Weaverville Watershed Analysis

Shasta-Trinity National Forest
Trinity River Management Unit
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INTRODUCTION

The Purpose of Watershed Analysis

Watershed analysis (WA) is a procedure used to characterize the human, aquatic, riparian, and terrestrial features, conditions, processes and interactions (collectively referred to as "ecosystem elements") within a watershed. Watershed analysis is an important component of the Aquatic Conservation Strategy (ACS) along with Riparian Reserves, Key Watersheds, and watershed restoration. It provides a systematic way to understand and organize ecosystem information. In doing so, watershed analysis enhances our ability to estimate direct, indirect and cumulative effects of our management activities on ACS objectives and guide the general type, location and sequence of appropriate management activities within the watershed.

In planning for ecosystem management and establishing Riparian Reserves to protect and restore riparian and aquatic habitat, the overall watershed condition and the array of processes operating there need to be considered. Watershed condition includes more than just the state of the channel and riparian area. It also includes the condition of the uplands, distribution and type of seral classes of vegetation, land use history, effects of previous natural and land-use related disturbances and distribution and abundance of species and populations throughout the watershed.

The watershed analysis is not a decision document; its purpose is to provide an information baseline to evaluate the existing conditions in terms of the desired conditions. The WA provides existing condition information to enable identification and prioritization of appropriate project opportunities that would enhance, maintain, or improve the landscape conditions in order to achieve or move toward the desired conditions of the land allocations given by the Shasta-Trinity Land and Resource Management Plan.

Watershed analyses are conducted by a team of journey-level specialists who are guided by the process outlined in *"Ecosystem Analysis at the Watershed Scale – Federal Guide for Watershed Analysis"*. This process is issue driven.

Focus of This Watershed Analysis

The focus of this analysis is vegetation condition as it relates to fuel loading, water quality, aquatic habitat, wildlife habitat, and soil productivity. The WA will provide information on the current condition in these watersheds as well as the desired condition based on the Land and Resource Management Plan (LRMP). This watershed analysis will focus lands within this watershed that are administered by the Shasta Trinity National Forest.

Format of the Document

This document is organized into five chapters.

Chapter 1 – Characterization of the Watershed: This chapter provides a brief overview of the dominant physical, biological and human processes or features of the watershed that affect ecosystem functions or conditions. It includes the most important land allocations, Forest Plan objectives and regulatory constraints that influence resource management in the watersheds. The watershed context is used to identify the primary ecosystem elements that will be analyzed in detail.

Chapter 2 – Issues and Key Question: This chapter provides the key elements of the ecosystem that are most relevant to the management questions or objectives, human values, or resource conditions within the watersheds. These issues and key questions are developed by the team and District Ranger.

Chapter 3 – Current Conditions: This chapter addresses the dominant physical, biological and human processes or features of the watershed that affect ecosystem functions or conditions relevant to the issues and key questions identified in Chapter 2. The current range, distribution and condition of these ecosystem elements are documented.

Chapter 5 – Desired Conditions: This chapter presents desired conditions of specific ecosystem elements based on the LRMP and professional judgment.

Chapter 5 – Management Opportunities to Meet Desired Conditions: This chapter summarizes the opportunities to move from existing conditions to the desired conditions identified in the Forest Plan or this Watershed Analysis.

CHAPTER 1
CHARACTERIZATION OF THE WATERSHEDS

This chapter provides a brief overview of the Weaverville watershed in terms of the dominant physical, biological and human processes that affect ecosystem function or condition. These processes will be covered throughout this analysis.

Physical Setting

Location

The watershed analysis area encompasses 53,646 acres: 29,463 acres are within the National Forest Boundary. The Weaver and Rush Creek watersheds are located in northwestern Trinity County, California, on the Trinity River Management Unit of the Shasta-Trinity National Forest. The community of Weaverville is within this watershed.

Climate

The climate of the Weaverville watershed is Mediterranean; hot and dry in the summer with temperatures occasionally above 100°F, and cold and wet in the winter with temperatures often below freezing. Winter storms are usually brought in from the Pacific on south to southwesterly winds. Snow frequently accumulates above 4,000 feet elevation during the winter months. Elevations between 3,000 feet to 4,000 feet are frequently subjected to rain on snow events. Mean annual precipitation varies between 70 inches in the upper portions of the watershed to nearly 40 inches at the lower end. About 90 percent of the precipitation falls between October and April, with snow usually remaining at higher elevations through May or June.

Terrestrial System

Fire and Fuels

Wildfires are a critical component in the development and maintenance of western ecosystems, especially within the forests dominated by Douglas fir in the northern Klamath Mountains. Forests are shaped by distinct ecological processes that are driven largely by climate and topography. Historically, frequent low-intensity wildfires played a major role in determining the dispersion and succession of tree stands in the interior west.

The most extensive and serious problem related to the health of national forests in the interior west is the over-accumulation of vegetation, which has caused an increasing number of large, intense, uncontrollable, and catastrophically destructive wildfires. Significant portions of this watershed are within the Wildland Urban Interface (WUI) and fuels conditions within the WUI are a primary focus of this analysis.

Vegetation

The Weaverville watershed, like most of the area in the central part of the Forest, is dominated by conifer forests and mixed conifer/hardwood forests. The primary disturbance agents in this watershed have been mining, logging, urbanization, fire, and recreation.

Plant Species of Concern

Habitats for species of concern include mid- to late-seral forests, rock outcrops, perennial riparian areas, and tree canopy openings. There are no documented populations of Sensitive or Survey and Manage plant species within the analysis area, primarily because of the lack of historical surveys.

Wildlife Species

Wildlife species known to occur within the Weaverville watershed include federally listed and Forest Service sensitive species based on current records. The area is an important wintering are for the Weaverville deer herd.

Aquatic System

Water Quality

The important water quality parameters that most influence the beneficial uses for the Weaverville watershed are sediment and turbidity. Several streams within the Weaverville watershed are used as domestic water supply for residents of Weaverville and Rush Creek areas.

The Trinity River is listed as sediment limited by Environmental Protection Agency (EPA) under the Clean Water Act section 303(d) and the Weaverville watershed is included within the Maximum Daily Load (TMDL) listing.

Fish Species

The fishes include anadromous fall Chinook salmon, winter steelhead trout, coho salmon, and resident rainbow trout and brook trout. The Southern Oregon Northern California Coastal (SONCC) Coho salmon have been listed as threatened under the Endangered Species Act (ESA). All stream areas accessible to anadromous fish have been listed as critical habitat. Due to the long-term overall decline of Chinook and steelhead runs, the Pacific Southwest Region of the Forest Service has put them on a regional sensitive species list to help ensure that Forest Service activities do not result in a trend towards listing them under the ESA.

Land Allocations and Management Direction

Planning direction for the Shasta Trinity National Forest is covered in the 1995 Shasta-Trinity National Forest Land and Resource Management Plan (LRMP). The LRMP

incorporated the direction in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, or ROD, as it is commonly known.

Management Direction

The Shasta-Trinity National Forest is divided into 22 management areas. The LRMP defines desired future conditions and management prescriptions within each management area. The Weaverville watersheds fall within Management Area 4, Trinity Alps Wilderness, and Management Area 7, the Weaverville/Lewiston Management Area.

Land Allocations

Table 1-1 summarizes the land allocations for this watershed, Map 1 displays where these land allocations occur spatially.

Weaverville Watershed

Management Area	Acres
Wilderness	9,449
LSR	1,793
Matrix	742
Adaptive Management Area (AMA)	10,282
Other (Private/BLM)	31,380
Total	53,646

Wilderness

A portion of the Trinity Alps Wilderness is within the Weaverville Watershed area. Wilderness areas are managed according to the Wilderness Act of 1964, the California Wilderness Act of 1984, and regulations pursuant to those acts and the Forest Service Manual. The Wilderness area is managed to preserve the integrity of the wilderness resources.

Late-Successional Reserve (LSR)

A portion of the Weaverville watershed area is located within Late-Successional Reverse (LSR). Late-Successional Reserves are to be managed to protect and enhance late-successional and old growth forest ecosystems, which serve as habitat for late-successional and old-growth dependent species.

Adaptive Management Area (AMA)

A portion of the Weaverville watershed is within the Hayfork Adaptive Management Area. The emphasis of this AMA is development, testing, and application of forest management practices, including partial cutting, prescribed burning, and low impact approaches to forest harvest, which provide for a broad range of forest values, including

commercial timber production and provision of late-successional and high quality riparian habitat.

Aquatic Conservation Strategy Components

Riparian Reserves (RR)

Riparian Reserves are designated under the ACS for all permanently flowing streams, lakes, and wetlands as well as intermittent and ephemeral channels. Riparian Reserves are present along stream channels throughout the analysis area, and occur across all land allocations. Riparian Reserves are to be managed to provide benefits to riparian associated species, improve travel and dispersal for many terrestrial animals and plants, and provide for habitat connectivity within the watershed. The Riparian Reserves also serve as corridors to connect Late Successional Reserves.

Human Uses

Communities

The communities of Weaverville, Rush Creek and dispersed neighbors are within the influence of the analysis area. The main industries are service, tourism associated with recreation, forest products, local branches of state, county, and federal agencies.

Transportation System

The transportation system in the analysis area is made up of roads and trails that provide access for motorized and non-motorized vehicles, livestock, and foot traffic. The road system in this watershed consists of state highways, county roads, arterial routes, collector routes, and a series of local spur roads.

Recreation Resources

Outdoor recreation in the area consists of a variety of opportunities. Opportunities in or adjacent to the Weaverville Watershed include hiking, OHV, mountain biking, hunting, swimming, and wildlife observation. Other opportunities in the area include camping, backpacking, kayaking, rafting, picnicking, fishing, and scenic driving.

CHAPTER 2
ISSUES AND KEY QUESTIONS

The purpose of this chapter is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, and resource conditions within the Weaverville watershed.

Six issues critical to the future management of this watershed were identified. They are:

- Issue #1: Human Uses, Values, and Expectations
- Issue #2: Access and Travel Management
- Issue #3: Erosional Processes
- Issue #4: Aquatic Systems
- Issue #5: Terrestrial Wildlife Habitat and Species
- Issue #6: Fire, Fuels, and Air Quality
- Issue #7: Plant Communities

The following is a broader description of each issue accompanied by key questions pertaining to the issue.

Issue #1: Human Uses, Values, and Expectations

Recreation

Key Question 1.1 What are the major recreation resources and uses of the watershed? What is the condition of these resources?

Outcome 1.1 Identify recreation areas. Identify potential recreation opportunities. Determine management practices that would restore or improve recreation opportunities.

Wood Products

Key Question 1.2 Are there areas with timber harvesting opportunities that would contribute to ecosystem management objectives?

Outcome 1.2 Identify areas for applying timber management practices that would result in a benefit to ecosystem management.

Key Question 1.3 Are there existing fuel wood opportunities within the watersheds? Are there areas that fuel wood opportunities may be developed?

Outcome 1.3 Identify areas that may be opened to fuel wood gathering or areas that fuel wood projects may be developed.

Issue #2: Access and Travel Management

Key Question 2.1 What are current trail conditions? What actions can be taken to provide access to the forest and protect the natural resources? Should some trails be closed and abandoned from the trail transportation system?
Outcome 2.1 Identify the level of trail maintenance necessary to protect the natural resources, and provide recreational opportunities. Determine management practices that would protect the natural resources, and provide trail access for recreation. Identify trails that could be abandoned and removed from the system.

Key Question 2.2 What role does the transportation system play in access to the area? Are there areas that would benefit from increased or decreased access?
Outcome 2.2 Identify roads of concern to local and extended users. Assess current condition of roads. Identify the road system necessary to serve management needs.

Issue #3: Erosional Processes

Geology, Hydrology, and Soil Resources

Key Question 3.1 What mass wasting processes are inherent within the watershed? What management actions, if any, would protect soil and water resources.
Outcome 3.1 Identify predominant mass wasting features, the delineation of priority treatment areas and appropriate techniques to protect riparian and soil resources.

Key Question 3.2 What soil erosion processes are occurring in the analysis area? What is the soils' sensitivity to erosion?
Outcome 3.2 Identify predominant soil erosion areas, the delineation of priority treatment areas and appropriate techniques to protect riparian and soil resources.

Key Question 3.3 What is the current level of Cumulative Watershed Effects? Are there any subwatersheds that area at or near threshold of concern?
Outcome 3.3 Identify areas where management actions may be modified to protect watershed function or where restoration actions are needed.

Issue #4: Aquatic Systems and Species

Key Question 4.1 What is the relative abundance and distribution of anadromous fishes in the watershed? What is the condition of aquatic habitats?
Outcome 4.1 Identify trends of anadromous fish populations and their distribution. Identify priority treatment areas and appropriate techniques to protect and/or improve fish habitat.

