

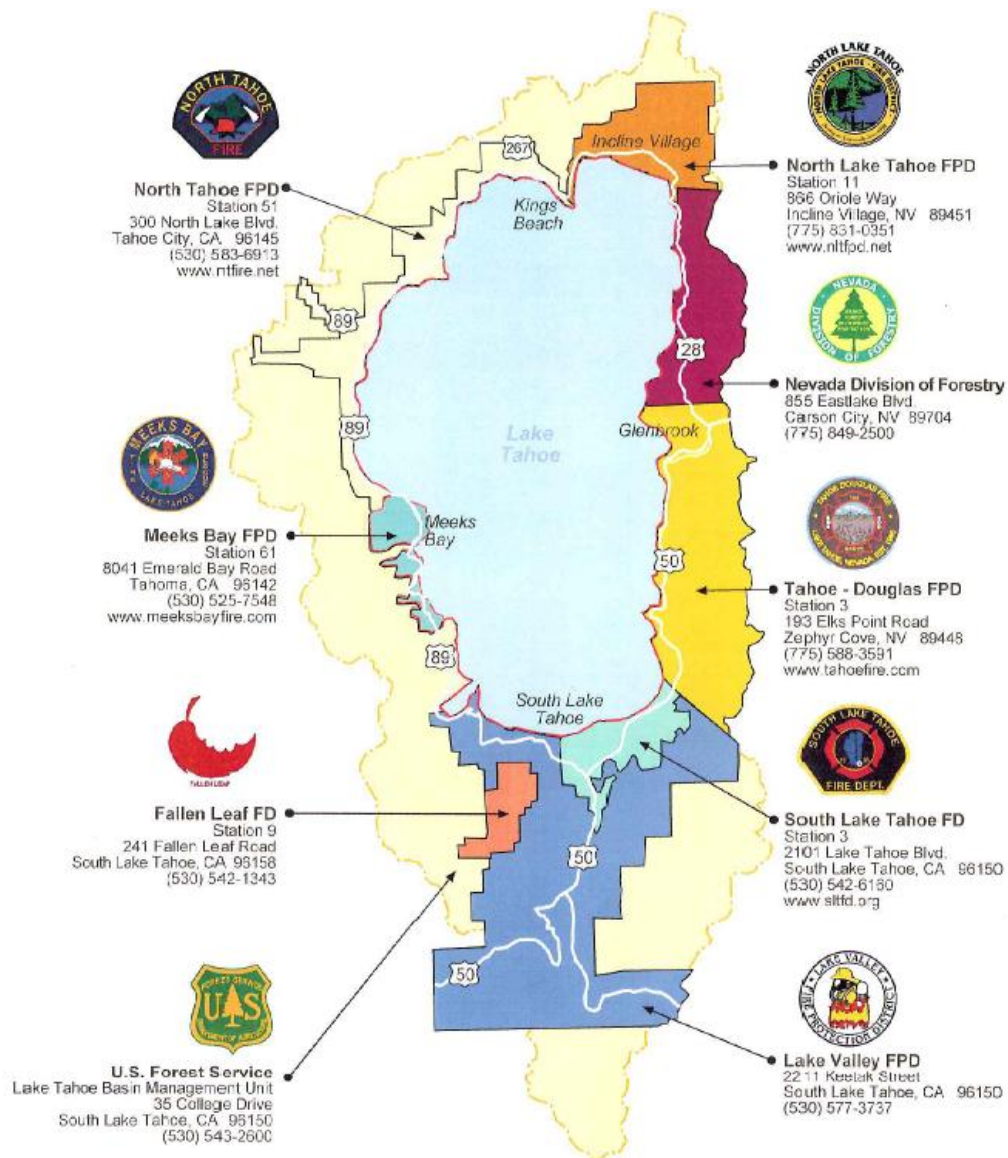


ANNEX I: NORTH TAHOE FIRE PROTECTION DISTRICT

I.1 District Profile

Figure I.1 of the Lake Tahoe Basin Fire Protection Agencies shows the area covered by the North Tahoe Fire Protection District (NTFPD). North Tahoe Fire protects all of the Placer County communities on the north and west shores of the Lake Tahoe Basin.

Figure I.1. Lake Tahoe Basin Fire Protection Agencies: North Tahoe Fire Protection District



North Tahoe Fire Protection District serves the north and west shores of Lake Tahoe, California. The District covers over 31 square miles of territory and borders the largest alpine lake in North America. The full-time resident population is just over 18,000 people, but communities swell to well over 50,000 people on any given day in the busy winter and summer tourist seasons. The district serves a rural area and is geographically isolated due to the numerous high mountain passes, two-lane highways, harsh weather conditions, and extreme influxes of tourists. The areas served are at altitudes of 6,000 feet to over 9,000 feet.

The District is a combination fire department with five fire stations and employs 40 full-time personnel. It also employs 20 to 25 part-time personnel. This district is an all risk fire and EMS transporting agency, providing fire suppression and prevention, rescue, hazardous materials, and paramedic ambulance services.

The District, under long term contract, administers and provides this all risk fire and EMS service to the community of Alpine Meadows, a world-class ski resort with over 750 housing units, limited egress, and a fire station staffed during peak demand, about 5 months throughout the year.

I.2 Hazard Identification and Summary

The NTFPD's planning team identified the hazards that affect the District and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to the District (see Table I.1).

