meeting targets and goals. Outcome-based management results will clearly provide the public and community leaders with knowledge and understanding in developing a Fire Adapted Community.

6.2.2 Monitoring, Tracking and Reporting Fuel Reduction Projects

The Tahoe Fire and Fuels Team provides a coordinated, comprehensive, and consistent process to report fuel reduction project planning, accomplishments, and funding sources across all jurisdictions through management of geospatial data and participation in the Lake Tahoe Environmental Improvement Program (Lake Tahoe EIP).

The Lake Tahoe EIP is a partnership of federal, state, and local agencies, private interests, and the Washoe Tribe, created to protect and improve the natural and recreational resources of the Lake Tahoe Basin. Forest management is one component of the hundreds of projects implemented each year, which also include projects designed to improve air quality, water quality, watersheds, habitat, transportation, recreation and scenic resources, and to deliver applied science.

The reporting tool for the Lake Tahoe EIP was recently redesigned to improve usability, cost-effectiveness, and system flexibility. The reporting tool is the primary method for tracking, monitoring and reporting fuel reduction projects in the Lake Tahoe Basin. It captures established performance measures for fuel reduction treatments, homeowner defensible space, and the multiple benefits achieved by fuel reduction projects. The tool also provides a basis for sharing information on future desired treatments, and to develop multi-disciplinary projects that achieve a wide variety of benefits.

The Tahoe Fire and Fuels Team manages geospatial data (i.e. data for mapping and spatial analysis), and annually creates spatial records of private, state, and local government fuel reduction treatments completed in the previous season. The records are used to update the Lake Tahoe CWPP treatments database. A spatial record of treatments on federal lands are kept within the Forest Service Activity Tracking Support database, which is similarly structured to the team-managed database and therefore suitable for compilation and comparison with treatments across all lands. Together, these spatial records form a complementary and substantiating record of accomplishments reported to the Lake Tahoe EIP, and are suitable for a variety of reports to multiple groups.

Additional information on reporting requirements and standards is available in Appendix – Tahoe Fire and Fuels Team Reporting Standards, and in Appendix A of the 2014 Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy.

7 Fire Adapted Community Assessments and Prioritized Fuel Reduction Projects

This chapter describes the process that was used to develop fuel reduction priorities, and background information on the Fire Adapted Community Assessments and Action Plans that were collaboratively developed for five regional divisions around the Lake Tahoe Basin.

Chapters 8 through 12 contain maps of prioritized fuel reduction projects for each of the five Lake Tahoe Basin divisions. A Fire Adapted Community Assessment and Action Plan is also included for each division, and contain local contextual information and actions that will prepare communities for wildfire.

7.1 Methodology for Fuel Reduction Project Identification and Prioritization

Chapters 8 through 12 contain fuel treatment maps and tables for each of the geographic divisions of the Tahoe Fire and Fuels Team. Each set of maps contains:

- **A Fire District Map** showing the jurisdictional boundaries of local fire protection district.
- **A Wildland-Urban Interface Map** showing the defense and threat zones of the wildland-urban interface collaboratively developed for the Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy. For more information on the wildland-urban interface zones, see <Section 3.2.2>.
- **A Fire Risk Index Map** showing the fire risk index score between 1 (highest priority) and 4 (moderate priority) for all areas within the wildland-urban interface. For more information on how the Fire Risk Index was developed, see <Section 3.2.3, West-Wide Wildfire Risk Assessment>.
- **A Fuels Treatments Index Page** showing index frames to more easily find areas of interest in the fuel reduction project maps that follow.
- **A Set of Fuels Treatment Maps** showing completed and future fuel reduction treatments on private, local, state, and federal land.
- **A Table of Completed and Future Treatments** containing additional information on the projects identified in the Fuels Treatment Maps, including ownership, acreage, treatment year, treatment type, and project name. The tables also include a West-Wide Risk Analysis score (WWA Score) for each project area that was calculated using the mean fire risk index score for the treatment polygon. A score of 1 indicates the highest priority, and a score of 4 indicates moderate priority.

Completed Treatments

Completed treatments are displayed differently depending on land ownership. Areas with completed initial treatments were included in the prioritization and planning process, to recognize the need for additional treatments over time both to meet fire behavior modification objectives, and to address the ongoing growth and accumulation of flammable fuels in Lake Tahoe Basin forests.

Private, Local, and State Land

The Tahoe Fire and Fuels Team maintains a spatial database of fuel reduction treatments on private, local, and state lands. These completed treatments are displayed in red. Each completed project was

assigned an ID, which is displayed on the map. Additional information on each project is available in the tables of completed and future treatments.