Issue #5: Terrestrial Wildlife Habitat and Species

Key Question 5.1 What is the amount and condition of Late Successional Old Growth (LSOG) habitat within these watersheds?
Outcome 5.1 Identify the amount and quality of LSOG habitat within these watersheds. Identify priority treatment areas (if any) and appropriate techniques to protect and/or improve LSOG habitat.

Key Question 5.2 What is the amount and condition of winter range deer habitat within the Watershed and within the Browns Integrated Project Area?
Outcome 5.2 Identify the amount and quality of deer habitat within these watersheds. Identify priority treatment areas (if any) and appropriate techniques to protect and/or improve deer habitat.

Issue #6: Fire, Fuels, and Air Quality

Key Question 6.1 What is the degree of threat from wildfires to local communities? How can the Fire Safe Council recommendations be implemented to reduce the treat of wildfires to local communities?
Outcome 6.1 Determination of the level of threat to local communities and identification of projects to reduce the threat. Identify fuels management projects that would reduce the threat of wildfires to local communities.

Issue #7: Plant Communities

Key Question 7.1 How have human-caused activities altered plant communities and lead to changes in plant species of concern?
Outcome 7.1 Identify plant populations and plant communities with restoration needs.

Key Question 7.2 What are the abundance and the distribution patterns of invasive weeds?
Outcome 7.2 Determine invasive weed treatment priorities.

CHAPTER 3
CURRENT CONDITIONS

This chapter describes the current conditions of the various physical, biological, and human ecosystem elements in the Weaverville watersheds relevant the issues and key questions identified in Chapter 2. The information provided here will provide a more detailed analysis of the watersheds than did the characterization in Chapter 1.

1. Human Uses, Values, and Expectations

1.1 CURRENT RECREATION RESOURCES AND USES

The primary recreation resource of the watershed is the open space setting with the forest, mountains and streams. The road and trail systems are other major recreation resources, along with the East Weaver Campground.

Travel is a major recreation use, including motorized touring on forest roads and off-highway vehicle travel on forest roads, unclassified roads, system trails, and unclassified trails. Non-motorized travel with hiking, biking and horseback riding on system and unclassified trails is also very popular. Historical interpretation, exploring nature, bird watching and wildlife viewing are favored pastimes of many forest visitors. Fishing, hunting, target shooting, and paintball games are popular activities. In addition, both dispersed camping and developed site camping and relaxation are favorite recreation ventures.

The Weaverville Basin has been heavily impacted from mining, logging, and road construction, and is undoubtedly in worse condition than it was 150 years ago. However the forest ecosystem is resilient, and as the sun shines and the birds sing, it remains an outstanding opportunity for recreation. Recreation is not without its impacts and there are specific sites in the watershed that require mitigation and repair from recreation use. OHV use tramples vegetation and causes erosion, and represents unmanaged recreation – one of the four items to address on the Chief's Agenda.

1.2 CURRENT TIMBER HARVESTING OPPORTUNITIES

The Weaverville watershed is dominated by mixed conifer timber stands, primarily consisting of Douglas fir. Current timber harvesting opportunities that would contribute to ecosystem management objectives are available on Forest Service land outside of the wilderness, as displayed on the following table.

Table 3-1. Current timber-producing National Forest land within the Weaverville Watershed.

Conifer dominated stands	Late Successional Reserve (LSR)	Wildlife Management Emphasis	Roaded Recreation Emphasis	Total Acreage Available	Wilderness Area
Young conifer plantation or seedling	76 ac.	0 ac.	909 ac.	985 ac.	0 ac.
Pole-size conifer	373 ac.	0 ac.	1,573 ac.	1,946 ac.	961 ac.
Early or mid-mature conifer	769 ac.	231 ac.	4,959 ac.	5,959 ac.	4313 ac.
Mature or old growth conifer	348 ac.	0 ac.	630 ac.	978 ac.	977 ac.
Total	1,566 ac.	231 ac.	8,071 ac.	9,868 ac.	6,251ac.

Table 3-1 displays the acreages National Forest conifer stands existing within the Weaverville Watershed. The 6,251 acres of timbered wilderness lands are not available for harvesting; the 1,566 acres of LSR may be harvested to a limited degree where harvesting is expected to enhance desired old growth conditions and/or protection. The 8,302 acres of wildlife management and roaded recreation emphasis areas are available for timber harvesting to a greater degree providing consistency with LRMP ecosystem management objectives.

The 985 acres of young conifer plantations and seedlings are the result of previous timber harvest activities, which included regeneration harvests followed by planting Douglas-fir and ponderosa seedlings in the clearcut units. These plantations are densely stocked with conifers, averaging over 250 trees/acre. In addition, brush species and grasses have occupied the spaces between the plantation trees resulting in reduced conifer growth due to competition for water and other soil nutrients.

The 1,946 acres of pole-sized conifer stands include both older plantations and natural stands. Generally, these pole-sized stands are very dense, with 1,754 acres (90%) identified as having crown closures of over 70%. Timber production on these stands is reduced due to inter-tree competition.

The early or mid-mature conifer component is the dominant vegetative type represented within the Weaverville watershed, comprising about 60% of the timbered acreage. Similar to the pole-sized stands in that the densities are generally high, about 53% of these stands (3,167 acres) have crown closures of over 70%. Likewise, timber production is reduced due to inter-tree competition; but unlike the pole-sized stands, these early or

mid-mature stands are currently available for timber harvesting opportunities due to the larger (over 12” dbh) size of the individual trees.

Mature or old growth conifers occupy about 10% (978 acres) of the available National Forest timberland within the Weaverville watershed. These older stands are currently suitable for timber harvest opportunities, but may not be available for timber harvesting due to ecosystem management objectives of other resources.

1.3 CURRENT FUELWOOD OPPORTUNITIES

The Weaverville watershed is adjacent to the community of Weaverville and has traditionally been heavily used by woodcutters as a prime fuel wood collecting area. Since the area is dominated by mixed conifer timber stands, woodcutters use the existing road system to access dead and down trees whenever the roads are open for travel. In addition, numerous “user-created” roads have been pioneered to access fuel wood since demand for fuel wood apparently exceeds the supply available on the existing road system.

Most of the 9,868 acres of the available conifer forest land outside of the wilderness is roaded; however, only the strips of land bordering the roads offer reasonable fuel wood gathering opportunities. There is no opportunity for fuel wood collecting in the wilderness.

2. Access and Travel Management

2.1 CURRENT TRAIL CONDITIONS

The current trail conditions in the watershed vary from good to poor. The trails in the Weaver Basin Trail system are generally in good condition, but in need of improvement in some aspects. The trails in the Weaver Basin Trail system are maintained in partnership with the Resource Conservation District and the Weaver Basin Trail Committee. User-created trails are more often in poor condition, receive little, if any maintenance, and cause resource damage.

Motorized use on non-motorized designated trails is a conflict both to user expectations and user safety. OHV use on user-created trails is widespread and represents unmanaged recreation.

The Weaver Basin Trail system commonly traverses ‘soft’ clay soils and during late fall, winter, and early spring the tread is wet and unstable, and undesirable for travel. The trail crossings at some drainages have culverts that are functionally inadequate, and some have non-standard bridge structures.

Access to the Weaver Basin Trail system can be improved with an additional entry point between downtown Weaverville and East Weaver Creek. A limited OHV trail system can be developed on Musser Hill, using roads recommended for decommissioning, existing

user-created trails, and a short segment of new trail construction. Most user-created OHV trails (unclassified trails) in the watershed can be decommissioned. A program of education, signing, and enforcement can be implemented to change existing use and behavior.

2.2 CURRENT ROAD SYSTEM

See the Browns Roads Analysis for a discussion of road systems, conditions and management opportunities within the Weaverville watershed (Appendix A).

3. Erosional Processes

3.1 CURRENT MASS WASTING

Due to the incompetent nature of the rocks within this area, mass wasting has played a dominant role in shaping the geomorphology. Mass wasting features include deep-seated dormant rotational landslides and shallow stream headwall basins. In general deep-seated dormant landslide terrain dominates northeast-facing slopes while headwall basins dominate the southwest-facing slopes. This characteristic is no doubt due to higher moisture conditions within northeast facing landscapes. Although mass wasting features occur throughout the analysis area, their occurrence is less frequent in the Musser Hill area.

The major analysis area creek systems of Weaver, East Weaver, Browns, and Rush form the major transporters of rock debris and sediments produced through these mentioned geomorphic processes. Debris flow deposits presently occupy all of these creeks. In several instances the processes that contribute to mass wasting are presently active, in most however they are dormant (Map 2).

By far the greatest occurrences of mass wasting features within the analysis area are dormant rotational/translational slides (1056/1076). Movement of a coherent mass characterizes this type of slide over a discrete, broadly concave failure surface. Most slides have occurred in association with at least one of the following: serpentinized shear zones, faults, lithologic contacts, wet zones such as inner gorges and areas encompassed by the Weaverville geologic formation. The latter is almost always associated with landsliding activity. The highest danger for precipitating further sliding exists where surface or groundwater is associated with at least one of the former factors.

Internested rotational landslides (1250) occur in proximity to perennial and ephemeral drainages. These areas are somewhat stable if ground slopes remain under thirty-five percent. At greater slope gradients these slides are considered unstable. Such slides commonly creep gradually, but where undercut by a road or drainage will slide out rapidly.

Valley inner gorges (1260) are defined as those slopes adjacent to channel margins having gradients in excess of sixty-five percent. The valley inner gorge is formed through

mass wasting triggered by channel downcutting, oversteepening and undercutting. Valley inner gorges occur throughout the analysis area.

Associated with inner gorges are rock debris flows (1101) that can be found throughout the analysis area especially along Sidney, Munger, Five Cent, and Garden Gulches and Weaver, Browns, Rush Creeks and their tributaries. These along with inner gorges are active mass wasting process zones.

The slope stability hazards of the mass wasting features have been first stratified through photo-interpretation techniques and reconnaissance field study according to their potential to be activated by possible management activities. This is a subjective; relative rating meant only to *compare* different mass wasting features within the area and is not meant as a site-specific tool.

Extreme hazards are defined for all active slides, regardless of their type. Some extreme areas were found or delineated during the initial stratification (1251) along China Gulch and Highway 3 areas.

High hazards are defined for all valley inner gorges (1260). The area where the stream channel evolves to an inner gorge profile also has a relatively high stability hazard. This area marks the point of headward migration of the tributary inner gorge and is usually formed through debris sliding, debris avalanching, and debris torrents. The upslope migration of the tributary inner gorge is an on-going geologic process. The migrational process is active in many of the tributary streams. Considering the abundance of dormant slide features these zones should be considered highly sensitive to management practices. In addition, most debris slide/avalanche prone slopes (1111) are also assigned a hazard level of high. Some rotational landslide prone slopes west of Rush Creek are also in this category.

Moderate to high hazards are defined for some translational/rotational areas (1059/1079) and debris flow areas (1101/1103/1104). Within these areas it is judged that there can be a relatively high probability of initiating some 1,000-to 10,000 cubic-yard landslides through intensive management *without proper mitigation*.

Low to moderate hazards is defined for crown scarp areas of translational and rotational type landslides (1056/1076). Perennial streams are common in these areas and ephemeral channels also carry significant seasonal flows. Most mass wasting processes are presently dormant and should remain so until the inner gorge zone migrates into these areas. Within these areas there is potentially a risk of initiating 100 to 1,000 cubic-yard headward-working rotational landslides through management without proper mitigation.

It should be noted that this zonation method is generalized. The possibility thus exists of differing hazard levels occurring within these general zones.

3.2 CURRENT SOIL EROSION

Soils within the watershed area have predominately formed in metavolcanic and metasedimentary residuum on the upper mountain sideslopes and ridges. Soils formed in these areas are generally shallow (less than 20 inches) to moderately deep (20 to 40 inches) loams to gravelly and very gravelly clay loams (Chaix, Chawanakee, Deadwood, Holland, Marpa, and Neuns soils). Soils formed in nonmarine sediments are moderately deep to very deep (greater than 60 inches), (Forbes, Soulajule, and Xerofluvents) (Table 3-2).

Table 3-2. Major Soils Information.

