LAKEHEAD AREA STRATEGIC FUELS REDUCTION PLAN UPDATE 2010

This project was funded through a grant from the
Shasta County Title III Secure Rural Schools Program

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

COUNTY OF SHASTA CALIFORNIA

Picture: contributed by Lee Delaney

This project was funded through a grant from the Shasta County Title III Secure Rural Schools Program and updated by the Western Shasta Resource Conservation District, 6270 Parallel Road, Anderson CA 96007

Phone: 530 365-7332
Fax: 530 365-7332
Email: wsrcd@westernshastarcd.org
Website: www.westernshastarcd.org

LAKEHEAD
STRATEGIC FUELS REDUCTION PLAN
UPDATE (2010)

SIGNATURE BLOCK

NAME	SIGNATURE	ORGANIZATION	DATE
David A. Kehoe		Chairman, Shasta County Board of Supervisors	JUN 15 2010
Doug Wenham		Unit Chief, CAL FIRE, Shasta Trinity Unit and County Fire Warden, Shasta County Fire Department	6/4/10

LAKEHEAD AREA STRATEGIC FUELS REDUCTION PLAN UPDATE 2010

-TABLE OF CONTENTS-

LAKEHEAD AREA STRATEGIC FUELS REDUCTION PLAN UPDATE 2010

I. INTRODUCTION

A. THE PLAN

In 2009, Shasta County entered into a consulting services agreement with Western Shasta Resource Conservation District (WSRCD) to update all of the existing strategic fuel management plans in western Shasta County including the *Lakehead Area Strategic Fuel Reduction Plan (2004)*. The purpose of the update was to meet with the local Fire Safe Council, watershed groups, landowners, and agencies to review the existing project list and priorities, move completed projects to a category of maintenance projects, add new projects, identify wildland urban interface areas, conduct risk assesments, and establish a revised list of priority projects.

The Plan update addresses values at risk, landowner objectives, the types of fuel treatments, the road system, potential funding sources, and fuelbreak locations, which together developed the updated fuels reduction plan. The recommendations include locating shaded fuel breaks along key roadways and ridge lines, increasing publicity for the updated fire and community evacuation plan, post the Plan on the WSRCD website, and continue annual neighborhood-based fuel reduction work. Background information from the original Plan was included as well as revisions based on new information.

The area covered by the Lakehead Fire Safe Council (FSC) is about 25 miles long, 20 miles wide, about 500 square miles or approximately 320,000 acres **(Map 1).** Access to the area is via Interstate 5, Shasta Lake, and several Forest Service roads.The communities within the Lakehead FSC Area include: Gregory Creek, Obrien Mountain, Northwoods, LaMoine, Vollmers, Delta, Lakehead, Lakeshore, Statton, Skyline Drive, Lakeview, Sugarloaf, Gibson, Highland Lakes, and Gilman Road area. The area has a population of about 1618 permanent residents (Sperling' Best Places, 2009), and about 256 seasonal/recreational residences spread throughout the Planning Area. With the presence of Shasta Lake National Recreation Area (NRA), the area is heavily used for recreation. Land ownership is 56% public and 44% private.

The topography of the area is steep, with elevations from 1,065 to 5,613 feet, draining into Upper Sacramento River and McCloud River and eventually flowing into Shasta Lake. The area has remained relatively undeveloped over time and provides high quality water for the Central Valley Project, which supplies water throughout the state. Generally, the climate of the Lakehead FSC Area is seasonal and varies with elevation. The summers are hot and dry and winters are cool with moderate rainfall, and snow above 4,000 feet elevation. The average annual precipitation in the Sacramento River Basin varies from a low of 30 inches north of Mount Shasta City, to a high of 80 inches near High Mountain.

B. BACKGROUND

Wildfire plays a natural part in the evolution of vegetation in the 320,000-acre Lakehead FS C Area (Planning Area), located 26 miles north of Redding, California. Much of the vegetation has evolved and co-existed with fire for many years and is either dependent on fire or has adapted to the fire regime now associated with the area. The forest ecosystems and the chaparral on the canyon slopes within the planning area evolved with frequent, low intensity fire over thousands of years.

Low intensity fires reduced fuel loads, thinned dense pockets of young trees and created small openings in the forest to allow species with less tolerance for shade, such as Douglas-fir, sugar pine and ponderosa pine, to dominate the forested landscape. Native Americans did not simply use the resources of the forest as they found them. There is growing evidence that they actively managed the land using fire to encourage certain plant and animal species and to create and maintain desirable landscapes. The open stands of trees and diversity of ecosystems encountered by the first Europeans were largely the result of human resource management through the use of fire and frequent accidental and lightning fires. The Native Americans were apparently the most important influence on the timing and location of fires, and therefore contributed to the maintenance of the fire dependent ecosystem.

Successful fire suppression activities for over one hundred years in the western United States, and in the planning area in particular, have significantly increased the volume and type of fuels across the landscape. The result is a recommended Very High Fire Hazard Rating throughout the planning area by CAL FIRE **(Map 2)**. The STNF rates the Planning Area as an extreme wildfire zone. The Lakehead Area experiences extreme fire weather conditions, especially from May until September, when the high temperature frequently goes above 110 degrees F for sustained periods. Frequent strong zonal north winds occur throughout the summer; dry lightning storms occur most years; and dry winds are common in the late summer and throughout the fall.

II. GOALS AND OBJECTIVES

A. ORIGINAL GOALS AND OBJECTIVES (2004)

- Provide for personal safety and minimize property loss
- Create a fire safe corridor along Interstate 5, the Union Pacific Railroad, and the Sacramento River from [Bridge Bay to LaMoine]
- Develop a citizen volunteer fire protection/inspector program
- Partner with STNF and private landowners on a strategic fuels reduction plan
- Develop neighborhood fuel reduction plans
- Develop a community educational program to promote fire-safe standards and practices for business owners and homeowners to reduce fuel build up on their properties
- Develop a chipping program to reduce community fuels
- Assist the Lakehead Volunteer Fire Company to up-grade their firefighting equipment
- Invite Union Pacific Railroad, CalTrans, Sierra Pacific Industries, Shasta County Road Department to partnership with the Lakehead FSC
- Protect ecological and landscape values to soils and to the environment

- Reduce volatile fuels on ridge lines, roads and large blocks of property
- Minimize the risk of fire starts
- Minimize wildfire from burning into the watershed
- Reduce fuels so that large trees or other valued landscape vegetation will be spared
- Encourage safe burning practices for the reduction of fuels
- Identify agency and landowner fire prevention responsibilities

B. ADDITIONAL GOALS AND OBJECTIVES (2010)

- Review existing fuel reduction project list to determine what has been completed and if any should be modified or dropped
- Identify assets at risk
- Prioritize and map all fuel reduction projects that will provide for human safety, minimize private property loss, minimize the potential of a wildfire burning into the community, and increase fire fighter safety
- Enter the completed update on the Western Shasta Resource Conservation District's website

III. METHODOLOGY

The activities necessary for and the actions taken for the update of the *Lakehead Area Strategic Fuels Reduction Plan for Private Land* are:

Activity	Action
Meet with Lakehead Fire Safe Council, landowners (residential, farm, ranch, timber), and representatives from local agencies about the scope of the update.	Met with the Lakehead FSC on October 7, 2009 to brief them on the update and explain the need for input to the categorization and prioritization of the proposed projects. Forms were sent out by the Lakehead FSC Chairman to obtain residents' input to the projects. Letters were sent on November 3, 2009 to landowners north of Lakehead who have not been participating in the Lakehead FSC meetings. The letter provided the same information presented at the meeting and forms to submit to the Lakehead FSC Chairman. Reviewed the community input at the 12/02/09 Lakehead FSC meeting and incorporated the recommendations into this update.
Present information to the Fire Safe Council, Shasta Trinity-Trinity National Forest, CAL FIRE, Shasta County Fire Department, and local landowners for review and assistance in assessment of risk,	The community input on the projects was consolidated by the Lakehead FSC chairman and categorization/prioritization was begun at the 12/02/09 Lakehead FSC meeting. Recommendations were

Activity	Action
identification of WUI's, and prioritization of fuel reduction projects.	incorporated into this update.
Evaluate values at risk, such as structures and natural resources.	Evaluation was accomplished at the 12/02/09 Lakehead FSC meeting.
Coordinate with agencies on their management objectives in the watershed.	Confirmed exisiting agency management objectives with agency representatives and carried them forward to this plan update.
Identify long term maintenance options for fuel breaks.	Reviewed discussion of options in the 2004 plan with the Lakehead FSC and carried them forward to this plan update.
Identify mechanical treatments and possible uses of excess fuels.	Reviewed the mechanical treatment options in the 2004 Plan with the Lakehead FSC and carried options forward to the Plan update.
Develop a priority list of recommendations and potential funding sources.	Developed the priority list of recommendations with the Lakehead FSC. Carried forward the potential funding sources from the existing plan
Complete a draft fuel management plan for review by the Lakehead FSC.	The draft was posted on line for Lakehead FSC on 03/05/10.
Present a draft fire reduction plan update to the community, and incorporate recommendations into the final plan update.	Presented draft plan to the community on 2/27/10. Posted on 03/05/10. Incorporated input on 5/28/10.

IV. RECOMMENDED ACTIONS

Proposed action items described in this plan update are carried forward from the existing plan. All projects have been reviewed and prioritized by the Lakehead FSC with input from the community, and federal, state, and local agencies All action items are considered an integral part of any plan to manage the fuels in the Lakehead FSC Area. Factors considered in developing this list include:

- Fire history for the area, both lightning caused and human caused fires
- Heavy fuel loading conditions with closed canopies
- Assets at risk
- Common wind directions and speed
- Roadsides overgrown with vegetation
- Major topographical features important to fire control and weather patterns which influence fire behavior
- Road access for fire fighters

A. ACTION ITEMS

1. Develop a program to assist residents unable to meet the challenge of reducing the fuel load on their property
2. Develop a citizen volunteer fire protection/inspector program and reimburse fire prevention inspectors for their expenses, or reward them for their efforts
3. Develop neighborhood fuel reduction programs/projects (e.g. Firewise Program)
4. Develop a variety of typical neighborhood-scale landscape designs that demonstrate fire safety, increase forest health, and reduce impacts from wind-driven fires while preserving or improving aesthetics and providing for security, privacy, and other values. Link the larger scale projects to individual fuel breaks. Lakehead community members can reduce structural ignitability throughout the planning area by implementing defensible space/Firewise Programs to include the following:

    - Assess risk/structure ignitability.
    - Upgrade existing structures to fire safe building codes.
    - Replace wood roofs with approved fire safe roofing.
    - Consider fire resistant exterior siding.
    - Maintain a minimum 100-foot defensible space around structures.
    - Clean roofs and gutters annually.
    - Develop a community phone tree in case of a fire emergency.
    - Develop agreements with the county to use the reverse 911 system.
    - Remove ladder fuels.
    - Clean and screen chimneys.
    - Maintain green grass and fire resistant plants within 30 feet of structures.
    - Move all flammable material at least 30 feet from homes.
    - Remove dead, dying, or diseased shrubs, trees, dried grass, fallen branches and dried leaves 100 feet around structures.
    - Attach a hose that can reach to all parts of the structures.

5. Develop a chipping program to reduce community fuels
6. Assist the Lakehead Volunteer Fire Company to up-grade their firefighting equipment
7. Identify agency and landowner fire prevention responsibilities
8. Encourage and maintain multi-agency and land owner responsibilities in the implementation and maintenance of this plan
9. Maintain and refine Emergency Evacuation Plans for the area
10. Purchase aerial photos and GIS maps for the area, and seek useful satellite maps
11. Develop comprehensive road maps of the area to assist emergency response agencies
12. Locate emergency Landing Zones for helicopters in the Salt Creek – LaMoine corridor. Locate and maintain at least 100 foot diameter areas
13. Develop a citizen's alert system for residents and businesses to provide notification in the event of an emergency

14. Reduce hazardous fuels along local roads, and request county grading and maintenance to provide safe and efficient ingress and egress for citizens and fire fighters in the event of a wildland fire

B. PROPOSED PROJECTS (Maps 6-6c)

Table 1
Lakehead Fuel Reduction Projects

PROPOSED PROJECT	MAP NUMBER	Category	Overall Priority
Gregory Creek Drainage Area FBs (2-4 projects*)	1	High	1
O'Brien Mountain Estates FBs (5 projects)	2	High	2
Lower Salt Creek Drainage FB	3	High	3
Lakeshore Drive FBs (2 projects)	4	High	4
Snowbird Lane Area FB	5	High	5
Old Mill Road FB	6	High	6
Gilman Road FBs (4 projects)	7	High	7
Dog Creek Road and Cavanaugh Canyon FBs (2 projects)	8	High	8
Lamoine and Slate Creek FBs	9	High	9
Top of The Hill Road FB	10	High	10
Statton Road Subdivision FBs	11	High	11
Sims Road FB	12	High	12
Pollard Flat FB	13	High	13
Lakeview Heights Subdivision FB	14	High	14
Holiday Harbor	15	High	16
Packers Bay Marina FB	16	High	17
Northwoods FBs (2 projects)	17	High	18
Lakehead-Riverview Drive Area FB	18	High	19
Skyline Drive Subdivision FB	19	High	20
Delta and Volmers FB	20	High	21

PROPOSED PROJECT	MAP NUMBER	Category	Overall Priority
Hirz Mountain Lookout Road FB	21	High	22
Waterman Road FB	22	High	23
Shasta Marina FB	23	High	24
Gibson Road FBS (2 projects)	24	High	25
Lakeside Woods Subdivision FB (completed)	25	High	1
Sugarloaf Subdivision FB (completed)	26	High	2
Highland Lakes Road FB (completed)	27	High	3

* A project is limited to what CAL FIRE inmate crews can accomplish in approximately 90 days during an18-month grant period. This equates to approximately 51 acres of fuel reduction.

#1 Concern – Poor Fire Ingress/Egress in the Gregory Creek Drainage:

The area off the Gregory Creek Exit east of the freeway is at great risk for a major fire driven by a north wind from the Gregory Creek Campground. Two narrow, single-lane roads access Gregory Creek Acres, making ingress and egress for emergency vehicles very difficult. While there is a safety zone at the lake, residents would not be able to use it if the fire began at the lake. An escaped campfire from Gregory Creek Campground at the base of the drainage on a north aspect could be devastating. Such a fire could quickly move through the drainage, and spill over into the Salt Creek/ Solus Mountain Road, the Lundgren Mountain, Statton Road subdivision /Gilman Road area.

Proposed Solution: Construct shaded fuel breaks along:

1. Gregory Creek: 2.1 miles long x 100 feet on each side = 51 acres
2. Claus Lane: .38 miles long x 100 feet on each side = 9.2 acres
3. Branch Road: .38 miles long x 100 feet on each side = 9.2 acres
4. Herman Way: .5 miles long x 100 feet on each side = 12 acres
5. Cordes Court: .2 miles long x 100 feet on each side = 4.8 acres
6. Zola Drive: 1 miles long x 100 feet on each side = 24 acres
7. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 54% private land, 46% federal land
Number of dwellings = 27
Value of dwellings = $6,593,400
Number of people = 63

Zola Drive showing the narrow road, steep terrain, and vegetation encroachment

Herman Way showing the steepness of slope

#2 Concern – Poor Ingress/Egress in O'Brien Mountain Estates:

Proposed Solution:

1. Construct roadside shaded fuel breaks in the O'Brien Mountain Estates subdivision: 8.4 miles long x 200 feet = 198 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 68
Value of dwellings = $16,605,600
Number of people = 157

#3 Concern – Poor Ingress/Egress in the Lower Salt Creek Drainage

Proposed Solution:

1. Construct shaded fuel breaks along Lower Salt Creek Road and Kamloop Road .25 miles long x 100 feet on each side = 6 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 70
Value of dwellings = $17,094,000
Number of people = 161

Note brush encroachment on Lower Salt Creek

#4. Concern – Poor Ingress/Egress along Lakeshore Drive.

Proposed Solution:

1. Construct shaded fuel breaks along Lakeshore Drive from Beehive Lakeshore Campground to Pine Street. 3 miles long x 100 feet on each side = 54 acres
2. Construct shaded fuel breaks from Antlers freeway exit to the end of Lakeshore Drive. 3.0 miles long x 100 feet on each side = 54 acres
3. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 198
Value of dwellings = $48,351,600
Number of people = 456

Vegetation along Lakeshore Drive north of the Antlers freeway exit

Lakeshore Drive looking south next to the freeway, north of the Antlers exit

#5 Concern – Poor Ingress/Egress in the Snowbird Lane area.

Proposed Solution:

1. Construct shaded fuel breaks along Snowbird Lane, Big Oak Lane and Ralph's Lane. 0.9 miles long x 100 feet on each side = 24 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 20
Value of dwellings = $4,884,000
Number of people = 46

Entrance to Snowbird

#6 Concern – Poor Ingress/Egress along Old Mill Road:

Old Mill Road is a single lane access feeder road to Gilman Road which is the main fire access route for fire suppresession and escape. Old Mill Road is located in extremely steep terrain with no alternative escape routes**.**

Proposed Solution:

1. Construct shaded fuel breaks along Old Mill Road/Our Road: 2.0 miles long x 100 feet on each side = 48 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 95% private land 5% USFS land
Number of dwellings = 20
Value of dwellings = $4,884,000
Number of people = 46

Old Mill Road showing the narrow road, steep canyon, and brush encroachment

#7 Concern – Poor Ingress/Egress along Gilman Road:

Gilman Road is a narrow, very curvy two-lane paved road leading to the McCloud Bridge. It is the main access route for fire suppression and the primary escape route for residents of this area. Gilman Road fuelbreak will have to be a cooperative effort between SPI, STNF, Shasta County Highway Department, and the homeowners.

Proposed Solution: Construct shaded fuel breaks along Gilman Road to the McCloud Bridge: 9.6 miles long x 100 feet on each side = 233 acres:

1. Gilman Road to Hirz Mountain Lookout Road: 4.6 miles long x 100 feet on each side = 110 acres
2. Gilman Road, Hirz Mountain Lookout Road to McCloud Bridge: 5 miles long x 100 feet on both sides = 123 acres
3. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 30% private land 70% USFS land
Number of dwellings = 20

Value of dwellings = $4,884,000
Number of people = 46

Gilman Road. Note dense vegetation to road edge

#8 Concern – Poor Ingress/Egress along Dog Creek Road and Cavanaugh Canyon.

Proposed Solution:

1. Construct shaded fuel breaks along Dog Creek Road. 1.98 miles long x 100 feet on each side = 72 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes.

Ownership = 100 % private land
Number of dwellings = 6
Value of dwellings = $1,465,200
Number of people = 14

Vegetation along Dog Creek Road

#9 Concern – Poor Ingress/Egress in the LaMoine and Slate Creek area.

These homes are situated in a canyon or on a hillside. A fire in July 2003 could have done great damage, but weather conditions, evening temperatures combined with fire suppression, limited the fire to six acres. Two historic structures were destroyed.

Proposed Solution:

1. Construct shaded fuel breaks along Slate Creek Road, Little Slate Creek Road, and LaMoine Roads west of the freeway. 1.3 miles long x 100 feet on each side = 31 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes.

Ownership = 100 % private land
Number of dwellings = 12
Value of dwellings = $2,930,400
Number of people = 28

Vegetation along Slate Creek

#10 Concern – Poor Ingress/Egress along Top of the Hill Road:

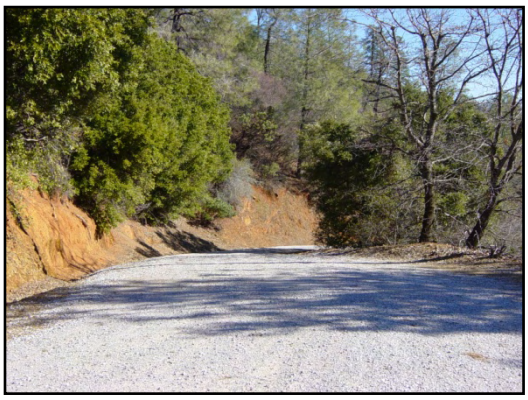
Top of the Hill Road is a single lane access feeder to Gilman Road, which is the main fire access route for fire suppresession and escape. Top of the Hill Road is located in steep terrain with no alternative escape routes**.**

Proposed Solution:

1. Construct shaded fuel breaks along Top of the Hill Road: .6 miles long x 100 feet on each side = 14.4 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes.

Ownership = 67% private land 33% USFS land
Number of dwellings = 2
Value of dwellings = $488,400
Number of people = 5

Top of The Hill Road showing brush encroachment



#11 Concern – Poor Ingress/Egress in the Statton Road Subdivision area.

Statton Road is a steep narrow road between Gilman Road and Salt Creek Road. Shaded fuel breaks are needed along Statton Road, Klamath Court, Kanuk Way, Yruok Drive, Wintoon Way, and Pit Point.

Proposed Solution: Construct shaded fuelbreak along:

1. Statton Road: 1.4 miles long x 100 feet on each side = 33.6 acres
2. Klamath Court: .1 miles long x 100 feet on each side = 2.3 acres
3. Kanuk Way: 1 miles long x 100 feet on each side = 2.3 acres
4. Yurok Drive: 2 miles long x 100 feet on each side = 4.6 acres
5. Wintoon Way: .5 miles long x 100 feet on each side = 12 acres
6. Pit Point: .04 miles long x 100 feet on each side = 1 acre
7. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 30
Value of dwellings = $7,326,000
Number of commercial Structures =
Number of people = 69

Statton Road showing narrow road, steep terrain, and brush encroachment.

#12 Concern – Poor Ingress/Egress in the Sims Road Area.

Proposed Solution:

1. Construct shaded fuel breaks from the freeway to the STNF Campground east of the freeway. 0.7 miles long x 100 feet on each side = 17 acres
2. Construct shaded fuel breaks along 1.4 miles of Mears Ridge Road. 1.4 miles long x 100 feet on each side = 34 acres
3. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 35
Value of dwellings = $8,547,000
Number of people = 81
USFS Campground = $

Mears Ridge Road north of the intersection with Sims Road.

#13 Concern – Poor Ingress/Egress in the Pollard Flat Area.
An effort should be made to coordinate roadside fuel reduction efforts with a timber harvest plan.