Table L.1. NTFPD—Hazard Summaries

Hazard	Probability of Occurrence	Spatial Extent	Potential Magnitude	Significance
Agricultural Hazards	Unlikely	Limited	Negligible	Low
Avalanche	Likely	Limited	Limited	Low
Dam Failure	Occasional	Limited	Limited	Medium
Drought	Occasional	Significant	Limited	Low
Earthquake	Occasional	Significant	Critical	High
Flood (100-year)	Occasional	Limited	Critical	Medium
Flood (Stormwater)	Occasional	Limited	Limited	Low
Human Health Hazards:				
West Nile Virus	Occasional	Limited	Limited	Low
Landslide	Occasional	Limited	Limited	Medium
Severe Weather:				
Extreme Cold/Freeze	Likely	Extensive	Limited	Medium
Extreme Heat	Likely	Extensive	Limited	Medium
Fog	Occasional	Significant	Limited	Low
Heavy Rain/ Thunderstorm/Hail/ Lightning/Wind	Likely	Significant	Limited	Low
Snow (was Winter Storm)	Likely	Extensive	Critical	Medium
Tornado	Occasional	Limited	Limited	Low
Soil Hazards:				
Erosion	Occasional	Limited	Limited	Low
Expansive Soils	Unlikely	Limited	Negligible	Low
Volcano	Unlikely	Significant	Limited	Low
Wildfire	Likely	Significant	Critical	High

Guidelines for Hazard Rankings

Frequency of Occurrence:

Highly Likely—Near 100 percent probability in next year
 Likely—Between 10 and 100 percent probability in next year or at least one chance in ten years
 Occasional—Between 1 and 10 percent probability in next year or at least one chance in next 100 years
 Unlikely—Less than 1 percent probability in next 100 years

Spatial Extent:

Limited—Less than 10 percent of planning area
 Significant—10-50 percent of planning area
 Extensive—50-100 percent of planning area
 Source: North Tahoe Fire Protection District

Potential Magnitude:

Catastrophic—More than 50 percent of area affected
 Critical—25 to 50 percent
 Limited—10 to 25 percent
 Negligible—Less than 10 percent

Significance (subjective):

Low, Medium, High

Impacts of past events and vulnerability to specific hazards are discussed below (see Section 4.1 Hazard Identification for more detailed information about these hazards and their impacts on Placer County).

I.3 Vulnerability Assessment

The intent of this section is to assess the District’s vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment in the main plan. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

I.3.1 Assets at Risk

This section considers the District’s assets at risk. Table I.2 lists District assets identified by representatives from the NTFPD as important to protect in the event of a disaster.

Table I.2. NTFPD—Critical Facilities and Other District Assets

Name of Asset	Type	Replacement Value	Hazard Specific Info
North Tahoe FPD facilities	Essential		
Headquarters Station 51	Essential	\$14.6 million	
Station 52 Training	Essential	\$12.5 million	
Station 53 Homewood	Essential	\$9.5 million	
Station 54 District shop	Essential	\$8.0 million	
Station 55 Fuels Reduction	Essential	\$8.0 million	
Station 56 Alpine Meadows	Essential	\$6.5 million	
Type 1 Structure Engines X 6	Essential	\$700,000 each	
Type 3 Brush Engines X 3	Essential	\$400,000 each	
ALS Ambulances X 7	Essential	\$125,000 each	
Command Vehicles etc.		\$50,000	
Placer Co. Sheriff Dispatch & Office	Essential		
Highways, Bridges, Arterial Roads	Transport/ Lifeline		
Utilities	Transport/ Lifeline	Power, Water, Gas, Sewer	
CalTrans & Placer Co. DPW	Transport/ Lifeline	Facilities and Equipment	
Lake Tahoe Outlet Dam	High Loss		
Schools and Shelter locations	High Loss		
Groceries stores			

Source: North Tahoe Fire Protection District

It is important to note that there are no hospitals within the North Tahoe Fire District boundaries. This becomes a significant vulnerability when the highways become impassable due to flooding, rock/mudslides, avalanches, and interstate closures.

Natural Resources

Several state or federally listed species may be found within the District boundary. These are identified, along with other species of concern found in the District, in Table I.3.

Table I.3. Species of Concern in the North Tahoe Fire Protection District

Species	Federal Status	Critical Habitat in NV/CA	Office Lead	State
Mammals				
Fisher, <i>Martes pennanti</i> (West Coast DPS)	C	N/A	YFWO	CA
Birds				
Yellow-billed cuckoo, <i>Coccyzus americanus</i> (Western U.S. DPS)	C	N/A	SFWO	CA/NV
Bald eagle, <i>Haliaeetus leucocephalus</i>	T	N	SFWO	CA/NV
Amphibians				
Yosemite toad, <i>Bufo canorus</i>	C	N/A	SFWO	CA
Mountain yellow-legged frog, <i>Rana muscosa</i> (Sierra Nevada DPS)	C	N/A	SFWO	CA/NV
Fishes				
Lahontan cutthroat trout, <i>Oncorhynchus clarki henshawi</i>	T	N	NFWO	CA/NV
Plants				
Webber ivesia, <i>Ivesia webberi</i>	C	N/A	NFWO	CA/NV
Tahoe Yellowcress, <i>Rorippa subumbellata</i>	C	N/A	NFWO	CA/NV

Source: North Tahoe Fire Protection District

Growth and Development Trends

Population growth within the NTFPD continues but is not uniform throughout. The areas within and closest to the developed communities are growing fastest and have higher housing densities. The more rural, mountainous areas are experiencing limited growth, in part due to land ownership, lack of services, and overall rugged terrain.

Unique to this part of Placer County is not the growth of full time residents, but the influx of visitors and tourists to the area, especially during the peak summer and winter seasons. While this area is home to only about 18,000 full time residents, during high season some 50,000 people, on any given day, may be enjoying the vast recreational and tourist opportunities. This spike in population creates a unique vulnerability to the area, especially in the event highways become impassable due to flooding, landslides, avalanches, or gridlocks due to high volume and extreme weather conditions. Even during the off-season, the lack of multiple transportation routes, if closed, can leave the resident population cut off from necessary, and potentially life-saving, services.