Soil Series	Map Units	Depth	Parent Material	Surface Texture	Clay %	Rock Frags	Burn Damage	Erosion Hazard
Chaix	18, 21, 25	MD	G	cosl	8-12	10-15	severe	H/14
Chawankee	25, 27	S	G	gsl	8-18	10-20	high	H/13
Deadwood	34, 35	S	MS	vgsl	10-20	50-85	moderate	M/7
Forbes	66, 67, 68	VD	NS	l	20-50	5-10	moderate	MH/12
Holland	21, 214	MD-D	MV	l	20-34	10-35	moderate	MH/12
Marpa	175, 218	MD	MS	gl	18-30	25-55	moderate	M/10
Neuns	34-5, 214 -18	MD	MV	vgl	10-25	40-60	moderate	M/8
Soulajule	304, 305	MD	NS	gl	20-45	10-40	moderate	MH/11
Xerofluvents	351	VD	NS	vcsl	4-10	50-90	low	L/2

Depth Classes:	Parent Material:	Soil Texture:	Erosion Hazard Rating:
S = shallow (10-20”) MD = mod deep (20-40”) D = deep (40-60”) VD = very deep (>60”)	G = granitic MS = metasediments MV = metavolcanics NS = nonmarine sediments	l = loam gl = gravelly loam vgl = very gravelly loam sl = sandy loam	L = low (<4) M = moderate (4 to 12) H = high (13 to 29)

Soil Cover/Erosion

Many land use activities have the potential to cause erosion rates to exceed natural soil erosion or soil formation rates. In order to assess the potential risk of a given soil to erode, an erosion hazard rating (EHR) was developed (R-5 FSH 2505.22). Many interrelated factors are evaluated in an EHR system to determine whether land use activities would cause accelerated erosion. The EHR system is designed to assess the relative risk of accelerated sheet and rill erosion. This rating system is based on soil texture, depth, clay percent, infiltration of soil, amount of rock fragments, surface cover (vegetative and surface rocks), slopes, and climate. Risk ratings vary from low to very

high with low ratings meaning low probability of surface erosion occurring. Moderate ratings mean that accelerated erosion is likely to occur in most years and water quality impacts may occur for the upper part of the moderate numerical range. High to very high EHR ratings mean that accelerated erosion is likely to occur in most years and that erosion control measures should be evaluated. These ratings assume varying amounts of vegetation cover depending on degree of vegetative management.

Analysis shows that most of the soils in this watershed area are moderately deep (20 to 40 inches) to shallow (< 20 inches) with areas of nonmarine sediments having deep and very deep (>40 inches) soils. Soil erosion levels are moderate to high depending on slope and cover (with soil cover greater than 50% on all slopes).

Low to moderate erosion hazard ratings insure soil erosion will not exceed the rate of soil formation. High to very high erosion hazard ratings indicate that soil erosion will exceed the rate of soil formation and site productivity will degrade if no erosion control measures are enacted. Maintaining soil cover to reduce erosion is the goal of the regional Soil Quality Standards (SOS, 1995), (see Appendix B for EHR determinations).

Soil Compaction/Porosity

About 800 acres of nonmarine sediment soil (Forbes, Holland, Soulejule series) are in a compacted state around Musserhill area just north of Weaverville (Map 3 hatched blue area). Soil Quality Standards (SQS) state that in an uneven-aged managed stand no more than 20% of the area shall be in a nonproductive state (landings, roads, main skid-trails) on matrix lands. Porosity (an expression of compaction) shall not decrease by 10% over background levels. In this 800 acres porosity exceeded threshold levels on 25 to 50% of the area (based on sampled line transects with a cone soil penetrometer and bulk density samples).

Soil Cover/Large Woody Debris

Cover transects indicate that the dominate cover is the 1 to 3 inch and the 3 to 20 inch class of woody material. Duff thickness ranged from ½ in on south-facing slopes to 3 inches on north-facing slopes. Average tons/ac for mixed conifer ranged from 10 to 16, for tree/brush stands from 8 to 12 and brush stands from 4 to 7. Large woody debris (LWD) ranged from 10 to 20 trees/ac for mixed conifer stands, for tree/brush stands it ranged from 4 to 8 trees/ac, and for brush areas 1 to 3 logs/ac old decayed class 4 and 5. SQS state that in areas of granitic soils cover should be maintained at 90% since these areas are highly erosive. For other soils, (metavolcanics, metasediments, nonmarine sediments) cover can range from 40 to 70% depending on erosion hazard rating for the particular soil. Overall, for this watershed, granitic soils need more soil cover on south and west facing slopes and nongranitic soils need more LWD on the south and west facing slopes.

Project Risk Assessment

By evaluating soil parent material type, depth, erosion hazard rating, and minimum slope a risk assessment map can be produced (Map 3). This map shows the areas of concern are the adjacent units west along the border of the Trinity Alps Wilderness and small granitic pluton that exists on the eastern border above Rush Creek. These areas are steep, shallow to moderately deep granitic and metasediment soils that have high erosion hazard ratings. These areas have sandy soil textures, low clay amounts and high burn damage risk. Other areas that have moderately high erosion hazard are the nonmarine sediment hills in and around Musser Hill. These areas are susceptible to sheet and rill erosion due to fine textures with lots of silt material. These soils are susceptible to compaction that changes the hydrologic function of the soil causing a decrease in infiltration and increased surface runoff (Map 3 and Appendix B).

If a catastrophic fire were to occur in the Weaverville Watershed severe erosion would occur on the granitic soils and the fine textured nonmarine sediments (see Appendix B, Soil Erosion Hazard ratings). Catastrophic fire would remove soil cover and cause organic matter destruction in the topsoil of the granitics. These factors would cause rill and gully erosion in the granitics and sheet and rill erosion in the nonmarine sediments. Erosion rates would be excessive (Appendix B), thus necessitating the need a for fuel reduction program in these areas to protect the resources.

3.3 CURRENT CUMULATIVE WATERSHED EFFECTS

Streams draining the analysis area are nested within the Upper-Middle Trinity River basin and directly contribute water and sediment to Rush, Little Browns, East Weaver, and West Weaver Creeks (Plate 1).

Beneficial Uses and Water Quality Objectives Within and Downstream of the Analysis Area: The designated beneficial uses for the Trinity River within the analysis area are established in the Water Quality Control Plan for the North Coast Region and are listed below (NCRWQCB, 1994):

- municipal and domestic supply (MUN);
- agricultural supply (AGR);
- groundwater recharge (GWR);
- freshwater replenishment (FRSH);
- hydropower Generation (POW);
- water contact recreation 1 and 2 (REC-1 and REC-2);
- commercial and sport fishing (COMM);
- cold freshwater habitat (COLD);
- wildlife habitat (WILD);
- migration of aquatic organisms (MIGR); and
- spawning, reproduction, and/or early development (SPWN).

The following is a list of the applicable water quality objectives that apply to the tributaries draining the Weaverville analysis area:

- general objective (anti-degradation);
- suspended material;
- settleable material;
- oil and grease;
- sediment;
- turbidity;
- pH;
- temperature;
- toxicity; and
- chemical constituents.

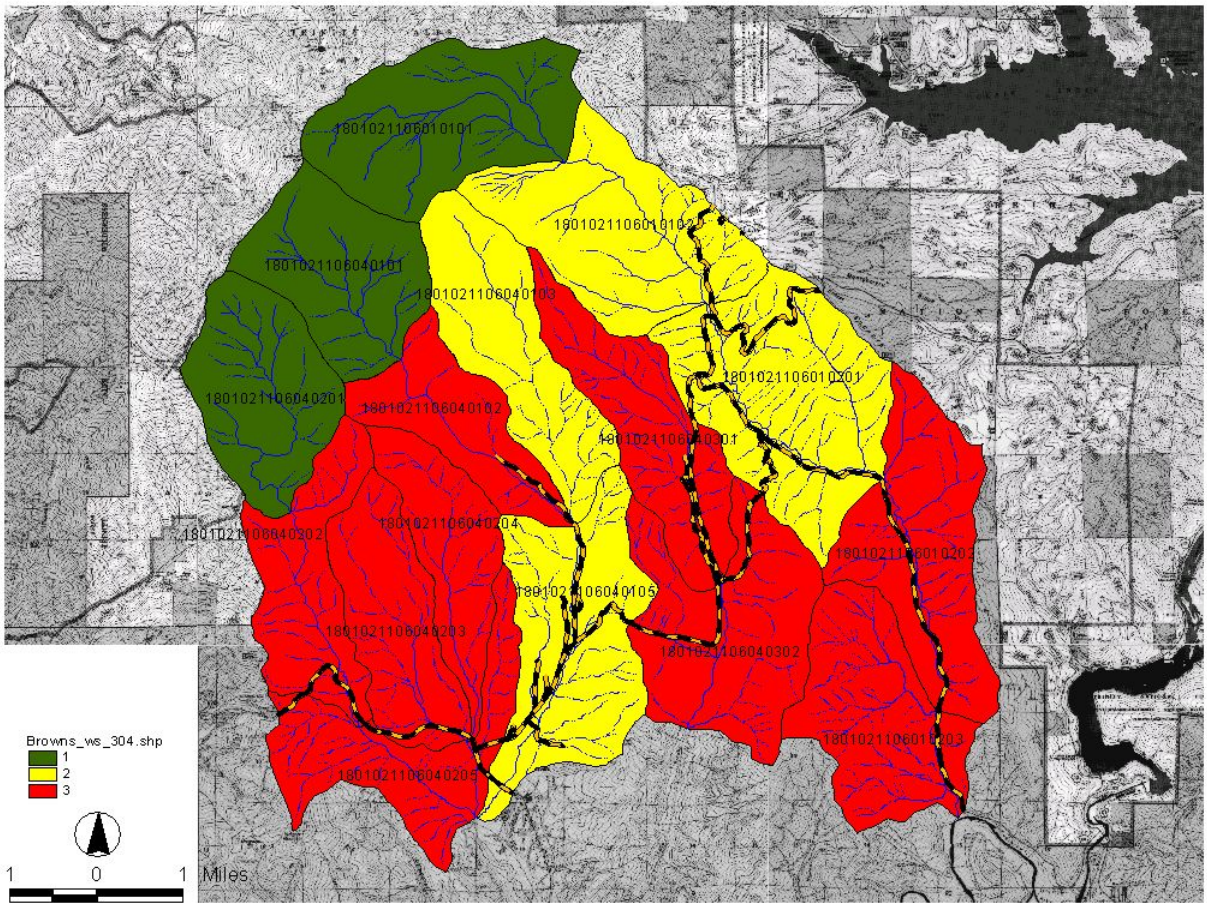


Plate 1. Map illustrating Weaverville Watershed Analysis subwatersheds and condition class.

These pollutants cannot be above a level that adversely effects human, plant, animal, or aquatic life (NCRWQCB, 1994). As a Water Quality Management Agency (WCMA) the Forest Service must demonstrate that proposed management activities will not further degrade local and regional water quality (USDA Forest Service, 2000). The main water quality concern for the analysis area is suspended and coarse sediment.

Trinity River Sediment TMDL: In 1992, the Trinity River watershed was listed as water quality impaired due to sediment under California's Clean Water Act Section 303(d) (NCRWQCB, 1994). A water quality management plan or Total Maximum Daily Load (TMDL) was developed by the EPA (2001) to reduce the amount of sediment in the Trinity River. The TMDL sets sediment load allocations that specify the amount of sediment reduction needed to meet the water quality objectives.

EPA (2001) infers that the limiting factor to beneficial uses is excess sediment transported and/or deposited in the Trinity River. The California State water quality objectives for sediment are listed in Table 3-3. Fine and coarse sediment are considered negative to the environment. Indicators to include: spawning gravel quality and permeability, pool depth and other geomorphic indicators.

The TMDL sediment source analysis attempts to show that the majority of suspended sediment and turbidity are sourced from timber harvest and roads. The Weaver-Rush watersheds were analyzed as a subset of the TMDL analysis area. According to the TMDL, fine and coarse sediment sourced from the Weaver-Rush 6th field watersheds needs to be reduced 42 percent to meet water quality objectives (EPA, 2001). In addition, the Watershed Condition is rated as "at risk."

Table 3-3. Sediment water quality objectives applicable to the Weaverville Watershed Analysis.

Parameter	Water Quality Objective
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Settleable Material	Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface water shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Turbidity	Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution with which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

The Shasta-Trinity Cumulative Watershed Effects (CWE) analysis process is used to characterize and quantify the current condition of water quality and quantity of the Weaverville Watershed Analysis. This CWE analysis compares the Forest Plan Threshold of Concern (TOC) to the existing Equivalent Roaded Area (ERA). Subwatersheds that are at risk are identified and investigated to determine which actions need to be taken to restore and or mitigate the level of ground disturbance. Specific recommendations from this analysis, if implemented, are likely to improve the long-term channel stability and help meet sediment TMDL goals.

CWE Analysis, Scope and Definitions: The Shasta Trinity National Forest CWE analysis process evaluates the potential impacts of land management on balance between rainfall-runoff, erosion, and stream channel response. CWE are defined in the Forest Plan

(USDA Forest Service, 1994) as the additive or compound effects of land management activities to water quantity and quality and beneficial uses, occurring away from the site of primary development, which are transmitted to the fluvial system.