Proposed Solution: Encourage residents to develop defensible space/Firewise activities around their homes and the restaurant east of I-5 on Pollard Flat = 6 acres

Ownership = 100 % private land
Number of dwellings = 6
Value of dwellings = $1,465,200
Number of people = 14

Pollard Flat east of the Restaurant

#14 Concern – Poor Ingress/Egress in the Lakeview Hieghts subdivision.

Proposed Solution: Construct shaded fuel breaks along Lakeview Drive:

1. Mays Lane and High Court: .67 miles long x 100 feet on each side = 16 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 55
Value of dwellings = $13,431,000
Number of people = 127

#15 Concern – Poor Ingress/Egress in the Holiday Harbor area:

Proposed Solution:

1. Construct a shaded fuelbreak around the marina: 1.6 miles long x 300 feet = 58 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes and along the access route

Ownership = 100 % USFS land

#16 Concern – Poor Ingress/Egress in the Packers Bay Marina area:

Proposed Solution:

1. Construct a shaded fuelbreak along the Packers Bay Road: 1.65 miles long x 300 feet = 62 acres
2. Encourage the development of defensible space/Firewise activities around the marina

Ownership = 100 % USFS land

#17 Concern – Poor Ingress/Egress for Northwoods Subdivision:

Acess is solely from I-5. This is a gated community, so arrangements will have to be made for access.

Proposed Solution:

1. Construct shaded fuel breaks on Northwoods Drive: 1.5 miles x 100 feet on each side = 37 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 15
Value of dwellings = $3,663,000
Number of people =39

#18 Concern – Poor Ingress/Egress in the Lakehead/Riverview Drive area:

Proposed Solution:

1. Construct shaded fuelbreak along Riverview Drive: 1.6 miles long x 100 feet on each side = 38 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 75
Value of dwellings = $18,315,000
Number of people = 173

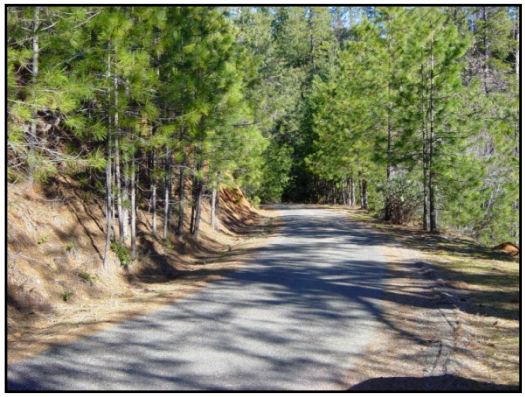
Riverview Drive north of Lakehead

#19 Concern – Poor Ingress/Egress in the Skyline subdivision near Lakeview Marina:
There is one primary narrow road for fire access and escape. All of the roads are narrow with turnouts.

Proposed Solution:

1. Construct shaded fuel breaks along Skyline Drive, Lakeview Drive, Spiral Lane, Ycotti Creek Ridge Road, and Oak Ridge Drive. 2 miles long x 100 feet on each side = 48 acres
2. Encourage residents to develop defensible space/Firewise activities around their homes

Ownership = 100 % private land
Number of dwellings = 20
Value of dwellings = $4,884,000
Number of people = 46



Skyline Drive showing over grown condition

#20 Concern – Poor Ingress/Egress in the Delta/Volmers area.
The access road into town is 0.4 miles-long with few turnouts as it winds down a steep bluff. The access road goes through a wooded area that should be thinned to reduce the fire hazard to residents and firefighters.

Proposed Solution: Thin the wooded area that the main access/escape route passes through = 20 acres

Ownership = 100 % private land
Number of dwellings = 10
Value of dwellings = $2,442,000
Number of people = 23

Access road into Delta/Vollmers

#21 Concern – Poor Ingress/Egress along Hirz Mountain Lookout Road:
Hirz Mountain Road is a single lane feeder road to Gilman Road, which is the main fire access route for fire suppresession and escape. Hirz Mountain Road is located in steep terrain with no alternative escape routes**.**

Proposed Solution:

1. Construct shaded fuel breaks along: Hirz Mountain Lookout Road: .7 miles long x 100 feet on each side = 17 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes.

Ownership = 10% private land 90% USFS land
Number of dwellings = 6
Value of dwellings = $1,465,200
Number of people = 14

Hirz Mountain Lookout Road showing narrow road in steep terrain

#22 Concern – Poor Ingress/Egress along Waterman road.
Waterman Road is a single lane feeder road to Gilman Road, which is the main fire access route for fire suppresession and escape. Waterman Road is located in steep terrain with no alternative escape routes**.**

Proposed Solution:

1. Construct shaded fuel breaks along: Waterman Road: .6 miles long x 100 feet on each side = 15 acres.
2. Encourage residents to develop defensible space/Firewise activities around their homes.

Ownership = 100% private land
Number of dwellings = 6
Value of dwellings = $1,465,200
Number of people = 14

Waterman Road Showing Brush Encroachment

#23 Concern – Poor Ingress/Egress in the Shasta Marina area.

Proposed Solution:

1. Construct a shaded fuelbreak around the marina. 1.7 miles long x 300 feet = 62 acres.
2. Encourage the development of defensible space/Firewise activities around the marina.

Ownership = 100 % private land
Number of dwellings =
Value of dwellings = $
Number of people =

#24 Concern – Poor Ingress/Egress in the Gibson Road area.

Proposed Solution: Construct shaded fuelbreak along Gibson Road, starting at Pollard Flat: 3.0 miles long x 100 feet on each side = 73 acres.

Ownership = 100 % private land
Number of dwellings = 15
Value of dwellings = $3,663,000
Number of people = 35

0.3 miles from Gibson Road

C. <u>OVERALL COMMUNITY WILDFIRE RISK ASSESSMENT (High, Medium, Low and Prioritization 1,2,3,etc.)</u>

BASIC ASSUMPTIONS	
People	2.3 per dwelling
Dwellings	960
Property Value ($244,200 per dwelling)	$234,432,000
Schools	$
Power line – ____ miles @ $250,000/mile	$

D. OVERALL COMMUNITY HAZARD RISK ASSESSMENT

Community, structure or area at risk	Map Number	Fuel Hazard	Risk of Wildfire Occurrence	Struc-tural Ignit-ability	Preparedness and Firefighting Capability	Overall Risk	Fire Hazard Severity Zone Rating
Gregory Creek Drainage Area FBs (2-4 projects*)	1	High	High	High	Low/High	High	Very High
O'Brien Mountain Estates FBs (5 projects)	2	High	High	High	Low/High	High	Very High
Lower Salt Creek Drainage FB	3	High	High	High	Low/High	High	Very High
Lakeshore Drive FBs (2 projects)	4	High	High	High	Low/High	High	Very High
Snowbird Lane Area FB	5	High	High	High	Low/High	High	Very High
Old Mill Road FB	6	High	High	High	Low/High	High	Very High
Gilman Road FBs (4 projects)	7	High	High	High	Low/High	High	Very High
Dog Creek Road and Cavanaugh Canyon FBs (2 projects)	8	High	High	High	Low/High	High	Very High
Lamoine and Slate Creek FBs	9	High	High	High	Low/High	High	Very High
Top of The Hill Road FB	10	High	High	High	Low/High	High	Very High
Statton Road Subdivision FBs	11	High	High	High	Low/High	High	Very High
Sims Road FB	12	High	High	High	Low/High	High	Very High
Pollard Flat FB	13	High	High	High	Low/High	High	Very High

Community, structure or area at risk	Map Number	Fuel Hazard	Risk of Wildfire Occurrence	Struc-tural Ignit-ability	Preparedness and Firefighting Capability	Overall Risk	Fire Hazard Severity Zone Rating
Lakeview Heights Subdivision FB	14	High	High	High	Low/High	High	Very High
Holiday Harbor	15	High	High	High	Low/High	High	Very High
Packers Bay Marina FB	16	High	High	High	Low/High	High	Very High
Northwoods FBs (2 projects)	17	High	High	High	Low/High	High	Very High
Lakehead-Riverview Drive Area FB	18	High	High	High	Low/High	High	Very High
Skyline Drive Subdivision FB	19	High	High	High	Low/High	High	Very High
Delta and Volmers FB	20	High	High	High	Low/High	High	Very High
Hirz Mountain Lookout Road FB	21	High	High	High	Low/High	High	Very High
Waterman Road FB	22	High	High	High	Low/High	High	Very High
Shasta Marina FB	23	High	High	High	Low/High	High	Very High
Gibson Road FBS (2 projects)	24	High	High	High	Low/High	High	Very High
Lakeside Woods Subdivision FB (completed)	25	High	High	High	Low/High	Medium	Very High

Community, structure or area at risk	Map Number	Fuel Hazard	Risk of Wildfire Occurrence	Struc-tural Ignit-ability	Preparedness and Firefighting Capability	Overall Risk	Fire Hazard Severity Zone Rating
Sugarloaf Subdivision FB (completed)	26	High	High	High	Low/High	Medium	Very High
Highland Lakes Road FB (completed)	27	High	High	High	Low/High	Medium	Very High

E. OVERALL COMMUNITY HAZARD REDUCTION PRIORITIES

Community, structure or area at risk	Map Numb er	Overall Risk	Structures at Risk	Cultur al Value	Type of treatme nt	Method of Treatment	Overall Priority
Gregory Creek Drainage Area FBs (2-4 projects*)	1	High	27	Low	Hand Labor	Brush and tree removal, pruning	1
O'Brien Mountain Estates FBs (5 projects)	2	High	68	Low	Hand Labor	Brush and tree removal, pruning	2
Lower Salt Creek Drainage FB	3	High	70	Low	Hand Labor	Brush and tree removal, pruning	3
Lakeshore Drive FBs (2 projects)	4	High	198	Low	Hand Labor	Brush and tree removal, pruning	4
Snowbird Lane Area FB	5	High	20	Low	Hand Labor	Brush and tree removal, pruning	5
Old Mill Road FB	6	High	28	Low	Hand Labor	Brush and tree removal, pruning	6
Gilman Road FBs (4 projects)	7	High	20	Low	Hand Labor	Brush and tree removal, pruning	7
Dog Creek Road and Cavanaugh Canyon FBs (2 projects)	8	High	20	Low	Hand Labor	Brush and tree removal, pruning	8
Lamoine and Slate Creek FBs	9	High	6	Low	Hand Labor	Brush and tree removal, pruning	9

Community, structure or area at risk	Map Number	Overall Risk	Structures at Risk	Cultural Value	Type of treatment	Method of Treatment	Overall Priority
Top of The Hill Road FB	10	High	12	Low	Hand Labor	Brush and tree removal, pruning	10
Statton Road Subdivision FBs	11	High	2	Low	Hand Labor	Brush and tree removal, pruning	11
Sims Road FB	12	High	84	Low	Hand Labor	Brush and tree removal, pruning	12
Pollard Flat FB	13	High	30	Low	Hand Labor	Brush and tree removal, pruning	13
Lakeview Heights Subdivision FB	14	High	35	Low	Hand Labor	Brush and tree removal, pruning	14
Holiday Harbor	15	High	6	Low	Hand Labor	Brush and tree removal, pruning	15
Packers Bay Marina FB	16	High	55	Low	Hand Labor	Brush and tree removal, pruning	16
Northwoods FBs (2 projects)	17	High		Low	Hand Labor	Brush and tree removal, pruning	17
Lakehead-Riverview Drive Area FB	18	High		Low	Hand Labor	Brush and tree removal, pruning	18
Skyline Drive Subdivision FB	19	High	15	Low	Hand Labor	Brush and tree removal, pruning	19
Delta and Volmers FB	20	High	75	Low	Hand Labor	Brush and tree removal, pruning	20
Hirz Mountain Lookout Road FB	21	High	20	Low	Hand Labor	Brush and tree removal, pruning	21
Waterman Road FB	22	High	10	Low	Hand Labor	Brush and tree removal, pruning	22
Shasta Marina FB	23	High	6	Low	Hand Labor	Brush and tree removal, pruning	23
Gibson Road FBS (2 projects)	24	High	6	Low	Hand Labor	Brush and tree removal, pruning	24
Lakeside Woods Subdivision FB (completed)	25	High		Low	Hand Labor	Brush and tree removal, pruning	25
Sugarloaf Subdivision FB (completed)	26						
Highland Lakes Road FB (completed)	27						

F. ESTIMATED COSTS:

The following table displays a list of projects recommended by the TAC and the community.

Project Name	Map Number	Acres	Funding Needs ($)[1]	Community Priority Recommendation/
Gregory Creek Drainage Area FBs (2-4 projects*)	1	110	$277,400	1
O'Brien Mountain Estates FBs (5 projects)	2	202	$534,400	2
Lower Salt Creek Drainage FB	3	6	$46,500	3
Lakeshore Drive FBs (2 projects)	4	108	$303,000	4
Snowbird Lane Area FB	5	24	$86,500	5
Old Mill Road FB	6	106	$293,400	6
Gilman Road FBs (4 projects)	7	48	$238,700	7
Dog Creek Road and Cavanaugh Canyon FBs (2 projects)	8	333	$556,700	8
Lamoine and Slate Creek FBs	9	72	$192,200	9
Top of The Hill Road FB	10	31	$100,400	
Statton Road Subdivision FBs	11			
Sims Road FB	12	56	$154,700	
Pollard Flat FB	13	51	$68,800	
Lakeview Heights Subdivision FB	14	6	$43,300	
Holiday Harbor	15	16	$65,100	
Packers Bay Marina FB	16	58	$160,700	
Northwoods FBs (2 projects)	17	39	$160,700	
Lakehead-Riverview Drive Area FB	18	37	$124,800	
Skyline Drive	19	38	$113,500	

[1] Projected costs for planning only. More precise costs will be determined when grant applications are prepared.

Project Name	Map Number	Acres	Funding Needs ($)[1]	Community Priority Recommendation/
Subdivision FB				
Delta and Volmers FB	20	48	$137,600	
Hirz Mountain Lookout Road FB	21	20	$ 74,200	
Waterman Road FB	22	17	$ 67,600	
Shasta Marina FB	23	15	$ 63,500	
Gibson Road FBS (2 projects)	24	62	$169,700	

V. PROJECT MAINTENANCE PRIORITY

Project	Map Number	Completed	Maintenance Priority
Lakeside Woods Subdivision[2]	27	2006	1
Sugarloaf Subdivision	28	14	
Highland Lakes Road	29	2010	2

#1 Maintenance concern Lakeside Woods Subdivision

Proposed solution: Conduct maintenance on the existing fuel break. 1mile long x 250 feet on each side = 30acres.

Ownership = 100 % private land
Number of dwellings = 107
Value of dwellings = $26,129,400
Number of people = 247

 # 2 Maintenance concern Sugarloaf Subdivision

Proposed solution: Conduct maintenance on the existing fuel break. 2.5 mile long x 300 feet on each side = 91 acres.

Ownership = 100 % Federal land
Number of dwellings = 107
Value of dwellings = $26,129,400
Number of people = 247

#2 Maintenance concern Highland Lakes Road

Proposed solution: Conduct maintenance on the existing fuel break. 3 mile long x 100 feet on each side = 72 acres.

[2] Modified Lakeside Woods Subdivision Project in 2004 Plan – 1 mile constructed

Ownership = 100 % private land
Number of dwellings = 15
Value of dwellings = $3,664,605
Number of people = 40

VI. PLAN UPDATES:

The Lakehead FSC and Fire Agencies intend to annually assess progress and invite agencies and landowners to submit additional projects that provide community protection. Additional (new) projects will be displayed in an update appendix to this plan and approved by the Shasta County Board of Supervisors.

VII. VALUES AT RISK

A. RESIDENCES AND MAJOR STRUCTURES

About 704 homes and 256 vacation/recreation homes make up the communities of Lakeshore, Lakehead, Delta, Pollard Flat, Vollmers, LaMoine, the Gilman Road neighborhood, and surrounding area. Major structures include stores, post office, motels, school, resorts and marinas. The winter population is 1,618 residents, but in summer the population can swell to three times this number of people (personal communication with local business leaders).

LAKEHEAD VOLUNTEER FIRE COMPANY

THE LIONS CLUB HALL

CANYON COMMUNITY CHURCH

CANYON ELEMENTARY SCHOOL

Dog Creek Bridge

The landscapes of residential settlements are a particularly sensitive aesthetic resource. Research has demonstrated that as many as one in five residents in the wildland-urban intermix feel a lush landscape today is more important than saving their home from a wildfire that may or may not occur. Comments in focus groups and public meetings reinforce the notion that rich vegetation across the landscape is essential to the quality of life they experience as part of living in a forest landscape

In community discussions throughout the west, the importance of the landscape arose many times. Saving the landscape from catastrophic fire was a common motivation of those strongly supporting hazard fuel reduction efforts; while others objected to removal of the understory for fear the openness would decrease their privacy. Those people in particular wanted to keep the landscape in what they perceived to be a natural state.

Many residential areas have covenents, conditions, and restrictions that restrict logging and tree removal in order to protect the aesthetics of the landscaping around homes. The energy with which these restrictions are enforced testifies to the importance of the landscape as an aesthetic resource.

B. FOREST LAND

Private timber production zones occupy about 77,384 acres in the higher elevations in the Planning Area. These lands are managed primarily by Roseburg Lumber and Sierra Pacific Industries for commercial purposes and are regulated by the California Forest Practice Rules. The intent of the Forest Practice Act is to "create and maintain an effective and comprehensive system of regulation and use of all timberlands so as to assure that: a) where feasible, the productivity of timberlands is restored, enhanced and maintained; and b) the goal of maximum sustained production of high-quality timber products is achieved while giving consideration to values relating to recreation, watershed, wildlife, range, forage, fisheries, regional economic vitality, employment and aesthetic enjoyment."

C. WILDLIFE AND PLANTS (MAPS 3 & 4)

The area has a typical distribution of species for Douglas-fir/mixed conifer/ponderosa pine/ gray pine forests, and California black oak woodlands of northern California. Elevation and exposure are primary influences on the distribution of the forest habitats. Douglas-fir occurs on north and east slopes, especially at elevations over 3,000 feet, but Douglas-fir is also a component of mixed conifer forests where the exposure is slightly warmer or elevations lower. The driest habitat types occur adjacent to Shasta Lake on south slopes. These areas are often vegetated by brushfields and gray pine. Ponderosa pine also occurs in these areas, but is more prevalent on east and north facing slopes. California black oak also occurs as a minor species in all four forest types. The California black oak is an important source of mast for wildlife. Mast is the fruit of oaks and other trees, particularly where considered food for wildlife and domestic livestock.

Large ponderosa pine trees within one mile of Shasta Lake provide existing and potential nest sites for bald eagles. Eagles are more likely to nest in trees that are located close to water. Snags provide roosting sites for eagles, as well as habitat for cavity nesting birds.

During writing this document, information was provided by sources regarding "special status" species that live or potentially live in the area. (Special status species are those that are afforded some form of legal protection, either by CA or the federal government.):

- Potential habitat for the Valley Elderberry Longhorn Beetle (Blue elderberry shrubs) exists in the Lakehead Area. Elderberry are found within riparian zones of streams that bisect the area.
- Northern Spotted Owls occur in the Dog and Slate Creek drainages. South of Lakehead the habitat is too fragmented, hot and open for this species.
- Pacific fishers are likely present in low numbers in riparian corridors.
- Northern goshawks and pine martens are present in higher elevations north of Lakehead.
- Pallid and big-eared bats have not been observed, but may occur in the area.

Table 2 displays the "special status" wildlife and plant species that have been recorded in the area, based on the California Native Diversity Database, September 2009.

Table 2
Listed Species (Map 4)

Scientific Name	Common Name	Legal Status
Accipiter gentilis	northern goshawk	CA Species of Concern
Actinemys marmorata	western pond turtle	CA Species of Concern
Ageratina shastensis	Shasta ageratina	CNPS-1B
Arctostaphylos klamathensis	Klamath manzanita	CNPS-1B
Asarum marmoratum	marbled wild-ginger	CNPS-2
Ascaphus truei	Pacific tailed frog	CA Species of

Scientific Name	Common Name	Legal Status
		Concern
Clarkia borealis ssp. borealis	northern clarkia	CNPS-1B
Erythronium citrinum var. roderickii	Scott Mountains fawn lily	CNPS-1B
Falco peregrinus anatum	American peregrine falcon	Federally-delisted
Gulo gulo	California wolverine	CA Species of Concern; CA Threat.; Fed. Protect.
Haliaeetus leucocephalus	bald eagle	Fed. De-listed
Hydromantes shastae	Shasta salamander	CA Threatened
Lewisia cantelovii	Cantelow's lewisia	CNPS-1B
Lewisia cotyledon var. heckneri	Heckner's lewisia	CNPS-1B
Martes pennanti (pacifica) DPS	Pacific fisher	Fed. Candidate; CA Species of Concern
Neviusia cliftonii	Shasta snow-wreath	CNPS-1B
Pandion haliaetus	osprey	Formerly Protected Under CA Forest Pract. Rules
Parnassia cirrata var. intermedia	Cascade Parnassia	CNPS-2
Penstemon filiformis	thread-leaved beardtongue	CNPS-1B
Phacelia dalesiana	Scott Mountain phacelia	CNPS-1B
Rana boylii	foothill yellow-legged frog	CA Species of Concern
Schoenoplectus subterminalis	water bulrush	CNPS-2

Shasta Lake has both a warm water and a cold water fishery. The warm water fishery is dominated by spotted bass, smallmouth bass, black crappie, channel catfish, and blue-gill. The cold water fishery is composed of rainbow trout, brown trout, and Chinook salmon. Native species such as white sturgeon, Sacramento blackfish, hardhead minnow, riffle sculpin, Sacramento sucker, and Sacramento squawfish are also present, but receive little fishing pressure. Fish habitat for warm water species is limited by the lack of cover and reservoir drawdown. Habitat for cold water species is considered good.

D. SOILS

The soil report for the Shasta-Trinity National Forest is the source of soil information for the Planning Area. The following information is excerpted from that report.

Soil parent materials in the area can be characterized as either metamorphic rocks, deep alluvium, or sedimentary rocks (limestone). Soils overlying metamorphic rocks are generally shallow to moderately deep, and very gravelly; erosion potential is moderate to low, often depending on slope. Soils overlying alluvium are deep, fine-textured and mostly unconsolidated; erosion potential is high to very high, again this is usually tied to slope. Yearly precipitation

totals in the area range from 50 to 70 inches, mostly as rain in the lower elevations, and snow in the higher elevations.