I.3.2 Estimating Potential Losses

Dam Failure

A dam failure can range from a small uncontrolled release to a catastrophic failure caused by prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. Dam failure flooding varies by area depending on which dam fails and the nature and extent of the dam failure and associated flooding.

Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Based on analysis provided in the Placer County General Plan Background Report, only four dams within Placer County have the potential to affect more than 100 persons. Of these four, a failure of the Lake Tahoe Dam could potentially impact areas within the NTFPD. Failure of this dam would be contained within the Truckee River floodway to Nevada County and could impact in excess of 1,000 people.

Flood

The Truckee River Watershed is the primary watershed of concern within the District boundaries. The Truckee River Watershed, with an area of approximately 2,720 square miles, encompasses the entire Lake Tahoe, Truckee River, and Pyramid Lake systems. The overflowing and diversion of Squaw Creek (upper Truckee River Basin) is responsible for major flooding events, such as the January floods of 1997, in eastern Placer County.

Flooding and soil erosion due to heavy rains and snow runoff have been a historical problem. Abundant snowfall in the mountains combined with rain and steep terrain can mean rapid runoff and flooding. Water flow can be high in peak runoff periods with historical downstream flooding. The primary impacts from flooding within the district include damage to roads, utilities, bridges, and flooding of homes, businesses and critical facilities. Road closures create difficulties in providing emergency services to areas cut off by flooding and limit the area's ability to evacuate.

The most notable flood event impacting the District is the January floods of 1997. This flooding started in late December over a crowded holiday period, with heavy winter storms causing some 6-7 feet of snow to fall at the lake level, followed by a warm wet storm causing approximately 14" inches of rain to fall in a two-day period. Flooding was widespread over much of northern California and parts of Nevada. All of the NTFPD's response area was impacted by flooding. Damage to infrastructure and private property was estimated at \$35 million, and included damage to bridges, highways, surface streets, utilities, and the collapse of a portable classroom. All transportation and supply routes were cut off or gridlocked and inaccessible. Mud and rockslides occurred throughout the region, with one large landslide, approximately 1 mile in length, occurring on the west shore.

Landslides

Given the geology, climate, and terrain of the District, landslides can be a significant concern. Notable landslides of record include the landslides occurring along the Truckee River, Squaw Creek, and Bear Creek rivers associated with the 1997 flood event. These include the Wayne Road, Sandy Way, and Navajo Court landslides discussed in detail in Section 4.1 of the main plan. See Figure 4.24 for a map depicting these landslide areas.

Severe Weather: Extreme Temperatures

Extreme weather events, often accompanied by extreme temperatures, occur on an annual basis within the NTFPD boundaries. With altitudes ranging from 6,000 to 9,000 feet above msl, extreme cold/freezing temperatures can create significant problems. Of particular concern to the District is the vulnerability of the area to broken utilities and power failures during extreme weather events. Most notably, during the mid-80s, a gas main failure occurred in Carson City, Nevada, causing a major outage throughout the region. This also resulted in an overload of the power utilities in the District, causing failures lasting several days. The District estimates that such outages lasting several days during extreme weather events occur approximately every 2-3 winters.

Severe Weather: Snow

Extreme winter weather events are a major concern to the District. Snow and winter weather conditions regularly result in utility outages and the closure of major transportation routes. According to the NTFPD planning team, major winter storms have routinely cut off transportation routes in the district for hours (as recent as March 2007) to over a week (back in the 1950s), stranding thousands and causing a major impact to services and supplies.

Wildfire

All communities within the District are listed on the National Fire Plan's "Communities at Risk" list as set forth in Section 4.3.2 of the main plan.

Over one hundred years of aggressive fire suppression under the national fire suppression policy has rendered wildlands severely overgrown. Much of the private land in the District's area is in the wildland urban interface with increasing residential development.

According to the NTFPD, the following areas of the District were prioritized for projects because of their population, values at risk, and fuel availability:

- Tahoe City
- Lake Forest
- Highlands
- Dollar Point
- Cedar Flats
- Carnelian Bay
- Agate Bay
- Tahoe Vista

-
- Kings Beach
 - Kingswood
 - Talmont
 - Tahoe Park
 - Pineland
 - Timberland
 - Skyland
 - Tahoe Pines
 - Tahoe Swiss Village
 - Homewood
 - Chamberlands
 - Tahoma
 - McKinney Estates.

As more people move into the area and impacts from recreational demands increase, there will be more human-caused wildfire starts each year. And, the increased number of widely scattered homes within the District adds greatly to the danger, complexity, and cost of fighting these fires.

Currently, many of the communities in the District are limited to one route access and egress in the event of a major wildfire. Historically, these routes are closed during major events, stranding many people, including visitors, away from their families and homes. So far there has been no loss of life attributed to the limited evacuation routes, but it is likely only a matter of time before people are cut off and trapped by a major fire event.

Forest overgrowth due to the efficiency of modern firefighting techniques, and to society's current election to limit forest thinning and harvesting, is a serious problem. If wildfire does not impact the forest first, native insects will eventually kill millions of trees. Explosions in insect populations usually start during a drought, when the lack of water combined with too many trees per acre render the trees too weak to fight off the insect attacks. Without a change in management practices on public lands, there is little hope of avoiding a kill off of trees similar to the kill off experienced by other national forests.

The most notable recent wildfire to impact the District was the Washoe Fire in August 2007. This fire occurred in the wildland urban interface area of Tahoe Park and Tahoe Woods subdivision, along the west shore of Lake Tahoe. Although no lives were lost, the fire destroyed 5 residential structures and encompassed 19 acres. Power and gas utilities incurred damages. There were also losses to timber assets, loss of watershed protection, and loss of the aesthetic value of a scenic corridor. This event caused major disruptions to west shore and Tahoe City traffic and business on a busy summer weekend. Highway 89 in West Lake was closed for a period of time.