CWE appear to result from the combination of changes in surface and mass failure erosion rates, instream sedimentation rates, and peak streamflows within watersheds in response to management activities (Haskins, 1983). The Federal Register defines a cumulative effect as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such other action (40 CFR 1508.7).

CWE Analysis Level and Confidence: For the Weaverville Watershed Analysis, a Level 1 CWE analysis was completed that relied on readily available information, no sediment budget, and limited field data collection. This level of CWE analysis uses the Haskins (1986) ERA model as a tool to identify at risk or "red flag" watersheds. The confidence in analysis is low to medium due to the lack of accurate legacy land use history, accurate and current timber harvest and road data on private lands, current road condition data, and current channel stability data.

CWE Analysis Core Data Sources: This CWE analysis relies on the Equivalent Roaded Area model developed by Haskins (1983). The existing ERA is calculated using readily available data from the Forest Service, State, and local agencies. The following summarizes the core data layers used to complete the CWE analysis.

Timber Harvest ERA: The timber harvest ERA is calculated using the land area and rate of timber harvest on public and private lands. The harvest history factors the type of harvest (e.g., thinning from below), the yarding method (e.g., tractor), the site preparation method (e.g., tractor pile and burn), and future actions (e.g., planting and prescribed burning). The public land harvest history relies on data from the Forest Service Stand Record System (SRS) database stored and maintained in GIS. The SRS data were updated to reflect public land harvest as of fiscal year 2004. Several of the units were inventoried to verify the ERA model recovery rates.

The private land harvest history was developed using harvest history data summarized as part of the Trinity River sediment TMDL (EPA, 2001), DWR (1980), and aerial photos from 1998. Several errors and gaps in the TMDL timber harvest GIS data were corrected and identified after comparing the GIS data and the aerial photos. GIS data was corrected using aerial photos and limited ground truthing to develop the harvest history. Several errors and gaps in the TMDL timber harvest data still exist as of the date of this report.

Road ERA: The road ERA is calculated using the area of land disturbed by the road prism. The road ERA calculation uses data from the Forest Service road database stored and maintained in GIS. The road layer was updated as part of the Weaverville Watershed Analysis and Browns Integrated Project Roads Analysis Process. The existing road ERA was calculated using the updated road layer that includes existing and new classified and unclassified Forest Service roads and trails, user created ATV trails, private roads and trails, county roads, and state and federal highways.

Several errors and gaps in the road layer were corrected and identified after comparing the road database to field inventory data and the 1998 aerial photos. For example, about 40 miles of private road were mapped from the 1998 aerial photos. There are still roads missing from the database as of the date of this report. In addition, very little data were readily available on road conditions.

To calculate the road ERA, the road length is multiplied by road width. The road length is summarized using GIS data. Road width varies depending on the road and surface type, and maintenance level. Road width accounts for the average prism width, pullouts, and landings.

Fire ERA: Watershed disturbances caused by wildland and prescribed fires and their impact on the hydrologic balance, sediment yield, and beneficial uses is analyzed as part of the CWE analysis. The fire ERA is calculated using the known wildland and prescribed fire history for the analysis area. Only landscape scale fires are of importance because the frequent lightning fire typically is not large enough to excess runoff or erosion.

Each fire is characterized according to how severe it burned and when it burned. A burn severity map is drawn to calculate the disturbed watershed area. Fire disturbance factors and recovery rates for different vegetation types and burn characteristics are used to estimate the likely-hood of negative cumulative effects. Typically, runoff and erosion caused by vegetation and duff layer removal are assumed to be recovered, or within the natural range of variation, at five to 10 years. For example, chaparral or brush fires typically have a high rate of fuel consumption are large and can cause severe burns, however, these disturbances recover rapidly. Within coniferous vegetation types, the rate of disturbance recovery depends more on the type of burn, for example, a low severity under-story burn is fully recovered within two to five years, whereas, a high severity crown fire may not recover for 30 or more years.

Fire history data, stored in GIS, was used to calculate the fire ERA. The Oregon Fire was the most recent large fire and burned in the western portion of the Weaverville Watershed Analysis area.

ERA Field Data: Field extensive data are used to help verify present and potential watershed conditions. These data are used to help verify or inventory the following items:

1) Inventory of channel stability;
2) Inventory of landslide prone terrane;
3) Inventory of needed restoration and mitigation measures;
4) Location, type, and condition of riparian reserves; and
5) road restoration and upgrade opportunities.

ERA Disturbance Factors and Recovery Rates: ERA disturbance factors for the analysis area were developed using the coefficients described by Haskins (1986), surrounding

forests, and scientific literature. Listed in Appendix C are the CWE disturbance factors and their recovery rates.

All mechanical ground disturbances from project activities are assumed to be fully recovered after 20 to 30 years. Ground disturbances caused by wildland and/or prescribed fire are assumed to be recovered in five to 10 years. Roads, landings, and skid trails do not recover with time unless specific mitigation or restoration occurs (Haskins 1986). Once a road is decommissioned or a landing is rehabilitated they are assumed to have a positive effect on ERA.

CWE Analysis Threshold of Concern and Watershed Condition Class: The Forest Plan LMP established TOC for 5th field watersheds and defines Watershed Condition Class (WCC) (USDA Forest Service, 1994). The WCC are defined as follows:

- Watershed Condition Class I: ERA less than 40 percent TOC;
- Watershed Condition Class II: ERA between 40 and 80 percent TOC; and
- Watershed Condition Class III: ERA greater than 80 percent TOC.

The following summarizes the FSM 2521.1 - Watershed Condition Classes. The ERA evaluates watershed condition and assigns one of the following three classes:

1. Class I Condition. Watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. The drainage network is generally stable. Physical, chemical, and biologic conditions suggest that soil, aquatic, and riparian systems are predominantly functional in terms of supporting beneficial uses.

2. Class II Condition. Watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. Portions of the watershed may exhibit an unstable drainage network. Physical, chemical, and biologic conditions suggest that soil, aquatic, and riparian systems are at risk in being able to support beneficial uses.

3. Class III Condition. Watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. A majority of the drainage network may be unstable. Physical, chemical, and biologic conditions suggest that soil, riparian, and aquatic systems do not support beneficial uses.

CWE Analysis Results: The existing ERA is listed for each 8th field subwatershed within the analysis area and used to calculate the present WCC (Table 3-4) (Plate 1). The TOC for the analysis area is 16 percent. There are five 7th field watersheds draining the analysis area to include:

- Rush Creek (i.e., broken into two 7th);
- Little Browns Creek;
- East Weaver Creek; and
- West Weaver Creek.

Rush Creek has a WCC of three, and the ERA increases downstream. The headwaters of Rush Creek drain wilderness and are in WCC one, whereas, the lower portion of the creek has been heavily managed and exceeds the TOC by a factor of two. The road network and rate of timber harvest are the main causes of the high ERA. There are several mass wasting features chronically contributing large volumes of sediment to Rush Creek.

Table 3-4. Weaverville Watershed Analysis current condition ERA spreadsheet.

HUC8	HUC6_NAME	Drainage Area (acres)	Forest Plan TOC (%)	Existing ERA (acres)	Existing ERA (%)	WCC
1801021106010101	Rush Creek	2860	16	5	0	1
1801021106010102	Rush Creek	2997	16	255	9	2
1801021106010201	Rush Creek	3470	16	410	12	2
1801021106010202	Rush Creek	2676	16	657	25	3
1801021106010203	Rush Creek	2384	16	813	34	3
Rush Creek (7ths)		14388	16	2140	15	3
1801021106040101	E Weaver Creek	2148	16	10	0	1
1801021106040102	E Weaver Creek	1567	16	210	13	3
1801021106040103	E Weaver Creek	2291	16	209	9	2
1801021106040105	E Weaver Creek	2886	16	356	12	2
E Weaver Creek (7th)		8892	16	784	9	2
1801021106040201	W Weaver Creek	2143	16	62	3	1
1801021106040202	W Weaver Creek	1836	16	282	15	3
1801021106040203	W Weaver Creek	1895	16	878	46	3
1801021106040204	W Weaver Creek	1530	16	237	15	3
1801021106040205	W Weaver Creek	2035	16	669	33	3
W Weaver Creek (7th)		9440	16	2127	23	3
1801021106040301	L Browns Creek	2151	16	304	14	3
1801021106040302	L Browns Creek	2838	16	426	15	3
L Browns Creek (7th)		4989	16	731	15	3

Little Browns Creek has a WCC of three. Smaller than the other three 6th field watersheds, the ERA of this watershed is equal to the TOC (i.e., 16%). The road network, rate of timber harvest, and urban development are the main causes of the high ERA. Highway 3 has impacted stream channel stability significantly in the lower subwatershed (1801021106040301) were the Highway 3 occupies ¾ of the original channel width.

East Weaver Creek has a WCC of two, however, one of the subwatersheds (1801021106040102) is in WCC three (Table 3-4). The headwaters of East Weaver Creek drain wilderness and have a WCC of one. The ERA increases downstream with urban development as the main cause of high ERA. Roading, urban development, and surface water use are significantly altering water quality and quantity in lower Weaver Creek.

West Weaver Creek has a WCC of three. The headwaters of West Weaver Creek drain wilderness and have a WCC of one. The ERA increases downstream with urban development and recent large severe wildland fire (i.e., Oregon) as the main cause of high ERA. Roading, urban development, and surface water use are significantly altering water quality and quantity in lower Weaver Creek. In addition, Highway 299 has impacted stream channel stability significantly because of highway runoff, channel diversion, and road-cut instability.

4. Aquatic Systems and Species

4.1 CURRENT ANADROMOUS FISH POPULATIONS AND DISTRIBUTION

The Weaverville planning watershed is made up of several subwatersheds where only the upper portions are located on National Forest System lands. The condition of anadromous fish abundance and habitat conditions will be addressed at the 7th field subwatershed level. The four watersheds are Rush Creek, Little Browns Creek, East Weaver Creek, and West Weaver Creek.

In general, streams of the Weaverville watershed begin in the Trinity Alps Wilderness area and are in very good condition in the upper areas of the watershed. Significant amounts of water are withdrawn from East and West Weaver Creeks by the Weaverville Community Service District and from Rush Creek at the Rush Creek Estates area. After streams leave the National Forest, the quality of riparian areas and instream habitat declines quickly. High water temperature and low flow are limiting factors to fish, especially during the mid-summer and fall.

Anadromous fishes found in the Weaverville Watershed include Fall-run Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), Winter-run Steelhead (*O. mykiss*) and Pacific Lamprey (*Lampetra tridentata*). The coho salmon is part of the Southern Oregon Northern California Coast Evolutionary Significant Unit and listed as threatened by the National Oceanic and Atmospheric Administration under the Endangered Species Act. Adult fishes are found in the Weaverville watershed during their spawning migrations. Chinook are found infrequently due to low stream flows that prevent migration during the fall. Coho salmon run later in the year can usually ascend streams in the watershed by late November or early December. Steelhead and lamprey ascend streams in the watershed during early spring and are limited by natural waterfalls, dams, and culverts. Juvenile fish of all species may be found at any time in the watershed, with juvenile steelhead being most abundant.

Fish habitat surveys have been performed periodically since the early 1980's for most streams (1963 for Rush Creek) in the analysis area. Many surveys note poor habitat conditions and from 1986 to 1992 most streams had habitat improvement structures installed. In confined channels such as West Weaver Creek and Little Browns Creek, some well-constructed structures still persist and provide complex habitats. In streams with less confinement and high bedload transport, the structures were less successful.

Water quality is generally very high in streams of the Weaverville watershed. Surveyed streams have had dissolved oxygen levels from 11 to 12 ppm, pH from 7 to 7.5, and temperatures around 60° F.

Rush Creek

Anadromous fishes have access to approximately 9.5 miles of stream habitat before steep bedrock falls block passage. Chinook are only found during years of early fall rain that

creates suitable migration conditions. Low fall flows generally prevent anadromous fishes from using Rush Creek until late November. Spawning surveys for salmon and steelhead have been conducted on sections of Rush Creek intermittently since 1964. Counts have varied widely according to year and survey effort, but have ranged from zero to one Chinook, zero to 32 coho, and five to 439 steelhead.

The very first fish habitat surveys in Rush Creek noted excessive bedload and recommended that measures be taken to improve habitat. During the 1980's a Coordinated Resource Management Planning group was formed of state and federal agencies to address habitat needs in Rush Creek. The group recommended placing instream structures and 32 structures were build in 1988 and 1989. Surveys in 2002 and 2004 showed that only 40% of the structures remain and less than 20% are still functioning. A 2002 Stream Condition Inventory (SCI) found that most of the large woody debris was less than 1 foot in diameter, pools averaged only 1.6 feet deep and 68% of the stream banks were unstable.