When parts of the area were denuded of vegetation during the copper smelting era, 1896 to 1919, extreme soil erosion occurred in those denuded areas. On the alluvial terraces the extent of the erosion was disastrous. Metamorphic surfaces experienced accelerated erosion and lost much of their topsoil. Alluvial surfaces also experienced accelerated surface erosion, but what is most striking is that they all eroded into a network of deep gullies. What had been a terrain of gently sloping terraces became a landscape of steep-sided gullies up to 20 feet deep. The gullies continued to erode for many years after smelting ended in 1910. Despite a massive effort to plug and dam the gullies from 1910 to 1960, they are only beginning to stabilize today.

Fuels management activities located on unstable soils or on slopes greater than 40 percent can stimulate erosion processes or exacerbate existing erosion problems; therefore, prior to any fuels management activities, all soil types within any future project area should be identified and evaluated to determine the erosion hazard. Projects should be designed to prevent or minimize erosion by reducing soil disturbance, maintaining vegetation where appropriate, avoiding steep and unstable slopes if possible, and incorporating the use of grass seed or fire resistant vegetation as a means to provide soil stabilization. Detailed soil mapping information should be examined once project boundaries have been established.

High intensity wildfire can also damage soil by incinerating roots and the humus layer (organic portion of soils) that holds soils together and provides energy dissipation. In addition, the loss of large areas of vegetation can reduce evapotranspiration and increase peak flow, which can result in augmented erosion potential, adversely affecting watershed resources. Many life forms, including invertebrates of phylum Arthropoda that are essential for cycling plant material and fixing atmospheric gases, are unknowingly destroyed. These invertebrates eventually re-establish their populations, but time is lost in maintaining and building up the soils. Over time, continual burning will result in soil depletion, much the same as continual plowing and crop harvesting will deplete the soil of mineral nutrients and negatively affect the soil structure. Fortunately in this area of California, there exist relatively young volcanic soils in the mountains and recent alluvial soils in the valleys that can tolerate fire without immediately showing negative effects. Continued burning though can have long-term negative effects (National Park Service, 2002).

Low intensity prescribed fires in light to medium fuels seldom produce enough heat to significantly damage soil or increase the erosion potential within a given watershed. The chemical and physical properties of soil change dramatically after a high intensity fire. Loss of organic matter causes the soil structure to deteriorate, and both the water-storing and transmitting properties of soils are reduced. The living tissues of microorganisms and plants can be damaged by fire if the temperatures are above 1200 degrees F (DeBano 1970).

VIII. SUPPORTING PLANS, ORGANIZATIONS AND AGENCIES

A. NATIONAL FIRE PLAN

In 2001, the Chief of the USDA Forest Service published a *National Fire Plan* (U.S. Department of Interior and U.S. Department of Agriculture, 2001), which is a cohesive strategy for

improving the resilience and sustainability of forests and grasslands at risk, for conserving priority watersheds, species and biodiversity, reducing wildland fire costs, losses and damages, and to better ensure public and firefighter safety. To achieve these goals, work began to improve firefighting readiness, prevention through education, rehabilitation of watershed functions, hazardous fuel reduction, restoration, collaborative stewardship, monitoring jobs, and applied research and technology transfer.

The objective of the National Fire Plan is to describe actions that could restore healthy, diverse, and resilient ecological systems to minimize the potential for uncharacteristically intense fires on a priority basis. Methods include removal of excessive vegetation and dead fuels through thinning, prescribed fire and other treatment methods. The focus of the strategy is on restoring ecosystems that evolved with frequently occurring, low intensity fires. These fires typically occurred at intervals of between 1-35 years and served to reduce the growth of brush and other understory vegetation while generally leaving larger, older trees intact. The report is based on the premise that sustainable resources depend on healthy, properly functioning, resilient ecosystems. The first priority for restoration is the millions of acres of already roaded and managed landscapes that are in close proximity to communities. More information about the National Fire Plan is available on the Internet at www.fireplan.gov.

B. THE CALIFORNIA FIRE PLAN

The California Fire Plan has five strategic objectives:

- Create wildfire protection zones that reduce risks to citizens and firefighters.
- Assess all wildlands (not just the state responsibility areas) to identify high risk, high-value areas and develop information and determine who is responsible, who is responding, and who is paying for wildland fire emergencies.
- Identify and analyze key policy issues and develop recommendations for changes in public policy.
- Develop a strong fiscal policy focus and monitor wildland fire protection in fiscal terms.
- Translate the analyses into public policies.

A key product of the Fire Plan is the identification and development of wildfire safety zones to reduce citizen and firefighter risks from future large wildfires. Initial attack success is measured by the percentage of fires that are successfully controlled before unacceptable costs are incurred. Assets at risk are identified and include citizen and firefighter safety, watersheds, water, timber, wildlife, habitat, unique areas, recreation, range structures, and air quality. Air quality is a factor because based on the annual average acres burned by wildfires from 1985-1994, CAL FIRE calculates wildfires emit almost 600,000 tons of air pollutants each year.

The safety and asset assessments in the plan enable fire service managers and stakeholders to set priorities for prefire management project work. Prefire management includes a combination of fuels reduction, ignition management, fire-safe engineering activities and improvements to forest health to protect public and private assets. CAL FIRE finds there is a direct relationship between reduced expenditures for prefire management and suppression and increased emergency fund expenditures, disaster funding, and private taxpayers' expenditures and losses.

CAL FIRE is responsible for fire suppression on privately-owned wildlands and provides emergency services under cooperative agreements with the counties.

In 2000, the State Board of Forestry and CAL FIRE completed a comprehensive update of the *State Fire Plan for Wildland Fire Protection in California*. The overall goal of the plan was to reduce total costs and losses from wildland fire by protecting assets at risk through focused prefire management prescriptions and increasing initial attack success. CAL FIRE's statewide Initial Attack Fire Policy is to aggressively attack all wildfires, with the goal of containing 95% of all fire starts to 10 acres or less.

In the Lakehead Fire Safe Council Area (Planning Area), the STNF has the responsibility for wildland fire protection on all ownerships. CAL FIRE and the STNF have entered into a cooperative agreement for dispatching and resource sharing on all wildland fires occurring in the "mutual threat zone" near the I-5 corridor. In the I-5 corridor, from Bridge Bay north through Castle Crags State Park, the STNF responds to wildland fires, and the Lakehead Volunteer Fire Company, in cooperation with Mountain Gate Fire Protection District responds to structure and vehicle fires. The cooperative agreement, in conjunction with the California Cooperative Fire Agreement on Wildland Fire Suppression between CAL FIRE, STNF, National Park Service, and Bureau of Land Management, outlines the cooperative sharing of resources for wildland fire suppression, since wildfires do not recognize political or ownership boundaries.

In summary, the STNF, Shasta County Fire Department, and CAL FIRE believe that cooperative fire protection, fuels reduction, and fire prevention must be linked in order to be successful in dealing with wildfire within the Lakehead FSC area.

C. SHASTA COUNTY FIRE SAFE COUNCIL

The Shasta County Fire Safe Council (SCFSC) was formed in May 2002 as part of a statewide effort that began in 1993 to form area Fire Safe Councils across the state to educate and encourage Californians to prepare for wildfires before they occur. (See www.firesafecouncil.org for more information.) The mission of the SCFSC is to be a framework for coordination, communication and support to decrease catastrophic wildfire throughout Shasta County. The group meets quarterly to discuss projects, share information, schedule speaking engagements, develop educational opportunities, and update maps showing fuels reduction projects and maintenance throughout the county. SCFSC has a mobile education trailer used for public outreach. The trailer is available to fire safe councils throughout the county for use at schools, fairs, and other civic gatherings. For more information check out SCFSC on the web at www.shastacountyfiresafecouncil.org.

D. SHASTA-TRINITY NATIONAL FOREST

The Shasta-Trinity National Service (STNF) administers about 194,312 acres or 56% of the Lakehead Fire Safe Council Planning Area (See Map #5). These lands are managed as part of the National Recreation Area. The STNF completed a *Fuels Analysis and Strategy* to provid a basis for managers to make decisions concerning placement and priorities of fuels management

projects. It is a unit level analysis meant for forest level considerations. The report states it may also be used as a tool for project level planning.

The analysis characterizes the STNF in terms of hazard, risk and value. Hazard is defined as fire behavior potential, which has implications for resource damage as well as suppression capability. Risk is the probability of a fire occurring based on local fire history. Value refers to the monetary, ecological or political worth of a definable area. All three values (hazard, risk and value) are quantified by a measure of low, moderate, or high through a combined use of scientific data and technical expertise, and displayed in a GIS map. The three are then combined to get an overall rating.

The final step of this analysis prioritizes the forest in terms of critical fire danger areas based on the hazard, risk and value ratings and management needs. These priorities align with the National Fire Plan and the Cohesive Strategy and will guide resource management considerations on the forest, such as natural fuels project priorities and identification of essential road access for protection purposes. The national priorities are wildland-urban interface, readily accessible municipal watersheds, threatened and endangered species habitat, and maintenance of existing low risk Condition Class I areas.

E. TIMBER PRODUCTION ZONES

About 77,384 acres or 22% of the Lakehead FSC Area are owned by private forest landowners who manage the lands as Timber Production Zones (TPZs), which are restricted to timber production and certain compatible uses (See Map __). Sierra Pacific Industries and Roseburg Lumber are the primary commercial forest landowners in the watershed.

Typically, all contractors and employees permitted on private forest land are required to make every effort and take all precautions necessary to prevent fires. A sufficient supply of hand tools are maintained on a job site at all times for fire fighting purposes only. Tools include shovels, axes, saws, backpack pumps, and scraping tools. Each forest worker, employee, or person permitted on private forest land is required to take immediate action to suppress and report any fire on or near the property.

On all fires, a sufficient number of people stay on a fire until it is known that adequate action has been taken by the agency with primary responsibility for putting out the fire. All people and equipment remain until released by the agency in charge, or for a longer period, if considered necessary by the land manager.

During fire season, most companies conduct daily aerial patrols covering their forest operations and pay special attention to those areas where work is underway, even hours after workers have left the area.

Specific treatments are required for limbs and other woody debris (often called slash) created by harvest operations in order to minimize fire hazards in areas of public access. This includes piling and burning slash no later than April 1 of the year following its creation, or within a specified period of time after fire season, or as written in the associated Timber Harvest Plan. Within 100 feet of the edge of the traveled surface of public roads, and within 50 feet of the edge

of the traveled surface of permanent private roads open for public use where permission to pass is not required, slash and any trees knocked down by road construction or timber operations are typically lopped for fire hazard reduction, then piled and burned, chipped, buried or removed from the area. Lopping is defined as severing and spreading slash so that no part of it remains more than 30" above the ground. All woody debris created by harvest operations greater than one inch (1") and less than eight inches (8") in diameter within 100 feet of permanently located structures maintained for human habitation are removed or piled and burned. All slash created between 100-200 feet of permanently located structures maintained for human habitation are usually lopped (cut) for fire hazard reduction, removed, chipped or piled and burned. Lopping may be required between 200-500 feet from a structure if an unusual fire risk or hazard has been determined.

F. PRIVATE LAND – OTHER

Other private land in the watershed totals about 75,614 acres or 22% of the Lakehead FSC Area (See Map 1). Private land use includes residences, businesses, recreation facilities in and around the communities of Lakehead, Lakeshore, Delta, Pollard Flat, Vollmers, and LaMoine, and the Gilman Road Area.

G. PARTNERS

The Lakehead Fire Safe Council was founded in 2001 by a group of homeowners who recognized the need to reduce the hazard of wildfire from around their communities and homes. The LFSC Mission Statement is:

The goal of this council is to identify, define, and reduce the fire danger in our area. The Scope of this Lakehead Fire Safe Council (LFSC) will encompass all Lakehead area residents including, but not limited to all 96051 zip code residents.

The objectives of LFSC are:

- Develop Fire Safety education information and activities
- Identify local fire dangers and develop a community wildfire protection plan
- Develop and implement plans to reduce fire danger
- Develop evacuation procedures
- Continue expansion of the guidelines for LFSC

Following is a list of organizations and agencies partnering with LFSC to implement this updated Strategic Fuels Reduction Plan.

- USDA Shasta-Trinity National Forest (STNF)
- CAL FIRE,
- California Highway Patrol (CHP)
- CalTrans
- Western Shasta Resource Conservation District (WSRCD)
- Lakehead Community Development Association (LCDA)

- Shasta County Fire Safe Council (SCFSC)
- Shasta County Sheriff's Department
- ShasCom
- Shasta County Road Department
- Lakehead Volunteer Fire Company
- Shasta County Fire Department
- Sierra Pacific Industries (SPI)
- Union Pacific Railroad (UP)
- Shasta Lake Business Owners Association
- O'Brien Mountain Homeowners Association
- Salt Creek Special Use Group
- Campbell Creek Special Use Group
- Local water utility groups
- Upper Sacramento River Exchange
- The communities of: Lakehead, Lakeshore, Delta, Pollard Flat, Vollmers, and LaMoine, and the Gilman Road Area

IX. ANALYSIS OF FUEL INVENTORY AND FIRE CONDITIONS

A. WILDLAND FIRE ENVIRONMENT

The three major components of the wildland fire environment are fuels, weather, and topography (National Wildland Coordination Group, 1994). Weather is a major factor and local weather conditions are important in predicting how a fire will behave.

Within the lower elevations of the Sacramento River Canyon the wind typically blows from the north during the early part of the summer and from the south during the latter part of the summer; and in the western foothills, the wind trends up the canyons on the hillsides east to west. In the valley the wind patterns push wildfire in a northerly or southerly direction and westerly direction in the foothills. From a strategic standpoint, fire spread in lower elevations can most likely be decreased by an east-west oriented fuelbreak or area to set up control lines. To hold valley fires from being pulled up through 'chimneys' in the canyons of the foothills, strategically placed fuel breaks near the foothills oriented in a north-south direction can help.

Topography can affect the direction and the rate of fire spread. Topographic factors important to fire behavior are elevation, aspect, steepness and shape of the slope. When fire crews are considering fire suppression methods, the topography is always critical in determining the safest and most effective plan of attack. When accessible, ridge lines are very important features from which to conduct fire suppression activities and can be a strategic area from which to conduct fuels management activities.

Fuel factors that influence fire behavior are: fuel moisture, fuel loading, size, compactness, horizontal continuity, vertical continuity, and chemical content. (National Wildfire Coordinating Group 1994)

- Fuel moisture is the amount of water in a fuel, expressed as a percentage of the ovendry weight of that fuel. For example, a fuel sample can be found to have 20- 60% moisture content. Moisture content can range from as low as 5 % to a high of 260+%.
- Fuel loading is defined as the ovendry weight of fuels in a given area, usually expressed in bone dry tons. For example, an area can be calculated to have 20 bone dry tons per acre of fuel. A bone dry ton is 2000 pounds of vegetation when rated at 0% moisture content.
- Size refers to the dimension of fuels, and compactness refers to the spacing between fuel particles.
- Continuity is defined as the proximity of fuels to each other, vertically or horizontally, that governs the fire's capability to spread and sustain itself.
- Chemical content in fuels can either retard or increase the rate of combustion.

All of these factors will influence the quantity of heat delivered, the duration, flame length and the rate of spread of any given fire, and should be considered prior to considering pre-fire projects or initiating fire suppression activities.

B. RECENT HISTORY OF MAJOR FIRES (MAP 5)

The Lakehead area has experienced several major fires in the last 30 years, plus numerous smaller fires each year that were caught in initial stages by aggressive fire suppression or otherwise restrained by less than perfect fire weather conditions.

The Delta Fire, a 1,260 acre fire started in the early afternoon on July 18, 1985, about 4 miles north of Lakehead by an illegal campfire down by the river. The fire blew up the canyon, jumping the freeway. The conditions were critical due to low humidity, a drought, and hot weather.

In Sept. 1999, a series of dry lightning strikes sparked numerous fires around the Lakehead area. Due to depleted fire suppression resources (local fire fighters were sent to other numerous major fires in the western United States), the fires grew into the High Complex Fire, and ultimately threaten the town of Lakehead. The High Complex Fire was eventually contained at around 39,000 acres after a massive fire suppression effort by over 1,000 personnel, including over 100 structure engines deployed to protect homes. One foot bridge and a water district's above ground supply line were lost when fire over ran fire lines.

Eight (8) other major fires occurred in Shasta County in the last two decades: the Fountain Fire near Round Mountain (1992) burned 63,960 acres; the Canyon Fire near Happy Valley (2001) burned 2,580 acres; the Jones Fire near Bella Vista (2001) burned 26,020 acres; the French Fire (2004) burned 12,675 acres; the Bear Fire (2004) burned 10,442 acres, the Motion Fire (2008) burned 28,330 acres; the Elmore Fire burned 343 acres, the Moon Fire (2008) burned 35,312 acres. These fires were wind driven events, with resulting extreme fire behavior and great property and timber losses.

In summary, with heavy fuel loading, hot temperatures, critically low humidity, and strong north winds, a major wildfire potential exists in the Lakehead and northern Shasta County area.

C. AGENCY LARGE FIRE DATABASES

CAL FIRE and STNF maintain databases with GIS layers on large fires and fire starts within and around their Forest Protection Zones (FPZ). The CAL FIRE database also includes fires recorded within the National Park Service Fire Protection Zone. Both databases include the year of fire start, large fires, and total fire acreage, but cause of fire is included only on CAL FIRE fire start data and STNF large fire data.

STNF records were made only of those fires that received some type of fire suppression action. Fires that had no suppression activity or were extinguished due to natural causes were not recorded. The CAL FIRE database is also historically incomplete, because it does not record large fires less than 300 acres and does not contain fire starts prior to 1985.

D. FUEL INVENTORY

The STNF developed a GIS layer for the 2004 Plan that shows fuel levels in the LFSC area As well as a layer that shows values, hazard, and risk.

Fuels are made up of the various components of vegetation, living and dead, that occur on a given site. Fuels have been classified into four groups – grasses, brush, timber, and slash. The differences in fire behavior among these groups are related to the fuel load and its distribution among the fuel diameter-size classes. In 1972, 13 mathematical fire behavior models or Fuel Models were developed by Rothermel (1972) to be utilized in fire behavior predictions and applications for every vegetation type. These Fuel Models represent the types of fuel most likely to support a wildfire.

TABLE 3
FUEL MODEL TYPES

Fuel Model	Fuel Complex
	Grass and Grass-Dominated
1	Short Grass (1 foot)
2	Timber (grass and understory)
3	Tall Grass (2.5 feet)
	Chaparral and shrub fields
4	Chaparral (6 feet)
5	Brush (2 feet)
6	Dormant brush, hardwood slash
7	Southern rough
	Timber litter
8	Closed timber litter
9	Hardwood litter
10	Timber (litter and understory)
	Slash
11	Light logging slash

Fuel Model	Fuel Complex
12	Medium logging slash
13	Heavy logging slash

The fuel models were designed to estimate fire behavior during severe fire hazard conditions when wildfires pose greater control problems and severely impact natural resources. Fuel models are simply tools to help the user realistically estimate fire behavior. The criteria for choosing a fuel model includes the assumption that fire burns in the fuel stratum best conditioned to support the fire. This means that situations will occur where one fuel model will represent the rate of spread most accurately, while another best depicts fire intensity. In other situations, two different fuel conditions may exist, so the spread of fire across the area must be weighed by the fraction of the area occupied by each fuel type.

E. RESULTS OF THE FUEL INVENTORY

The USFS Fuel Model GIS layer shows that 85 percent of the area lies in Fuel Model # 9 or #10, and 15 percent lies in Fuel Model # 6. Following is a description of these three predominant fuel models.

- Fuel Model #9 comprises 40% of the area. Model #9 is described by Anderson, 1982, as hardwood litter. Both long-needle conifer and hardwood stands are typical. Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines, or southern pine plantations are grouped in this model.
- Fuel Model #10 comprises 45 % of the area. Model #10 is described by Anderson, 1982, as dead-down fuels include greater quantities of 3-inch or larger limbwood resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Any forest type may be considered if heavy downed material is present.
- Fuel Model #6 is prevalent in much of the rest of the area. It is described by Anderson, 1982, as dormant brush, hardwood slash. Fuel situations to be considered include intermediate stands of chamise, chaparral, and oak brush. Much of the remaining area is covered in low elevation hardwoods, poison-oak, and whiteleaf manzanita.

TABLE 4
ACRES OF VEGETATION TYPE

Fuel Model/ Vegetation Type	Total Acres
6 – dormant brush, slash	52,097
9 – hardwood litter	138,924
10 – overmature litter	156,289
TOTAL	**347,310**

To understand the current fuel loading conditions, it is important to understand past fuel loading conditions. Due to the historical fire regime, overall plant densities were most likely lower than those of today. Frequent fires would have drastically reduced vegetation densities and

accumulated fuels. Furthermore, it is also very likely that the species composition is much different today due to fire suppression. Fire-adapted species, which thrived in re-occurring fire environments, have declined due to competition from non-fire dependent species. In addition, much of the area was impacted by the smelters in operation around the turn of the 20th century. Much of the vegetation that has come back since 1920 is different from what was growing in 1880.

Whatever the cause of the fuel modification, the resulting danger from wildfire is critical. Map # 4, Value/Hazard/Risk Rating, graphically shows the breakdown of high, medium, and low rated areas. Those areas in the wildland urban interface are graphically represented as the High rating areas.

X. FUEL TREATMENTS

INTRODUCTION

Reducing fuel loads is one of the most effective elements of any fire prevention and protection program. Although fire is an integral component of the planning area ecosystem, managing fire by managing fuel loading is critical to maintaining communities, ranches, forest land, grazing lands, riparian areas, and the overall health and function of the watershed. The ability to implement fuel reduction projects typically comes down to the source of funds available, the cost of labor, the permitting process to implement the project, and landowner cooperation.

A. PRESCRIBED BURNING

The NPS has been engaging in prescribed burning within the WNRA since 1994. CAL FIRE conducted prescribed fires on private land twice, first in 1983 and again in 1986. Advantages of prescribed fire are: it can be low in cost to implement, it can be implemented over a large area, and it may decrease herbicide use by controlling the timing of sprouting. Some of the negative aspects of prescribed fire are: the potential for erosion, the smoke, the practice has a limited season, there is the risk of escape, it is not feasible in small areas, and it is not a stand-alone tool.