Along with severe winter storms and heavy snow, wildland fires are a significant threat to regional power distribution systems. Power outages caused by wildland fires directly affect the safety of district residents, drastically restrict critical water system operations, and severely limit available water supplies for fire suppression.

Other Hazards

While of lower planning significance to the District relative to other hazards, the following information about avalanche and hazardous materials release should still be noted:

Avalanche

During an intense snow year in 1982, multiple major avalanches caused deaths, injuries, property damage, and isolated residents in the Alpine Meadow's ski resort and valley. Seven people died in the March 31, 1982 event, and resulted in significant damage to the ski area lodge, shop and some residential homes, as well as to power infrastructure. In the 1976 Beaver Bowl Avalanche, three fatalities occurred.

According to the NTFPD, in addition to the above events resulting in fatalities, numerous avalanches have occurred over the years causing damage to structures, vehicles, and closing main roads (including Highway 89). Avalanches continue to occur in the Lake Tahoe region almost every year. Several avalanches during the winter of 2008/2009 took the lives of 3 highly respected local citizens.

I.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities; administrative and technical mitigation capabilities; fiscal mitigation capabilities; mitigation outreach and partnerships; and other mitigation efforts.

I.4.1 Regulatory Mitigation Capabilities

Table I.4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the NTFPD.

Table I.4. NTFPD's Regulatory Mitigation Capabilities

Regulatory Tool	Yes/No	Comments
General plan	No	See Placer County
Zoning ordinance	No	See Placer County
Subdivision ordinance	No	See Placer County
Site plan review requirements	Yes	Structural plan checks
Growth management ordinance	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, water conservation, wildfire)	Yes	Local Fire Prevention Code
Building code	Yes	Version: Placer County Building Code (2007 California Building Code)
Erosion or sediment control program	No	
Storm water management program	No	
Capital improvements plan	Yes	

Regulatory Tool	Yes/No	Comments
Economic development plan	No	
Local emergency operations plan	Yes	
Other special plans	Yes	Community Wildfire Protection Plan
Flood Insurance Study or other engineering study for streams	No	See Placer County

Source: North Tahoe Fire Protection District

Alpine Meadows, Community Wildfire Protection Plan, 2005

The Alpine Meadows Community Wildfire Protection Plan (CWPP) summarizes wildfire dangers and issues within the Alpine Meadows area. The CWPP also catalogs community wildfire protection needs and identifies corrective action and community projects that will mitigate some of the problems.

I.4.2 Administrative/Technical Mitigation Capabilities

The board is comprised of 5 members representing 5 regions within the Lake Tahoe basin and is selected by registered voters within the District. The board serves as the governing body for the District's more than 18,000 residents. Members of the board are elected by geographical Division for 4 years.

The Board of Directors approves District Rules and Regulations and, through the Fire Chief, ensures adherence to District policies. District policy and actions may be adopted by motion, or more formally, by resolution.

The NTFPD provides services through six fire stations: Alpine Meadows, Tahoe City, Homewood, Dollar Hill, Carnelian Bay, and Kings Beach. These fire stations are staffed by 60 to 65 uniformed and support personnel.

The Assistant Chief oversees the operations division which includes service delivery, communications, apparatus repair, replacement, and purchasing. The Assistant Chief is responsible for engine company staffing, alarm response guidelines, and standard operating procedures.

NTFPD's dispatch services are provided by the Grass Valley Emergency Command Center in Grass Valley, CA. The dispatch center uses computer aided dispatching to ensure optimal resource monitoring and management utilizing the closest resource backed up by station cover assignments in a multi-tiered alarm structure.

For apparatus maintenance and repair the District employs 1 full-time Mechanic/Captain and two part-time assistants. The District pursues an aggressive vehicle replacement policy which refurbishes engines after 10 years, places them in reserve after 20 years and replaces them after 25 years. District ambulances are designed to have the ambulance module remounted on a new

chassis every 5 years until replacement. The North Tahoe Fire Protection District maintenance and repair facility personnel ensure the District purchases only items of a specified quality at the least expense to the taxpayers. The District maintenance and repair facility personnel are charged with all tasks associated with providing a safe and reliable apparatus fleet at the lowest possible expense to the taxpayers.

I.4.3 Fiscal Mitigation Capabilities

Table I.5 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table I.5. NTFPD’s Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	No	
Authority to levy taxes for specific purposes	Yes	Only with 2/3 voter approval
Fees for water, sewer, gas, or electric services	No	
Impact fees for new development	Yes	
Incur debt through general obligation bonds	Yes	Only with 2/3 voter approval
Incur debt through special tax bonds	Yes	Only with 2/3 voter approval
Incur debt through private activities	No	
Withhold spending in hazard prone areas	No	

Source: North Tahoe Fire Protection District

As indicated above, the District has several programs, plans, policies, and codes and ordinances that guide hazard mitigation. Some of these are described in more detail below.

Codes and Ordinances

Avalanche

Placer County’s avalanche management program defines Potential Avalanche Hazard Areas (PAHAs) where the minimum probability of avalanche occurrence is 1 in 100 per year or where avalanche damage has already occurred. According to the Placer County Avalanche Ordinance the following information must be disclosed in PAHAs:

- Identification that a structure is within a PAHA;
- A warning that avalanche control work is conducted in the area and avalanche warnings will be provided as feasible; and
- Identification of sources that provide weather information and general information on avalanches.

In addition, the County limits construction as necessary in PAHAs and will not issue a building permit for construction in a PAHA without certifying that the structure will be safe under the anticipated snow loads and conditions of an avalanche.

I.4.4 Mitigation Outreach and Partnerships

The NTFPD has automatic aid agreements with bordering Districts and mutual aid agreements with other fire agencies throughout the area. The District relies heavily upon this aid from their neighbors. Due to the high costs that are associated with a resort based economy, three-quarters of the NTFPD personnel live outside of the area served. This requires additional personnel from neighbors to respond and assist with incidents that are within the operational area.

