Tahoe Basin Fuels Reduction 2004 Action Plan

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I. INTRODUCTION

Goal

The goal of the Tahoe Basin Fuels Reduction Action Plan is to provide the basis for a sustained program of projects and actions that address desired future conditions for a forest system and fuel loads over a 5 to 10 period. The plan and the process for its creation are strategic. They are to address:

1. The assessment of fire risk for the entire Basin.
2. Desired future conditions of all forest values, including forest fuels that have been formally identified in Basin planning processes.
3. Defining optimum project solutions that integrate public health and safety goals with environmental threshold goals.
4. Building capacity, political support, and funding support for forest improvement projects.
5. Leveraging all available resources and securing the collaboration necessary for a successful sustained effort.
6. Identifying the most expeditious manner of planning projects, funding them, and implementing them.
7. Operations using a program management approach that anticipates all parts of the system needed to run a fuels reduction program at the fire district scale and regional scale.

The subsequent outcome of the planning effort will be used to revise and amend the forest project lists and program elements in the Environmental Improvement Program for Lake Tahoe.

Background
In July 2002, the Tahoe Basin experienced its first large fire in more than 70 years. The Gondola Fire at Stateline burned approximately 670 acres. Had it not been for a massive initial attack from aircraft, hand crews and a change in weather conditions, hundreds of structures in the Kingsbury Grade area would more than likely have been destroyed. Fire suppression efforts cost over $3 million and reminded us that wildfire in Tahoe is not a question of "if," it is a question of "when."

Suppression efforts for the Gondola Fire ran a bill of about $4,400 per acre. Compared to the cost of fire suppression, the cost of pre-fire fuel reduction is relatively inexpensive, usually costing from $1,100 - $3,200 per acre for mechanical thinning depending on the location, and $400 - $900 per acre for prescribed burning. The cost of suppression does not include any damage to personal property or structures. The total dollar figure for a wildfire that destroys homes and other structures in Tahoe is hard to estimate, but in all likelihood would be staggering. It is easy to see that pre-fire fuels reduction is an investment well worth making to reduce the risk of catastrophic wildfire.

Planning Area Boundaries –
For the purpose of fire and fuels planning in the Tahoe Basin, the 7 fire protection district boundaries are used (Figure 1).

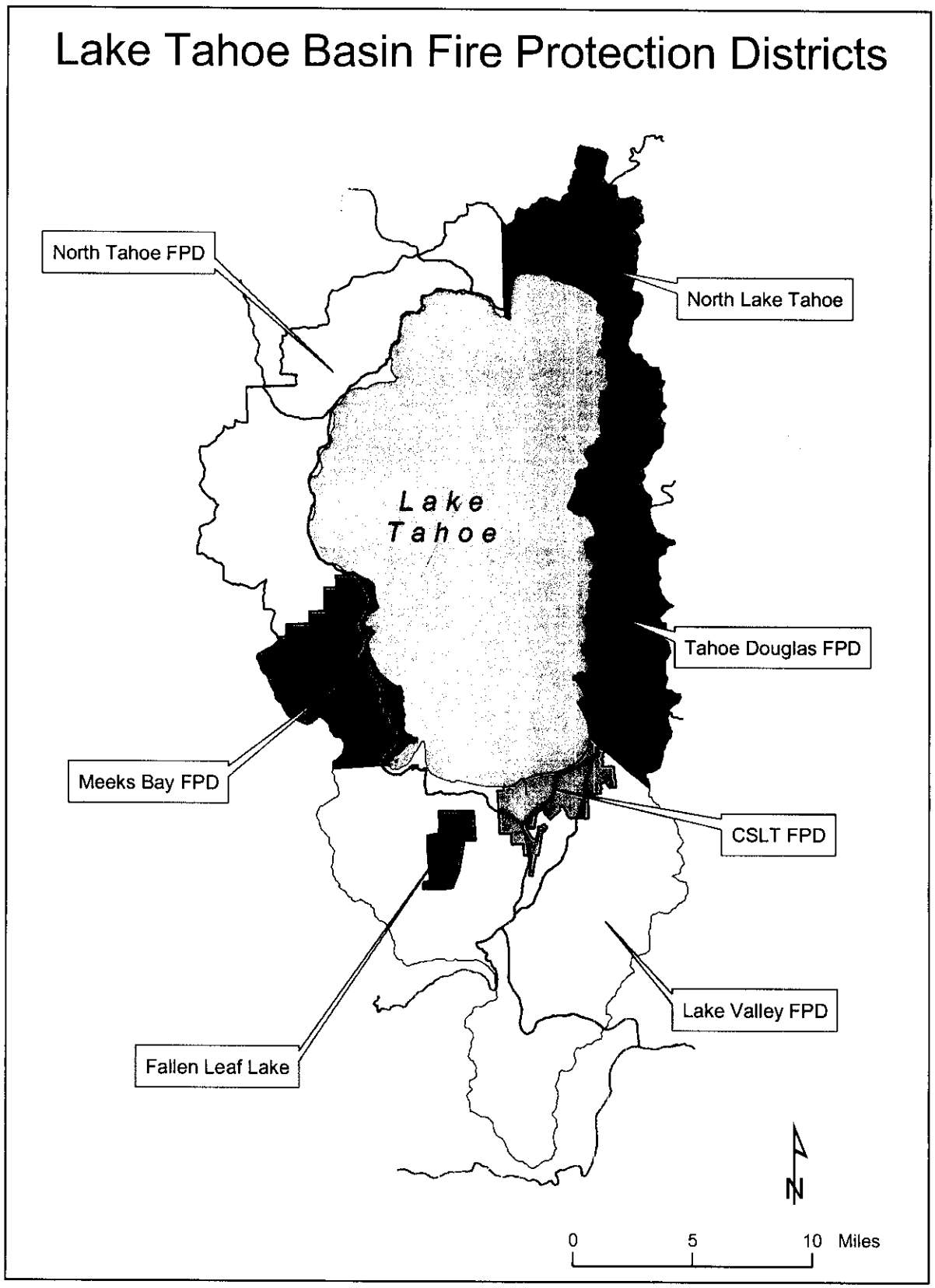

Figure 1. Planning Area Boundaries by Fire Protection District

Current Process and Plan Development

Tahoe Basin agencies (US Forest Service, California Dept. of Forestry and Fire Protection, California Tahoe Conservancy, California State Parks, Nevada State Lands, Nevada Dept. of Forestry, the 7 local Fire Protection Districts, The League to Save Lake Tahoe, and private stakeholders-a list of fire contacts is included in Appendix B) have been working collaboratively to address Tahoe's fire issues. These multi-agency efforts help to create fuel reduction guidelines and the implementation of fuel reduction projects. The TRPA Environmental Improvement Program (EIP) lists many fuel reduction activities as high priority projects. However, the amount of work needed has been continually outpaced by the lack of consistent funding for pre-fire fuels treatment.