Prescribed fire is used to approximate the natural vegetative disturbance of periodic wildfire occurrence. This vegetative management tool is used to maintain fire dependent ecosystems and restore those outside their natural balance. Generally, low intensity prescribed fire is applied by trained experts to clear ground of dangerous fuels like dead wood and brush. This low-intensity fire is vital to the life cycles of fire-dependent range and forest lands.

Most prescribed fires are lit by crews using a drip torch, a hand-carried device that pours out a small stream of burning fuel. Other fires or burns are ignited by helicopters carrying a gelled fuel torch (helitorch) or a sphere dispenser machine that drops material to ignite the surface fuels in forest and range types. Exactly how each unit is ignited depends on weather, the lay of the land, and the intensity of the fire needed to meet the goal of the burn (USDA Forest Service 2002). The technique can be used to burn piles of cut brush or grass over a designated prepared area (broadcast burn).

Prescribed fire is useful in restoring and maintaining natural fire regimes in wildland areas, but logistic, economic, and social attributes are constraints on widespread deployment. Because of such conflicts, resource managers often employ mechanical fuel reduction, such as thinning, in conjunction with prescribed fire to reduce fuels and the fire hazard (Regents of the University of California 1996) (CAL FIRE 2002).
Prescribed fire is not without controversy and risk. A prescribed fire can get out of control and cause damage to watersheds, wildlife habitat, and structures, and can even result in loss of life. It is only an option when this risk can be reduced to manageable levels. Factors closely monitored to mitigate risk include:

- Fuel moisture content
- Ratio of dead-to-live fuel
- Fuel volume
- Size and arrangement of fuel
- Percentage of volatile extractives in the fuel
- Wind speed and direction
- Relative humidity
- Air temperature
- Topography

A successful prescribed burn must account for all these factors to prevent the fire from going out of control. Guidelines for measuring the data and selecting the levels necessary to manage the prescribed fire are available from a variety of sources. One excellent reference for wildland-urban zones is the USDA Forest Service publication, *Burning by Prescription in Chaparral* (USDA Forest Service 1981).

Air quality is another consideration in the use of prescribed burning. Communities in the Urban-Wildland Interface are very sensitive to the presence of smoke. Burn days approved by state and local authorities take into consideration the meteorological effects on both fire severity and smoke dispersion. In the case of chaparral, prescribed burning for range improvement has been practiced by California landowners under permit from CAL FIRE since 1945 (Green 1981). Currently, procedures for prescribed burning require a written plan for each burn. A plan includes such items as an objective, an area map, a description of the burn unit and surrounding areas, a smoke management plan, and the burn prescription (USDA Forest Service 1981).

Prescribed fire is the primary treatment method for all public lands, ranging from USFS land to state parks. According to FRAP, the *Forest and Rangeland Resources Assessment Program* (Regents of the University of California 1996), most prescribed burns were to control brush, especially chaparral. Public agencies feel prescribed burns offer the lowest cost solution when considering the scale of the area requiring treatment. However, prescribed fires can be quite expensive when the true cost of planning, data gathering, reporting, and control and suppression are considered. Other major constraints are the reduction in allowable burn days because of increasing air quality concerns, high fuel load levels found in many forested and urban-wildland areas, and the increased production of pollutants, such as carbon monoxide, nitrous oxide, and particulates. In these situations, a combination of mechanical methods of fuel reduction combined with prescribed fire may provide the best solution.

B. SHADED FUEL BREAKS

Shaded fuel breaks are constructed to create defensible space where firefighters can conduct relatively safe fire suppression activities. Shaded fuel breaks may also slow a wildfire's progress enough to allow supplemental attack by firefighters. The main idea behind shaded fuelbreak construction is to break up fuel continuity to prevent a fire from reaching the treetops, thus forcing the fire to stay on the ground where it can be more easily and safely extinguished. Shaded fuel breaks may also be utilized to replace flammable vegetation with less flammable vegetation that burns less intensely. A well-designed shaded fuelbreak also provides an aesthetic setting for people and a desirable habitat for wildlife, in addition to fuels reduction. The California Board of Forestry has addressed the needs to strengthen community fire defense systems, improve forest health and provide environmental protection. The Board rules allow a Registered Professional Forester (RPF) to use a special silviculture prescription when constructing or maintaining a community fuel break, exempts community fuel breaks from an assessment of maximum sustained production requirements and allows defensible space prescriptions to be used around structures.
The WSRCD, through consultation with its agency partners, has developed the following Shaded Fuelbreak standards:

- The typical minimum width of a shaded fuelbreak is 100 feet, but can exceed 300 feet wide in some areas. The appropriate width is highly dependent on the slope, fuel density, fuel type, fuel arrangement, and landowner cooperation.
- Fuel breaks should be easily accessible by fire crews and equipment at several points. Rapid response and the ability to staff a fire line is very important for quick containment of a wildfire.
- The edges of a fuelbreak are varied to create a mosaic or natural look. Where possible, fuel breaks should compliment natural or man-made barriers such as meadows, rock outcroppings, and roadways.
- A maintenance plan should be developed before construction of a fuel break. Although a fuelbreak can be constructed in a matter of a few weeks, maintenance must be conducted periodically to keep the fuelbreak functioning properly.
- The establishment of a shaded fuelbreak can lead to erosion if not properly constructed. Short ground cover, such as grass, should be maintained throughout the fuelbreak to protect the soil from erosion.

Demonstration Fuelbreak

A properly treated area should consist of well-spaced vegetation with little or no ground fuels and no understory brush. Tree crowns should be approximately 10-15 feet apart. The area should be characterized by an abundance of open space and have a 'park like look' after treatment.

In areas where privacy is a concern, islands of brush may be left in strategic positions. CAL FIRE recommends that brush left in place be limited to islands having a diameter two times the height of the brush, and a distance three times the height of the brush between the islands. If the islands of brush are strategically placed, a homeowner can achieve a reasonable amount of defensible space, and retain the privacy most people are seeking when they move to the wildland – urban interface (WUI).

The Pile and Burn method is most commonly utilized when constructing fuel breaks. Material is cut and piled in open areas to be burned. Burning takes place under permit on appropriate burn days. Burn rings can be raked out after cooling as a means to decrease their visual effect.

In dealing with chaparral, a relatively new technique called "crush and burn" combines mechanical fuels treatment with burning. It is more effective in eliminating chaparral than a low-intensity prescribed burn, which has difficulty competing with the high moisture content of live chaparral. In this method, the chaparral is mechanically crushed, then piled and burned. It is a good technique for areas adjacent to communities and to encourage chaparral regeneration in riparian zones.

C. MECHANICAL TREATMENT

Using mechanized equipment for reducing fuels loads on suitable topography and in certain fuel types can be very effective. Depending on the use of the equipment, it may require environmental review and documentation. Using equipment to remove excess vegetation may enable the landowner to process the debris to a level where it can be marketed as a product for use in power generation. The debris then becomes labeled as "biomass" or "biofuels" and is further explained in Section IX of this report.

Mechanical methods to remove fuels include, but are not limited to, the utilization of bulldozers with or without brush rakes, excavators, chainsaws or mechanized falling machines, masticators, chippers, and grinders. Mechanical treatments are typically conducted on chaparral landscapes with some type of masticator, which grinds standing brush and reduces it to chips, which are typically left on the ground. Brush may also be mechanically removed and fed into a grinder for biomass production. Mechanical treatments are also utilized on industrial and non-industrial timberlands in which trees are thinned by mechanized tree cutting or falling machines. In most cases, stands of trees are thinned from below as a means to eliminate the fuels that can take a fire higher in the forest into the tree canopy (ladder fuels). However, stands of trees may also be thinned from above to eliminate crown continuity.

Mechanical treatments can be used successfully on stable ground up to 50% slope, but should only be conducted during dry periods when soils are not saturated to minimize erosion and compaction. The drastic visual impacts should be considered when planning projects so that all parties are aware of how the area will look when the project is completed. Initial planning should

address mitigation for erosion potential, using measures such as waterbars, ditching, and mulching in critical areas. Furthermore, the impacts on wildlife and archaeological resources must be addressed.

Due to air quality concerns, the mechanical treatment method is becoming a more acceptable method of fuel reduction in WUI areas despite its greater cost. Compared to prescribed fire, mechanical treatment involves less risk, produces less air pollutants, is more aesthetically pleasing, and allows landowners to leave desirable vegetation.

Mechanical treatment will usually necessitate a cultural resource survey, CEQA/NEPA documentation, a Natural Diversity Database search, and the preparation of Water Quality documents. The cost of these safeguards must be figured into the budget for any projects using mechanical methods.

D. BIOMASS ANALYSIS

For thousands of years, people have been taking advantage of the earth's vegetation, also called biomass, to meet their energy needs (www.epa.gov, 2002). Technologies for using biomass continue to improve and today biomass fuels can be converted into alternative fuels (biofuels), such as ethanol, methanol, biodiesel, and as boiler fuel for use in industrial heating and power generation.

When used for generating electricity, biomass is typically burned to transform water into steam, which is used to drive a turbine and attached generator (www.epa.gov, 2002). Although a majority of the biomass market is associated with energy production, biomass offers a wide verity of uses such as fiber-reinforced composites, fiber-filled thermoplastics, high performance fiberboard, cement board, mulch for landscaping and soil amenities, smoke chips for curing and flavoring meat and bio-oils which are used as asphalt additives or adhesives. Potential markets continue to be explored and developed by the private sector, and the federal government has also demonstrated interest in the biomass industry by the release of Executive Order 13134. On August 12, 1999, President Clinton released Executive Order 13134, designed to stimulate the creation and early adoption of technologies needed to make biobased products and bioenergy cost-competitive in the large national and international markets (www.bioproducts-bioenergy.gov, 1999).

The utilization and development of biomass technology offers many economic and socioeconomic benefits. However, one of the most widely acknowledged benefits is the development and utilization of biofuels as a means to reduce the world's dependency on non-renewable fossil fuels. Presently, a majority of the electricity in the U.S. is generated by burning fossil fuels such as coal, natural gas, and oil. On the local level, the development of biotechnology also offers both economic and socioeconomic benefits. The PLANNING AREA contains thousands of acres of forestland, which produce a substantial amount of renewable biomass each year. The biomass market associated with wood products production has long been developed, and biomass harvesting for fuel reduction is a common practice within managed forestlands in northern California. Biomass production not only provides economic support at the local, state, and federal levels, but also reduces the nation's dependency of fossil fuels. The watershed also contains thousands of acres of brushland, which produce a significant amount of

renewable biomass, although only a small portion of the biomass produced from chaparral landscapes is utilized for biofuels.

The potential for biomass production within the Lakehead planning area is limited primarily due to the vegetation composition not being desirable or easily gathered. The closest wood-fired power plant is approximately 50 road miles away in Anderson, California. This is a 50-megawatt wood-fired power plant, Wheelabrator Shasta Energy, which utilizes one hundred semi truckloads (~1,400 bone dry tons) of biomass each day, seven days/week, to produce electricity (Jolley 2002). There are other wood-fired power plants in Shasta County, but this facility is the closest to the Lakehead Fire Safe Area.

The feasibility of any biomass operation depends on the market price of biomass, (also commonly called hogged fuel or hog fuel if it is processed through a hammer hog) the density or amount of fuel on the ground, and transportation costs. Processing can include harvesting and chipping or hogging and costs are directly correlated with the species, age, size and density of the vegetation being processed as well as the topography of the area. The transportation cost from the project area to the nearest wood fired power plant is directly related to the size of the vehicle, time needed for loading biomass, the road bed system and distance to the plant.

The price a power plant is willing to pay for a ton of biomass vs. the processing and transportation costs determines the economic feasibility of an operation. However, the value of fuel reduction to the landowner should be included in this calculation to determine the true feasibility of a biomass operation.
Harvesting is usually accomplished with an excavator and/or a bulldozer tractor, which is utilized to remove and pile the brush. Processing can be accomplished with a hammer hog, tub grinder, drum chipper or some other type of industrial type chipper fed by the excavator or other mechanical means.

Biomass Collection in Action. Tub grinder on right, conveyor moves biomass into the van.

Pursuant to the California Forest Practice Rules, if biomass operations involve the harvest of commercial species, the project requires a permit issued by CAL FIRE. Biomass operations not involving the harvest of commercial species are not subject to the California Forest Practice Rules, but are subject to Water Quality jurisdiction, and may require county permits or other agency review depending on the physical characteristics of the project area. A Registered Professional Forester should be involved prior to commencement of any biomass operation in

order to determine what permits might be required and to estimate the cost and timing of obtaining the permits.

Although the biofuels industry is the most developed biomass market in northern California, other markets are currently in the developmental stage and may become a commercially viable option for biomass products in the future. These markets are far from becoming a significant force in the market place, but may provide alternative utilization methods and future marketing opportunities.

E. MAINTENANCE TREATMENT

Maintenance plans for all existing shaded fuel breaks, as well as a maintenance strategy for all planned shaded fuel breaks need to be formulated as soon as funding can be made available. A maintenance section needs to be added to all planned shaded fuel breaks. Scrub oak re-sprouts and manzanita seedlings on disturbed areas are typical of the vegetation needing control. Control can take many forms including chemical control, mechanical control, or grazing by livestock (namely goats).

The time frame for maintenance is typically two years, five years and ten years after initial construction of the shaded fuel break. Treatment with livestock would need to be repeated more frequently (See #2 below).

Periodic maintenance of a fuelbreak sustains its effectiveness. Seeding the fuelbreak with annual grass cover immediately following its construction will help reduce brush and conifer invasion, but only depending on grass cover will not eliminate invading plants for an extended period of time. The species of grass must be selected with care. A mature stand of tall grass presents a flashy fuel hazard that may be almost bad as the re-sprouts.

Shade is another method for controlling the re-growth of vegetation. The shade in shaded fuel breaks is a two-fold benefit. Not only does it make the fuelbreak more aesthetically palatable, the shade also limits the re-growth of shade intolerant species like manzanita and toyon thereby reducing fire behavior in a shaded stand.

Following are several methods to maintain fuel breaks:

1. Herbicides

The use of herbicides is a very effective and inexpensive method of eliminating unwanted vegetation, but there are many restrictions. Some herbicides are species specific, which means they can be used to eliminate brush species and will not harm grass species. Manual treatment is also a very effective means to eliminate invading vegetation, but is very labor intensive. The cost of fuelbreak maintenance must be balanced with its degree of effectiveness.

2. Herbivores

Herbivore (goat) grazing may be used as a means of maintaining fuel breaks, since goats will eat brush and weeds. Browse makes up about 60% of a goat's diet, but only about 10-15% of a cow's diet.

Goats used for fuel load reduction are managed to remove dense understory, including brush, shrubs, forbs, and lower branches to remove ladder fuels. It may require giving goats supplements of protein or energy, depending on the class of goats used and the time of year. The choice must be balanced on the type of soil, vegetation and livestock analysis. Monitoring of the herbivore grazing is critical since over-grazing can lead to erosion.

As goats work through an area they also work on the understory, old pine needles and leaves, break lower branches, and split apart old downed branch material. Once an area has been "brushed" by goats, it can be maintained as a living green belt. Fire control or containment with goats takes coordination of the stock owner, land steward, local fire patrol, professional fire abatement teams, CAL FIRE, DFG, and others.

According to a report published by the North Carolina Cooperative Extension Service, grazing goats have been observed to select grass over clover, prefer browsing over grazing pastures, prefer foraging on rough and steep land than over flat, smooth land, graze along fence lines before grazing the center of a pasture, and graze the top of the pasture canopy fairly uniformly before grazing close to the soil level.

Herbivore grazing has been done in the Sierra Foothills by Goats Unlimited, Rickerby, CA. They report the vegetation in the Sierra Foothills grazing area consists of woody plants, shrubs, forbs and grasses. Before entering a new area, the herder develops a landscape goal, completes a vegetative survey and identifies toxic plants. They identify the growth habit and adaptation of each plant species, especially those that are toxic. The objective is to control the invasion of unwanted species and encourage perennial grasses to return. In a report published by Langston University, goats improve the cycling of plant nutrients sequestered in brush and weeds, enabling the reestablishment of grassy species. Portable electric fencing with solar energizers is used to control the goats' foraging area.

A "Rule of Thumb" for the cost of using goats for fuels reduction projects was found in a report on the Internet. A minimum effective goat herd has 500 animals, which will remove fuel from about 3 acres per day at a cost of $1.00 per day per goat. The cost includes the goats, portable fencing, a goat herder, water and all transportation and daily supervision.

Herbivores Used In Fuel Reduction

3. Converting Brush Land to Forest Land

Brush land frequently occurs on soils that are best suited for growing brush. The exception to this are forest soils that have been burned, and have come back to brush. Brushland soils are sloping to very steep loams and are gravelly, stony, or rocky. These soils are usually shallow to bedrock, and available water capacity is low or very low. Vegetation is generally chaparral, which includes such species as chamise, Lemmon ceanothus, buckbrush, toyon, poison-oak, whiteleaf manzanita, and western mountainmahogany. There are few trees occurring on the sites, such as interior live oak and gray pine. At least 80 percent of the surface cover is woody vegetation.

Conversion from brushland to forest land will entail a thorough investigation of the site. Soil depth, type, aspect, and exposure will all determine the success or failure of an attempted conversion. With few exceptions, most of the brushy sites are naturally occurring, and represent the native vegetative community.

Natural regeneration of coniferous species after a burn is very difficult to accomplish. A conversion from brush to forest land should begin with a thorough investigation of the capability of the site to support coniferous trees. The second, or next step, should be to secure a reliable source of climatically adapted seedlings; and the third step should be to develop a planting plan. A realistic cost estimate should be the fourth step. All this should be accomplished before the existing brush cover is removed.

XI. ROADS FOR ACCESS

Roads are an essential part of any fire and fuels management plan, providing the principal access to the communities, homes and wild places in the watershed (See Map #8). Additionally, roads may offer a defensible space from which firefighters can conduct direct attack on wildfires and also provide strategic locations for roadside fuel breaks. Roadside fuel breaks provide not only defensible space for firefighters, but also a safe escape route for residents in the event of a wildfire.

Roads in the PLANNING AREA typically intersect the Interstate 5 corridor. The area can be reached from both the north and south along I – 5, which is the major connection throughout the area. All roads are important for providing fire protection access. This plan will not attempt to

identify and map all paved or improved roads. Roads that are vital to future projects will be included in treatment options. Following is a list of dominant fire access roads.

A. MAIN NORTH SOUTH ROADS

- Interstate 5.

B. ROADS GOING WEST FROM INTERSTATE 5

- Lakeshore Drive
- Lower Salt Creek Road
- Gregory Creek Road
- Sugarloaf-Lakeshore Road
- Sugarloaf Lookout Road
- Dog Creek Road
- Slate Creek Road
- Highlands Lake Road
- Upper Shotgun Road

C. ROADS GOING EAST FROM INTERSTATE 5

- Turn Table Bay Road
- Gilman Road
- Statton Road
- Gregory Creek Road
- Antlers Road
- Fenders Ferry Road
- Sims Road
- North Salt Road
- Girard Ridge Road

D. OTHER ROADS

- Delta Point Lookout Road
- Riverview Drive
- Mammoth Drive
- Chamise Street
- Doney Street
- Snowbird Lane
- Pollard Flat
- Gibson Road
- Little Slate Creek Road
- Bear Flat Way

XII. POTENTIAL COST SHARE FUNDING SOURCES

The following table is a list of cost share programs provided by the University of California, Cooperative Extension Service (UCCE).

TABLE 5
FUNDING SOURCES AND COST SHARE PROGRAMS

Program	Goals	Services	Will Fund	Agency	Who	Limitations
Emergency Watershed Protection	Helps safeguard people and property following natural disasters.	Technical and financial assistance	Up to 75%	NRCS	Public agencies, non-profits, community groups	25% cost share. Must obtain necessary permits
Environmental Quality Incentives Program	To address significant natural resource needs and objectives	Cost sharing, technical and educational assistance	Up to 75% set by local working group	NRCS, FSA	Agricultural producers having significant natural resource needs	Approved practices up to $10,000 per producer per year. Must have Conservation Plan approved by RCD.
Hazard Mitigation Grant Program	Hazard mitigation to reduce risk from future disasters	Cost share	Up to 75%	FEMA	Agencies, governments, non-profits, tribes	Federal Disaster Areas
Vegetation Management Program	To provide incentives for using fire as a tool to control unwanted brush, and other vegetation, which creates wildfire hazards?	Covers liability, conducts prescribed burn	Up to 90% cost share	CAL FIRE	Landowners, individual or group	Agreement to sign, plan required

Program	Goals	Services	Will Fund	Agency	Who	Limitations
California Forest Improvement Program	Forestry, watershed and riparian protection and enhancement	Reforestation, site prep, land conservation, and fish & wildlife habitat improvements	75% up to $30,000 per contract, rehab after natural disaster up to 90%	CAL FIRE	Landowners	Plan (can be cost shared) required, 20-50,000 acres of forestland

Additional funding sources include:

- California Department of Conservation, RCD Assistance Program
- USDA Forest Service State Fire Assistance (SFA)
- Shasta County Regional Advisory Committee, Title II Funds, Secure Rural Schools and Community Self-Determination Act of 2000
- Bureau of Land Management (BLM) Community Assistance
- National Park Service (NPS) Community Assistance/WUI
- U.S. Fish and Wildlife Service (USFWS) Wildland-Urban Interface Grant Program
- California State Fire Safe Council Clearinghouse, Fuel reduction project grant funding

XIII. FUNDING FUELBREAK MAINTENANCE

Since grant funds are often obtained just to construct the fuel break, maintenance efforts are often left to the landowner. Unfortunately, some landowners do not have the physical or financial means to do maintenance. If a fuelbreak is not properly maintained in its entirety, it will not provide adequate fire protection in the long run. Therefore, in some situations it is often best for watershed groups and other conservation organizations to seek funding for maintenance as a means to better ensure fire protection for a given area. The Community Protection Plan was developed as a result of the USFS National Fire Plan. This plan provides grant funding for fuel reduction projects on private lands. In addition, many of the programs listed in Table 5 above also provide funding opportunities for fuels reduction and maintenance.

Information on private sector funding can be found at the following Internet sites:

- www.fdncenter.org
- www.ceres.ca.gov/foreststeward/funding.html
- www.ice.ucdavis.edu/
- www.teleport.com/~rivernet/general.htm
- www.tpl.org/tpl/about/
- www.ufei.calpoly.edu/data/news/grants.html

Funding programs can assist in the development of shaded fuel breaks, defensible space around structures, roadside fuel reduction, and community fire safe projects.