The District is also a participating member of the Sierra Front WildFire Cooperators, a bi-state, multi-agency organization. The cooperators address numerous issues pertaining to wildfire suppression, prevention and public education.

The District also works with other agencies on wildfire-related matters. Working with professional fire experts from the U.S. Forest Service and California Department of Forestry and Fire Protection helps ensure that the District's work complements state and federal work and is up to standard for controlling wildfires.

In implementing many of the fuels management projects, the NTFPD works closely with the Tahoe Fire and Fuels Team which consists of representatives of Tahoe Basin fire agencies, CAL FIRE, Nevada Division of Forestry and related state agencies, the Nevada Fire Safe Council, the Tahoe Regional Planning Agency, the USDA Forest Service, conservation districts from both states, the California Tahoe Conservancy, and the Lahontan Regional Water Quality Control Board. Coordination of fuels reduction projects in the Tahoe Basin is overseen by a Multi-Agency Committee (MAC) comprised of the above agencies.

I.4.5. Other Mitigation Efforts

The District is involved in a variety of mitigation activities including, public education, fuels management projects, and other activities to reduce fuel loads and fire risk. These mitigation activities include:

- Public presentations and defensible space inspections
- Working with Homeowner's Association's Living with Fire publication
- Public outreach via website, local paper and school education programs
- Fire & Life Safety structural plan review program
- Forest Fuel's management program
- Advise and assist with water system infrastructure improvements
- Details on some of the recent, ongoing mitigation projects are noted below.

Fuel Reduction Projects

The NTFPD has begun work on three fuel reduction projects across North Tahoe that are top priorities in the CWPP. The projects are employing an innovative mix of NTFPD hand crews, low-impact equipment, controlled burning, and limited commercial harvesting to reduce fuel and create shaded fuel breaks. This will be an ongoing project for years to come and will require ongoing maintenance for treated parcels. Initial treatment has begun on high priority areas. To date, 230 acres in various areas have undergone treatment. The three current projects include the following priority areas: Rocky Ridge neighborhood, the Firestone property on Dollar Hill, and an area between Dollar Hill neighborhoods and Chinquapin. To date, the Rocky Ridge Neighborhood and the Firestone property on Dollar Hill are complete. The Dollar Hill neighborhoods and Chinquapin projects are ongoing.

Rocky Ridge Neighborhood (June 1, 2008 – September 1, 2008)

- 25 acre high hazard area where prevailing winds would carry fire from Tahoe City into the neighborhood. Number nine priority project in the CWPP.
- NTFPD hand crews and low-impact, rubber tracked chipper were used on steep slopes.
- Partnership with California State Parks and Rocky Ridge homeowners who are completing defensible space within 100 feet of structures.
- Project Goal: Create a shaded fuel break where wildfire would move from the forest canopy to the ground and become manageable.
- Project cost: \$85,000. Funding provided by California State Parks, SNPLMA and a federal earmark for NTFPD provided by U.S. Congressman John Doolittle.

Firestone Property on Dollar Hill (Start August 15, 2008)

- 65 acre tract on Dollar Hill owned by North Tahoe Public Utility District (NTPUD). Number two priority project in the CWPP.
- NTFPD hand crews thinned vegetation in stream areas while a commercial timber company was used to remove trees less than 18 inches diameter.
- NTPUD assisted the project by allowing North Tahoe Fire to use their property as storage areas on Defensible Space clean-up days for free chipping and pine needle drop.
- Project Goal: Create a shaded fuel break between neighborhoods east and west of the project area in order to help protect lives and homes in the event of a wildfire.
- Project cost: \$190,000. Funds provided by North Tahoe Public Utility District and funds from federal land sales outside of Las Vegas through the Southern Nevada Public Lands Management Act (SNPLMA).

Area between Dollar Hill and Chinquapin (work ongoing for the past two years is moving toward completion)

- 40 acre treatment around the Chinquapin neighborhood east of Dollar Hill. Number one priority project in the CWPP.
- NTFPD hand crews removing fuels on very steep, inaccessible slopes and preparing for controlled burns each year. Low-temperature understory burning will be used on days when conditions allow the smoke to be carried away from neighborhoods.

- Partnership with CAL FIRE, Incline-based North Lake Tahoe Fire Protection District, and Chinquapin homeowners.
- Project Goal: Understory burns will replace nutrients in the soil, creating a healthier forest that doesn't have to be treated as often. The area should not need treatment again in less than 10 years.
- Project Cost: \$200,000. Funding provided by Chinquapin homeowners, Secure Rural Schools and Community Self-Determination Act Title III funds and a federal earmark for NTFPD provided by U.S. Congressman John Doolittle.

Fuels Reduction: Chipper Program

The NTFPD provides fuels reduction chipping to roughly 1200 or more properties each year, which is equivalent to over 300 acres of treatment in the district. Chipping statistics from 1999 to 2007 are provided below:

Chipping Stats 1999-2007		
Season	Parcels Treated	Pounds
2007	1323	807,500
2006	567	379,278
2005	634	353,450
2004	543	286,285
2003	636	285,100
2002	517	248,000
2001	716	427,840
2000	407	223,087
1999	546	299,277
Totals	5889	3,309,817
5889 Lots = 1472.25 at ¼ acre per lot average.		

Source: North Tahoe Fire Protection District

I.5 Mitigation Strategy

I.5.1 Mitigation Goals and Objectives

The North Tahoe Fire Protection District adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

I.5.2 Mitigation Actions

The planning team for the NTFPD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and schedule are included.

1. Community Wildfire Protection Plan (CWPP) projects

Issue/Background: TBFC Final Report Finding 2: The risk of wildfire in the Tahoe Basin is extreme and the probability of catastrophic fire occurrence is increasing.