The current planning efforts are focusing on fuels treatment in the urban and wildland-urban interface (the undeveloped area directly adjacent to homes and structures) areas . An analysis of the wildland-urban interface in the Tahoe Basin identified 125 linear miles or 23,933 acres of wildland-urban interface basin-wide with about 9,738 acres of the wildland-urban interface area not in federal ownership. Ownership patterns across the landscape are complex, especially in the wildland urban interface zone (Table 1). This diversity of ownerships and jurisdictional boundaries creates the need for cooperation and basin-wide planning.

Table 1. Fire Protection District Acres of Wildland Urban Interface by Ownership

Fire Protection District/Fire Department	Federal Ownership (Acres)	State Ownership (Acres)	Local Ownership (Acres)	Private Ownership (Acres)	Other Public (Acres)
North Lake Tahoe	1051	38	1	193	820
Tahoe Douglas	2890	90	41	1340	144
Lake Valley	5688	1267	148	852	141
City of S. Lake Tahoe	216	526	265	230	101
Fallen Leaf Lake	304	1	0	48	0
Meeks Bay	564	450	0	256	22
North Tahoe	3508	1462	30	852	395
TOTALS	**14221**	**3834**	**485**	**3771**	**1623**

Tahoe Basin agencies are working to fund a Tahoe Basin Fire Plan that will include all the required elements to access resources from the National Fire Plan, Health Forest Restoration Act and other funding sources. The Basin Fire Plan will incorporate each fire protection district's Community Fire Plan and create a GIS database to track activities, provide map making capability and data analysis basin-wide.

Basin agencies meet and coordinate through The Tahoe Basin Fire Safe Council, The Forest Planning Group and the Fire and Fuels Planning Technical Group. Each group meets monthly.

II. WILDFIRE PROBLEM DEFINED

Problem
The Lake Tahoe Basin is faced with a severe fuel loading situation that, unless treated, will lead to catastrophic wildfires, personal injury and property damage. The forests of Lake Tahoe are experiencing mortality due to drought, lack of natural fire, overstocking (too many trees), and beetle infestation. Accumulations of forest fuels have reached a level which require immediate attention in order to avoid a high intensity catastrophic wildfire. The lack of consistent funding and tangled regulations demands a proactive approach to achieve results.

Values at risk include:

- The safety of our communities;
- Stability of the watershed needed to protect Lake Tahoe's clarity;
- Scenic quality vital to the area's recreational appeal and economy;
- Wildlife, fisheries habitat;
- Soil resources;
- Air quality;
- High valued development in housing, business, and recreation facilities.

The bottom line: Investment is needed to restore Lake Tahoe's forests to a healthy and desired future condition.

Initial Identification of Values at Risk
A values at risk assessment was preformed by the US Forest Service and published in the Lake Tahoe Watershed Assessment Volume I, Chapter 5. The analysis combined watershed rating of fire susceptibility index (relative risk rating) and values at risk. The values at risk considered by watershed are a combination of urban values, lake clarity values at risk and old-growth forest values. TRPA GIS Staff used this values at risk assessment as the base map for further analysis of the wildland urban interface. In the near future the Basin Fire Plan will include a new fire risk assessment and have more detailed fuels data.

TRPA has defined the wildland urban interface (WUI) as 1,250 feet from the urban boundary (Chapter 71 of TRPA Code of Ordinances). It should be noted that the US Forest Service has a broader definition extending 1.5 miles from the urban boundary. These distances are only estimates and will expand and/or contract as site characteristics dictate. For the purpose of this initial identification of values at risk and area needing treatment, the 1,250 foot WUI was used to calculate acreage estimates (Table 2).

Table 2. Acres of Wildland Urban Interface by Fire Protection District

Fire Protection District	Total Acres of Wildland-Urban Interface
North Lake Tahoe	2103
Tahoe Douglas	4505
Lake Valley	8096
City of S. Lake Tahoe	1338
Fallen Leaf Lake	352
Meeks Bay	1292
North Tahoe	6247
TOTAL	**23933**

III. 2004 ACTION PLAN

Timeline of Fuels Reduction

Since the late 1980s, fuel reduction projects have been completed by many different agencies and landowners. The timeline below is a brief overview and is in no way an exhaustive list.

1881 - more than 2 billion board feet of lumber was removed from Lake Tahoe (the equivalent of approximately 130,000 homes today).

1910 - logging slows to almost a standstill in the Tahoe Basin.

1988 - Nevada Division of Forestry hand crews demonstrated that fire protection goals could be met while satisfying erosion and water quality concerns. A 20-acre pilot fuel reduction project was conducted in the First Creek drainage. This cooperative effort between the Nevada Division of Forestry, the Incline Village General Improvement District, the Tahoe Regional Planning Agency, and the North Lake Tahoe Fire Protection District was viewed as a success.

1991 - The Incline Village General Improvement District began its "Selective Timber Harvest and Fuels Reduction Project". This project reduced hazardous accumulations of dead trees and brush on 750 acres of greenbelt areas in our upper subdivisions. Thousands of dead and dying trees were helicopter-logged. This Project was made possible with the cooperation of the Incline Village General Improvement District, the Nevada Division of Forestry, the Tahoe Regional Planning Agency, and the North Lake Tahoe Fire Protection District.

1992 - Estimated that 20% to 30% of the forest in Lake Tahoe had been killed by bark beetles. TRPA Forms the Forest Health Consensus Group in response to the public's perceived wildfire threat.