XIV. GRANT FUNDING OPPORTUNITIES

Funding sources are as varied as the projects listed above. WSRCD has the mechanism in-place to seek funding for any projects generated through this plan. The Lakehead FSC is a 501-c-3 non-profit, and will be able to apply for grant funds also. There are several sources of funding available through the agencies in the area. Historically, funding sources have been CalFed, BLM, CAL FIRE, National Park Service (NPS), USFS, U. S. Fish and Wildlife Service (USFWS), and California Department of Conservation (DOC).

Agencies that have funded or can fund fuelbreak construction and education/outreach efforts include:

- USDA Forest Service
- California Department of Conservation RCD Grant Assistance Program.
- USDI Bureau of Land Management
- USDI Fish and Wildlife Service
- CAL FIRE
- USDI National Park Service
- Shasta County – Secure Rural Schools & Community Self-Determination Act of 2000.
- FEMA

XV. REFERENCES

- Anderson, Hal, *Aids in Determining Fuel Models for Estimating Fire Behavior*, 1982, U.S. Department of Agriculture, Forest Service Ogden, Utah, General Technical Report INT-122, 1982.
- Andrews, Patricia L., *BehavePlus Fire Modeling System Version 1.00.00*, December 2001.
- Bull, Brian, NF Ag News Views, *Using Goats for Vegetation Management,* 2002.
- California Department of Fish and Game. 1993. *Restoring Central Valley Streams: A Plan For Action.* Inland Fishery Division.
- California Department of Forestry and Fire Protection, *California Fire Plan*, May 2000.
- California Department of Forestry and Fire Protection, *Fire and Resource Assessment Program, (FRAP)* 2002.
- California Department of Forestry and Fire Protection, *Shasta County Unit Fire Plan, 2008.*
- California Department of Water Resources, *Sacramento Valley Westside Tributary Watershed Erosion Study*, Executive Summary.), 1992.
- California Board of Forestry and Fire Protection, *California Forest Practice Rules 2002,* California Resources Department.
- DeBano, L.F., and R.M. Rice, *Fire in Vegetation Management*: *Its Effect on Soil*, American Society of Civil Engineers, 1970.
- Federal Register, Volume 66, Number 160, Friday, August 17, 2001.

- Goats Unlimited, *Goats Unlimited: Firebreaking with Meat Goats,* 2002.
- Hart, S. P., Langston University, Journal of Dairy Science, *Recent Perspectives In Using Goats For Vegetation Management In The USA,* 2001.
- Hartley, Rick, CAL FIRE, personal communication to Hide Wenham (WSRCD), 2002.
- Jolley, Steve, Wheelabrator Shasta Energy, Anderson, CA, personal communication WSRCD, 2002.
- Kristofors, Kris V., *Mining Era in Shasta County, California, 1896-1919: An Environmental Impact Study,* an unpublished masters thesis at CSU Chico, 1973.
- Lewis, H.T., *Patterns of Indian Burning in California: Ecology and Ethnohistory,* Ballena Press, 1973.
- National Wildfire Coordination Group, *S-290 Intermediate Wildland Fire Behavior,* National Interagency Fire Center, Boise, Idaho 1994.
- National Wildfire Coordination Group, *Interagency Standards for Fire and Aviation Management, 2008*
- Regents of the University of California, *Sierra Nevada Ecosystem Project (SNEP),* 1996.
- Rothermel, Richard C. *A Mathematical Model for Fire Spread Predictions in Wildland Fuels,* USDA Forest Service, Ogden, UT, INT-115, 1972.
- Schimke, H.E. and L.R. Green. *Prescribed Fire For Maintaining Fuel breaks in the Central Sierra Nevada,* U.S.D.A. Forest Service, Pacific Southwest Range and Experiment Station, Berkeley, CA., 1970.
- Shasta Trinity National Forest, *Land and Resource Management Plan,* 2002.
- Shasta Trinity National Forest, *Shasta Trinity Fire Management Plan,* Redding, CA, 2001
- Shasta Trinity National Forest, *Shasta Lake West Watershed Analysis*, Redding, CA 2000
- *Sunset Western Garden Book,* Kathleen Norris Brenzel, Editor, Sunset Publishing, 2001
- U. S. Census Bureau, U. S. Census 2000.
- U.S. Department of Conservation, Division of Mines and Geology. *Mines and Mineral Resources of Shasta County, California.* County Report 6. 1974.
- USDA Forest Service, *Burning By Prescription in Chaparral,* 1981.
- USDA Forest Service, *Soil Survey of Shasta-Trinity National Forest Area, California*, 1985.
- USDA Forest Service and Department of the Interior, *The National Fire Plan*, October 2000.
- US Environmental Protection Agency (www.epa.gov), *Biomass*, 2002.
- U.S. Fish and Wildlife Service and U. S. Bureau of Reclamation, 2001. *AFRP Final Restoration Plan.*
- U. C. Davis, *Natural Diversity Database 2002,* California Department of Forestry & Fire Protection.
- The White House, Office of the Press Secretary, *Executive Order 13134, Developing and Promoting Biobased Products and Bioenergy*. www.bioproducts-bioenergy.gov, 1999.

APPENDICES

APPENDIX A: GLOSSARY
APPENDIX B: COMMUNITY FIRE SAFE FUEL REDUCTION GUIDELINES
MAPS

APPENDIX A

GLOSSARY

BehavePlus – A computer program used for predicting fire behavior.

Chain – A unit of measurement equal to 66 feet.

Fuel Characteristics – Factors that make up fuels such as compactness, loading, horizontal continuity, vertical arrangement, chemical content, size and shape, and moisture content.

Fuel Ladder – Fuels which provide vertical continuity between strata. Fire is able to carry from ground, to surface, to crown.

Fuel Moisture Content – The amount of water in a fuel, expressed as a percentage of the ovendry weight of that fuel.

Fuels – Any organic material, living or dead, in the ground, on the ground, or in the air, that will ignite and burn. General fuel groups are grass, brush, timber and slash.

Mast – Fruit of oaks and other trees, particularly where considered food for wildlife and domestic livestock.

Mechanical Treatment – Using mechanized equipment including but not limited to bulldozers with or without brush rakes, excavators, rubber tired skidders, mechanized falling machines, chippers and grinders.

Pile and Burn – Material is cut and piled in open areas to be burned. Burning takes place under permitting environmental conditions.

Prescribed Burning – The burning of forest or range fuels on a specific area under predetermined conditions so that the fire is confined to that area to fulfill silvicultural, wildlife management, sanitary or hazard reduction requirements, or otherwise achieve forestry or range objectives.

Rate of Speed – It is expressed as rate of forward spread of the fire front, usually is expressed as chains per hour.

Seral Vegetation – A series of plant communities that follow another over time on a specific site.

Shaded Fuelbreak– A wide strip or block of land on which the vegetation has been modified by reducing the amount of fuel available, rearranging fuels so that they do not carry fire easily, and replacing particularly flammable fuels with others that ignite less easily and burn less intensely.

Surface Fire – A fire that burns surface litter, debris and small vegetation.

Topography – The configuration of the earth's surface, including its relief and the position of its natural and manmade features.

Wildland Urban Interface – Areas where urban fuels directly meet forest fuels, primarily within 66 to 200 feet of houses, but may extend as far as one quarter mile.

APPENDIX B

COMMUNITY FIRE SAFE FUEL REDUCTION GUIDELINES

Why 100 Feet ?

Following these simple steps can dramatically increase the chance of your home surviving a wildfire!

A **Defensible Space** of 100 feet around your home is required by law.[1] The goal is to protect your home while providing a safe area for firefighters.

1 "Lean, Clean and Green Zone."

– Clearing an area of 30 feet immediately surrounding your home is critical. This area requires the greatest reduction in flammable vegetation.

2 "Reduced Fuel Zone."

– The fuel reduction zone in the remaining 70 feet (or to property line) will depend on the steepness of your property and the vegetation.

Spacing between plants improves the chance of stopping a wildfire before it destroys your home. You have two options in this area:

a. Create horizontal and vertical spacing between plants. The amount of space will depend on how steep the slope is and the size of the plants.

b. Large trees do not have to be cut and removed as long as all of the plants beneath them are removed. This eliminates a vertical "fire ladder."

When clearing vegetation, use care when operating equipment such as lawnmowers. One small spark may start a fire; a string trimmer is much safer.

Remove all build – up of needles and leaves from your roof and gutters. Keep tree limbs trimmed at least 10 feet from any chimneys and remove dead limbs that hang over your home or garage. The law also requires a screen over your chimney outlet of not more than ½ inch mesh.

1. These regulations affect most of the grass, brush, and timber-covered private lands in the State. Some fire department jurisdictions may have additional requirements. Some activities may require permits for tree removal. Also, some activities may require special procedures for, 1) threatened and endangered species, 2) avoiding erosion, and 3) protection of water quality. Check with local officials if in doubt. Current regulations allow an insurance company to require additional clearance. The area to be treated does not extend beyond your property. The State Board of Forestry and Fire Protection has approved Guidelines to assist you in complying with the new law. Contact your local CDF office for more details.

April 2006

Here's How to Get Started: Create a Fire Safe Landscape in Seven Steps

Step One

Evaluate the environment around your home. What will catch on fire? Be on the lookout for those "little things" that can burn your home; this can include lounge cushions, papers or anything flammable outside your home. Also consider slope, prevailing winds, vegetation type and density, and exposure to direct sun.

Step Two

Determine what you need to do. Start with the closest Home Ignition Zone and work toward the Defensible Space Zone and through the Wildland Fuel Reduction Zone.

Step Three

Develop a plan for correcting any fire safe problems identified in steps one and two. Consider completing your work prior to June 1 of each year before fuel conditions become too dry. Make sure your power tools have approved spark arresters and, if working in the summer months, complete all work before 10 a.m. Coordinate with adjacent land owners if possible and incorporate existing formal landscape features.

Step Four

Consider codes and regulations related to *defensible space*, burning, work performed near waterways, and tree removal; comply with federal environmental laws and, if necessary, secure permits such as burn permits.

- The Department of Forestry & Fire Protection (CAL FIRE) should be consulted if any wood products from your property are sold, traded or bartered. Types of regulated wood products include sawmill logs, firewood or wood chips.
- The Department of Fish & Game should be notified and consulted if work occurs near a river, stream, lake, or tributaries. Go to: www.dfg.ca.gov/1600/1600.html
- Before cutting down trees, residents should check local association and special district regulations.

Step Five

Implement the plan. Get help and any needed equipment. Begin work in the Home Ignition Zone and work out from there. Remember: It's the little things—such as patio furniture and cushions, leaves, needles, firewood piles, bark, etc.—that can ignite and cause a fire to your home.

Step Six

Remove all slash and debris generated during the fuel modification process by chipping, burning or disposal at your local vegetative waste site. Contact your local fire department for permit requirements. Contact your local Fire Safe Council about their chipping, home consultation and other programs. Find your local Fire Safe Council at www.FireSafeCouncil.org.

Step Seven

Continue to monitor and evaluate the fire safe condition of your home and landscape. Maintain your home's resistance to fire and the *defensible space* in the surrounding property on a routine basis—annually or more frequently, if needed. For new construction, consider fire resistant materials such as concrete panels, stone, brick or other material that doesn't burn easily.

Design and printing: www.FireSafeHelp.com. To order, call: 530/872-0850
Special thanks to the Butte County Fire Safe Council

Is Your Home a Safe Place to Stay?

You live in an area of natural beauty—but it's also prone to wildfire. In fact, it's not a matter of *IF* the timberlands of California will burn, it's a matter of *WHEN* that will happen.

Fortunately, you can take steps today to dramatically improve your odds of survival by making your property "fire safe."

A fire safe property is one where the home and landscape resist the impact of fire. A fire safe landscape is a beautiful landscape that not only protects your home from fire but can also increase the value of your home and impact your home's insurability.

The Fire Environment

Fire behavior is affected by a variety of factors—some of these you can do something about and others are weather-related and beyond your control. Understanding these terms will help you make your home and the surrounding property fire safe.

Fuels: Any flammable materials that will burn. This includes everything from the home itself to plants, dried leaves in the rain gutter, brush, wood shingles, patio furniture and decking material. If it will burn, it's a fuel.

Ignition: The point at which a fire starts as a result of fuel contacting with embers, firebrands (hot, flying embers), direct flame, or superheated air.

Topography: Primarily slope or the steepness of the incline on which your house is situated. Also your home's location on the slope and proximity to canyons or ravines.

Weather: Primarily wind, but also air temperature and humidity (moisture content of the air).

Extreme X-Factor: A multiplication factor used to increase the *defensible space* around a home due to extreme fire behavior factors such as slope, and/or constant or unusually strong winds. If your home is located **on or near** the top of a slope and/or **receives constant or unusually strong winds** you must increase the *defensible space* in Zones 2 and 3 by a multiplication of 1.5 (**X-Factor**). For instance, in Zone 2, increase the *defensible space* from 100 feet to 150 feet.

During the summer and fall months, a combination of low humidity, high temperatures and strong winds results in a "red flag" weather warning. During such a condition, the fire danger is very high. The X-Factor explained above helps provide that extra margin of *defensible space* necessary to keep your property fire safe.

California Fire Safe Council
P.O. Box 2106
Glendora, CA 91740
Phone: 626/335-7426
www.FireSafeCouncil.org

FireSafe COUNCIL

- www.FireSafeCouncil.org
  California Fire Safe Council
- www.fire.ca.gov
  California Department of Forestry & Fire Protection; includes forest management information

Funding for this brochure was provided by a grant from State Farm Insurance.

A Homeowner's Guide to Fire Safe Landscaping

Timberland

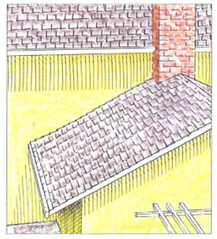
The California Fire Safe Council's mission is to provide leadership and support that mobilizes all Californians to protect their homes, communities and environment from wildfire. We accomplish our mission through broad-based public/private partnerships that create community-wide change via education and action programs because we believe fire prevention and loss reduction are everyone's business.

FireSafe COUNCIL

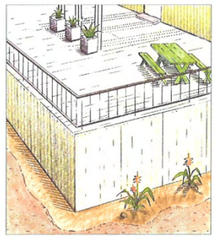
www.FireSafeCouncil.org

Home Ignition Zone
(The home plus 10 ft distance)

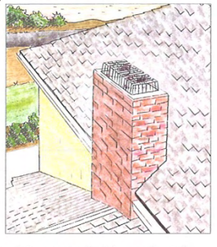
It's the 'little things' that will endanger your home. Just a little ember landing on a little pile of flammable material will burn it. Spend a morning searching out and getting rid of those flammable little things outside and your home will be much safer.



1. Keep your rain gutters and roof clean of all flammable material.
2. Get rid of dry grass, brush and other flammable materials around your home—and don't forget leaves, pine needles and bark walkways. Replace with well maintained (watered) landscape vegetation, green lawn and landscape rocks.
3. Clear all flammable materials from your deck. This includes brooms, stacked wood and easily ignitable patio furniture. Also enclose or board up the area under your deck to keep it from becoming a fuel bed for hot embers.



4. Move woodpiles and garbage cans away from your home. Keep woodpiles away from the home a distance of 2 times the height of the pile—more if lot size allows.
5. Use fine mesh metal screen (1/4" or less) to cover eaves, roof and foundation vents to prevent windblown embers from entering.



6. Inspect and clean your chimney every year. Trim away branches within 10 feet. Install a spark arrester with 1/2" or smaller mesh screen.
7. Got a propane tank? Get rid of any flammable materials within 10 feet of it and, if possible, position it at least 30 feet from any structures.
8. Window screens should be metal, not plastic or other flammable or meltable material.
9. If your home has a pet door, check its seal.

Burning embers landing on wood shake roofs are one of the leading risk factors for losing your home to a wildfire. If possible, replace wood shingle roofs with non-flammable (Class-A) roofing materials, such as asphalt shingles, tile or metal roofing.

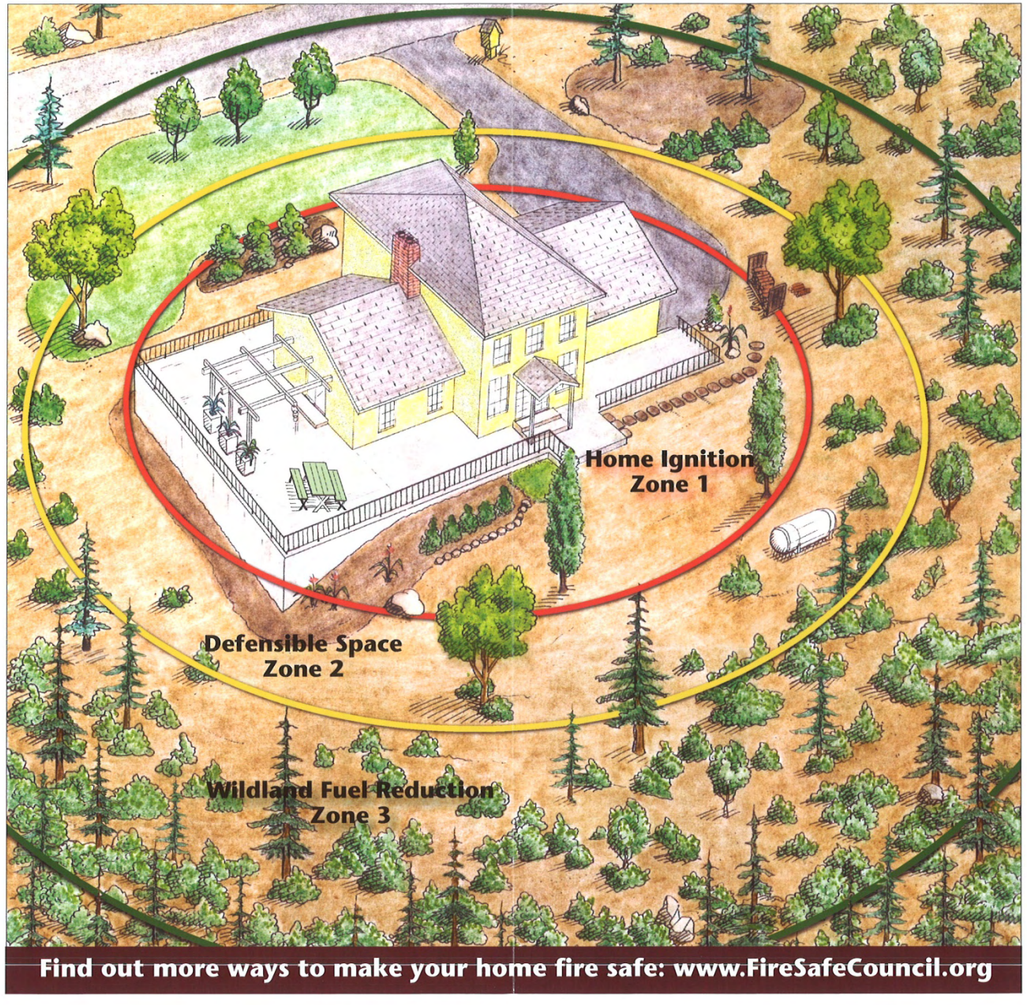
Defensible Space Zone *(100 feet or more distance)* • Keep this area lean and green!

Your "*defensible space*" is the area that is a minimum of 100 feet from your home (as required under State Public Resources Code 4291 or other local ordinances). This is the area where you've modified the landscaping to allow your house to survive on its own—greatly improving the odds for firefighters defending your home.

If your home is on a slope or subject to high winds, extend the distance of this zone based upon the "**X-Factor.**" For instance, this zone may increase to 150 feet (1.5 X 100 feet).

Create a *Defensible Space Zone* by keeping in mind the three R's of defensible space:

- **Remove**—dead and dying grass, shrubs and trees.
- **Reduce**—the density of vegetation (fuel) and ladder fuels, those fuels extending from the ground to the tree canopies.
- **Replace**—hazardous vegetation with less flammable, irrigated landscape vegetation including lawn, or other low growing groundcovers and flowering plants.



Find out more ways to make your home fire safe: www.FireSafeCouncil.org

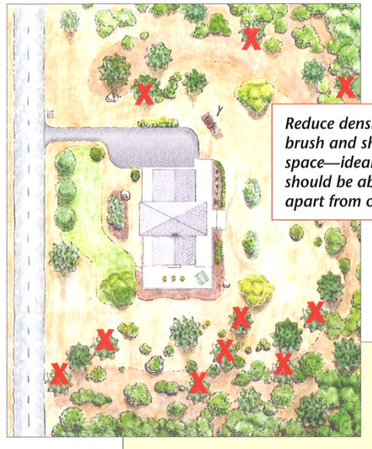
Wildland Fuel Reduction Zone
(Beyond 100 feet distance)

Getting rid of the undergrowth and thinning out densely-crowded smaller trees in this outlying area will reduce fire intensity and slow the spread of a fire moving toward your home. Defensible space increases the odds of your home's survival.

Experts recommend a minimum of 10 feet of spacing between individual trees and shrubs, measured at the crown (widest part) of the tree or shrub. You may need to increase this distance based on your property's **X-Factor**.

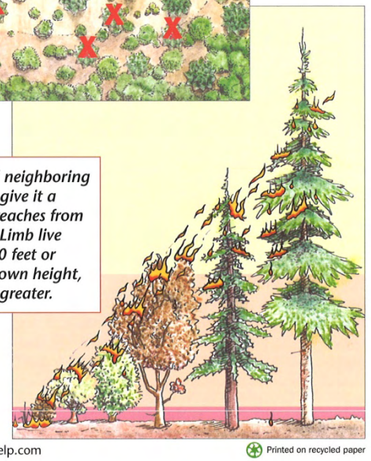
Mature trees should also be limbed up 10 feet, or 1/3 of their live crown height, whichever is greater.

It's possible, depending upon the size of your property, that you will be limited by your property boundary and unable to complete the fire safe measures identified in Zones 2 and 3. If this happens, talk with your neighbors and ask for their cooperation. A safer home means a safer neighborhood for everyone.



Reduce density by giving brush and shrubs more space—ideally they should be about 10 feet apart from one another.

Fire "climbs" neighboring trees—don't give it a ladder that reaches from low to high. Limb live trees up to 10 feet or 1/3 of live crown height, whichever is greater.