North Tahoe Fire participated in a joint bi-state CWPP development in 2004. The resulting document is used to direct and prioritize fuel treatment projects in and around the district. The plan utilizes a ranking system of projects based on protecting life, property and the environment. The ranking coupled with funding and available resources allows work to start in the identified hazard areas.

This plan is now 5 years old and needs to be updated. During the last 5 years, the District has identified many difficulties in proceeding with priority projects. Some of these difficulties are due to multiple land owners in a single project plot and funding limitations. There are also areas that were not identified in the original plan leaving gaps in the protective halo surrounding the communities.

Funding is needed to update the plan, continue projects, address the identified problems, and provide for ongoing maintenance in the areas already treated.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing CWPP and future updates help establish priorities and projects. TBFC Recommendations: 15, 54, 69, 89 and the Lake Tahoe Basin Multi-Jurisdictional Fire Reduction and Wildfire Prevention Strategy 10-Year Plan

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: Sum of all projects in 2004 plan \$13,406,070.

Benefits (Losses Avoided): Life safety, catastrophic loss to property, watershed stability, forest health, and regional economics.

Potential Funding: Local, state and federal funding.

Schedule: Ongoing.

2. Defensible Space Inspection, Tree Marking, Chipping Program, and Public Education

Issue/Background: Defensible space is the single most important action that can be taken by individual home owners to protect homes from wildland fire. It is also one of the most critical aspects of protecting the wildland from fire that originates in the community.

Inspections, free chipping, public education, enforcement, and compliance are important components to the overall success of the program and when coupled with CWPP projects, lead to improved wildland intermix safety. Chipping programs can lead to less dooryard burning, better air quality and better compliance with regulations. Inspections, public education, and enforcement are needed to help protect the entire community through uniform communications and standards.

Residential chipping services have increased by 25-150 percent each year and need to continue. This increase dictates the following years projected needs. This aspect of the community assistance program allows homeowners to complete defensible space on their own with the knowledge that the material will be disposed of efficiently. Disposal of material is the biggest problem for homeowners and the chipping program allows homeowners the opportunity and incentive to complete work.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: TBFC Recommendations 37-42 and 44 describe actions that will assist property owners and fire agencies with attaining required defensive space for all properties within 5 years.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$200,000 (Annually).

Benefits (Losses Avoided): Life, property, environmental health and safety.

Potential Funding: Local, state and federal funding.

Schedule: Ongoing May through November each year.

3. Hazardous Wood Roof Replacement Program

Issue/Background: Historical data suggests that firebrands are a principle WUI ignition factor and that highly ignitable wood roofs can cause homes to be lost in wildland fire events without direct flame impingement into the structure.

In January 2008, NTFPD adopted fire code changes to prohibit the use of shake shingles on new construction. The high cost of wood shake roof replacement precludes many property owners from changing to Class “A” fire resistive materials. The cost/benefit relationship is difficult when roofs contain additional years of useful life. A stipend program to assist property owners with the costly conversion is felt to be the only way of achieving successful “change out” close to 100 percent.

According to the Tahoe Fire Commission Report (May 2008), there are many homes in the basin which have wood shake shingle roofs that pose a risk to the dwelling and surrounding homes as well. Furthermore, the report recognizes that replacing wood shake shingle roofs is one of the most effective retrofits a homeowner can do. Finding 17A specifically states that “the use of appropriate building materials helps prevent homes from ignition in a fire.” Finding 17B also states that “there is a need to require the retrofiting of such structures to make them safer from the hazards of catastrophic fire within the basin.” To reduce the risk posed by wood shake shingle roofs, the report recommends that local governments, with the assistance of the Tahoe Basin fire chiefs and any basin fire safe councils, pursue any grant or loan programs that may be available to assist property owners in retrofiting their residences to meet these requirements.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing CWPP as well as the TBFC Final Report Recommendations 45-47.

Responsible Office: North Tahoe Fire Protection District / Nevada Fire Safe Counsel.

Priority (High, Medium, Low): High

Cost Estimate: \$1,906,822 (\$1,206,822 federal share + \$700,000 non-federal share).

Benefits (Losses Avoided): In addition to the avoided loss of life and safety, the net present value of benefits calculated in the Benefit Cost Analysis is \$12,419,506. Data not included in this estimate includes the value of power lines and electric infrastructure, pumping stations and other water infrastructure, and the value of merchantable timber. Finally, there is damage to the local tourist-dependent economy and the watershed protecting the clarity of Lake Tahoe.

Potential Funding: FEMA and local funding.

Schedule: The goal stated in the Fire Commission report is to have fire resistive roofing on all structures within 10 years. North Tahoe Fire plans to begin a 5 year effort starting in 2009. The local program is expected to take at least three full years (36 months) to be complete but could be completed earlier depending upon the participation level of property owners. The proposed schedule of work is as follows:

- Outreach & marketing to prepare educational materials, handouts, and supplies – 1 month
- Management paperwork & notification to designated treatment areas – 4 months
- Homeowner receives contractor bids – 2 months
- Contractor selection and homeowners contractual agreement – 2 months
- Permit process through Building Department – 2 months
- Roofing construction and replacement – 20 months
- Close out open Building Dept permit through sign-off – 1 month
- Property owner submits for reimbursement – 1 month

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- Funds advance to the Fire District – 1 month
 - Project tracking and reporting to OES – 2 months

4. Regional Water System Fire Protection Upgrades and Interoperability

Issue/Background: The communities in the North Tahoe Fire Protection District are served by 16 different public and private water purveyors. All of these companies were started many decades ago with little to no regional master planning or concern for fire suppression. Several of these systems were installed 50-100 years ago and designed to only provide domestic water to a few seasonal customers.