Federal Land

The US Forest Service Lake Tahoe Basin Management Unit maintains a spatial database of fuel reduction treatments on federal lands. These completed treatments are displayed in dark green.

Future Treatments

A future treatment in an area indicates that the area has not recently been treated for hazardous fuels, and is being considered for a fuel treatment. These areas will be assessed for treatment feasibility, and funding will be pursued for priority projects.

Private and Local Land

Private and local lands within the wildland-urban interface of Lake Tahoe are varied in terms of size, vegetation, and primary use. They include large forested lots, smaller residential parcels, commercial property, and common areas jointly managed by a homeowner association. The development of fuel reduction projects for this plan focused on identifying areas where treatments can be managed as distinct fuel reduction projects. The plan therefore includes future projects in areas with larger forested lots, or in areas where multiple ownerships can be combined to make a viable fuel reduction project. Small residential parcels were excluded from the fuel treatment identification process because individual lots are typically managed by the property owner for defensible space. Future private and local fuel reduction treatments are indicated in yellow.

State Land

State land available for future treatment includes land managed by California State Parks, the California Tahoe Conservancy, Nevada State Parks, and the Nevada Division of State Lands. Future treatments were identified during the development of *the Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy*, and are indicated in light blue.

Federal Land

Federal land available for future treatment includes land managed by the US Forest Service Lake Tahoe Basin Management Unit. Future treatments were identified during the development of *the Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy*, and are indicated in light green.

Treatment Types

Treatments are methods used to achieve the desired fuel loading conditions described below. The type of treatment strategy to use depends upon cost effectiveness, availability of implementation resources, the size and type of vegetation to be removed, and site-specific resource protection needs. The primary treatments used in the Lake Tahoe Basin include:

- Thinning (hand and ground-based mechanical)
- Prescribed burning (pile and understory burning)
- Mastication and chipping

Thinning

Mechanical and hand thinning are used to reduce the number of trees, which affects crown fire potential. Mechanical thinning is generally more cost effective than hand thinning for removal of large trees (trees greater than 16 inches diameter), and allows removal of larger trees to achieve spacing objectives. Ground-based mechanical thinning is generally prohibited on slopes more than 30 percent and on sensitive areas, such as stream environment zones. Aerial-based mechanical thinning uses helicopter or cable-based systems to remove trees on slopes greater than 30 percent. Hand thinning is generally limited to the removal of trees less than 16 inches diameter on steeper slopes, and in sensitive areas. Hand thinning may also involve pruning, which removes lower branches on trees, increasing the crown-base height (the distance from surface fuels to tree crowns). Because it is labor-intensive, pruning is generally limited to project areas in the defense zone.

Prescribed Burning

Prescribed burning reduces surface fuels using pile burning or understory burning. Pile burning is used on steep slopes where machines are prohibited and adjacent to developed areas where machines cannot process or otherwise remove material. Understory burning may be used to remove slash created by machine thinning and as an additional treatment in previously treated areas, or to restore forest health and to mimic the historic process of low-intensity fire.

Mastication and Chipping

Mastication and chipping are used to reduce ladder and surface fuels. Masticators consist of a mastication head on the end of an articulated arm that moves through the forest on a tracked or rubber-tired machine or mounted on a small loader-type machine with rubber tracks. Fuels are ground up into irregular-shaped chunks and left on the ground. The irregular-shapes allow air and water to seep between them, hastening decomposition. Chips are created when material is fed into a chipper and either removed from the site as biomass or spread on site.

7.2 Methodology for Developing Fire Adapted Community Assessments

In addition to the maps of completed and future fuel reduction treatments, Chapters 8 through 12 contain a Fire Adapted Community Assessment for each of the geographic divisions of the Tahoe Fire and Fuels Team.

The Fire Adapted Community Assessment was created by the Fire Adapted Communities (FAC) Learning Network and was adapted by the Tahoe Fire and Fuels Team for the Tahoe region. It is a tool designed to help communities assess the threats that wildfire poses to the community and the resources available

or necessary to mitigate that risk. The end product of the tool is a list of actions that can be taken by the community that can mitigate the identified risks. The tool helps communities identify the resources, leadership, networks, motivation, skill sets and partnerships that can be organized to address wildfire hazard with prioritized actions designed to reduce the threat wildfire poses to the community.