Here's How to Get Started: Create a Fire Safe Landscape in Seven Steps

Step One

Evaluate the environment around your home. What will catch on fire? Be on the lookout for those "little things" that can burn your home; this can include lounge cushions, papers or anything flammable outside your home. Also consider slope, prevailing winds, vegetation type and density, and exposure to direct sun.

Step Two

Determine what you need to do. Start with the closest Home Ignition Zone and work toward the Defensible Space Zone and through the Wildland Fuel Reduction Zone.

Step Three

Develop a plan for correcting any fire safe problems identified in steps one and two. Consider completing your work prior to June 1 of each year before fuel conditions become too dry. Make sure your power tools have approved spark arresters and, if working in the summer months, complete all work before 10 a.m. Coordinate with adjacent land owners if possible and incorporate existing formal landscape features.

Step Four

Consider codes and regulations related to *defensible space*, burning, work performed near waterways, and tree removal; comply with federal environmental laws and, if necessary, secure permits such as burn permits.

- The Department of Forestry & Fire Protection (CAL FIRE) should be consulted if any wood products from your property are sold, traded or bartered. Types of regulated wood products include sawmill logs, firewood or wood chips.
- The Department of Fish & Game should be notified and consulted if work occurs near a river, stream, lake, or tributaries. Go to: www.dfg.ca.gov/1600/1600.html
- Before cutting down trees, residents should check local association and special district regulations.

Step Five

Implement the plan. Get help and any needed equipment. Begin work in the Home Ignition Zone and work out from there. Remember: It's the little things—such as patio furniture and cushions, leaves, needles, firewood piles, bark, etc.—that can ignite and cause a fire to your home.

Step Six

Remove all slash and debris generated during the fuel modification process by chipping, burning or disposal at your local vegetative waste site. Contact your local fire department for permit requirements. Contact your local Fire Safe Council about their chipping, home consultation and other programs. Find your local Fire Safe Council at www.FireSafeCouncil.org.

Step Seven

Continue to monitor and evaluate the fire safe condition of your home and landscape. Maintain your home's resistance to fire and the *defensible space* in the surrounding property on a routine basis—annually or more frequently, if needed. For new construction, consider fire resistant materials such as concrete panels, stone, brick or other material that doesn't burn easily.

Design and printing: www.FireSafeHelp.com. To order, call: 530/872-0850
Special thanks to the Butte County Fire Safe Council

Is Your Home a Safe Place to Stay?

You live in an area of natural beauty—but it's also prone to wildfire. In fact, it's not a matter of *IF* the brushlands of California will burn, it's a matter of *WHEN* that will happen.

Fortunately, you can take steps today to dramatically improve your odds of survival by making your property "fire safe."

A fire safe property is one where the home and landscape resist the impact of fire. A fire safe landscape is a beautiful landscape that not only protects your home from fire but can also increase the value of your home and impact your home's insurability.

The Fire Environment

Fire behavior is affected by a variety of factors—some of these you can do something about and others are weather-related and beyond your control. Understanding these terms will help you make your home and the surrounding property fire safe.

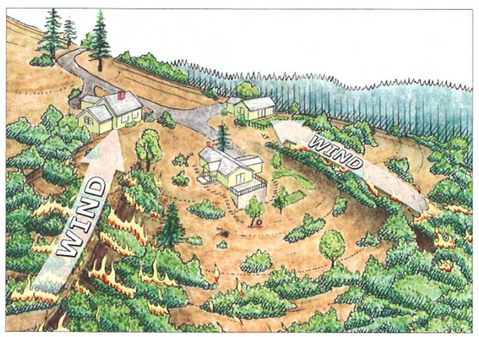
Fuels: Any flammable materials that will burn. This includes everything from the home itself to plants, dried leaves in the rain gutter, brush, wood shingles, patio furniture and decking material. If it will burn, it's a fuel.

Ignition: The point at which a fire starts as a result of fuel contacting with embers, firebrands (hot, flying embers), direct flame, or superheated air.

Topography: Primarily slope or the steepness of the incline on which your house is situated. Also your home's location on the slope and proximity to canyons or ravines.

Weather: Primarily wind, but also air temperature and humidity (moisture content of the air).

Extreme X-Factor: A multiplication factor used to increase the *defensible space* around a home due to extreme fire behavior factors such as slope, and/or constant or unusually strong winds. If your home is located **on or near** the top of a slope and/or **receives constant or unusually strong winds** you must increase the *defensible space* in Zones 2 and 3 by a multiplication of 1.5 (**X-Factor**). For instance, in Zone 2, increase the *defensible space* from 100 feet to 150 feet.



During the summer and fall months, a combination of low humidity, high temperatures and strong winds results in a "red flag" weather warning. During such a condition, the fire danger is very high. The X-Factor explained above helps provide that extra margin of *defensible space* necessary to keep your property fire safe.

California Fire Safe Council
P.O. Box 2106
Glendora, CA 91740
Phone: 626/335-7426
www.FireSafeCouncil.org

FireSafe COUNCIL

For more information:

- www.FireSafeCouncil.org
  California Fire Safe Council
- www.fire.ca.gov
  California Department of Forestry & Fire Protection; includes forest management information

Funding for this brochure was provided by a grant from State Farm Insurance.

A Homeowner's Guide to Fire Safe Landscaping

Brushland

The California Fire Safe Council's mission is to provide leadership and support that mobilizes all Californians to protect their homes, communities and environment from wildfire. We accomplish our mission through broad-based public/private partnerships that create community-wide change via education and action programs because we believe fire prevention and loss reduction are everyone's business.

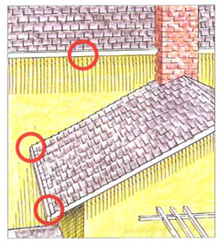
FireSafe COUNCIL

www.FireSafeCouncil.org

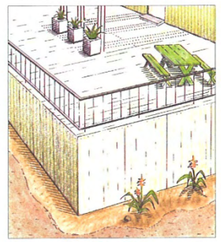
Home Ignition Zone

(The home plus 10 ft distance)

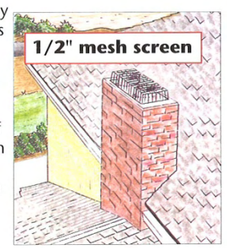
It's the 'little things' that will endanger your home. Just a little ember landing on a little pile of flammable material will burn it. Spend a morning searching out and getting rid of those flammable little things outside and your home will be much safer.



1. Keep your rain gutters and roof clean of all flammable material.
2. Get rid of dry grass, brush and other flammable materials around your home—and don't forget leaves, pine needles and bark walkways. Replace with well maintained (watered) landscape vegetation, green lawn and landscape rocks.



3. Clear all flammable materials from your deck. This includes brooms, stacked wood and easily ignitable patio furniture. Also enclose or board up the area under your deck to keep it from becoming a fuel bed for hot embers.
4. Move woodpiles and garbage cans away from your home. Keep woodpiles away from the home a distance of 2 times the height of the pile—more if lot size allows.
5. Use fine mesh metal screen (1/4" or less) to cover eaves, roof and foundation vents to prevent windblown embers from entering.



6. Inspect and clean your chimney every year. Trim away branches within 10 feet. Install a spark arrester with 1/2" or smaller mesh screen.
7. Got a propane tank? Get rid of any flammable materials within 10 feet of it and, if possible, position it at least 30 feet from any structures.
8. Window screens should be metal, not plastic or other flammable or meltable material.
9. If your home has a pet door, check its seal.

Burning embers landing on wood shake roofs are one of the leading risk factors for losing your home to a wildfire. If possible, replace wood shingle roofs with non-flammable (Class-A) roofing materials, such as asphalt shingles, tile or metal roofing.

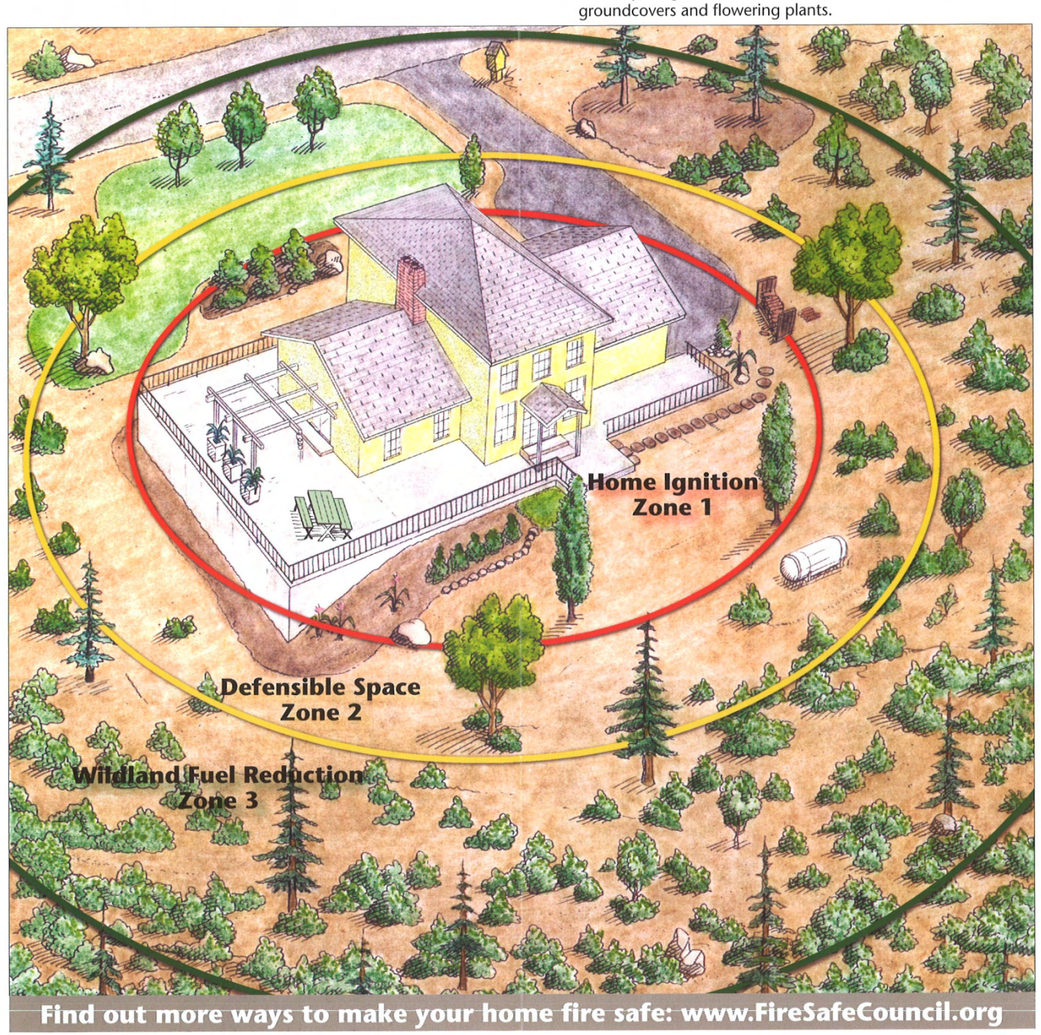
Defensible Space Zone *(100 feet or more distance)* • Keep this area lean and green!

Your "*defensible space*" is the area that is a minimum of 100 feet from your home (as required under State Public Resources Code 4291 or other local ordinances). This is the area where you've modified the landscaping to allow your house to survive on its own—greatly improving the odds for firefighters defending your home.

If your home is on a slope or subject to high winds, extend the distance of this zone based upon the "**X-Factor.**" For instance, this zone may increase to 150 feet (1.5 X 100 feet).

Create a *Defensible Space Zone* by keeping in mind the three R's of defensible space:

- **Remove**—dead and dying grass, shrubs and trees.
- **Reduce**—the density of vegetation (fuel) and ladder fuels, those fuels extending from the ground to the tree canopies.
- **Replace**—hazardous vegetation with less flammable, irrigated landscape vegetation including lawn, or other low growing groundcovers and flowering plants.



Find out more ways to make your home fire safe: www.FireSafeCouncil.org

Wildland Fuel Reduction Zone

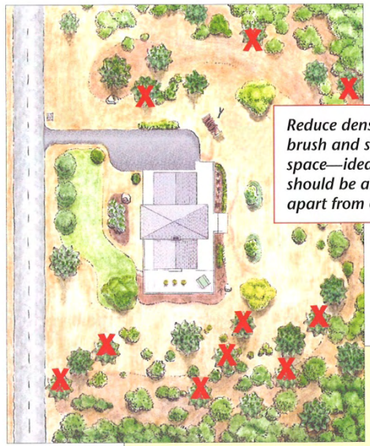
(Beyond 100 feet distance)

Getting rid of the undergrowth and thinning out densely-crowded smaller trees in this outlying area will reduce fire intensity and slow the spread of a fire moving toward your home. Defensible space increases the odds of your home's survival.

Experts recommend a minimum of 10 feet of spacing between individual trees and shrubs, measured at the crown (widest part) of the tree or shrub. You may need to increase this distance based on your property's **X-Factor**.

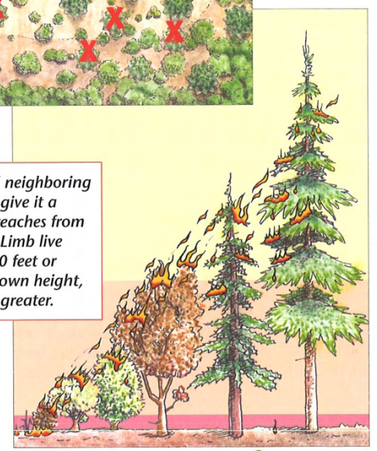
Mature trees should also be limbed up 10 feet, or 1/3 of their live crown height, whichever is greater.

It's possible, depending upon the size of your property, that you will be limited by your property boundary and unable to complete the fire safe measures identified in Zones 2 and 3. If this happens, talk with your neighbors and ask for their cooperation. A safer home means a safer neighborhood for everyone.



Reduce density by giving brush and shrubs more space—ideally they should be about 10 feet apart from one another.

Fire "climbs" neighboring trees—don't give it a ladder that reaches from low to high. Limb live trees up to 10 feet or 1/3 of live crown height, whichever is greater.



Here's How to Get Started: Create a Fire Safe Landscape in Seven Steps

Step One

Evaluate the environment around your home. What will catch on fire? Be on the lookout for those "little things" that can burn your home; this can include lounge cushions, papers or anything flammable outside yor home. Also consider slope, prevailing winds, vegetation type and density, and exposure to direct sun.

Step Two

Determine what you need to do. Start with the closest Home Ignition Zone and work toward the Defensible Space Zone and through the Wildland Fuel Reduction Zone.

Step Three

Develop a plan for correcting any fire safe problems identified in steps one and two. Consider completing your work prior to June 1 of each year before fuel conditions become too dry. Make sure your power tools have approved spark arresters and, if working in the summer months, complete all work before 10 a.m. Coordinate with adjacent land owners if possible and incorporate existing formal landscape features.

Step Four

Consider codes and regulations related to *defensible space*, burning, work performed near waterways, and tree removal; if necessary, secure permits such as burn permits.

- The Department of Forestry & Fire Protection (CDF) should be consulted if any wood products from your property are sold, traded or bartered. Types of regulated wood products include sawmill logs, firewood or wood chips. For more information, contact your local CDF unit.
- The Department of Fish & Game should be notified and consulted if work occurs near a river, stream, lake, or tributaries. Go to: www.dfg.ca.gov/1600/1600.html
- Before cutting down trees, residents should check local association and special district regulations.

Step Five

Implement the plan. Get help and any needed equipment. Begin work in the Home Ignition Zone and work out from there. Remember: It's the little things—such as patio furniture and cushions, leaves, needles, bark, etc.—that can ignite and cause a fire to your home.

Step Six

Remove all slash and debris generated during the fuel modification process by chipping, burning or disposal at your local vegetative waste site. Contact your local fire department for permit requirements. Contact your local Fire Safe Council about their chipping, home consultation and other programs. Find your local Fire Safe Council at www.FireSafeCouncil.org.

Step Seven

Continue to monitor and evaluate the fire safe condition of your home and landscape. Maintain your home's resistance to fire and the *defensible space* in the surrounding property on a routine basis—annually or more frequently, if needed. For new construction, consider fire resistant materials such as concrete panels, stone, brick or other material that doesn't burn easily.

Design and printing: www.FireSafeHelp.com. To order, call: 530.872.0850
Special thanks to the Butte County Fire Safe Council

Is Your Home a Safe Place to Stay?

You live in an area of natural beauty—but it's also prone to wildfire. In fact, it's not a matter of *if* the grasslands of California will burn, it's a matter of *when* that will happen.

Fortunately, you can take steps today to dramatically improve your odds of survival by making your property "fire safe."

A fire safe property is one where the home and landscape resist the impact of fire. A fire safe landscape is a beautiful landscape that not only protects your home from fire but can also increase the value of your home.

The Fire Environment

Fire behavior is affected by a variety of factors—some of these you can do something about and others are weather-related and beyond your control. Understanding these terms will help you make your home and the surrounding property fire safe.

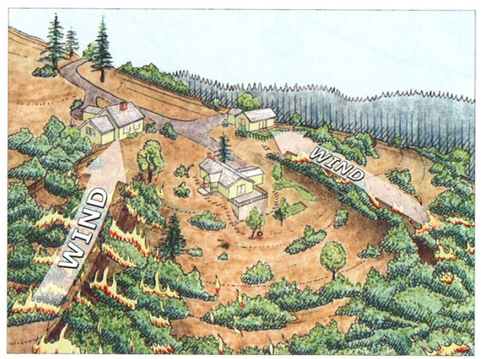
Fuels: Any flammable materials that will burn. This includes everything from the home itself to plants, dried leaves in the rain gutter, brush, wood shingles, patio furniture and decking material. If it will burn, it's a fuel.

Ignition: The point at which a fire starts as a result of fuel contacting with embers, firebrands (hot, flying embers), direct flame, or superheated air.

Topography: Primarily slope or the steepness of the incline on which your house is situated. Also your home's location on the slope and proximity to canyons or ravines.

Weather: Primarily wind, but also air temperature and humidity (moisture content of the air).

eXtreme X-Factor: A multiplication factor used to increase the *defensible space* around a home due to e**X**treme fire behavior factors such as slope, and/or constant or unusually strong winds. If your home is located **on or near** the top of a slope and/or **receives constant or unusually strong winds** you must increase the *defensible space* in Zones 2 and 3 by a multiplication of 1.5 (**X-Factor**). For instance, in Zone 2, increase the *defensible space* from 100 feet to 150 feet.



During the summer and fall months, a combination of low humidity, high temperatures and strong winds results in a "red flag" weather warning. During such a condition, the fire danger is very high. The X-Factor explained above helps provide that extra margin of *defensible space* necessary to keep your property fire safe.

April 2005

For more information:

- www.FireSafeCouncil.org
  California Fire Safe Council
- www.firewise.org
  National Wildland/Urban Interface Fire Program
- www.fire.ca.gov
  California Department of Forestry & Fire Protection; includes forest management information
- www.allstate.com
  Allstate Insurance

California Fire Safe Council
P.O. Box 2106
Glendora, CA 91740
Phone: 626/335-7426
www.FireSafeCouncil.org

FireSafe COUNCIL

Allstate
You're in good hands.

This brochure made possible by a grant from the Allstate Foundation.

A Homeowner's Guide to Fire Safe Landscaping

Grassland

The California Fire Safe Council's mission is to provide leadership and support that mobilizes all Californians to protect their homes, communities and environment from wildfire. We accomplish our mission through broad-based public/private partnerships that create community-wide change via education and action programs because we believe fire prevention and loss reduction are everyone's business.

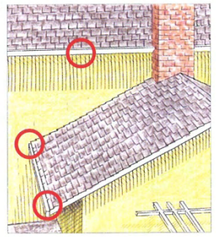
FireSafe COUNCIL

www.FireSafeCouncil.org

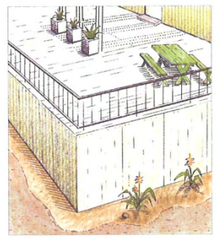
Home Ignition Zone

(The home plus 10 ft distance)

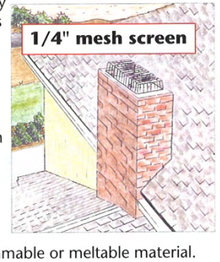
It's the 'little things' that will endanger your home. Just a little ember landing on a little pile of flammable material will burn it. Spend a morning searching out and getting rid of those flammable little things outside and your home will be much safer.



1. Keep your rain gutters and roof clean of all flammable material.
2. Get rid of dry grass, brush and other flammable materials around your home—and don't forget leaves, pine needles and bark walkways. Replace with well maintained (watered) landscape vegetation, green lawn and landscape rocks.
3. Clear all flammable materials from your deck. This includes brooms, stacked wood and easily ignitable patio furniture. Also enclose or board up the area under your deck to keep it from becoming a fuel bed for hot embers.



4. Move woodpiles and garbage cans away from your home. Keep woodpiles away from the home a distance of 2 times the height of the pile—more if lot size allows.
5. Use fine mesh metal screen (1/4" or less) to cover eaves, roof and foundation vents to prevent windblown embers from entering.



6. Inspect and clean your chimney every year. Trim away branches within 10 feet. Install a spark arrester with 1/4" or smaller mesh screen.
7. Got a propane tank? Get rid of any flammable materials within 10 feet of it and, if possible, position it at least 30 feet from any structures.
8. Window screens should be metal, not plastic or other flammable or meltable material.

Burning embers landing on wood shake roofs are one of the leading risk factors for losing your home to a wildfire. If possible, replace wood shingle roofs with non-flammable (Class-A) roofing materials, such as asphalt shingles, tile or metal roofing.