1995 - The Tahoe ReGreen program was created to reduce the risk of catastrophic fire and improve forest health in the Tahoe Basin. The goal was to remove dead and dying trees on public lands and to assist private property owners to do the same. Over a four-year period, the program had 33 member-agencies participating. The program was successful, however, the Tahoe ReGreen program lost its funding source and is being replaced by the Tahoe Basin Fire Safe Council.

1996 - The Tahoe Regional Planning Agency incorporates forest improvement projects for public lands into the draft Environmental Improvement Program (EIP) in regard to its Vegetation Threshold.

1997 – The President of the United States announces a target of 1,000 acres of prescribed burn treatment per year on Forest Service lands at his convening of the Lake Tahoe Forum.

2002 – The TRPA Governing Board passes a resolution calling for renewed focus on fire threat and increased project activity.

2003 – The TRPA Governing Board passes a resolution with specific actions to be accomplished in creating a focused planned effort with on the ground action as a result. They also agree to make forest fuels reduction and fire risk reduction the number one staff priority for the year.

2004 Planned Fuel Reduction Projects and Grant Proposals

Basin agencies have been working closely to address fire and forest health issues in and around Lake Tahoe. Overall coordinated basin-wide efforts are underway for a Tahoe Basin Fire Plan, community fire planning for each of the 6 fire protection districts, geographic information system database compilation, community outreach and education, biomass utilization opportunities, and continuing implementation of fuels reduction work. Below is a compilation of individual agencies' Projects and Grant Proposals submitted for 2004 implementation.

North Lake Fire Protection District (NLTFPD)
Since the mid 1980s, the NLTFPD has been a leader in recognizing and implementing fuels reduction work around the Incline Village area. They have become a model for the Tahoe Basin. They field a 20-person crew each fire season (8-10 stay on all year) to do a variety of fuels work and are usually available locally for initial attack should a wildfire start.

NLTFPD projects planned for 2004 include 150 acres of fuels treatment in Crystal Bay on private, state and federal lands. 30 acres of treatment for the Nevada Department of Wildlife, about 100 acres of treatment for the Incline Village General Improvement District, 10-15 acres of urban lot treatments, 20 acres on the USFS owned Rocky Ridge parcel (NLTFPD commonly contracts to work on Forest Service lands), 100 acres of treatment in six homeowner associations, 30 acres of highway projects for the Nevada Department of Transportation and 20 urban lots to be treated for Nevada State Lands.

Tahoe Douglas Fire Protection District
Tahoe Douglas Fire Protection District is focused on creating a planning document for the district.

Lake Valley Fire Protection District
The Lake Valley Fire District has recognized the need to improve the ability to minimize the effects of a large fire within our community. The District has initiated multi-step process of conducting a threat assessment and formulating an action plan that will; improve public education efforts; revise local building codes to increase improve the fire resistance of structures; implement a comprehensive defensible space inspection and enforcement program; build increased capacity the capacity to conduct fuels reduction projects on private property; and improve the Districts suppression capabilities.

Actions planned by the District for the 2004 season are: 1) complete a Community Wildland Fire Plan, 2) continue community chipping program with a target of reducing fuels on 800 private parcels, 3) hire one full-time defensible space inspector and complete 1500 inspections, and 4) add one Type III wildland engine to its fleet

City of South Lake Tahoe Fire Department (CSLTFD)
The City of South Lake Tahoe is currently creating a City Fire Plan.

Meeks Bay Fire Protection District
Meeks Bay FPD has been doing defensible space inspections and offering chipping to the land owners in their district since 1998. They are also active in education, training and encouraging property owners to implement defensible space work. Meeks Bay FPD estimates that 10 percent of the properties in their district meet defensible space regulations.

For 2004, Meeks Bay has proposals in for planning, continuation of the free chipping program and a FEMA Prevention grant. In addition they will continue defensible space inspections and education programs.

North Tahoe Fire Protection District
Project Information pending

Fallen Leaf Lake Fire Department

Since the early 1990s, the Fallen Leaf Lake Community Services District, in cooperation with the US Forest Service and as part of the Tahoe ReGreen effort, has implemented fuel reduction projects in and around Fallen Leaf Lake. The Fallen Leaf Lake Fire Department (FLLFD) is active in educating landowners in defensible space requirements. It is estimated that 10 percent of the parcels around Fallen Leaf Lake are in compliance with defensible space regulations. In 2004, the Fallen Leaf Lake Fire Department will continue its burn pile program, defensible space inspections for all residents, treat 17 lots if grant funding is received, and put together a grant proposal for fuels reduction along all the roads around Fallen Leaf Lake to provide for safer evacuation and response for emergency vehicles. FLLFD also applied for a FEMA Prevention grant.

The California Department of Forestry & Fire Protection (CDF)

Forest Practice

CDF is responsible for regulating commercial timber operations on state and private lands (excluding California Department of Parks and Recreation lands) in the Tahoe Basin. CDF Foresters also provide service forestry to state and private landowners offering cost share opportunities to assist them with land management planning to improve forest health, enhance productivity, and reduce fuel loading. A forester from the Nevada/Yuba/Placer (NEU) Unit is responsible for providing service forestry and implementing and enforcing forest practice rules under the California Forest Practice Rules on the Placer County side of the Basin. Presently, there are no foresters funded to do similar work on the El Dorado side of the Basin. If the current budget reduction plans are implemented, the NEU forester position will be eliminated.

Fire Protection

CDF has jurisdictional fire protection responsibility for California State and private lands. However, by agreement between the State of California and the USDA Forest Service, the Forest Service has the direct protection responsibility on all state responsibility lands, meaning State and private lands, as well as the national forest lands in the Tahoe Basin.

From outside the Tahoe Basin, CDF has ground and air support available in the event of extended attack situations, such as the Gondola and Showers fires.

The California Tahoe Conservancy (CTC)

CDF has an interagency agreement with the CTC to provide forestry advice and services on the CTCs forested lands. One licensed forester, a forestry assistant and up to 5 seasonal employees work in this capacity out of an office in South Lake Tahoe. CDF works closely with the CTC Urban Land Management Program on hazard fuel reduction projects within the urban interface. CDF also works with the CTC Forest Habitat Enhancement Program on fuel reduction, forest health and wildlife habitat enhancement projects in the urban interface and general forest areas. A list of CDF/CTC projects is located under the CTC heading.