The FAC Learning Network, including the coordinating team and participants, developed the tool. Modifications were made by Tahoe Basin fire districts so that the tool would best serve Tahoe communities. FAC Learning Network participants are currently testing versions of the tool, and improvements are anticipated to include the development of new user interfaces to facilitate reviewing and updating action plans. When available, future versions and related resources will be available at: www.FACNetwork.org.

The Fire Adapted Community Assessment contains the following sections:

- General Info
 - Community Description
 - Team Members
- Community Characteristics
 - Wildfire Threat and Response Capability
 - Community Assets and Resources
 - Residential Structures and Assets
 - Ownership and Stakeholders
- Resources and Strategies
 - Plans and Regulations
 - Wildfire Mitigation and Risk Reduction Programs
 - Resources
- Outreach and Partnerships
 - Public Outreach and Input
 - Partners

Each category was assigned an overall readiness rating, an impact rating, and a feasibility rating, based on each communities unique characteristics, resources, and partnerships. An action plan follows each category, which contains related actions that will increase community fire-adaptation. The action plans were developed within each division by stakeholder working groups to ensure diversity in ideas, and to increase community engagement in fire planning.

8 Tahoe Douglas (NV) Division Projects and Assessment

8.1 Fuel Reduction Project Maps and Tables

8.1.1 Tahoe Douglas Fire Protection District

8.2 Fire Adapted Community Assessment

8.2.1 General Info

8.2.1.1 *Community Description*

8.2.1.2 *Team Members*

8.2.2 Community Characteristics

8.2.2.1 *Wildfire Threat and Response Capability*

8.2.2.2 *Community Assets and Resources*

8.2.2.3 *Residential Structures and Assets*

8.2.2.4 *Ownership and Stakeholders*

8.2.3 Resources and Strategies

8.2.3.1 *Plans and Regulations*

8.2.3.2 *Wildfire Mitigation and Risk Reduction Programs*

8.2.3.3 *Resources*

8.2.4 Outreach and Partnerships

8.2.4.1 *Public Outreach and Input*

8.2.4.2 *Partners*

9 South Tahoe (CA) Division Projects and Assessment

9.1 Fuel Reduction Project Maps and Tables

9.1.1 Lake Valley Fire Protection District

9.1.2 City of South Lake Tahoe Fire Department

9.1.3 Fallen Leaf Fire Department

9.2 Fire Adapted Community Assessment

9.2.1 General Info

9.2.1.1 *Community Description*

9.2.1.2 *Team Members*

9.2.2 Community Characteristics

9.2.2.1 *Wildfire Threat and Response Capability*

9.2.2.2 *Community Assets and Resources*

9.2.2.3 *Residential Structures and Assets*

9.2.2.4 *Ownership and Stakeholders*

9.2.3 Resources and Strategies

9.2.3.1 *Plans and Regulations*

9.2.3.2 *Wildfire Mitigation and Risk Reduction Programs*

9.2.3.3 *Resources*

9.2.4 Outreach and Partnerships

9.2.4.1 *Public Outreach and Input*

9.2.4.2 *Partners*

10 North Tahoe (CA) Division Projects and Assessment

10.1 Fuel Reduction Project Maps and Tables

10.1.1 North Tahoe Fire Protection District

10.2 Fire Adapted Community Assessment

10.2.1 General Info

10.2.1.1 *Community Description*

10.2.1.2 *Team Members*

10.2.2 Community Characteristics

10.2.2.1 Wildfire Threat and Response Capability

10.2.2.2 Community Assets and Resources

10.2.2.3 Residential Structures and Assets

10.2.2.4 Ownership and Stakeholders

10.2.3 Resources and Strategies

10.2.3.1 Plans and Regulations

10.2.3.2 Wildfire Mitigation and Risk Reduction Programs

10.2.3.3 Resources

10.2.4 Outreach and Partnerships

10.2.4.1 Public Outreach and Input

10.2.4.2 Partners

11 Meeks Bay (CA) Division Projects and Assessment

11.1 Fuel Reduction Project Maps and Tables

11.1.1 Meeks Bay Fire Protection District

11.2 Fire Adapted Community Assessment

11.2.1 General Info

11.2.1.1 Community Description

11.2.1.2 Team Members

11.2.2 Community Characteristics

11.2.2.1 Wildfire Threat and Response Capability

11.2.2.2 Community Assets and Resources

11.2.2.3 Residential Structures and Assets

11.2.2.4 Ownership and Stakeholders

11.2.3 Resources and Strategies

11.2.3.1 Plans and Regulations

11.2.3.2 Wildfire Mitigation and Risk Reduction Programs

11.2.3.3 Resources

11.2.4 Outreach and Partnerships

11.2.4.1 Public Outreach and Input

11.2.4.2 Partners

12 North Lake Tahoe (NV) Division

12.1 Fuel Reduction Project Maps and Tables

12.1.1 North Lake Tahoe Fire Protection District

12.2 Fire Adapted Community Assessment

12.2.1 General Info

12.2.1.1 Community Description

12.2.1.2 Team Members