Adequate fire suppression infrastructure is a key component of community fire suppression capabilities. The lack of adequate fire flow has a direct relation to life safety, environmental protection, property loss prevention and regional economic stability. Several recent structure fires could have been suppressed much quicker if there had been adequate hydrants with the proper fire flow and storage to support the fire fight. All of these fires have either extended into the wildland or had great potential to destroy hundreds to thousands of acres of National Forest land and the associated watershed leading directly into Lake Tahoe.

Current California Fire Code requires a minimum of 1000 GPM fire flow for 2 hours for a typical residential structure. This includes hydrant spacing of 500 feet or less, the necessary storage and/or refill capacity of at least 120,000 gallons, the proper main lines, pump capacity and back up power supplies. Many of the residential structures in this District exceed the typical residential square footage by 3-4 times. This, compounded with the multitude of small water companies, exacerbates the lack of adequate fire flow.

Existing and future water system facilities need to be “hardened” and protected against fire, tampering, and potential attack. Structural improvements, system redundancy, alarm systems, source identification, and regional master planning are needed to meet the stated objectives for the least cost.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Regional water purveyor capital improvement project master planning and cost study.

Responsible Office: Regional planning lead by Placer County Water Authority with cooperation of all local public and private water companies and the North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$150-200 million.

Benefits (Losses Avoided): Life safety, environmental damage, water clarity, property loss, economic stability.

Potential Funding: Rate payers; local, state and federal funds.

Schedule: Ongoing for 10-20 years.

5. North Tahoe Fire Protection District Critical Facility Infrastructure Improvements

Issue/Background: All North Tahoe Fire District facilities were built 50 to 60 years ago and fail to meet current building codes and seismic standards for critical public safety facilities.

Scientists have studied the Lake Tahoe region for earthquake faults and have located three major faults within the Lake Tahoe Basin. According to their calculations, these faults are capable of producing quakes reaching 7.0 or above on the Richter scale. In addition to the typical and expected damage from the quake itself, these quakes are more than capable of producing large underwater landslides that have produced massive seiche waves in the basin in the ancient past. These waves are reported to have been up to 100' high and have deposited massive boulders far above the current lake level. Four of the District's five fire stations are built only a few feet above lake level and are well within the projected hazard zones for seiche wave damage. All of the facilities would sustain major damage in a heavy earthquake possibly trapping and injuring emergency response personnel and destroying emergency response units.

Funding is needed for facilities master planning, property acquisition, funding studies, plan development and construction.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: A seismic upgrade and/or relocation of all North Tahoe Fire District facilities needs to be studied and completed as soon as possible.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$6-10 million + '07 est. (\$300K planning, permits... each station, \$2 mil. 52, 55, \$1 mil. 53, 54)

Benefits (Losses Avoided): Safety of emergency response personnel and equipment is critical for natural disaster response and mitigation.

Potential Funding: Federal, state and local pre-disaster mitigation funds.

Schedule: 3-10 years.

6. North Tahoe Fire Protection District Headquarters Station Relocation and EOC Development

Issue/Background: All North Tahoe Fire District facilities were built 40 to 60 years ago with no consideration for current fulltime co-educational staffing and District administrative functions. The facilities do not properly house District staff or modern fire equipment and technology. They also do not meet current public accessibility requirements or meet national standards for public safety facilities.

The District has also identified a great need to establish a regional Emergency Operations Center and have redundant dispatch capabilities to manage large scale, natural, or man-made disasters or long-term events. No facility with the proper infrastructure and technology currently exists in the region. The Lake Tahoe region has and will again become geographically isolated from all forms of outside assistance, for extended periods of time, during natural and man-made disasters. This is evidenced in many severe winter storms as recently as the winter of 2007. (1952, 1982, 1992, 1997, 2007)

The USFS has direct protection responsibilities for approximately 90 percent of the land located in the Tahoe Basin. The Forest Service does not have any facilities or fire protection equipment located on the northern half of the lake basin. Recommendation #79 of the TBFC Final Report states that all fire agencies in the basin must respond “closest forces” to mitigate any wildland fire threats. North Tahoe Fire, by default, is the closest resource to any incident on the north shore of the lake. The District has worked hard over the last several years with the USFS as well as CAL FIRE, discussing the feasibility of co-locating Federal and/or State resources in a North Tahoe Facility to improve response times and establish a presence on the north shore. This idea is fully supported in Recommendations 75-77 of the TBFC Final Report and would benefit all parties as well as improve protection and reduce loss on the north shore.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: North Tahoe Fire has already expended significant funds and resources for the initial planning phases of this project.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$14.6 Million (\$4.6 million Federal/\$10 million local).

Benefits (Losses Avoided): The ability of local emergency services to function during and after any type of local or regional disaster is critical for public safety and economic stability. Response personnel and equipment must be safe from harm in order to respond and assist local victims and prevent further damage and harm during and after the emergency. The proposed

facility improvements would address these issues and provide the necessary facilities to house fire, rescue, EMS, and law enforcement personnel during emergencies, extended periods of inclement weather that isolates the region, loss of power, and long term emergency management.

Potential Funding: Local, state and federal funds

Schedule: 2005-2008 Planning and permits. 2009-2010 Implementation and construction.*

*Contingent on funding from multiple sources

7. FCC P-25 Interoperability Radio Systems

Issue/Background: Communications is a factor cited in almost every fatality, injury or near miss report involving emergency responders. Communication difficulties are also discussed in the Lake Tahoe Basin Fire Commission Final Report compiled after the Angora and Washoe Fires of 2007.