Tahoe ReGreen and the Tahoe Fire Safe Council (TFSC)

CDF actively participated in the creation and implementation of the Tahoe ReGreen Project. CDF supplied funding for the ReGreen Project using its Forest Resource Improvement Fund (FRIF). These funds provided a Tahoe ReGreen Coordinator, two retired annuitant foresters to issue tree removal permits, and a fire captain B to supervise county inmates on fuel reduction projects. These funds were eliminated in 2001 due to a shortfall in FRIF. All the positions just mentioned were lost and the funding is not likely to be restored.

Since that time, CDF applied for and was awarded a grant to start a local fire safe council. A fire safe council administrator was hired as an employee of the Tahoe Resource Conservation District. The TFSC recently started and will be able to carry on the work initiated by the Tahoe ReGreen Project. The TFSC recently appointed a Board and will soon be obtaining non-profit status. CDFs role will be to continue to provide technical support to the TFSC.

California Tahoe Conservancy

The California Tahoe Conservancy owns and manages approximately 5,500 acres of land in the Tahoe Basin. 2004 projects planned includes treating approximately 200 parcels, wildland urban interface planning in the Tahoma area and Aspen enhancement work in South Lake Tahoe.

University of Nevada Reno Cooperative Extension

The UNR Cooperative Extension has worked with the fire agencies in the Tahoe Basin to create "Living with Fire in the Tahoe Basin" a publication/presentation with agency endorsed recommendations for reducing wildfire threat in and around homes (Appendix A). They have put in a proposal for printing 10,000 copies of "Living with Fire" in 2004.

California State Parks

California State Parks are actively managing their land in the basin. In 2004 they are planning the following projects:

- Burton Creek SP - Over snow contract thinning, Thin and stack along park roads, continue Rocky Ridge Defensible Fuel Profile Zone (DFPZ).
- Ward Creek Unit - Thinning and chipping along Hwy 89 bike trail
- Sugar Pine Point SP - Prescribed burning, Thinning and chipping picnic loop, Over snow contract thinning
- D.L. Bliss SP - Prescribed burning, continue north boundary DFPZ
- Emerald Bay SP - Continue Hwy 89 DFPZ, Implement Vikingsholm Vegetation Management Plan
- Washoe Meadows SP - Continue contract thinning, continue boundary DFPZ

Nevada Tahoe Resource Team

Slash Pile Burning – 167 Acres

- Highway 28 Fuelbreak – 120 Acres
- Slaughter house – 12 Acres
- Van Sickle – 10 Acres
- Spooner Meadow North/ North Canyon – 25 Acres

Prescribed Fire – 200 Acres

- Write Burn Plan and Implement Burn in Tunnel Creek – 200 Acres

Forest Restoration Phase I – 220 Acres

- Machine Harvest North of Spooner Meadow - 190
- Hand Thinning North of Spooner Meadow – 30

Forest Restoration Phase II –

- Van Sickle Hand Thinning – 40 Acres
- Write Prescribed Burn Plan for 200 Acres North of Spooner Meadows

Sugar Pine Project – 39 Acres

- Hand Thinning Uphill from Memorial Point – 12 Acres
- Hand Thinning Bonpland Creek – 12 Acres
- Hand Thinning Slaughter house – 15 Acres

Upland Wildlife Habitat Improvement (Aspen) –

- Conifer Removal North Canyon – 15 Acres
- Conifer Removal Slaughter house – 5 Acres

North Canyon Old Growth – 40 Acres Hand Thinning

Tahoe Regional Planning Agency

In September 2003, the TRPA Governing Board passed a resolution directing staff to coordinate closely with Basin agencies (particularly the Fire Protection Districts) to achieve a number of fuel reduction goals. Much of the list below illustrates TRPA's commitment to creating a fire safe Lake Tahoe Basin.

1. Working with land managers and regulatory agencies, through the Forest Planning Group, to modify and streamline current regulations in order to better facilitate fuels reduction work. Examples:

- Revised TRPA Code of Ordinances Chapter 71 -Tree Removal to allow vehicle use in stream environment zones for the purpose of fuels reduction and forest health. Revisions were approved by the TRPA Governing Board January 2004

- Currently pursuing amendments to the 208 Plan to allow the Chapter 71 revisions to move forward.

2. Created a draft funding proposal for fuels reduction work specific to treating areas of wildland urban interface (the area surrounding Tahoe's communities).

3. Working with Tahoe Basin Fire Chiefs and other land managers to coordinate fuels reduction work and pre-fire planning. Fire Chiefs and land managers meet monthly to coordinate efforts.

4. Working with local Fire Protection Districts to create Memoranda of Understanding (MOU's) to delegate defensible space responsibilities to the local jurisdictions.

5. Submitted grant proposal to the Bureau of Reclamation for fire risk assessment and ecologically focused fuels reduction planning. This planning effort incorporates all the agencies and stakeholders in the Basin and will provide a long-term plan to guide ecologically based fuels reduction into the future. Potential funding $662,450.

6. TRPA staff is compiling fuels reduction data from all the Tahoe Basin land managers in order to act as a clearinghouse for this information. TRPA will create a Geographic Information System (GIS) database as a tool to better coordinate efforts between agencies and ownerships.

7. Immediate implementation of current Environmental Improvement Program (EIP) fuel reduction projects while identifying and adding new fuel reduction projects to the EIP list.

Tahoe Basin Fire Safe Council

The newly formed Tahoe Basin Fire Safe Council (TBFSC) is actively participating with The Tahoe Basin FPD's on fire safety issues at Lake Tahoe. The TBFSC has been writing proposals to get funding for a wide range of needs (Table 3).