12.2.2 Community Characteristics

12.2.2.1 Wildfire Threat and Response Capability

12.2.2.2 Community Assets and Resources

12.2.2.3 Residential Structures and Assets

12.2.2.4 Ownership and Stakeholders

12.2.3 Resources and Strategies

12.2.3.1 Plans and Regulations

12.2.3.2 Wildfire Mitigation and Risk Reduction Programs

12.2.3.3 Resources

12.2.4 Outreach and Partnerships

12.2.4.1 Public Outreach and Input

12.2.4.2 Partners

13 Appendices

13.1 Tahoe Fire and Fuels Team Fuel Reduction Reporting and Data Standards

13.2 Tahoe Fire and Fuels Team 2015 Incident Action Plan

13.3 Public Survey Results

14 Info Boxes

14.1 The Challenges of Fighting Wildland Fires in the Lake Tahoe Basin

<Authored by Jeff Meston>

Lake Tahoe is the second deepest lake in the United States and is considered a national treasure. Firefighters have a significant responsibility to protect this treasure, as well as protecting the lives of Tahoe's residents and visitors and the region's built environment and infrastructure.

According to the 2010 Census, Lake Tahoe's permanent resident population was, at that time, approximately 55,000. A substantial percentage of homes in the region are vacant much of the year because they are vacation or second homes; some are used as vacation rentals. This pattern of usage also presents challenges for firefighters. In terms of tourism, data varies depending on the source, but hundreds of thousands of visitors may be in the Basin on a given peak day. Many factors play into the delivery of fire protection services at Tahoe. This includes the desire of our residents and visitors to enjoy Tahoe's many recreational attractions, environmental values, and thousands of acres of public lands.

Fire is a natural part of the Sierra ecosystem. Historically, low intensity fires occurred that removed excessive fuels, thinning vegetation and improving forest health and sustainability. When significant development occurred, natural fires had to be suppressed, and when they were kept small, fuel loading continued to increase, creating the potential for higher intensity fires.

As homes and infrastructure were built around the Lake, we observed dispersed patterns of development with many homes built on steep slopes to capture beautiful lake and mountain vistas. A

network of primarily narrow, rural roadways complicate the protection of life and property in a wildland fire.

Firefighting at Lake Tahoe is a complex mix of trying to protect our watershed, minimizing greenhouse gas emissions, and protecting the land and wildlife that live and breed here. We are also keenly aware of the need to reduce sediment that flows into the Lake clouding its clarity. During a wildland fire, firefighters and other emergency responders may also need to facilitate the safe evacuation of residents and visitors, at the same time we are working to protect of residential, commercial and resort properties and vital community infrastructure (e.g., power lines and other facilities such as those providing water, sewer collection and export, and communications).

The goal of firefighting in the wildland/urban interface (WUI) is to protect the structure and its occupants from the threat of damage. Firefighters try to construct fire lines to protect the structures and/or extinguish spot fires near or on the property. This is known as structure defense. It is a staffing intense process where firefighters and apparatus are assigned to go into a neighborhood and determine which homes have the greatest chance of surviving the fire. The greatest variables are: Has the structure been taken care of by the owner, including building construction with non-combustible materials (roofs, siding, decking)? Does the status of the property's defensible space allow a safe structure defense zone for firefighters to risk their lives in the protection of the home? Homeowners who make a conscious decision as to the conditions of their home and property, including providing for appropriate defensible space, can truly make a significant difference and contribution to the success firefighters may have when they respond in during a wildland or other fire.

There are several special conditions that occur in urban interface firefighting. These include weather, fire behavior, water supply, previous fire history, fuel, topography, the travel of embers, number of structures being threatened, evacuation, available firefighting resources, power lines, animal control, other fire situations that could impact firefighting tactics and firefighter safety.