Little Browns Creek

Little Browns Creek has approximately 0.9 miles of habitat accessible to anadromous fishes on National Forest System lands. Culverts on County Road 232 present a complete barrier to migrating fishes. Juvenile steelhead and coho salmon have been observed in the analysis area however spawning has not been documented.

Highway 3, County Roads 230, 232 and 807, and FS road U34N77A closely parallel Little Browns Creek within the analysis area. Little Browns Creek has been channelized and its habitat greatly simplified. Large woody debris is lacking, pools are shallow, and the stream banks are vulnerable to erosion (2003 stream condition inventory). Six habitat improvement structures were installed in 1992, several of the structures still exist and provide valuable habitat.

East Weaver Creek

East Weaver Creek has approximately 0.5 miles of habitat accessible to anadromous fishes on NFS lands. The diversion dam for the Weaverville Community Service District blocks migration .25 miles above the East Weaver Campground. Juvenile coho salmon and steelhead have been observed near East Weaver Campground but adult spawning has not been observed.

Stream condition inventory surveys performed in 2002 found that most large woody debris was of small diameter (< 1 foot), pools are shallow (ave. 1.1 feet) and 83% of stream banks are unstable.

West Weaver Creek

West Weaver Creek has approximately two miles of habitat accessible to anadromous fishes on NFS lands. Coho salmon are found up to Highway 299 where a culvert presents a migration barrier; steelhead can ascend the culvert but a waterfall near Bear gulch stops their migration. Up to four adult coho salmon and 12 steelhead have been observed spawning on NFS lands in West Weaver Creek.

Stream condition inventory surveys performed in 2003 found that most large woody debris was of small diameter (< 1 foot), pools are shallow (ave. 1.4 feet) and 51% of stream banks are unstable.

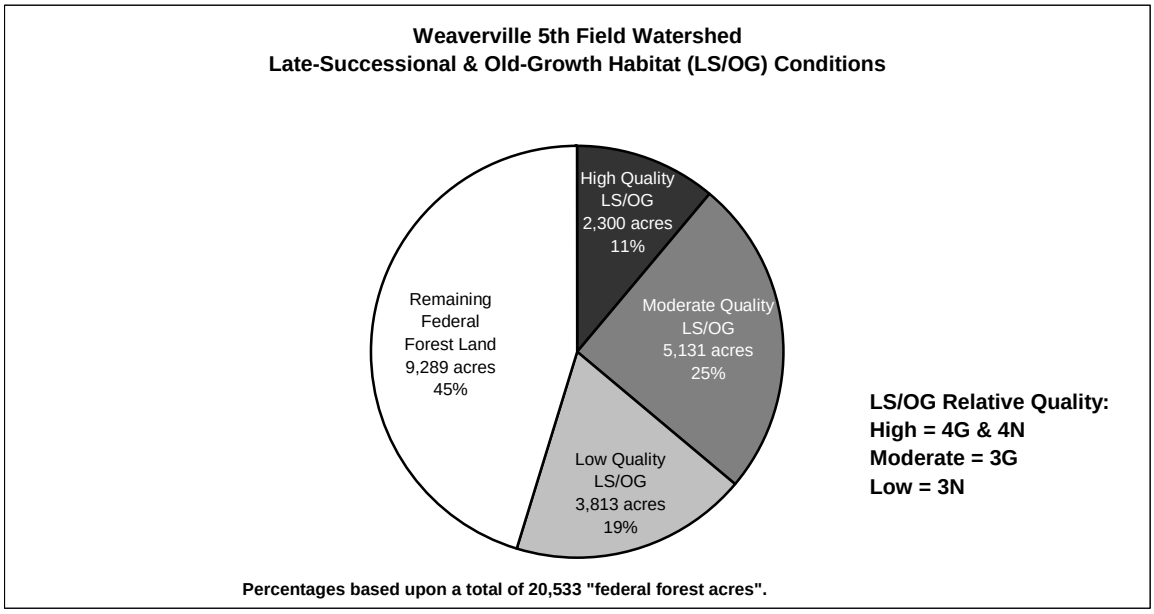
Sidney Gulch
Anadromous fishes have been observed in Sidney Gulch up FS road 33N42. A section of concrete channel passing through the Weaverville Ranger District compound stops migration in all but optimal flows. Up to 12 coho and two steelhead have been observed spawning on NFS lands in Sidney Gulch.

Stream habitat has not been formally inventoried on Sidney gulch. However, observations during spawning surveys suggest that Sidney Gulch suffers from similar habitat deficiencies as other local streams with low levels of large wood, shallow pools and an unstable channel.

5. Terrestrial Wildlife Habitat and Species

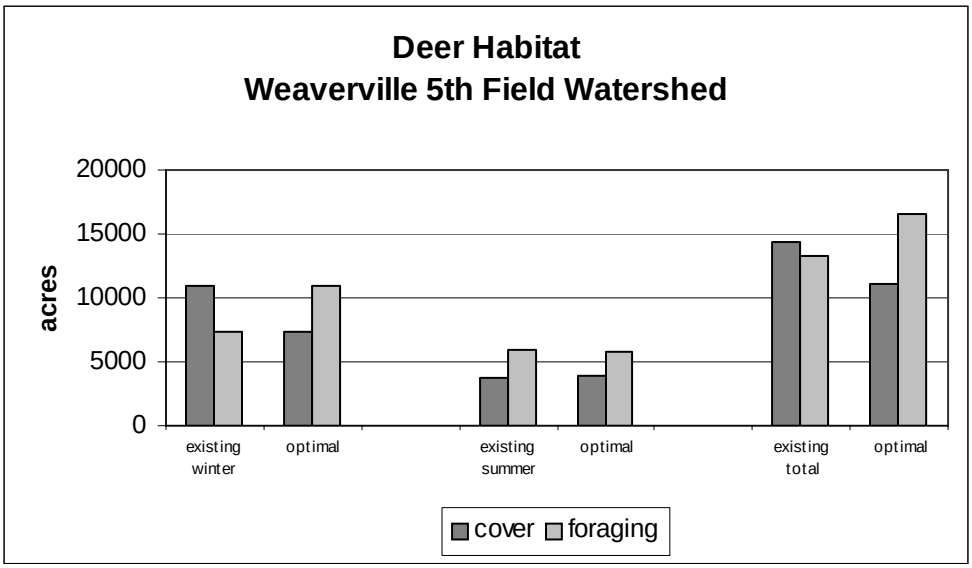
5.1 CURRENT LSOG AMOUNT AND CONDITION

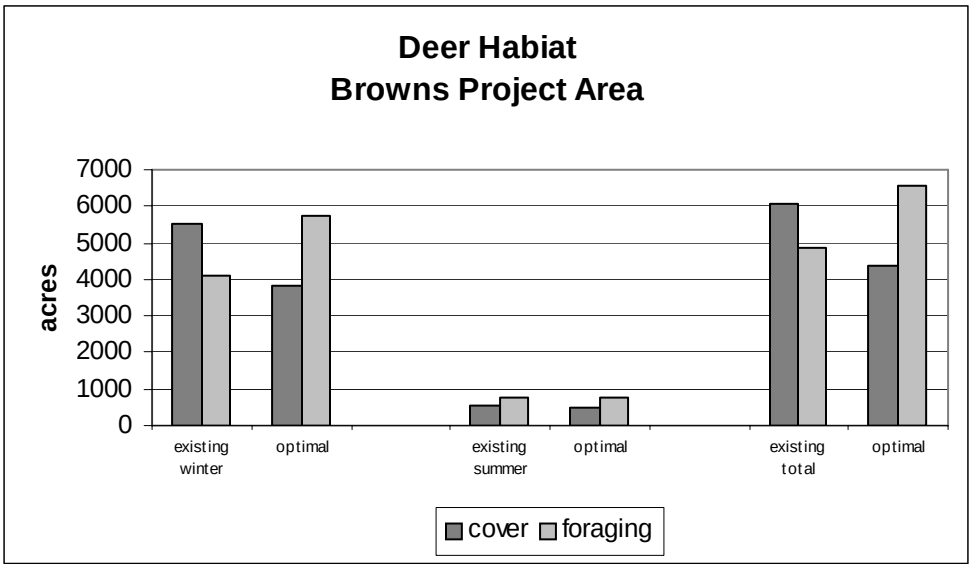
The 54,000-acre Weaverville Watershed includes 20,533 acres of federal forest land (i.e., federal land capable of producing LSOG). Old-growth comprises 2,300 acres or roughly 11 percent of this land. This old-growth exists in scattered patches ranging from roughly 2 to 400 acres in the upper two-thirds of the watershed with approximately 650 acres lying with the Browns Integrated Project Area. Mature (i.e., late-successional) forest dominates the watershed (12,937 acres or 63 percent of the federal forest land). The Watershed Analysis file includes a more comprehensive analysis of LSOG conditions along with maps, definitions and assumptions used (Appendix D).



5.2 CURRENT DEER HABITAT AMOUNT AND CONDITION

Winter range deer habitat within the Weaverville 5th Field Watershed is currently not providing optimum habitat conditions for deer assuming a rough ideal deer habitat ratio of 40% cover and 60% foraging (Thomas el al. 1979). The cover to forage ration in the watershed is currently 52% cover (14,381 acres) to 48% forage (13,225 acres). The Browns Integrated Project Area lies largely within winter range where the current ratio is currently 56% cover (6,053 acres) to 44% forage (4,840 acres). Most of the existing chaparral (i.e., brush-dominated) foraging habitat is decadent and thus too thick to allow deer access and too woody to provide nutritious browse (Gartner 1991). Much of the hardwood (i.e., acorn-producing) foraging habitat is overly dense and at risk to loss from wildfire. The Watershed Analysis file includes a more comprehensive analysis of deer habitat conditions along with maps, definitions and assumptions used (Appendix E).





6. Fire, Fuels, and Air Quality

6.1 CURRENT WILDFIRE THREAT TO LOCAL COMMUNITIES

Fire History

In pre-settlement forests of the Klamath region, biomass ultimately burned by frequent, low to moderate-severity fire. High-severity fires more than a few acres in size were unusual. Dead biomass on the forest floor was kept at low levels, and small understory trees were killed and subsequently consumed by fire. Small areas of high-severity fire killed patches of large trees, however the majority of large trees survived and were consumed at some point after their natural death (Weatherspoon and Skinner 1996).

Native Americans that inhabited the Klamath Mountains were dependent on local resources for commodities and shelter; therefore, periodic understory burning was a desired strategy. Mixed-conifer-Douglas-fir/hardwood forests were frequently burned along ridgetops to maintain travel corridors and openings for food and commodity production (Agee 1993). They used fire to promote the growth of acorns, berries, and plants, such as beargrass and hazel that provided fiber used in basket construction (Key 2000). In addition, natives burned to reduce the hazard of large, severe fires (Skinner and Chang 1996). Local Indians known to have inhabited the Klamath Mountains belonged to the Wintu, Yurok, and Hoopa tribes.

Native American activities before 1850; activities of miners, trappers and settlers in the mid-nineteenth century, and fire suppression in the twentieth century have all influenced fire history (Agee 1993). Biomass consumption dropped proportionately with annual burned acres as fire suppression was initiated in the early century. Fire suppression, in

forests that previously experienced frequent fires, has allowed fuels to build up both vertically and horizontally, increasing the chance of stand-replacement events.

Sixty-seven fire events within the proposed Brown's project area boundary occurred between the years 1931 and 1996 (Table 3-5) (Map 4). The longest fire interval between two fires was 12 years; however, the majority of them occurred between 0-2 years. Since all fires located on map 4 occurred during the 20th century, we assume that suppression tactics were employed. In addition, located on the map are fires that occurred outside of the proposed Brown's project boundary for the period of 1917 to 2000.

Table 3-5. Average number of years between fire events within the proposed Brown's project area from 1931 to 1996.

Fire Decade	Total Fires	Average Number of Years Between a Fire
1930-1939	16	2.0
1940-1949	8	1.5
1950-1959	14	1.7
1960-1969	0	12
1970-1979	19	1.3
1980-1989	5	2.0
1990-1999	5	3.0

Lightning is a common and important source of ignition in the Klamath Mountains. Wet and dry thunderstorms generally occur throughout the summer and early fall months. The computer program, Fire Family Plus was used to determine fire causes from 1993-2003. Approximately 70% of the fires on the Weaverville district occurred from lightning and 30% were caused from human, equipment, or miscellaneous (Figure 3-1).