Table 3. Tahoe Basin Fire Safe Council 2004 Grant Proposals

2004 GRANT APPLICATIONS		
Project/Program	**$$ Requested**	**Description**
1 Low Income Senior and Disabled Fire Hazard Reduction Assistance	$20,000	Designed to provide low-income seniors and disabled residents with a volunteer fire fighter crew that can provide the labor to create defensible space.
2 Residential Fire Safety Inspection Program	$48,668	Designed to provide the public with two full time inspectors that can conduct fire safety inspections upon request. Also incorporates a media campaign to motivate residents to request inspections.
3 Tahoe California Wildfire Hazard Assessment and Mitigation Plan	$75,000	Designed to hire a consulting firm to conduct a fire hazard assessment for the unincorporated areas of the California portion of the Basin. Includes North Tahoe FPD, Meeks Bay FPD, Fallen Leaf FD, and Lake Valley FPD.
4 Tahoe Basin Fire Safe Council Administration and	$72,450	Designed to provide funds for the adminsitration of the Fire Safe Council for 2005. Includes funds for education and outreach.
5 Tahoe Basin Fire Safe Chapter Start-up Program	$72,206	Designed to encourage homeowner's associations/subdivisions to form fire safe chapters. Upon becoming a chapter, the group will be allocated $5,000 to conduct an initial fire safety project.
6 Community Chipping and Defensible Space Program	$45,180	A request for funds to continue to operate the Lake Valley Fire Protection District Chipping Program for eight months with two seasonal firefighters. Also will provide some funds to conduct residential inspections on a limited basis.
7 ArcView GIS Software Package	$1,200	A request for a $1,200 GIS software package that will be used by the Backyard Conservation Program and Fire Safe Council to produce maps out of our own office.
Total Dollars Requested	**$334,704**	

Nevada Fire Safe Council

The Nevada Fire Safe Council has been educating and organizing Fire Safe Council Chapters in the Tahoe Basin for the past several years. They are currently Fire Safe Chapters in Glenbrook, Tyrolia Village and Incline Village. They have received many grants in the past years and put many projects on the ground. In 2004 the Nevada FSC will be working with the Glenbrook Chapter on a fuels modification project, coordinating with Nevada Department of Forestry on fuels reduction work and chipping. Of particular interest is the Nevada Fire Safe Councils involvement in putting together a state-wide fire plan for Nevada. The Tyrolia Fire Safe Chapter is planning fuels reduction on 75 acres in their area.

United States Forest Service

The US Forest Service owns approximately 160,200 acres of the land in the Tahoe Basin and will continue its fuels management program in 2004. The USFS has 2,743 acres of fuel treatments planned for FY 2004 including 1,900 acres of prescribed burning. Projects are planned for the West Shore, Slaughterhouse Creek, Heavenly Creek and Cathedral Road areas.

Basin-Wide Fire Planning Efforts for 2005-2015

As illustrated above, basin agencies are busy in 2004. The next 10 year phase of planning and implementation are being worked out now. The first order of business will be a basin-wide planning effort with each fire protection district creating their own community fire plans. Each community fire plan will be part of the larger Basin Fire Plan. These planning documents will allow the Fire Protection Districts, The Fire Safe Councils and other agencies to access funding from the National Fire Plan, The Healthy Forests Restoration Act 0f 2003 and many other funding sources. The multi-stakeholder, cooperative nature of this fire plan is critical to attaining funding and integral to the overall success of creating fire safe communities.

Cost for fuels reduction work is highly variable depending on many factors (Table 3). Table 4 illustrates the cost to treat all the wildland urban interface in each fire protection district. These numbers are only preliminary estimates of work in the wildland urban interface and do not include costs for planning, environmental documentation, defensible space work, community education and outreach. Also, depending on the kind of work (hand crews, mechanical), the site specific width of the wildland urban interface and if the bi-products of treatment can be sold, cost and acreage estimates will very likely change. The current estimate of treating 23,933 acres over the next tens years would require a funding level of $5,000,000 to $7,500,000 per year, however total costs could be as much as $10,000,000 per year.

Table 3. Estimated Costs for Fuel Reduction Work in the Tahoe Basin
(Estimates based on cost figures from basin land managing agencies)

Type of Fuel Reduction Treatment	**Cost per Acre**
Urban Lot (Hand work)*	$3,200-$3,600
Mech. Thinning (wildland)	$1,100-$1,800
Mech. Thinning (urban interface)	$2,200-$3,200
Hand Crew Work (difficult terrain)	$3,200-$7,200
Prescribed Fire	$400-$900
Chipping	$500-$600

*Hand work on urban lots is highly variable depending on the site and in some cases can cost more than $7,000 per acre.

Another aspect to fuels treatment is maintenance. Planning will include a maintenance schedule for fuels treatments that will be maintained in a GIS database. The maintenance treatments will require a consistent source of funding. Initial treatment will be more expensive than subsequent maintenance treatments and the use of prescribed fire can be a cost effective method for maintenance.

Table 4. Cost Estimates for Fuels Treatment in the Wildland Urban Interface by Fire Protection District.

Fire Protection District	Total Acres of Wildland-Urban Interface	Cost per Acre (Mechanical Treatment)		Total Cost	
		Low Estimate	High Estimate	Low	High
North Lake Tahoe	2103	$2,200	$3,200	$4,626,600	$6,729,600
Tahoe Douglas	4505	$2,200	$3,200	$9,911,000	$14,416,000
Lake Valley	8096	$2,200	$3,200	$17,811,200	$25,907,200
City of S. Lake Tahoe	1338	$2,200	$3,200	$2,943,600	$4,281,600
Fallen Leaf Lake	352	$2,200	$3,200	$774,400	$1,126,400
Meeks Bay	1292	$2,200	$3,200	$2,842,400	$4,134,400
North Tahoe	6247	$2,200	$3,200	$13,743,400	$19,990,400
Total Acres	**23933**		**Totals**	**$52,652,600**	**$76,585,600**

The Forest Health Consensus Group created Desired Future Condition statements for the forests of Lake Tahoe. The following are strategies and recommendations for land managers when applying forest health/fuels reduction prescriptions.

FOREST HEALTH STRATEGIES BY MANAGEMENT ZONES

These descriptions serve as general targets for land managers in their effort to re-establish forest health in the Lake Tahoe Basin and represent a mosaic of states that encompass a range of characteristics that occur through the variation of time and landscapes. Our goals will include a gradual return to proportions of age classes, including late successional and old growth stands that approximate pre-Comstock logging levels. This goal includes recognition of the need to retain and foster stands which exhibit, or which may easily attain, late successional characteristics (large, heavy limbed, broad crowned or very tall trees).

URBAN:
In general, the goal is to create an urban forest that is healthy, sustainable and free of excessive fire fuels and other hazards to life and property.