A continued challenge for suppressing fire in the urban interface is the availability of resources. We are fortunate within the Basin to have the US Forest Service CAL FIRE, the Nevada Division of Forestry and many other mutual and automatic aid partners to augment local resources. These agencies have the capability to support fire incidents with Incident Management Teams, aircraft, bulldozers and hand crews. Fires in the WUI require significant resources as quickly as possible. Members of the Lake Tahoe Regional Fire Chiefs Association have mutual aid agreements that detail available resources for any jurisdiction whether city, county, fire district, state or federal agency. Even during a major emergency, each agency must have the capacity to maintain daily operations, including medical emergency response. For many local fire districts and departments, calls for medical response are approximately 70 percent of their call volume. Fire managers must consider these needs as they allocate resources to a wildland fire. Without question, Tahoe is heavily dependent on our mutual and automatic aid agreements and the ability of our partner agencies to help provide the resources we need to successfully respond to a major fire or other disaster.

When firefighters enter a neighborhood during wildfires, they are frequently faced with a series of difficult decisions. Each engine carries a limited crew and supply of water. The team must conduct a “structure triage” to identify where they should most effectively focus their resources. The “triage” includes a determination of which structures and areas need priority defensive actions and those that may already be destroyed. They must consider defensible space, structure combustibility, and the safety of the firefighters involved. Again, here is where appropriate homeowner preparation such as having fire resistant building materials and design and proper defensible space can make the difference between saving and losing a home or saving or losing life.

Lake Tahoe is a unique treasure, one we all love, but it is very prone to fire. Individual homeowners have the responsibility and obligation to provide defensible space for the protection of their dwelling in a wildland fire. Each homeowner must know how to evacuate their structure and what items they should take in the process. Each homeowner must exercise fire safety on a regular basis and help our professional firefighters and emergency responders defend their home in time of need.

14.2 Red Flag Warning Days

A Red Flag Warning also known as a Fire Weather Warning. It is a forecast warning issued by the United States National Weather Service to inform area firefighting and land management agencies that conditions are ideal for wildland fire ignition and rapid spread. During or following drought conditions, and when humidity is very low, and especially when high or erratic winds that may include lightning are a factor, the Red Flag Warning becomes a critical forecast for firefighting agencies. When a Red Flag warning is issued, firefighting agencies often alter their staffing and equipment resources to prepare for the increased risk. The public must also pay attention to Red Flag Warnings and understand they also need to have a heightened awareness that fire danger is higher, with an increased probability of flames spreading quickly in the event of an ignition.

The criteria for fire weather watches and red flag warnings vary with each National Weather Service Office and each warning area, based on the local vegetation type, topography, and distance from major water sources, wind speed and direction and forecasted temperatures. Forecasters usually include the daily vegetation moisture content calculations, expected afternoon high temperature, afternoon minimum relative humidity and daytime wind speed as part of their communications.

14.3 Fire PIT

<Authored by Susie Kocher>

Wildfire is a major concern in the Lake Tahoe Basin. The area supports over 55,000 full-time permanent residents (per the 2010 Census) along with hundreds of thousands of tourists and vacation homeowners attracted to the area for winter skiing and summer recreation. Surrounding lands are primarily forested and owned by the USDA Forest Service and state agencies, along with private lands around the Lake where residential and commercial developments are located.

In the wake of the devastating Angora Fire in 2007, the governors of Nevada and California established the California-Nevada Tahoe Basin Fire Commission. The final report of this Commission (May 2008),

recognized the need for multi-jurisdictional collaboration through a “Tahoe Fire and Fuels Team” to plan and implement fuels reduction and fire prevention projects, and to provide the public with consistent and coordinated notification and educational messaging.

<Figure Z> The aftermath of the 2007 Angora Fire. The highlighted area shows the location of a forest-thinning project, where the fire changed from a crown fire to a lower-intensity surface fire. Nearby homes were still impacted by embers. Photograph from R5-TP-025, USDA Forest Service.

To deliver such coordinated messaging to the residents and visitors of the Lake Tahoe region, member agencies of the Tahoe Fire and Fuels Team formed the Fire Public Information Team (Fire PIT). This standing working group consists of public information and education staff from local fire departments, regulatory agencies, state forestry agencies, the Forest Service, and Cooperative Extensions in both Nevada and California. The goal of the Fire PIT is to proactively inform and educate the public on how to protect lives, communities, property and the exceptional natural resources of Lake Tahoe. Team products and projects include annual wildfire awareness events, coordinated media releases and outreach campaigns.

Annual Wildfire Awareness Events

The Fire PIT has been promoting Wildfire Awareness Weeks (or Months) since 2010. Volunteers and staff from over 20 organizations have collaborated to host outreach events, and conduct a media campaign to promote different aspects of Fire Adapted Communities.