- The need for effective communications, consolidated dispatch functions, technology updates, and multi-jurisdictional interoperability are critical to firefighter and public safety as well as property and environmental conservation.
- Many of these issues are part of a federal standard and compliance is required by 2018.
- This is an unfunded mandate of significant expense that affects the local taxpayer and fire district budgets for many years.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Federal FCC standards and specifications.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$500,000 for base, mobile, and handheld radios, \$200,000 for District's portion of required infrastructure; upgrades (based on 2007 cost estimates).

Benefits (Losses Avoided): Current technology, inter-operability with multi-disciplinary emergency response agencies.

Potential Funding: Federal, state and local funds.

Schedule: Pending funding, estimated 2010-2012.

8. Skid Steer Loader with Transport Trailer, Fuels Reduction Masticator Attachment and Snow Blower Attachment

Issue/Background: CWPP/Fuels reduction work: Minimum impact mastication equipment can reduce hazardous fuel loads much more quickly and efficiently than hand treatment. This equipment is the most effective method of maintaining previously treated lots and also works very well in smaller urban lots. The speed and efficiency of production allows much more fuels reduction work to be done each season, thereby reducing the threat of catastrophic wild fire in the communities quickly. This goal is clearly identified in the Tahoe Basin Fire Commission's Final Report. Mastication helps eliminate the fuels without the need to wait for piles to cure and waiting for a permissible burn day. Less pile burning means better air quality, fewer resources needed for the same result and less public concern.

Critical infrastructure needs: Heavy snowfall can exceed 60 inches in a single storm. Without access to hydrants and key emergency infrastructure facilities, the ability to serve and protect the community is severely hampered.

The year round use of this District asset would prove valuable by freeing up personnel to work on other projects and components of fuels reduction and emergency services. It would allow personnel to rapidly clear hydrants during and after storms. It would lower the occurrence of workers comp. injuries with less man hours spent hand treating fuels reduction projects or digging over 800 hydrants buried after each storm.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: CWPP Projects, Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy 10-Year Plan.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$150,000

Benefits (Losses Avoided): Life safety and property loss prevention.

Potential Funding: Federal, State and local funds.

Schedule: 2009.

9. District GIS Technology, Equipment, Database and Mapping Improvements

Issue/Background: Handle and manipulate information, statistical analysis, project planning and tracking, fuels management, parcel treatment, services provided:

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- GIS/GPS interface for response routes, Hydrant locations when covered by snow;
 - Critical tool for many applications used in fuels management and emergency services;
 - Sharing information with other agencies for project work; and
 - Presentations for public education, evacuation routes, fuels management.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Tahoe Basin Fire Commission Report, Recommendation #6.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$30,000.

Benefits (Losses Avoided): Improved response times to emergencies, improved regional information sharing.

Potential Funding: Federal, State and local funds.

Schedule: 2010.

10. Emergency Radio Transmitters and Information Systems

Issue/Background: Lake Tahoe experiences a significant influx of visitors during the busy summer and ski seasons. There are also times where natural and man-made disasters affect the region, possibly for extended periods of time. During these times, evacuation or emergency instructions are critical between public safety agencies and the public. Accessing emergency information particularly during power outages is critical to public safety. Advising and educating the public (many who are not familiar with the area) is an important task. Creating a network of low output emergency radio transmitters could be crucial to safe and orderly evacuations or shelter in place notifications.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: The NTFPD in cooperation with Placer County and the State of California will implement this project for the benefit of the region. FCC approval would be required.

Responsible Office: North Tahoe Fire Protection District.

Priority (High, Medium, Low): High

Cost Estimate: \$42,500.

Benefits (Losses Avoided): Emergency communications with the public including orderly evacuation instructions, shelter in place instructions, public safety messages such as road closures, avalanche danger, high fire danger, etc.

Potential Funding: Federal, state and local funds.

Schedule: 2010.

11. Hydrant Risers, Replacements and Markers

Issue/Background: There are over 825 hydrants in the District serviced by 16 different water companies. There are many small water companies with little to no funds available for infrastructure repairs or upgrades.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office: Water companies and North Tahoe Fire District.

Priority (High, Medium, Low): Medium

Cost Estimate: \$275,000.

Riser parts plus labor to install \$175+\$150=\$325 per hydrant plus 17 percent administrative fee including contingency.

Benefits (Losses Avoided): Protecting lives and property by gaining faster access to water supplies especially during inclement weather.

Potential Funding: Federal, state and local funds as well as local rate payers.

Schedule: As soon as funding and resources are available. This project may be done separately or in conjunction with the regional water system upgrades and interoperability.

12. Seiche Wave Warning Systems, Signs and Public Education

Issue/Background: Scientists have studied the Lake Tahoe region for earthquake faults and have located three major faults within the Lake Tahoe basin. According to their calculations, these faults are capable of producing quakes reaching 7.0 or above on the Richter scale. These quakes are more than capable of producing large underwater landslides that have produced massive seiche waves in the basin in the ancient past. These waves are reported to have been up to 100' high.

Most of the basin's communities are located less than 100 feet above lake level. If a seiche wave were to occur to the magnitude reached in the past, there could be significant loss of life. This

type of incident could happen very rapidly with little to no warning, due to the relatively small confines of the lake basin.

A sophisticated network of warning devices coupled with information signs and regular public education could improve evacuations and save lives.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: UNR and USGS research with tsunami warning systems as a template.

Responsible Office: Placer County OES/North Tahoe Fire.

Priority (High, Medium, Low): Medium

Cost Estimate: Undetermined.

Benefits (Losses Avoided): Significant life safety due to advanced warning

Potential Funding: Undetermined

Schedule: Undetermined.

13. Evacuation Shelter Improvements

Issue/Background: Generators, water, food supplies, cots, shelter managers, CERT teams.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office: American Red Cross, TTUSD, North Tahoe Fire.

Priority (High, Medium, Low): Medium

Cost Estimate: Undetermined.

Benefits (Losses Avoided): Life safety

Potential Funding: Undetermined

Schedule: Undetermined