Manage for a balance of all size/age classes of trees throughout neighborhoods. Initially retain all sound 30 inch diameter and larger trees, especially Jeffery Pine, Ponderosa Pine, Sugar Pine and Incense Cedar and promote retention of sufficient seedlings and small trees (less than 6" dbh) to build the forest of the future in accordance with defensible space guidelines. Remove dead arid mechanically unsound trees that are a liability to public safety and property.

WILDLAND URBAN INTERFACE (WUI):
Manage forest density and fuel loading at a level that will not carry high intensity stand replacing fire so as to provide a line of defense against fire entering or leaving developed areas. Place highest priority on achieving the desired future condition for this zone as soon as possible since doing so may be key to successfully achieving the objectives in other zones. The width of the WUI is a minimum of 1,250 feet from the urban boundary, however, this distance is only a starting

point and greater distance may be needed. These determinations will be determined on a site specific basis.

RECREATION:
Similar to urban zone strategy for the developed portions of recreation sites. Same as WUI zone strategy where appropriate around larger recreation complexes. Same as general forest zone strategy for forested areas between ski trails and similar terrain.

GENERAL FOREST:
General forest management will be a lower priority until the urban zone and WUI have been treated. Activities in the general forest, including prescribed fire, will focus on overall forest health and ecosystem processes Prescriptions will reduce tree stocking and fuel loading and convert/maintain species and size/age class distribution toward the desired future condition.

Introduce prescribed fire (broadcast burning), where feasible, on an interval of about 15 years where fuel loading is light. Defer introducing prescribed fire where fuel loading is moderate to heavy until sufficient pre-treatment can modify fire behavior to limit stand replacing fire and Urban and Recreation Zones are sufficiently protected.

NATURAL PROCESSES EMPHASIZED
Prescriptions for fuel reduction shall emphasize multiple environmental objectives and implement a holistic approach to projects. Considerations include wildlife habitat, water quality, scenic quality and overall forest health.

Introduce prescribed fire on a 10-15 year cycle in areas where fuel loading is light and areas are remote from urban and recreation development. Defer prescribed fire where recreation and urban development would be likely threatened by an escaped prescribed fire until tree density and fuel loading are reduced via mechanized practices and until sufficient defensible fuel profile zones are established.

Methods to attain these strategies are a combination of the following:

- Reduction of ground fuels (fuels on the forest floor)
- Reduction of ladder fuels
- Thinning
- Prescribed burning

IV. PROGRAM ELEMENTS FOR A SUSTAINED EFFORT

Risk Assessment
Various resource inventories have been conducted in the Tahoe Basin. Among them have been fire risk assessments by professional experts within the City of South Lake Tahoe and Incline Village areas. Other urbanized areas of the Basin have not had similar assessments and reports conducted for them. Local knowledge of fire and land management agencies has been used, however, as guidance for project determinations in these areas.

Planning efforts should include professionally conducted assessments and report for all urbanized areas of the Lake Tahoe Basin. This information needs to be spatially oriented and formatted for analysis via a geographic information system (GIS). In addition to analysis the GIS information then provides a record for planning and tracking changes and treatments. It will facilitate the regional support for the district scale efforts over time.

Local Ordinances and Building Codes
Fire risk is not limited to forest conditions. Many land use and building choices were made without incorporating fire risk factors. A fire wise community must address the whole and that can influence building codes and land use policies. The fire risk assessment and subsequent action plan will need to address local and regional ordinance changes as part of the program. The Fire Wise Program may be a model to consider for the planning group.

Environmental Documentation
There are several approaches that can be taken to facilitate project development and approval. The forest fuels plan is guidance and a strategic document intended to assess needs, facilitate mobilization, garner resources, and foster collective action needed to address desired future forest conditions. It is not a binding document and subsequent actions are subject to review and appropriate levels of documentation.

A development and review process for projects similar to the one created for water quality improvement or erosion control and SEZ restoration projects can be utilized. The advantage of such a process is it provides consistency in application, facilitates coordination, and the identification of particular issues early when there is time to address them rather than on the backend of a process that is perceived complete by the proponents.

A third approach that can be pursued is a programmatic analysis that attempts to anticipate all of the variable project situations and access potential significant impacts. The document can articulate the methods by which to avoid impact or mitigate it to less than significant. Individual projects use the adopted document findings as the basis for its finding of no significant impact.

For Tahoe such a document would need to address NEPA, CEQA, and TRPA requirements, which is not an uncommon approach. The appropriate lead for the Federal Forest Restoration Act would be the Forest Service.

Implementation Capacity Needs
Trained field crews will be needed for each district and land management agency. Trained contractors and service providers are another capacity resource that needs to be developed and available for on the ground work. This plan anticipates an expanded level of operation, meaning more acres treated per year than exist right now. In addition once the initial investment has been made, maintenance or cyclical treatment will be necessary with the corresponding capacity available.

Public Outreach and Education Needs
Capacity and funding support for public outreach and education on forest fuels reduction, forest management and desired future condition, defensible space, and other watershed values is as

critical to a successful program implementation as field crews who get the work done. A campaign capability that can reach property owners and residents with promotional information with appropriate regularity is necessary given the turnover in residency, the number of property owners that live outside the Basin, and the attention span of the public.

The existing BMP Retrofit Program must address the same property owners in addressing best management practices for water quality treatment on developed parcels. There has been a perceived conflict of message between practices for BMPs and defensible space. Public outreach and education is the linking effort between the two programs and is critical to both, therefore a united campaign that both programs can use is critical. A watershed theme message that addresses water quality and forest watershed values including forest fuels and defensible space, etc., leverages expenditures, staff resources, and limits confusion on the part of the public.

Instead of two different groups approaching landowners and residents, a single approach under a theme message can be consistently applied. Managers of the two programs and field crews will need to be oriented and trained to support such a coordinated message. The value for the coordinating effort will be less confusion with the "customer", the perception of a seamless effort, and an anticipated higher level of public support and cooperation.

Geographic Information System (GIS) Capacity Needs

There are some very powerful fire and fuels related tools now being used for fire risk assessment, fuels classification and fire behavior modeling. A functional and accessible GIS system needs to in place for the long-term management of projects in the Tahoe Basin. Currently, most agencies have GIS expertise and some, such as TRPA and USFS, have strong GIS programs. What is needed initially is a large spatial data compilation effort in order to get all these data in once place. Once the clearinghouse is set up, all the basin agencies will be able to access the information. This clearinghouse will facilitate multi-ownership projects, help with identification of areas in need of fuels reduction and be a tracking system for subsequent maintenance work. The Tahoe Integrated Information Management System (TIIMS) will play an integral role for disseminating fire and fuels reduction information.