Each year, the Fire PIT chooses a theme that will inspire actions to reduce wildfire risk to homes and communities. Themes have focused on defensible space, ember preparedness and community involvement. Planners also give presentations on wildfire awareness to 6th graders during the same period. In the last five years, over 60 events have been held, reaching more than 6,500 participants.

<Figure A> University of California Master Gardeners talk about fire resistant landscaping at a wildfire awareness month kick-off event.

<Figure B> Tahoe Resource Conservation District staff members explain the fire triangle to 6th graders at South Tahoe Middle School.

Promotion and Education Campaigns

The Fire PIT conducts coordinated media campaigns, with publications, newspaper and radio public service announcements, TV and radio appearances, direct mail, banners and posters. All promotions direct residents to the ***Living with Fire in the Lake Tahoe Basin*** website maintained by the University of Nevada Cooperative Extension (UNCE). Outreach materials developed by UNCE are used by all basin agencies to deliver a consistent message on fire adapted community principles.

Examples of Fire PIT campaigns include:

<Figure C> The “Get Defensive” defensible space campaign, the Lake Tahoe Fire Adapted Communities Guide and the “Healthy Forest, Healthy Lake” series of interpretive trail signs.

Coordinated Media Releases

The Fire PIT develops monthly themed press releases that are shared widely on individual organizations’ social media.

Recently, collaboration has expanded in the form of joint messaging on prescribed fires. More than 10 agencies conduct burns in the Lake Tahoe Basin, making it difficult for the community to know who’s burning where, and when. To address this, the Fire PIT acts as a clearinghouse for prescribed fire information. Weekly press releases provide details on the location and plan for all prescribed fire activities in the Lake Tahoe Basin, across all land ownerships and jurisdictions.

A standing working group of public information and education staff in the Lake Tahoe Basin has facilitated interagency cooperation, and has strengthened communication and support between agencies and the public. By working together to synthesize wildfire mitigation, information and education efforts, professionals such as the Fire PIT can help protect and create healthy, vibrant fire adapted communities. For examples of publications and press releases, visit the Tahoe Fire and Fuels Team website at tahoe.livingwithfire.info/tahoe-fire-fuels-team/

14.4 Remote Automated Weather Systems

<Authored by Jeff Dowling>

There are nearly 2,200 interagency Remote Automatic Weather Stations (RAWS) strategically located throughout the United States. These stations monitor the weather and provide weather data that assists land management agencies with a variety of projects such as monitoring air quality, rating fire danger, and providing information for research applications.

Most of the stations owned by the wildland fire agencies are placed in locations where they can monitor fire danger. Units in the RAWS network collect, store, and forward data to a computer system at the National Interagency Fire Center (NIFC) in Boise, Idaho. Units transmit this information via the Geostationary Operational Environmental Satellite (GOES) operated by the National Oceanic and Atmospheric Administration (NOAA). The data is automatically forwarded to several other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center (WRCC) in Reno, Nevada.

Fire managers use this data to predict fire behavior and monitor fuels; resource managers use the data to monitor environmental conditions. Locations of RAWS stations can be searched online through the Western Regional Climate Center.

14.5 Community Chipping Programs

- 14.6 Fire Behavior Modeling
 - 14.7 Geographic Information Systems
 - 14.8 Flame Length / ROS / Hauling Chart
 - 14.9 Fuel Moisture / Humidity / Climate / Solar Radiation
 - 14.10 Tree Species
 - 14.11 White Pine Blister Rust
 - 14.12 The Much-Maligned white fir
 - 14.13 Tree identification
 - 14.14 Brush identification
 - 14.15 Dwarf Mistletoe
 - 14.16 Bark Beetles
 - 14.17 Non-native Invasive Species
 - 14.18 Comstock logging, flumes, and railways
 - 14.19 Even-aged vs. Uneven-aged Management
 - 14.20 Stand-replacement fire regimes, highlighting lodgepole
 - 14.21 Stream Environment Zones
 - 14.22 The Washoe Tribe's Adaptation to Fire
 - 14.23 Western Regional Success Story for Incline
 - 14.24 Highlights from Division Action Plans
 - 14.25 Types of Monitoring – effectiveness monitoring protocol
 - 14.26 Wildlife effects, highlights on certain species
 - 14.27 UNCE and UCCE contribution to TFFT
 - 14.28 History of the Living with Fire program
-