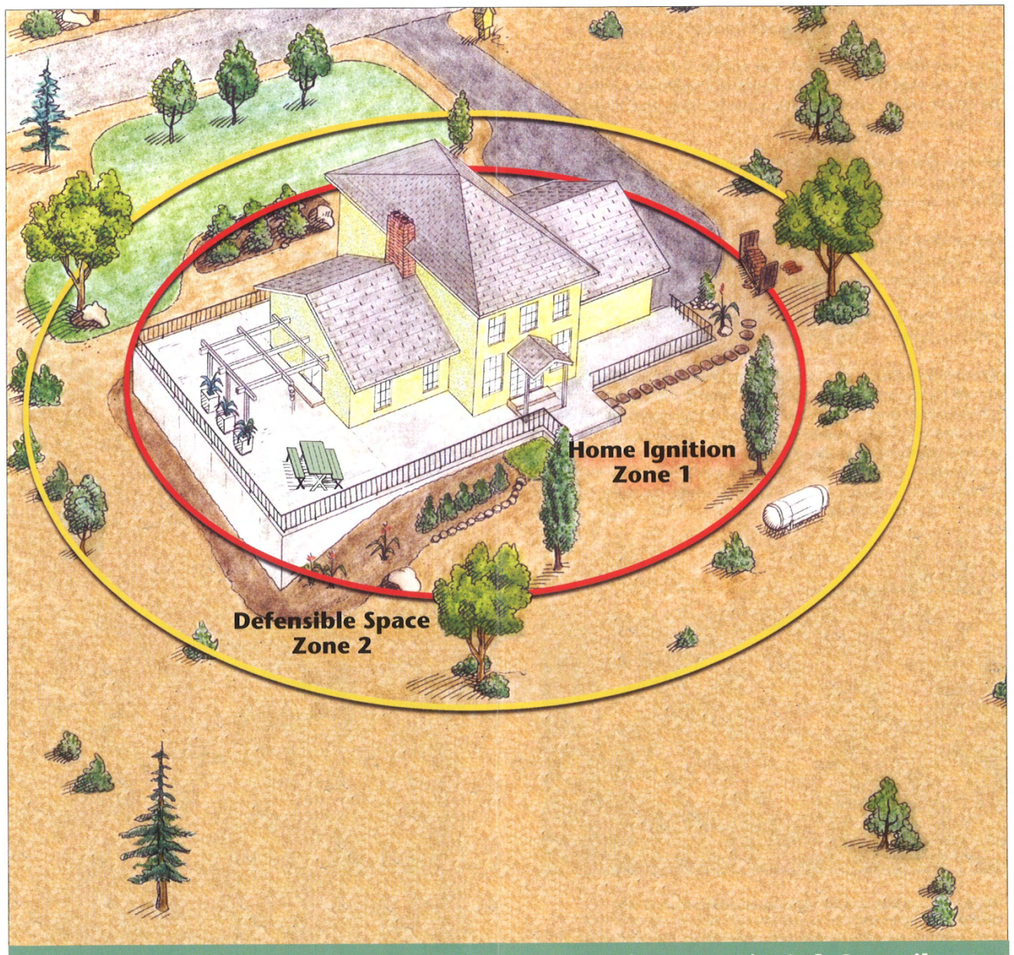
Defensible Space Zone *(100 feet or more distance)* • Keep this area lean and green!

Your "*defensible space*" is the area that is a minimum of 100 feet from your home (as required under State Public Resources Code 4291 or other local ordinances). This is the area where you've modified the landscaping to allow your house to survive on its own—greatly improving the odds for firefighters who are defending your home.

If your home is on a slope or subject to high winds, extend the distance of this zone based upon the "**X-Factor.**" For instance, this zone may increase, then, to 150 feet (1.5 X 100 feet).

Create a *Defensible Space Zone* by keeping in mind the three R's of defensible space:

- **Remove**—dead and dying grass, shrubs and trees.
- **Reduce**—the density of vegetation (fuel) and ladder fuels, those fuels extending from the ground to the tree canopies.
- **Replace**—hazardous vegetation with less flammable, irrigated landscape vegetation including lawn, or other low growing groundcovers and flowering plants.



Find out more ways to make your home fire safe: www.FireSafeCouncil.org

Are you doing the right thing—the wrong way?

Getting rid of the hazards around your home is a good idea—but you need to do it properly or you could accidentally start a wildland fire.

Each year fire departments respond to thousands of fires started by people using equipment the wrong way. Whether working to create defensible space around your home, just mowing dry grass, or pulling your dirt bike over to the side of the road, if you live in a wildland area you need to use all equipment responsibly. Lawnmowers, weedeaters, chainsaws, grinders, welders, tractors and trimmers can all spark a wildland fire. Do your part, the right way, to keep your community fire safe.

Here's how to do it the RIGHT WAY:

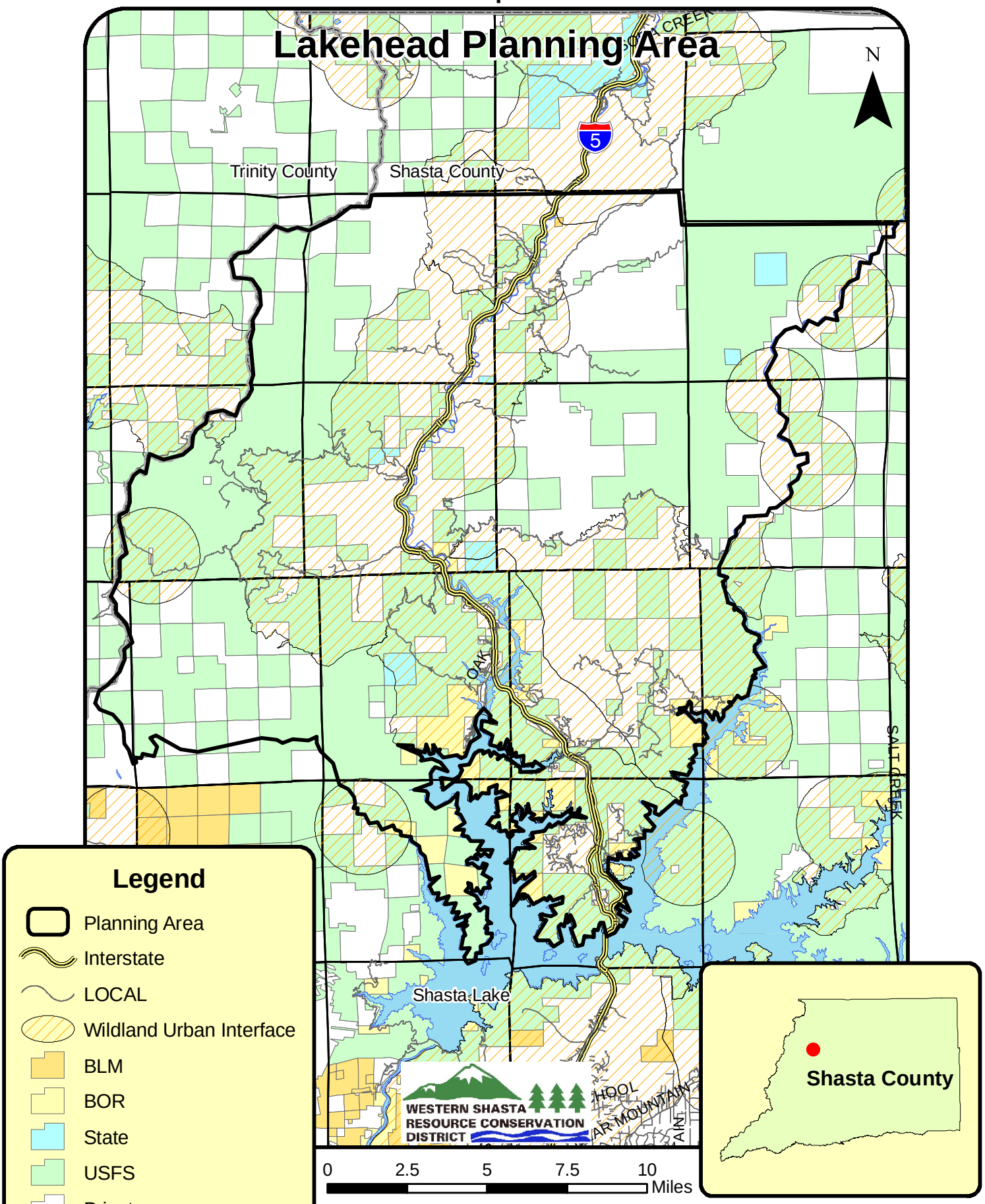
- Mow before 10 a.m. If it's too hot for you, it's too hot to mow. **REMEMBER, DON'T MOW DURING THE HEAT OF THE DAY OR WHEN THE WIND IS BLOWING!**
- **Beware**—Lawn mowers are designed to mow lawns, not dry grass, weeds or rocks! A grass-hidden rock is enough to start a fire when struck by a metal blade. Remove rocks from the area before you begin mowing.
- **In wildland areas,** spark arresters are required on all portable gasoline powered equipment. This includes tractors, harvesters, chainsaws, weedeaters and mowers.
- Keep the exhaust system, spark arresters and mower in proper working order and free of carbon buildup. Use the recommended grade of fuel and don't top off.
- **In wildland areas,** grinding and welding operations require a permit plus 10 feet of clearance, a 46-inch round point shovel, and a backpack watertype fire extinguisher—all ready to use.
- Hot exhaust pipes and mufflers can start fires you won't even see—until it's too late! Don't drive your vehicle onto dry grass or brush.
- Keep a cell phone nearby and call 911 **immediately** in case of fire.

MAPS

1. PLANNING AREA BOUNDARY/LAND OWNERSHIP
2. FIRE HAZARD SEVERITY MAP
3. PLANTS
4. WILDLIFE
5. FIRE HISTORY

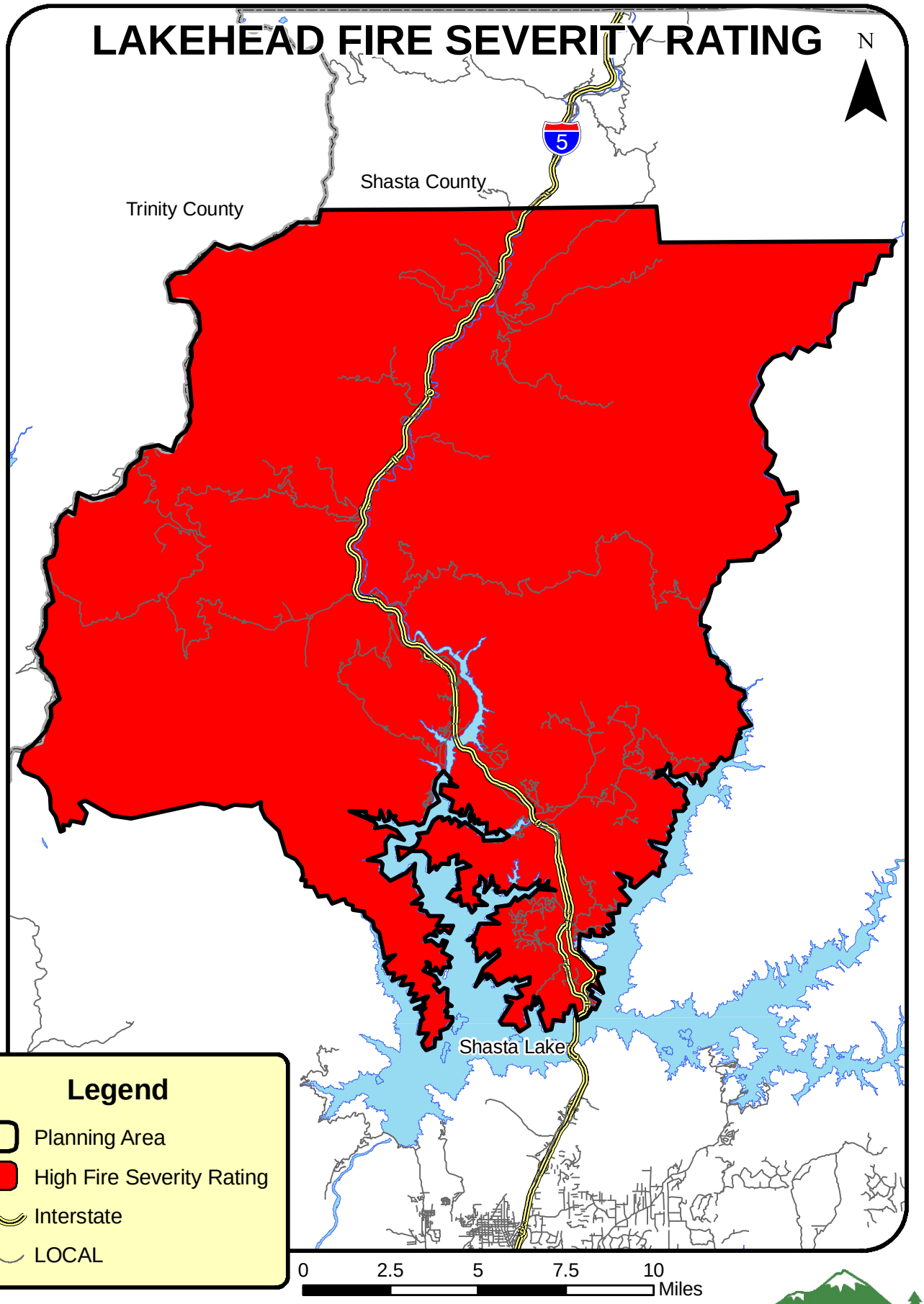
6-6c. PROPOSED PROJECTS

Map 1


Lakehead Planning Area
N
5
Trinity County
Shasta County
OAK
SALT CREEK
Shasta Lake
WESTERN SHASTA
RESOURCE CONSERVATION
DISTRICT
0
2.5
5
7.5
10
Miles
Legend
Planning Area
Interstate
LOCAL
Wildland Urban Interface
BLM
BOR
State
USFS
Private
Shasta County

MAP 2

LAKEHEAD FIRE SEVERITY RATING

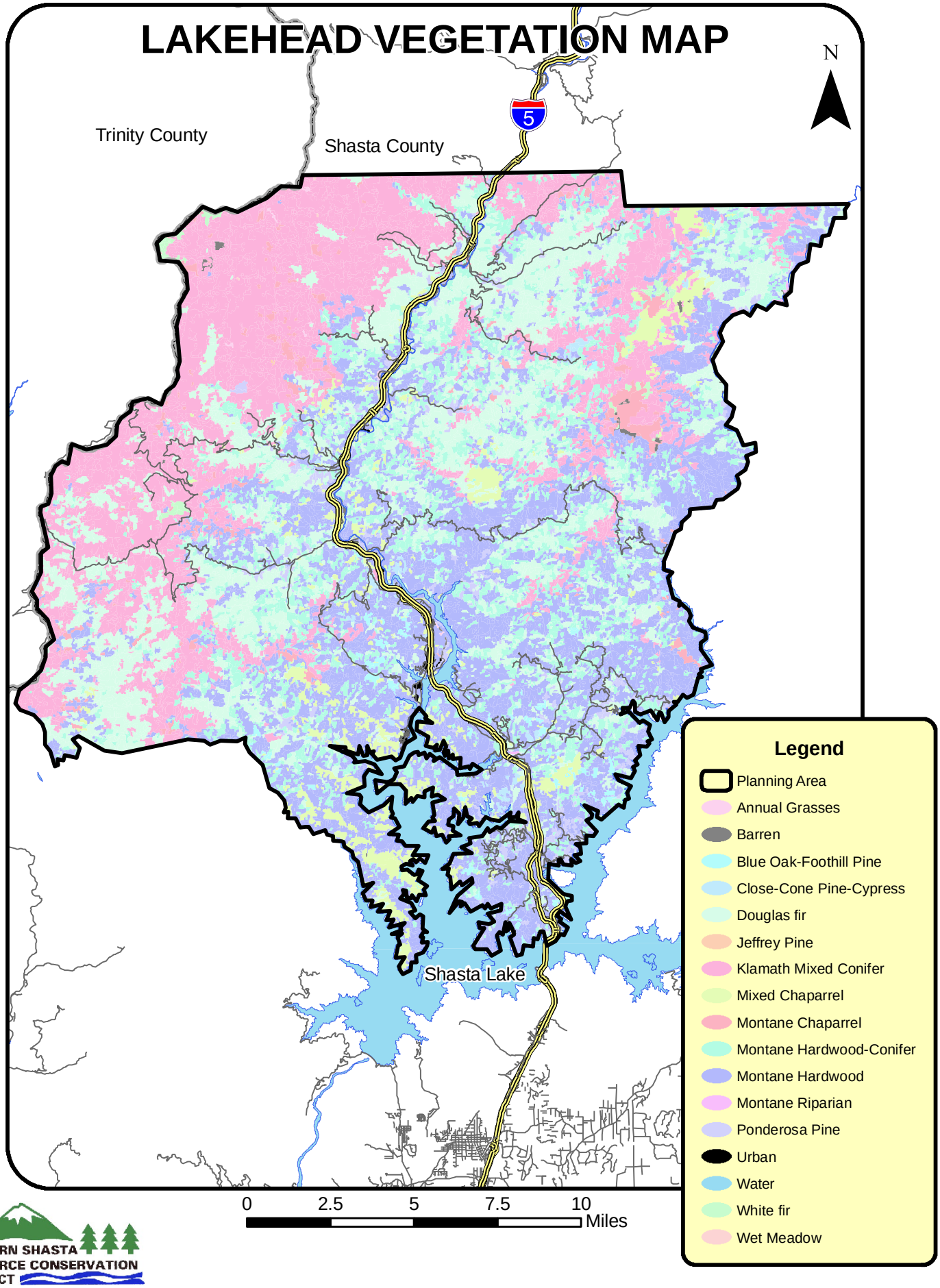


VERY HIGH FIRE HAZARD SEVERITY ZONE
as Recommended by CAL FIRE

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

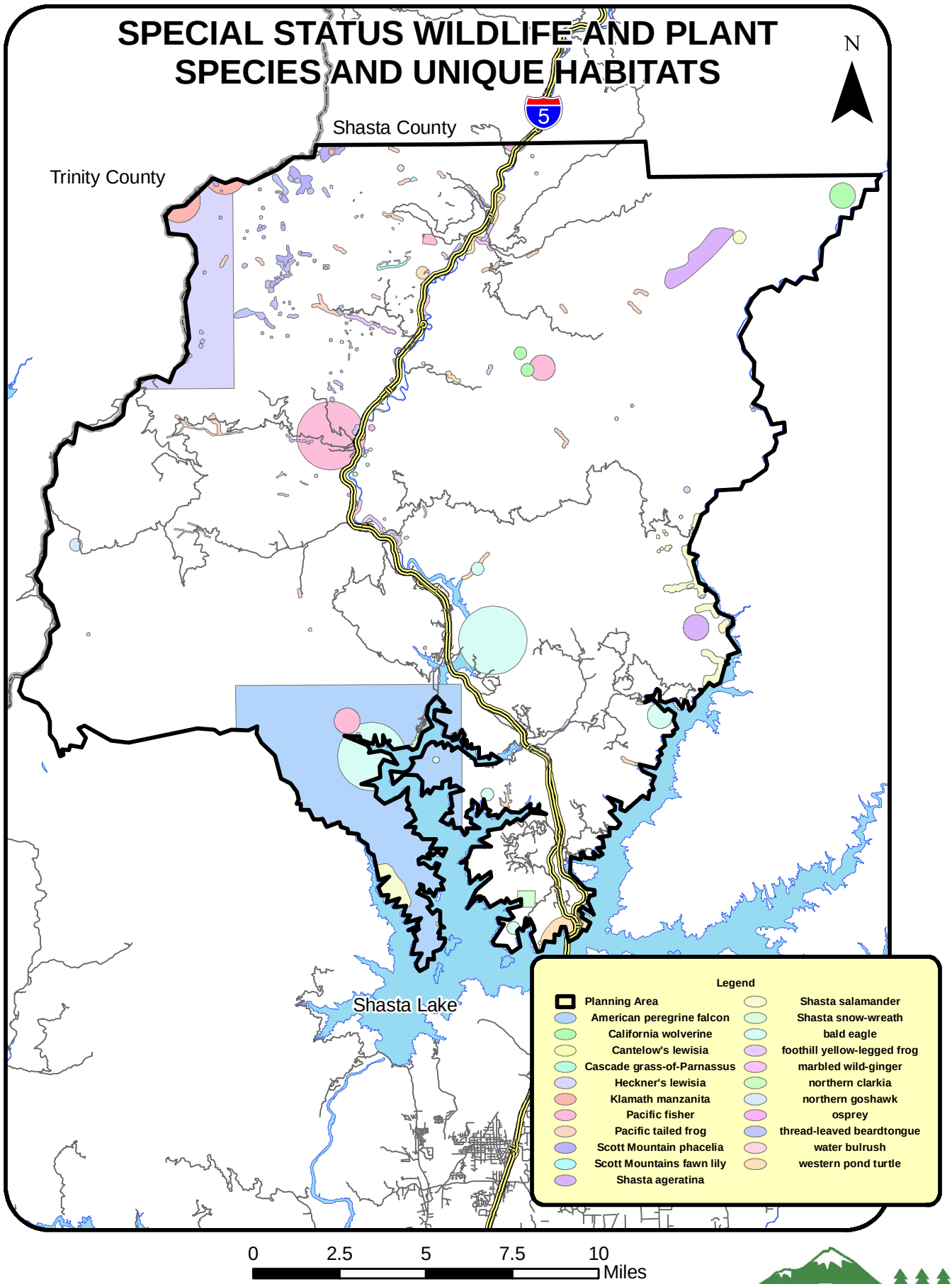
MAP 3

LAKEHEAD VEGETATION MAP



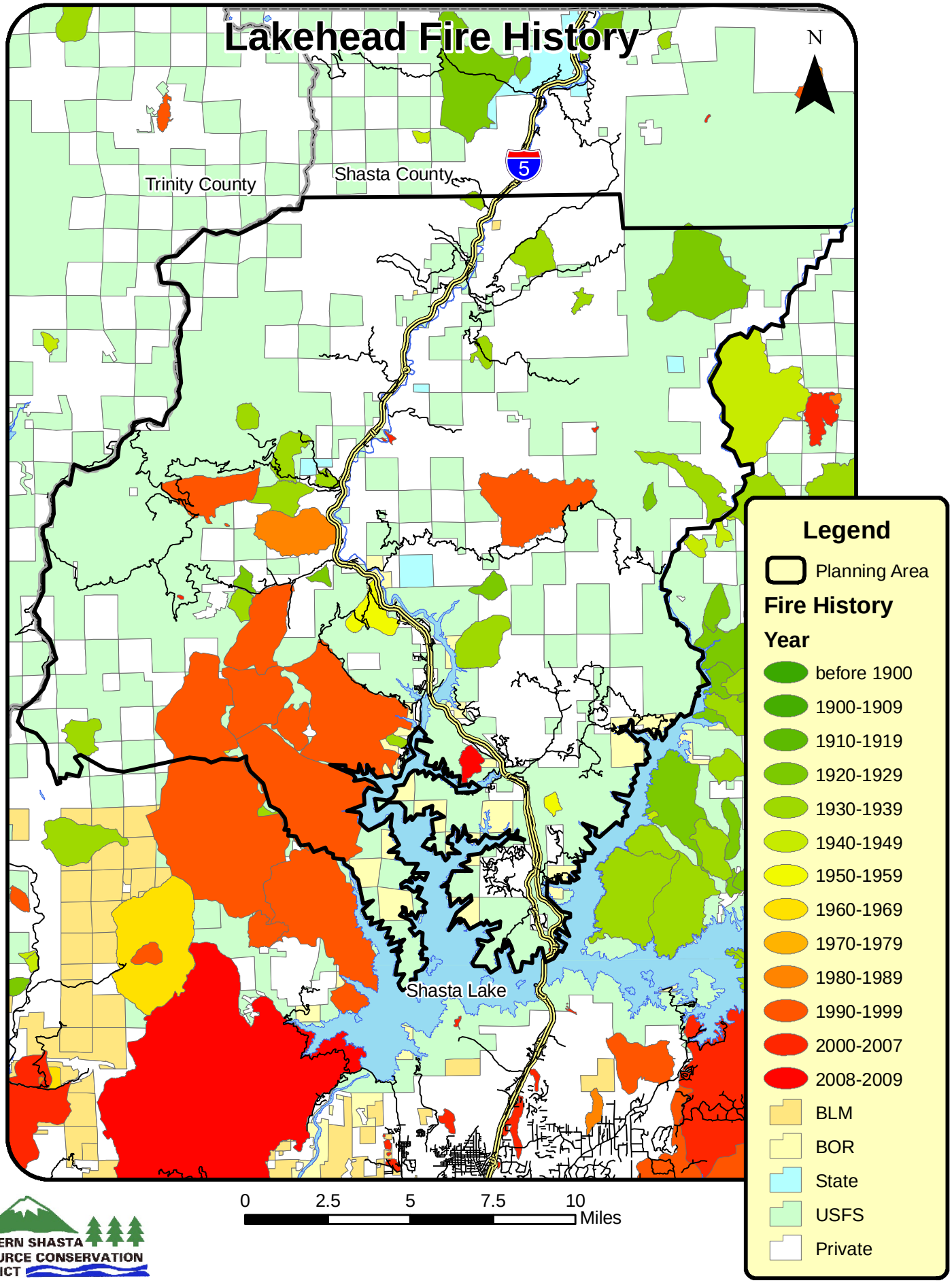
WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