Biomass Utilization

Forest fuels reduction work creates a large volume of material or biomass that must be removed from the forest floor. Some quantity is appropriate to leave or be returned but the volume generated far exceeds what is appropriate for the desired condition. There have been several practices employed to deal with removal. Namely they are pile burning, and chipping and hauling. Both are problematic for different reasons given the quantities this plan will generate. Air quality related health concerns would limit the conditions for which significant amounts of burning can be done. Chipping and hauling are extremely costly primarily due to the hauling costs for removing the material from the Tahoe Basin. This presents a problem because enough woody material must be removed to reduce the risk of high intensity devastating fires. It must also be removed to create the conditions necessary for low intensity prescribed fire. The prescribed fire is a management tool intended to mimic the natural role of fire in the forest.

The biomass is a commodity looking for a market. There are several potential uses for this biomass that appear more viable now than 10 years ago. The greatest potential is using the biomass to create various forms of energy. Biogeneration electric plant technology appears to have promise for utilizing the material as exhibited by the conversion of the boiler plant facility for the high school at South Lake Tahoe. Some of the technology can convert the material into either electricity or biofuel to be used in diesel engines. The material may also be used to create wood pellets for wood pellet stoves. Another potential use is converting the material into compost or mulch for agricultural or ornamental landscape uses.

The value of rolling up local district planning efforts into a regional plan approach is the ability to address the biomass solution and look for economies of scale that may be employed.

Jobs and Industry Potential
The previous two topics on implementation capacity and biomass have a direct connection to local job creation and small-scale industry development for the Lake Tahoe Basin. A five to ten year funded investment program creates opportunities that did not exist before. After the initial investment period maintenance of forest through management practices will continue to be needed requiring fieldwork and creating biomass. This is likely to go on for decades after the initial work.

The opportunity to create jobs and industry exists and should be pursued. In turn opportunities to defray public expenditures for management activities may be created. It would be a win-win situation that lends itself to a more sustainable program. It also demonstrates in practice how the environment and local economy are linked.

Finance Plan
A finance plan will be needed that projects the known and potential funding sources that can support the effort over the life of the program. A finance plan is one of the tools that allow program managers to anticipate changes or actions necessary to maintain or attain funding. It is especially useful as a means of communicating with individual and group stakeholders that are important to the support of the program, but who are not involved regularly with it. An updated finance plan can also be used to track progress and participation by the various entities at the private, local, state, and federal levels.

For federal lands it appears currently that the newly authorized Forest Restoration Act will be a funding source assuming adequate levels of appropriations. In addition there is the potential of the Southern Nevada Public Lands Management Act and other budget appropriations. Funding for state lands will be through the budget appropriations process and EIP capital commitments. The property owner will largely finance treatment on private lands although there do exist cost share grant programs. The cost share grant programs for eligible property should be promoted and the amount available expanded. In addition funding for technical assistance to property owners should be expanded.

Overhead should be minimized and as much funds for projects placed on the ground as possible. Preliminary indications are that the Fire Protection Districts can operate crew work with 10% overhead.

Program Management
The concept of program management can mean a variety of things to people. It can range from the cooperation of independent entities, to entities collaboratively acting as a single management unit, to a single entity with command and control authority. Since the issue of forest improvement projects and fuel load reduction for fire threat reduction falls within the domain of many groups at the local, state, and federal level each with their own authorities a collaborative management effort is likely needed. It is a case where the whole is greater than the sum of the parts.

Collaboration is not always a simple process and it does require additional time and energy, resources. The benefit to the whole however is addressing not just the local condition but also the big picture. In turn additional resources and support for local level can be gained and maintained.

A collaborative management structure will be necessary that facilitates alignment and communication with executives, senior management, and line staff amongst the various implementers and support organizations. It is anticipated that the Fires Safe Councils will play a leadership role in organizing and operating such a collaborative structure. It will be important that each organization involved define its role in the program over time.

Various tools and process will also need to be employed to support the management of the program. Many already exist but will need to be oriented differently to support the effort. One

example is GIS described above. Several organizations have GIS (TRPA, USFS, CTC), which are utilized for their own programs. A game plan for how existing GIS and its operation can be used to support this effort, and what else is needed must be created.

A similar statement can be made for process. It will be pragmatic to create a process for project development and approval that can be supported for consistent and timely application. A comparable effort has been done for erosion control and stream environment zone restoration projects, which can serve as a model for the forest planning collaboration.

The direction for the environmental improvement program (EIP) partners is to be engaged in collaborative program management on an annual cycle. This is emerging with the development of the Southern Nevada Public Lands Management Act (SNPLMA) funding process (the major federal funding source for EIP) for Lake Tahoe and the Federal Partnership. Since the forest fuels program is part of the EIP the ability to participate will be important. As such program planning will need to anticipate tracking and reporting progress and accomplishments in addition to project plan projections. This program will generate tremendous public interest and credible oversight, progress reporting, and accountability will be critical sustain support.

APPENDIX A. Forest Vegetation Types of the Lake Tahoe Basin

Developed by the Forest Health Consensus Group 1991

FOREST VEGETATION TYPES IN THE LAKE TAHOE BASIN

There are four general forest vegetation types within the Lake Tahoe Basin: Mid-montane and Upper-montane, Mixed subalpine, and Riparian, which can occur within any of the previous three. Several recognizable vegetation communities exist within each of the forest vegetation types. For example, a vegetation community characterized by red fir, mountain hemlock, and western White Pine is recognizable within the Upper-montane vegetation type.

When describing or mapping vegetation, it is tempting and convenient to describe discrete vegetation communities separated by solid lines. On the ground, it is rarely so neat and simple. The change from one vegetation community to a neighboring one is characterized more by a gradient than a clean boundary. Adjoining communities phase into one another, and the overlap area, frequently called an "escorted," has some vegetation attributes of both communities. The width of this overlap area may vary from one to many yards. But, the important point is that there is generally a gradation between communities which causes neat, precise, mapping to misrepresent reality to a degree, and which can certainly confound overly-simplistic land management direction-setting.