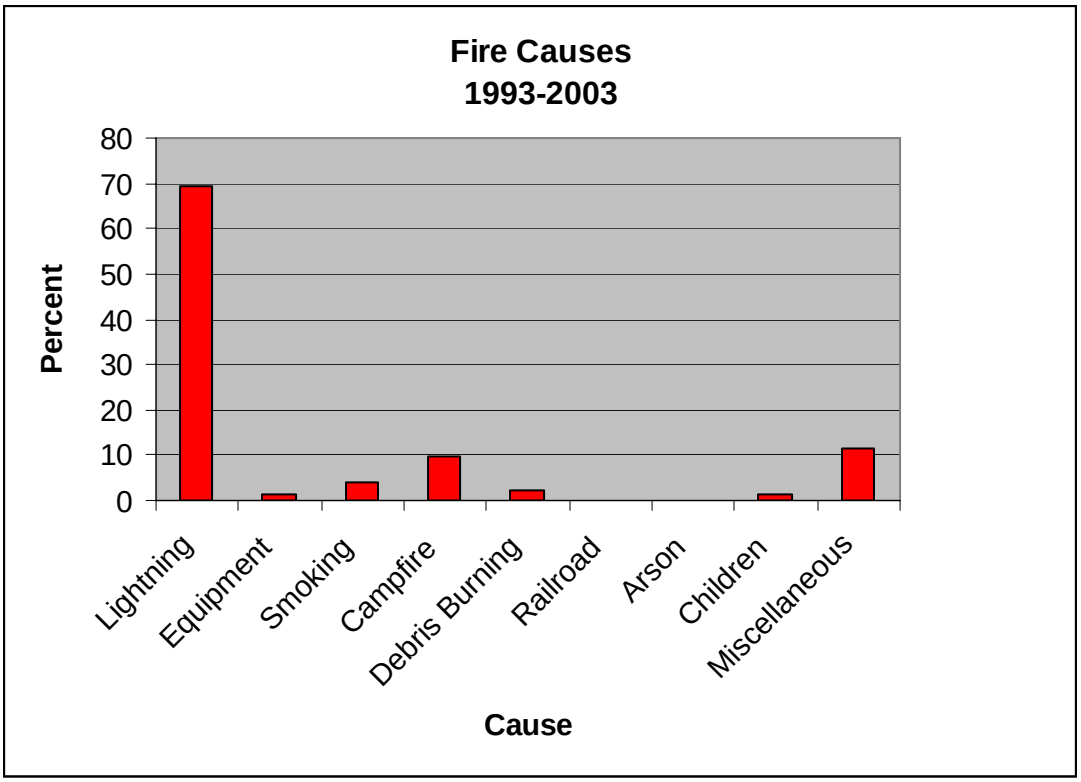


Figure 3-1. Fire causes on the Weaverville Ranger District for the period 1993-2003

Fuels History

Historically, fuel treatments on National Forest land had been accomplished for purposes of site preparation for reforestation, and the treatment of timber sale generated fuels. Today, however, fuel treatment objectives often incorporate ecosystem health and restoration (Omi and Martinson 2002).

A much greater percentage of biomass historically was stored in the boles of large trees, and herbaceous vegetation in relatively open stands, whereas now much more goes into small trees in dense stands (Weatherspoon and Skinner 1996). Larger, fire resistant trees have been harvested and replaced by smaller, fire susceptible trees. Dead biomass in the form of logging slash and natural fuels has increased due to the lack of fire, and inadequate or nonexistent fuel treatments (Weatherspoon and Skinner 1996).

In California's Mediterranean climate, decomposition rates are generally low and limited by low temperatures in the winter and inadequate moisture in the summer. Neither historically, nor presently has decomposition been the primary remover of biomass in a mixed-conifer forest (Weatherspoon and Skinner 1996). Frequent, low-severity fire plays an important role in regulating fuel accumulations in forested stands of the Klamath Mountains. This type of fire influences vertical and horizontal fuel continuities, as well as creates and maintains canopy gaps that mitigate crown fire propagation (Sinner and Chang 1996).

A long-term fuels history is not known in the Brown's area since fuel accumulations were not sampled during the pre-settlement period. Fuel assessments were conducted in the later 20th century and are found in four Forest Service planning documents (Table 3-7). In addition, old photographs from the late 1800's, and early 1900's of Trinity County were assessed to see if fuel loadings could be determined. Either no photographs were found of the proposed Brown's project area, or fuel loadings were indistinguishable.

Table 3-7. Average fuel loadings and their geographical location found within the proposed Brown's project area taken from four different Forest Service Environmental Assessments (EA).

Name of EA	Date	Geographical Area	Avg. Tons Per Acre
East Weaver	1985	Musser Hill ridge-road and East Weaver	35
Brown's	1985	Little Browns, Finley Gulch, China Gulch, Musser Hill	35
Lewiston	1988	Trinity Dam Blvd	21
West Weaver	1992	Glennison Gap	15

Stand Composition

The Klamath Mountains of northern California are known to be unique with high floristic diversity (Mohr et al. 2000). This region encompasses several mountain ranges such as the Marble, Siskiyou, Scott and Salmon Mountains; and consists of alpine, subalpine, and montane forests. The proposed Brown's project area is located in a montane forest, and its vegetation is characterized by mixed conifer-Douglas-fir, in which Agee (1993) further describes as the Psuedotsuga/hardwood zone.

Dominant conifer species within this area consist of *Pseudotsuga menziesii var. menziesii* (Douglas-fir), *Pinus ponderosa var. ponderosa* (ponderosa pine), *Pinus lambertiana* (sugar pine), *Calocedrus decurrens* (incense-cedar) and *Pinus sabiniana* (gray pine). Dominant hardwood tree species consist of *Quercus garryana* (Oregon white oak), *Quercus kelloggii* (California black oak), *Arbutus menziesii* (Pacific madrone), and *Quercus chrysolepsis* (canyon live oak). Dominant brush species consist of *Arctostaphylus patula* (greenleaf manzanita), *Arctostaphylus viscida* (whiteleaf manzanita), and *Ceanothus cuneatus* (buck brush).

Stand composition in the proposed Brown's project area was determined from data collected using a variable plot sampling method. Plots in China Gulch were sampled in 1999, and plots at Musser Hill and Little Browns creek were sampled in 2003. The total sample area is composed of 525 acres, 12 units and 136 plots. Three of the units consist of brush and were sampled only for dead and down fuel loadings, which is discussed in the fuels portion of this report. Basal area (BA) per acre, trees per acre, canopy closure, and fire condition class were determined by unit and are shown in Table 3-8.

In addition, a weighted average was calculated for basal area per acre, trees per acre, trees per acre between 2-12 inches, canopy closure and fire condition class rating (Table 3-9).

Species composition by percent basal area was also determined so that probability of mortality from a fire could be calculated (Table 3-10.)

Table 3-8. Basal area per acre, trees per acre, canopy closure, and fire condition class rating for the proposed Brown's project area per unit.

Unit	Basal Area Per Acre (ft^2)	Trees Per Acre	Canopy Closure (%)	Fire Condition Class Rating
1A	Brush			
1B	51	158	44	3
1C	94	431	80	3
1D	105	280	50	3
2A	151	307	73	3
3A	Brush			
3B	221	519	74	2
3C	240	678	82	3
3D	192	533	84	3
3E	Brush			
China Gulch 1	245	322	NA	NA
China Gulch 4	248	386	NA	NA

Table 3-9. Weighted average BA per acre, trees per acre, trees per acre (2-12 inches), canopy closure, and fire condition class rating for the proposed Brown's project area.

Weighted Average BA/Acre (ft^2)	Weighted Average Trees/Acre	Weighted Average Trees/Acre (2-12 in.)	Weighted Average Canopy Closure (%)	Weighted Average Fire Condition Class Rating
185	369	233	73	3

Table 3-10. Species composition by percent basal area for the proposed Brown's project area (China Gulch included).

Tree Species	Total Trees Counted in Sample	Percent Basal Area
Douglas-fir	491	66
Ponderosa pine	95	13
Incense cedar	57	1
Sugar pine	9	8
Gray pine	7	1
California black oak	73	10
Oregon whit oak	11	1
Canyon live oak	6	1
Pacific madrone	0	0
TOTAL	749	100

Condition Class

Three Condition Classes have been developed to classify the current state of vegetation with respect to each of the five Historic Fire Regime Groups (Cohesive Strategy 2000). Table E lists the descriptions of each condition class, the fire regime associated with it, and an example of management options.

The Brown's area currently falls within condition class 3. This was determined by referring to the Cohesive Strategy (2000) for a locality map of vegetation types that are currently classified in this condition. In addition, stand data plots sampled within the Brown's area show 6 out of 7 units fell within Condition Class 3, and 1 out of 7 units fell within Condition Class 2 (China Gulch and brush fields excluded) (Table 3-11).

Condition class 3 ecosystems contain stands littered with substantial amounts of dead material and are choked with hundreds of small trees that reach into the canopy of the larger, older-age forest above (Cohesive Strategy 2000). These ecosystems are at relatively high risk for damage from wildfires.

Fire Regime

Fires in the Klamath Mountains are more frequent and less severe than in the Pacific Northwest, however, less frequent than in Sierra Nevada forests (Mohr et al. 2000). Several fire researchers found the pre-settlement median fire return intervals for mixed-conifer-Douglas-fir forests in the Klamath Mountains. Their results show 16 years, 10-19 years, and 11-18 years (Skinner and Chang 1996). For ponderosa pine, studies show that prior to 1900 most stands experienced low-severity surface fires at intervals ranging from 1 to 30 years (FEIS 2003).

Fire regimes for the Brown's area are described in the Cohesive Strategy (2000), and fall within Groups I and II (Table 3-12). Both groups describe many of the lower elevational zones across the United States, which have been affected by the presence of human intervention, and are the furthest away from historical levels (Cohesive Strategy 2000). These areas are at greatest risk to loss of highly valued resources, commodity interests, and human health and safety (Cohesive Strategy 2000). Timber stands within the proposed Brown's project area are classified as a I and brush stands are classified as a II.

Table 3-11. Current condition class attributes as described in the Cohesive Strategy (2000).

Condition Class[1] descriptions		
Condition Class	**Fire Regime**	**Example Management Options**
Condition Class 1	Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	Fire regimes have been moderately altered from their historical range; the risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one of more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.

[1] Current conditions are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities.

Table 3-12. The Five Historic Natural Fire Regime Groups (Cohesive Strategy 2000).

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0-35 years	Low severity
II	0-35 years	Stand replacement severity
III	35-100+ years	Mixed severity
IV	35-100+ years	Stand replacement severity
V	>200 years	Stand replacement severity

Hazard/Risk/Values

Hazard describes the potential for resource damage should a fire occur. This was determined from local historical weather data coupled with local fuel models, and then calculating fire behavior for a particular area. These values are assigned a rating of low, moderate and high and were taken from the Shasta-Trinity Fire Management Plan (SHF-FMP)(2004).

Risk describes the probability of a fire occurrence, and was determined by plotting the location of historical fire starts on a map, and then locating their concentrations. These values are assigned a rating of low, moderate and high and were taken from the SHF-FMP (2004).

Value describes resources that would suffer a significant or irretrievable loss if they were damaged or lost by wildfire. It may be monetary and/or non-monetary worth such as wildlife habitat, homes, timber, and aesthetic values. This was determined by the SHF Forest Leadership team, and was assigned a rating of low, moderate and high (SHF-FMP)(2004).

A combined analysis was then used to develop the Hazard/Risk/Value map by combining ratings and assigning a low, moderate and high value based on these combinations, which were also taken from the SHF-FMP (2004). These ratings were then applied within the proposed Brown's project area boundary to more specifically assess the hazard/risk/values (Map 5).

Wildland Urban Interface (WUI)

Approximately 50% of the proposed Brown's project area falls within the Wildland Urban Interface. The nearest town is Weaverville, which is listed in the Federal Register for communities at high risk from wildfire (2001), therefore making this area a high priority for fuels treatments (10-year Plan 2001).

Existing Fuels

Fuel Models: There are three Fire Behavior Fuel Models represented within the Brown's area which are 5, 8, and 10. Fuel Model 5 is described as brush, and models 8 and 10 are described as timber litter.

Fuel Loading: A random systematic sampling method was used to assess fuel loadings in the proposed Brown's project area. The total sample area is composed of 458 acres, 10 units, and 126 plots (10 plots from China Gulch were excluded due to a conflicting sampling method). Data was then entered into the Fuels Management Analyst Plus (FMA +) computer software program to calculate an average fuel loading for each unit. The units were then combined and a weighted average was calculated over the entire area for both timber and brush units.

Fuel loadings range from approximately 1.70 to 33.20 tons per acre for timber stands and 1.60 to 4.35 tons per acre for brush stands (Table 3-13). Minimum fuel loadings within the proposed Brown's project area are generally located in stands with south-west aspects and contain vegetation such as oak, gray pine and brush species. Maximum fuel loadings are generally located in stands with north-east aspects and contain vegetation such as Douglas-fir, cedar, sugar and ponderosa pines.