MAP 4



WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

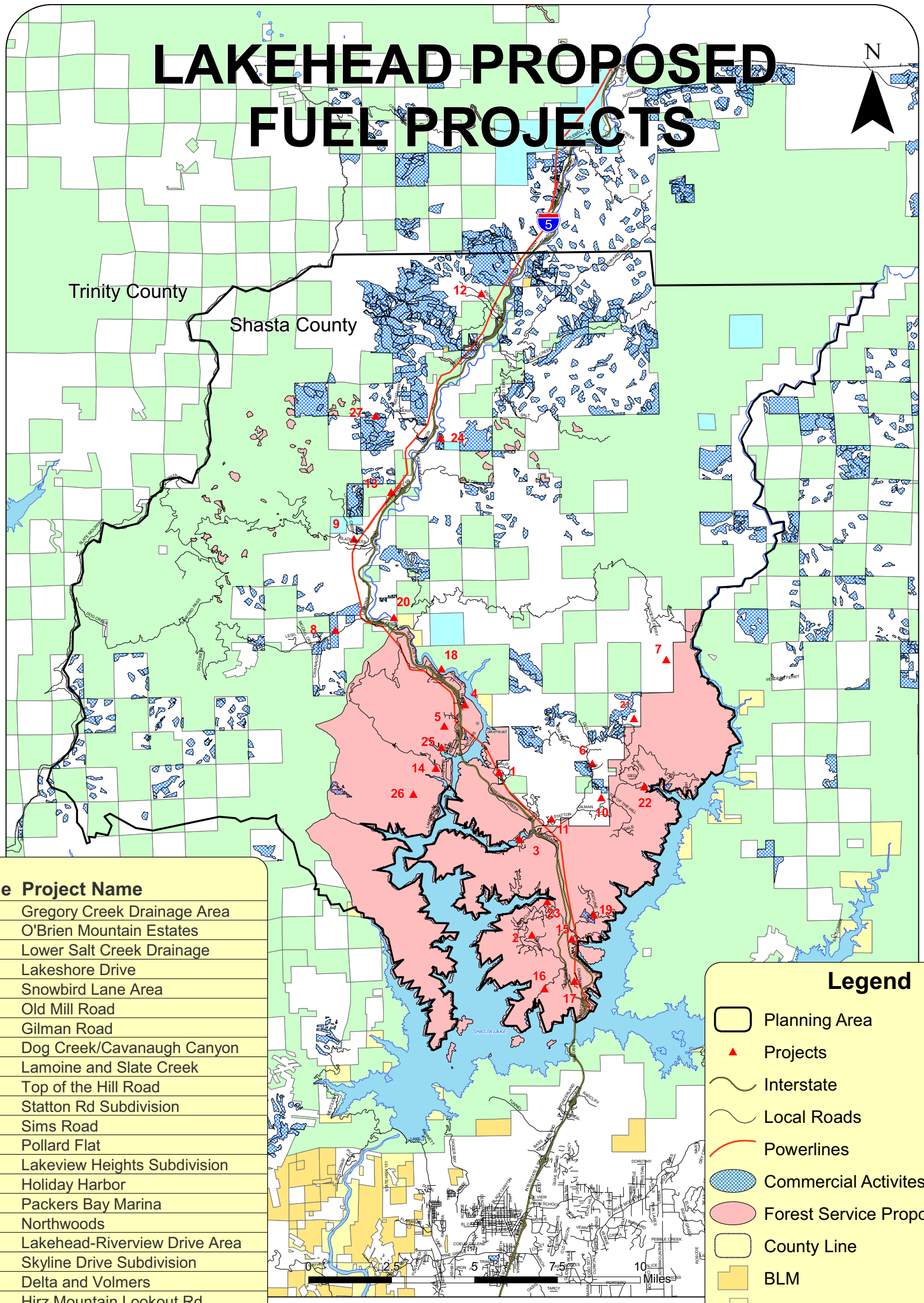
MAP 5



WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

MAP 6

LAKEHEAD PROPOSED FUEL PROJECTS



Code	Project Name
1	Gregory Creek Drainage Area
2	O'Brien Mountain Estates
3	Lower Salt Creek Drainage
4	Lakeshore Drive
5	Snowbird Lane Area
6	Old Mill Road
7	Gilman Road
8	Dog Creek/Cavanaugh Canyon
9	Lamoine and Slate Creek
10	Top of the Hill Road
11	Statton Rd Subdivision
12	Sims Road
13	Pollard Flat
14	Lakeview Heights Subdivision
15	Holiday Harbor
16	Packers Bay Marina
17	Northwoods
18	Lakehead-Riverview Drive Area
19	Skyline Drive Subdivision
20	Delta and Volmers
21	Hirz Mountain Lookout Rd
22	Waterman Road
23	Shasta Marina
24	Gibson Road
25	Sugarloaf Subdivision Completed
26	Lakeside Woods- Completed
27	Highland Lakes Road-Completed

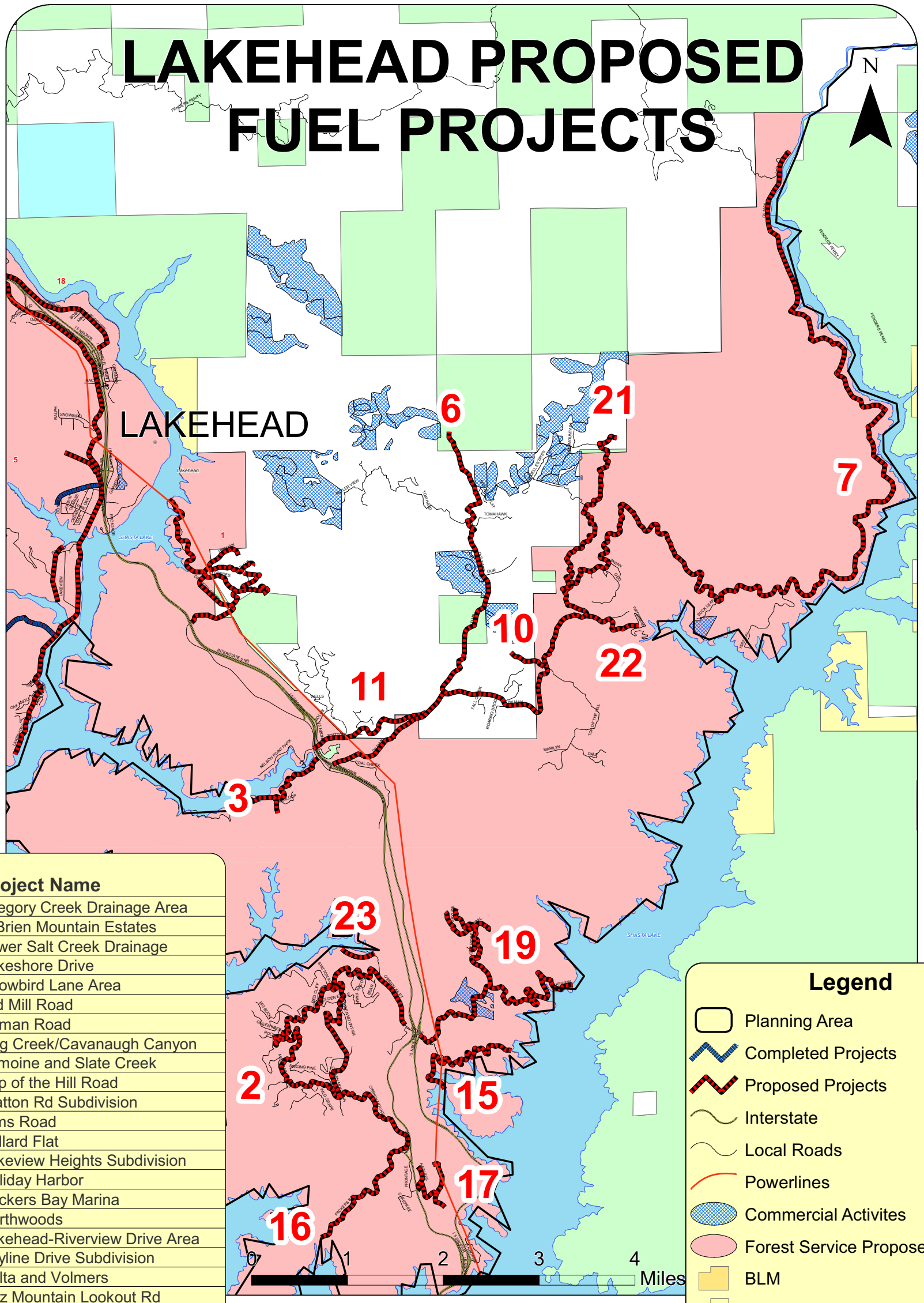
Legend

- Planning Area
- Projects
- Interstate
- Local Roads
- Powerlines
- Commercial Activites
- Forest Service Proposed Activities
- County Line
- BLM
- BOR
- State
- USFS
- Private

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

MAP 6A

LAKEHEAD PROPOSED FUEL PROJECTS



Code	Project Name
1	Gregory Creek Drainage Area
2	O'Brien Mountain Estates
3	Lower Salt Creek Drainage
4	Lakeshore Drive
5	Snowbird Lane Area
6	Old Mill Road
7	Gilman Road
8	Dog Creek/Cavanaugh Canyon
9	Lamoine and Slate Creek
10	Top of the Hill Road
11	Statton Rd Subdivision
12	Sims Road
13	Pollard Flat
14	Lakeview Heights Subdivision
15	Holiday Harbor
16	Packers Bay Marina
17	Northwoods
18	Lakehead-Riverview Drive Area
19	Skyline Drive Subdivision
20	Delta and Volmers
21	Hirz Mountain Lookout Rd
22	Waterman Road
23	Shasta Marina
24	Gibson Road
25	Sugarloaf Subdivision Completed
26	Lakeside Woods- Completed
27	Highland Lakes Road-Completed

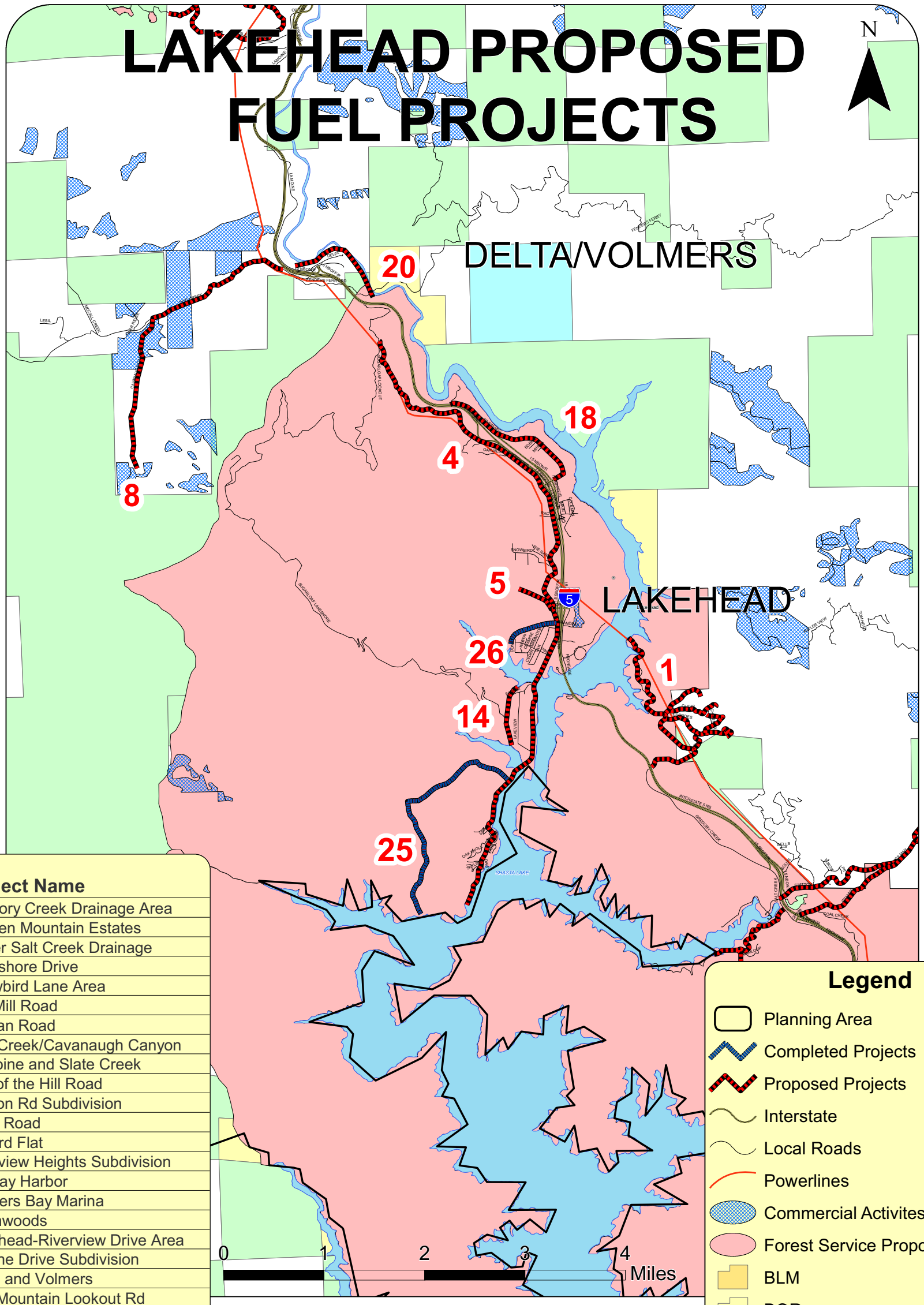
WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

Legend

- Planning Area
- Completed Projects
- Proposed Projects
- Interstate
- Local Roads
- Powerlines
- Commercial Activites
- Forest Service Proposed Activities
- BLM
- BOR
- State
- USFS
- Private

MAP 6B

LAKEHEAD PROPOSED FUEL PROJECTS



Code	Project Name
1	Gregory Creek Drainage Area
2	O'Brien Mountain Estates
3	Lower Salt Creek Drainage
4	Lakeshore Drive
5	Snowbird Lane Area
6	Old Mill Road
7	Gilman Road
8	Dog Creek/Cavanaugh Canyon
9	Lamoine and Slate Creek
10	Top of the Hill Road
11	Statton Rd Subdivision
12	Sims Road
13	Pollard Flat
14	Lakeview Heights Subdivision
15	Holiday Harbor
16	Packers Bay Marina
17	Northwoods
18	Lakehead-Riverview Drive Area
19	Skyline Drive Subdivision
20	Delta and Volmers
21	Hirz Mountain Lookout Rd
22	Waterman Road
23	Shasta Marina
24	Gibson Road
25	Sugarloaf Subdivision Completed
26	Lakeside Woods- Completed
27	Highland Lakes Road-Completed

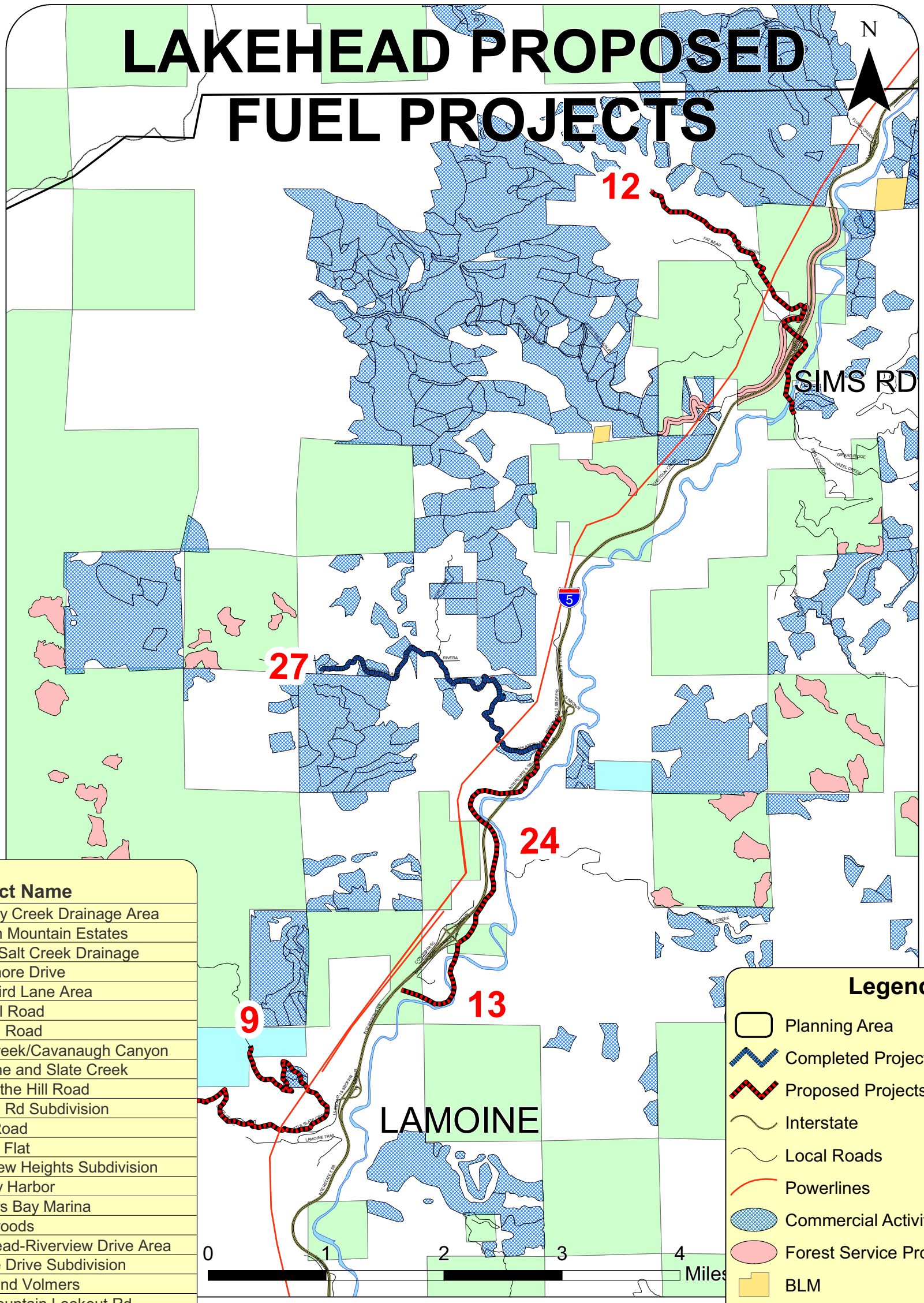
Legend

- Planning Area
- Completed Projects
- Proposed Projects
- Interstate
- Local Roads
- Powerlines
- Commercial Activites
- Forest Service Proposed Activities
- BLM
- BOR
- State
- USFS
- Private

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

MAP 6C

LAKEHEAD PROPOSED FUEL PROJECTS



Code	Project Name
1	Gregory Creek Drainage Area
2	O'Brien Mountain Estates
3	Lower Salt Creek Drainage
4	Lakeshore Drive
5	Snowbird Lane Area
6	Old Mill Road
7	Gilman Road
8	Dog Creek/Cavanaugh Canyon
9	Lamoine and Slate Creek
10	Top of the Hill Road
11	Statton Rd Subdivision
12	Sims Road
13	Pollard Flat
14	Lakeview Heights Subdivision
15	Holiday Harbor
16	Packers Bay Marina
17	Northwoods
18	Lakehead-Riverview Drive Area
19	Skyline Drive Subdivision
20	Delta and Volmers
21	Hirz Mountain Lookout Rd
22	Waterman Road
23	Shasta Marina
24	Gibson Road
25	Sugarloaf Subdivision Completed
26	Lakeside Woods- Completed
27	Highland Lakes Road-Completed

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

Legend

- Planning Area
- Completed Projects
- Proposed Projects
- Interstate
- Local Roads
- Powerlines
- Commercial Activites
- Forest Service Proposed Activities
- BLM
- BOR
- State
- USFS
- Private