There is also variation within vegetation communities. Subtle changes in such environmental factors as: slope, soils, aspect, moisture regimes, biological influences, past and present land use practices, or fire frequency and intensity create a range of conditions within even a single vegetation community. Variations in the above environmental factors create complexity in what might otherwise be simple vegetation descriptions. Also, interaction among these and other factors further complicate community descriptions. Examples of such variations and interactions among the above environmental factors are described below:

SLOPE: Changes in slope steepness can affect drainage (and therefore available moisture) and fire intensity. See the discussion of moisture regimes, and fire frequency and intensity for the effects on species mix within forest communities. Steeper slopes have a greater potential for erosion and high intensity fire.

SOILS: Soils in the Lake Tahoe Basin are of either volcanic or granitic origin. Granitic soils tend to be more well-drained and drier than volcanic soils. These differences can lead to a change in vegetation. Drier sites tend to support more Jeffrey Pine and moister sites tend to support a higher percentage of fir. Other soil factors also influence vegetation. These include physical, biological, and chemical make-up of soils. Differences in soils can occur gradually and can result in subtle variations in vegetation, although on occasion, an abrupt change may occur.

ASPECT: North and east-facing aspects are noticeably cooler and more moist than south aspects. Typically, then, one might find purer stands of Jeffrey Pine on south and west-facing slopes, and purer stands of fir on north-facing slopes, all other factors being equal.

MOISTURE REGIMES: Close proximity to bodies of surface water, a shallow local water table, and basins formed by changes in slope can create a more moist micro-site and produce a subtle change to a wetter site species. Consequently, we may find Lodgepole Pine and/or Aspen growing within communities typified by Jeffrey Pine or fir. The

eastside of the Basin is generally drier than the westside. Land use can also affect moisture regimes.

BIOLOGICAL INFLUENCES: Plants, animals, insects, and microorganisms, etc., influence each other within the forest ecosystem. The associations which occur between the many biological organisms of the forest in turn affect the distributions and densities of communities within the ecosystem. Parasitism, predation, allelopathy, seed distribution, fungal and bacterial associations are examples of biological processes which have influenced vegetation patterns within the Lake Tahoe Basin ecosystem.

PAST AND PRESENT LAND USE PRACTICES: Human activities, such as logging, road construction, urbanization, fire suppression and others have affected the composition of vegetation communities. For instance, where selective logging of certain species (e.g. Jeffrey Pine) has occurred, the residual species (e.g. White Fir) may come to dominate the site. Also, exclusion of fire will lead to changes in arrangement, composition, and age of vegetation. The combination of these and other human activities has resulted in the conversion of open pine stands to ones containing a higher proportion of fir trees growing more closely together. In addition, human activities have altered the proportion of the forest in each age class. For example, much of the Basin was clear-cut in the late 1800's. The forest ecosystem is therefore predominantly second growth and has more uniformity in age and maturity than the pre-European settlement forest.

FIRE FREQUENCY AND INTENSITY: In pre-settlement times, fires exerted a profound influence in the development and maintenance of the forests in the Lake Tahoe Basin. Fire frequency is the measure of how often a specific piece of ground experiences a fire. Fire intensity is the measure of how much heat is released by a fire. Together, for a specific geographic area, they constitute the primary elements of what is called a "fire regime." For example, the pre-settlement fire regime of the mixed conifer forests of the Basin could be described as frequent, mostly isolated low intensity fires. Infrequent stand replacement fires also helped shape the forest.

Pre-settlement fire regimes with frequent lightning and Native American ignitions, resulted in forests with a different species composition and stand characteristics than today. For example, in Mid-montane forests of the Basin, fire suppression has radically reduced the frequency of fire. Lack of fire has favored the increased dominance of White Fir over Jeffrey Pine and suppressed reproduction of shrub and herb species. Also, tree densities and fuel accumulation has increased without frequent fire. High intensity wildfires are more likely with current fuel conditions.

Fire is key in the maintenance of biological diversity. Many plants have adaptations that help them survive wildfire while others *require* fire as part of there life cycle. Improved wildlife habitat often results from the effects of fire. Under pre-settlement conditions, the pattern of stands across the landscape were probably more diverse, which in turn may have limited the spread of both fires and insect epidemics.

In summary, forest type classifications are helpful in describing pre-European settlement conditions. These classifications describe the forest as if it were made up of pure stands. In fact, variations in one or more of the above environmental factors will produce stands which exhibit complex mixtures of these characteristics.

APPENDIX B. Lake Tahoe Fire Contacts

Fire Contacts in the Tahoe Basin

Contacts -- Land Managers	Agency/Affiliation	Email	Phone
Brian Schafer	Lake Valley Fire Protection District	schafer@caltahoefire.net	530-577-3737
Christy Daugherty	California Dept. of Forestry and Fire Protection	christy.daugherty@fire.ca.gov	530-544-5843
Dave Marlow	USFS	dmarlow@fs.fed.us	530-543-2625
Jim Linardos	North Lake Tahoe Fire Protection District	jlinardos@nltfpd.net	775-831-0351
Roland Shaw	Nevada Dept. of Forestry	rshaw@forestry.nv.gov	775-687-4898
Judy Clot	California Tahoe Conservancy	judy@tahoecons.ca.gov	530-542-5560
Mike Chandler	CSLT Fire Protection District	mchandler@ci.south_lake_tahoe.ca.us	530-542-6167
Jim Lawrence	Nevada State Lands	lawrence@govmail.state.nv.us	775-687-4735
Rich Adams	Cal State Parks	richadams@jps.net	530-581-5746
John Pang	Meeks Bay Fire Protection District	chief@meeksbayfire.com	530-525-7548
Bruce Van Cleemput	Tahoe Douglas Fire Protection District	chief@tahoefire.com	775-588-3591
Duane Whitelaw	North Tahoe Fire Protection District	whitelaw@ntfire.net	530-583-6913
Chris Sauer	Fallen Leaf Fire Department	fallenleaffire@yahoo.com	530-542-1343
Elwood Miller	Nevada Fire Safe Council	firesafe@renonevada.net	775-322-2413
Jennifer Arrowsmith	Tahoe Basin Fire Safe Council	tahoebasinfiresafe@yahoo.com	530-543-1501 ext. 112