Table 3-13. Minimum, maximum, and weighted average fuel distributions by size class and fuel class for brush and timber units in the proposed Brown's project area (China Gulch excluded).

Size Class (inches)	Fuel Class	Minimum (tons/acre)		Maximum (tons/acre)		Weighted Average (tons/acre)	
		Timber	Brush	Timber	Brush	Timber	Brush
0-.24	1 hr	0.3	0.20	1.0	0.30	0.51	0.28
.25-.9	10 hr	1.0	1.00	3.2	1.00	2.29	1.00
1-2.9	100 hr	0.4	0.40	7.9	0.60	1.86	0.44
3+	1000 hr	0.0	0.0	27.1	6.30	10.1	2.63
TOTAL		**1.70**	**1.60**	**33.20**	**8.20**	**14.76**	**4.35**

Fuel Bed and Duff Depths: A weighted average was calculated for fuelbed and duff depths in brush and timber units using the same sampling method and calculations as described for fuel loadings (Table 3-14).

Table 3-14. Minimum, maximum, and weighted average fuel bed and duff depths in brush and timber units in the proposed Brown's project area (China Gulch excluded).

	Minimum (inches)		Maximum (inches)		Weighted Average (inches)	
	Timber	Brush	Timber	Brush	Timber	Brush
Duff Depth	0.79	0.48	7.2	2.40	3.99	0.67
Fuel Bed Depth	1.63	0.60	2.06	3.00	1.93	0.91

Fuel Arrangement: Also known as fuel orientation, is described by how fuels are arranged either on the surface floor or aerially. Vertically oriented fuels may rapidly increase in depth with an increase in fuel load. This arrangement of fuel is found in brush fields and patches of conifer reproduction throughout the proposed Brown's project area. Vertically arranged fuels may create a hazard because they function as ladders for fire to enter tree crowns.

Horizontally oriented fuels are common in timber litter and logging slash, and slowly increase in depth as the load increases. Twigs, branches and trees that fall onto the forest floor create a criss-cross mosaic of fuels that stack up over time. This type of fuel arrangement may increase residence times and create high fire severity effects. The proposed Brown's project area is composed of many timbered stands of which horizontal fuels exist.

Fuel Continuity: The continuity of fine fuels is especially important to the spread of surface fire. If fuels are patchy such as in open stands or brush fields, fire will have difficulty traveling from one fuel island to another. It often requires a strong wind with spotting for a fire to travel from patch to patch (NWCG S-290). In the proposed Brown's project area, brush fields are a prime example of patchy fuels, however, many of these stands are decadent, therefore, fire may spread throughout the crowns under 90th percentile weather conditions.

On the other hand, continuous fuels will determine where a fire will spread, how fast it will spread, and whether the fire travels through ground fuels, aerial fuels, or both. In the proposed Brown's project area, timber stands are a prime example of this type of continuity since needles, leaves, and branches are continually falling creating a blanket of fuels on the forest floor.

Fire Behavior

Fire behavior for timber units was determined by FMA+ and is based on dead and down fuel loadings, tree stand data, and 90th percentile weather. Two fuel models were used from the FMA+ Master Fuel Model Set based on sampled fuel loadings, which are separated into low (letter A) and moderate (letter M). Breaking out fuel models into these two categories gives a more accurate description of the amount of fuels present at any given site.

Surface fire: All fire behavior outputs for the proposed Brown's project area were that of a surface fire. Fuel model 8 resulted in the lowest rates of spread, flame lengths, and fire intensities (Table I). Direct attack by fire suppression personnel would be feasible without mechanical equipment. The probability of a large, high-severity fire occurring in this fuel model with 90th percentile weather would be low.

Fuel model 10 resulted in the highest rates of spread, flame lengths, and fire intensities (Table 3-15). Many areas throughout the proposed Brown's project area fall within this fuel model. Fire suppression tactics would be indirect attack, and mechanical equipment and air support would be required. The probability of a large, moderate to high-severity fire with 90th percentile weather conditions would be high, and provides the chance for the initiation and propagation of crown fire.

Crown fire: Approximately 58% of the plots sampled within the proposed Brown's project area exceeded the critical canopy bulk density of 0.0023 lbs/ft^3, which is a minimum needed to provide vertical propagation of fire in the canopy (FMA+ 2004). For

trees to torch, however, surface fire intensity must be high enough to ignite them, which fuel models 8 and 10 may not always provide. However, these fire behavior outputs do not take into account jackpot fuels, brush and other ladder fuels that may be present. Therefore, the chance for a passive and active crown fire does exist, and may occur with a change of fuel loadings, weather conditions, ladder fuels, slope, or a combination of them.

Fire behavior outputs for fuel model 5 were determined using the computer software program Behave + (Table 3-16). Resulting flame lengths for this fuel model would require suppression personnel to employ indirect attack methods as well as mechanical and aerial support.

Table 3-15. Fire behavior in timber units for the proposed Brown's project area using FMA+ (2004) for fuel models 8 and 10.

Fuel Model	Rate of Spread (chains/hour)			Flame Length (feet)			Fire Intensity (btu/ft/sec)		
	8A	**8M**	**10A**	**8A**	**8M**	**10A**	**8A**	**8M**	**10A**
Timber	1.2	2.2	6.4	0.8	1.4	4.2	3	10	129

Table 3-16. Fire behavior in brush units for the proposed Brown's project area using Behave + (2004) for fuel model 5.

Fuel Model	Rate of Spread (chains/hour)	Flame Length (feet)	Fire Intensity (btu/ft/sec)
Brush	24.0	6.5	334

Fire Severity

Fire severity is the degree to which a site has been altered or disrupted by fire; loosely, a product of fire intensity and residence time (NWCG 1996). Since the proposed Brown's project area falls within Groups I and II of the Five Historic Natural Fire Regime Groups; resulting fire severities for timber stands should be low and for brush stands stand replacement (Table 3-12). However, given that the current condition class rating for this area is a 3 (Table 3-11), we can assume that changes in fire severity would occur, and be more severe than that of historical periods.

Probability of mortality was calculated for 4 tree species between 2-12 inches dbh using FMA+. Douglas-fir, ponderosa pine, incense cedar and oak species were used for the calculation since most of the basal area sampled came from these species (Table 3-10). The mortality rate is intended for trees per acre for a specific diameter and species, not for a single tree. All units were combined and an average mortality was calculated (Table 3-17).

More than half of the trees per acre within the proposed Brown's project area are between 2-12 inches diameter (Table 3-9). By removing small diameter trees from the stand, percent mortality would decrease. Trees greater than 12 inches diameter have lower mortality rates due to thicker bark and higher branches, thus larger trees may not need to be removed. However, this does not always hold true in older stands that are crowded with touching tree crowns, which was previously discussed in the fire behavior section

Table 3-17. Probability of mortality for 4 tree species by diameter for timber units sampled in the proposed Brown's project area.

Species	Diameter					
	2	**4**	**6**	**8**	**10**	**12**
Ponderosa Pine	NA	59 %	44 %	31 %	22 %	57 %
Douglas-fir	76 %	65 %	47 %	34 %	24 %	19 %
Incense cedar	84 %	79 %	74 %	69 %	63 %	58 %
Oak species	NA	95 %	89 %	63 %	41 %	11 %

7. Plant Communities

7.1 CURRENT POPULATIONS OF PLANT SPECIES OF CONCERN

Known Populations of Species of Concern

There are no known Federally Threatened or Endangered plant species on the Shasta-Trinity National Forest. There are 38 known Forest Service Sensitive or Survey and Manage plant populations within the Weaverville 5th field watershed (Table 3-18). No Survey and Manage bryophytes or fungi are known from the watershed, or are there any Forest Plan Endemic species.

Table 3-18. Sensitive and Survey & Manage species found within the Weaverville 5th Field Watershed

Species	No. Populations	General Location	Protection Status	Habitat
Brownie lady's-slipper *Cypripedium fasciculatum*	4	Musser Hill Rush Creek	FS Sensitive Survey & Manage	Shady riparian areas; very mesic conifer forest
mountain lady's-slipper *Cypripedium montanum*	18	Glennison Gap Lit. Browns Creek Rush Creek Browns Mtn.	FS Sensitive Survey & Manage	Shady riparian areas; very mesic conifer forest
olive-thorn lichen *Dendriscocaulon intricatulum*	2	Musser Hill Weaverville	Survey & Manage lichen	Black oak woodland
English Peak greenbriar *Smilax jamesii*	14	East weaver drainage Rush Creek Little Browns Creek	FS Sensitive	Shady riparian areas

Potential Suitable Habitat within the Analysis Area

The Weaverville watershed lies within four subsections of the Klamath Mountains Ecological Section of California, but is mainly represented by two of those subsections, Oregon Mountain (M261Ac) and Eastern Klamath Mountains (M261Ai). Metamorphic soils dominate, although some ultramafic (serpentine) soils are present. 442 acres of ultramafic (serpentine) soils are present within the Browns Integrated Project analysis area.

Mixed conifer, Douglas fir, ponderosa pine, and combinations of these forest types represent the dominant plant communities within the watershed. Interspersed within these forest types are oak woodlands, mixed chaparral at lower elevations and canyon live oak stands on stony steep slopes. Large granitic and other rock outcrops are present at higher elevations in the northern third. Riparian habitat is found throughout, primarily in the form of streams and associated springs and seeps, but some seasonal and perennial wetlands are present. Overall the watershed is very hot and dry in the summer.

Field survey for rare plants has occurred most intensively in the Browns Integrated Project area. No formal surveys have occurred in the Trinity Alps Wilderness, but rare plant populations have been found incidental to recreational visits. Limited access and steep terrain limit survey work in the wilderness. Rare plant discoveries on private land are not documented with the Forest Service and the extent of rare plant populations is unknown there.
Suitable habitat for Sensitive and Survey & Manage plant species is thought to exist based on plant association maps, soil and geology maps, and observations made in the analysis area. Within the portion of the watershed that is not administratively withdrawn, suitable habitat for Sensitive plants is restricted to the forested plant communities or

large, rock outcrops. Plant species of concern that have potential for suitable habitat are listed in Tables 3-19. All species except Oregon willow herb have been found within the watershed.

Table 3-19. Sensitive and Survey and Manage Species with potential for Suitable Habitat within the Weaverville Watershed

Species	Habitat
Brownie lady-slipper *(Cypripedium fasciculatum)* Mountain lady-slipper *(Cypripedium montanum)* English Peak greenbriar *(Smilax jamesii)* Canyon Creek stonecrop *(Sedum paradisum)*	Douglas-fir or mixed conifer montane forest, riparian-influenced or not
Red Mountain catchfly *(Silene campanulata* ssp. *campanulata)*	Ponderosa pine forest on serpentine soils
Oregon willow herb (*Epilobium oreganum*)	Serpentine wetlands
Olive-thorn lichen (*Dendriscocaulon intricatulum*)	Black oak trees

7.2 CURRENT POPULATIONS OF INVASIVE WEEDS

Invasive Weeds

Invasive weed species have been introduced and dispersed along existing roadways. Annual, non-native grasses have largely replaced native grasses and are prolific throughout the watershed, but especially in open chaparral, oak woodlands, and in close proximity to all roads. The watershed includes two major highways (Hwy. 3 and Hwy. 299), both provide access to all National Forest roads and act as vectors for introduction and spread of weeds from outside areas.

Six weed species have been documented within the watershed (Table 3-20), but more are known to exist that have not been documented. As is typical of weed spread and establishment, more weeds are found along transportation vectors and within developed urban areas. Two species, spotted knapweed and lens-podded hoary cress, are significant because of their ability to invade extensively and because populations in Trinity County are very restricted. Lens-podded hoary cress is a State List B species and spotted knapweed is a State List A species, making both very high priority for control and management. Both are located on private land within the town of Weaverville and have not been seen on National Forest to date.

Table 3-20. Documented Invasive Weeds within the Weaverville Watershed

Scientific Name	Common Name	Areas Found
Cytisus scoparius	scotch broom	McKinzey Gulch Rush Creek Little Browns Creek
Centaurea solstitialis	yellow starthistle	throughout
Cardaria chalapensis	lens-podded hoary cress	town of Weaverville
Centaurea maculosa	spotted knapweed	town of Weaverville
Cirsium arvense	Canada thistle	Rush Creek
Cirsium vulgare	bull thistle	East Weaver Creek

CHAPTER 4
DESIRED CONDITIONS

This chapter describes the desired conditions of resources within the Weaverville watersheds. The ecological conditions and management objectives pertain to the issues and key questions identified in Chapter 2. The information provided here will be used in Chapter 5 for identification of possible management actions.

1. Human Uses, Values, and Expectations

1.1 RECREATION RESOURCES AND USES

The desired condition is to meet the Forest objective to provide a variety of high quality recreation experience opportunities. The desired condition for the major recreation resources in the watershed is that the forest, mountains, and streams would be part of a healthy, sustainable ecosystem. The desired condition is for the East Weaver Campground, and system roads and trails to be improved and maintained to standard. The desired condition is for the development of a limited OHV trail system in the Musser Hill area.

1.2 TIMBER HARVESTING OPPORTUNITIES

The desired condition of the mixed conifer timber stands within the Weaverville watershed is specific to the management prescription identified in the LRMP. The desired condition within the LSR areas is different from the desired condition within the Matrix lands, which include wildlife management emphasis and roaded recreation emphasis. Timber harvest opportunities could be used to provide the desired conifer forest conditions on Forest Service land outside of the wilderness, as displayed in Table 4-1.

Late-Successional Reserves are to be managed to protect and enhance conditions of late-successional and old-growth ecosystems, which serve as habitat for late-successional and old-growth related species including the northern spotted owl. Therefore, the 1,566 acres of conifer stands within the Weaverville watershed would be best served as representing the mature or old growth conifer stand condition. Roads to access any timber harvest opportunities such as thinning, silvicultural treatments, or salvage harvesting consistent with LSR Standards and Guidelines would be maintained to allow for access.

Table 4-1. DFC of timber-producing National Forest land within the Weaverville Watershed.

Conifer dominated stands	Late Successional Reserve (LSR)	Wildlife Management Emphasis	Roaded Recreation Emphasis	Total Acreage Available
Young conifer plantation or seedling	0 ac.	19 ac.	670 ac.	689 ac.
Pole-size conifer	0 ac.	39 ac.	1,348 ac.	1,387 ac.
Early or mid-mature conifer	0 ac.	96 ac.	3,366 ac.	3,462 ac.
Mature or old growth conifer	1,566 ac.	77 ac.	2,687 ac.	4,330 ac.
Total	1,566 ac.	231 ac.	8,071 ac.	9,868 ac.

Within the Wildlife Management and Roaded Recreation emphasis areas, LRMP prescriptions emphasize a variety of management activities while maintaining healthy and vigorous ecosystems. In addition, a sustained yield of wood products is emphasized. Therefore, on a 120 year rotation and a 10-year re-entry for timber harvesting, the desired condition of the conifer stands within the Weaverville watershed would represent an equal amount of each stand type to perpetuate the sustained level of forest products. The acreages reflected on Table 4-1 reflect an even distribution of timber age classes and the number of years each age class remains within the listed type of conifer stand (i.e. stands up to 10 years of age would be within the young conifer or seedling stage; whereas stands 10 to 30 years of age would be in the pole-sized conifer stage).

In addition, within the Matrix areas, a well-developed transportation system would benefit timber harvesting opportunities. Therefore, the desired condition to meet timber harvesting needs would include roads to access as much of the area as possible to the extent acceptable to other ecosystem management objectives.

1.3 FUELWOOD OPPORTUNITIES

The desired condition for fuel wood opportunities is an area managed for fuel wood supply and access. Periodic timber sales with cull and non-merchantable wood products available to the public for fuel wood would benefit fuel wood collection opportunities. In addition, a well-developed transportation system with road surfaces armored to allow for wet weather access would provide needed access to both timber sale generated wood and annual “dead and down” fuel wood collection opportunities.

2. Access and Travel Management

2.1 TRAIL CONDITION

The desired condition is to implement trail management objectives to provide for user safety and resource protection. The desired condition would provide standard bridge structures at trail crossings in some drainages, and hardening or rocking the tread surface on some segments of trail for resource protection. The desired condition would add access to the Weaver Basin Trail from the airport with a new trail alignment. The desired condition would construct a small segment of trail to combine with some decommissioned roads to develop a limited OHV trail system, in conjunction with education, signing, and law enforcement.

3. Erosional Processes

3.1 and 3.2 MASS WASTING FEATURES AND SOIL EROSION AREAS

The desired future condition of the Weaverville Watershed Analysis area is to improve watershed condition and meet water quality objectives. To accomplish the desired condition several actions need to be taken and are summarized in chapter 5.

3.3 CURRENT CUMULATIVE WATERSHED EFFECTS

The five 7th field watersheds draining the Weaverville Watershed Analysis area are currently in a degraded condition (Table 3-4) and are not meeting water quality objectives for sediment according to EPA (2001). A WCC ranking of three indicates the watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. A majority of the drainage network may be unstable. Physical, chemical, and biologic conditions suggest that soil, riparian, and aquatic systems do not support beneficial uses.

The desired future condition of the Weaverville Watershed Analysis area is to improve watershed condition and meet water quality objectives. To accomplish the desired condition several actions need to be taken and are summarized in chapter 5.

4. Aquatic Systems and Species

4.1 ANADRAMOUS FISH DISTRIBUTION AND HABITAT

Desired conditions would be to have anadromous fish migration unimpeded by culverts, dams or other manmade structures. Streams would provide a complex mix of aquatic habitats including deep pools with adequate cover, riffles with good spawning gravel and

adequate flows to allow year round survival. Riparian Reserves would be in good condition to provide large woody debris input, stream shade, and effective filter strips.

5. Terrestrial Wildlife Habitat and Species

5.1 LSOG AMOUNT AND CONDITION

To benefit species associated with late-successional and old-growth ecosystems, at least 15 percent of federal forest land consists of stands exhibiting old-growth characteristics in blocks of at least 100 acres.

5.2 DEER HABITAT AMOUNT AND CONDITION

To benefit wintering deer, shrub dominated habitat exists as a mosaic of young vigorous shrubs and older thicker pockets and stringers while oak dominated habitat exists in a fire resistant condition consistent with desired landscape fuel conditions.

6. Fire, Fuels, and Air Quality

6.1 WILDFIRE THREAT

Forest health is restored and maintained using controlled fire and silvicultural approaches.

Wildland-urban interfaces are managed to provide for community and firefighter safety.

Municipal watersheds are protected from uncharacteristic wildfire effects and remain within the range of ecological conditions characteristic of the fire regime under which they developed.

In Roaded Recreation areas, an average of 10 tons per acre of unburned dead/down material is maintained on slopes less than 40 percent. Preference is to have a portion of this tonnage in large material (i.e., 4 to 6 logs over 10 feet long at the largest diameter available). Where feasible, maintain the same amount on slopes over 40 percent.

Threatened and endangered species habitats are protected from uncharacteristic wildfire effects and remain within the range of ecological conditions characteristic of the fire regime under which they developed.

Existing low risk Condition Class 1 areas are maintained.

7. Plant Communities

7.1 POPULATIONS OF PLANT SPECIES OF CONCERN

Developed road and trail mileage are reduced to limit uncontrolled human caused fires and spread of fire-prone invasive weeds.

Natural fire regimes are restored to protect sensitive plant habitat. Severe fires that could have significant impacts on habitat for mountain and Brownie lady slipper orchids, English Peak greenbriar, and Canyon Creek stonecrop are limited. All of these species easily survived fires prior to human settlement when fires were more often low-intensity and occurred on a regular, frequent basis.

7.2 INVASIVE WEED SPECIES

Yellow starthistle and scotch broom populations are controlled or reduced in number.

Severe wildfire and activities that create disturbed ground are limited to prevent the spread and establishment of invasive weeds in the watershed.

CHAPTER 5
OPPORTUNITIES TO MEET DESIRED FUTURE CONDITIONS

This chapter identifies possible management actions that would move the current condition identified in Chapter 3 closer to the desired condition identified in Chapter 4. Actions identified here are for a specific resource element and need to be taken in context with other resource needs. The presence of an opportunity in this chapter does not constitute a decision that must be implemented; they are specific areas that resource specialists wish to bring to the line officers attention. Not all opportunities are feasible and some may be mutually exclusive. The line officer is responsible for deciding which action may be taken forward and analyzed as "proposed actions" in a NEPA analysis.

Issue #1: Human Uses, Values, and Expectations

Recreation

Management Opportunities 1.1

There are several opportunities to meet objectives for desired future conditions for recreation in the watershed:

- Improve East Weaver Campground with new SST, and redesign campsite units to accommodate recreational vehicles (RV's).
- Develop a day use picnic area at the bridge site on the Rainbow-Hansen trail.
- Provide historical interpretative signing on the La Grange Ditch and at Sykes Hole sites.
- Accommodate organized paintball game area.
- Improve trail system with OHV trail area.

Wood Products

Management Opportunities 1.2 and 1.3

- Use commercial timber sales to meet both wood product needs and vegetation needs of other resources (e.g. fuels objectives or wildlife habitat objectives).
- Improve the road transportation system to provide maximum access within resource constraints. Surface the road surfaces with gravel or shale to allow for wet weather public access.

Issue #2: Access and Travel Management

Management Opportunities 2.1

There are several opportunities to meet objectives for desired future conditions for trails in the watershed:

- Improve trailheads on Weaver Bally and East Weaver roads.
- Construct a new segment of the Greasy Loop trail #09W85 to avoid private property and excessively steep trail grades.
- Rehabilitate and restore OHV impact areas and user-created trails.
- Harden / rock segments of the Weaver Basin #09W87 and Rainbow-Hansen #09W85 trails in clay soils.
- Construct standard bridge structures on Weaver Basin Trail #09W87.
- Develop limited OHV trail system in the Musser Hill area, converting roads 34NO5Y; 34N52Y.1; 34N52YA; 34N95C; 34N96B; U343N05YA; U34N34B; U34N95A; U34N95B; and 34N95J to trails, and utilizing unclassified trail UT34N95CA. In addition, a short segment of trail (approximately ¼ mile) may be constructed.
- Implement a signing project to sign designated motorized and non-motorized trails, regulatory and trail directional signs.
- Provide additional access to the Weaver Basin Trail system by constructing new trail from the Airport to the Weaver Basin Trail #09W87.
- Add the segment of the Moon Lee Ditch from the waterwheel to the South line of Section 2, as a Foot-only trail, to the Weaver Basin Trail system.

Issue #3: Erosional Processes

Management Opportunities 3.1

- Avoidance of land disturbing activities is probably the most practicable scheme for large dormant landslide areas.
- Any on-site erosion and sediment control measures that increase infiltration and subsequently soil moisture should not be used on slopes that have a high probability of landslide failure.
- Channel cleanout should be performed on *strategic* areas. Because channels, culverts or basins designed to contain a given volume of debris will become blocked by an irregular mass of trees or other debris unless removed, resulting in an overtopping or destruction of the structure and diversion of the flow.
- For larger intermittent and perennial channels, more significant measures may need to be employed. In alluvial channels, there may be a need to try to establish some local base levels and sediment catchments in order to control lateral cutting and bed load transport of sediment, especially within gutted channels. Measures such as log and rock check dams, bank stabilization, head cut structures, planting

of riparian vegetation and placement of large organic material can all be used to aid channel stabilization. These measures could most appropriately be employed along tributary streams to Rush Creek underlain by granitics.

- For bedrock-controlled channels, artificial structures may not be as important or practical as in alluvial type channels (since these are usually avalanche chutes for debris flows). However, structures may be necessary in gutted channels where sediment is now available for transport. Structures may be feasible in certain reaches of these channels, which will aid in sediment stabilization, help restore or maintain pool habitat and provide needed cover. Planting riparian vegetation may also contribute to sediment stabilization and will also help provide shading for critical reaches.
- When planning structures at particular locations it must be remembered that channelized debris flows have enormous amounts of energy. It is nearly impossible to try to stop them in the channel. Virtually all debris flows begin to stop flowing naturally when two conditions are met: (flow becomes non-channelized on at least on side (2) the stream channel gradient is less that 10-15 degrees. The destructive scouring phase of the flow will not usually extend more than 200 meters past this point. Deposition can occur well beyond this point however, depending on the volume and water content of the flow. Another method of predicting runout is to look at fan deposits from old debris flows. Debris flows out of the same valley tend to have similar volumes and runout distances. Future debris flows usually will not extend far beyond the old fans.
- For roads that are contributing sediment to creeks, consider a regular maintenance program. This is especially true within the Weaverville formation, especially along the China Gulch road. Other possible measures include: armoring the road and drainage ditch, out sloping, enlarging culverts, installing rolling dips and waterbars, or relocation and reconstruction. Road closure should also be considered where roads are needed only for a short term.

Since the geomorphology and bedrock geology of the Analysis area has been fully mapped this specific information can be used in detailed land management applications:

- Stratification of the landscape into different erosional regimes (landslide-prone or highly erodible terrain) for a wide variety of purposes, in particular the delineation of riparian reserves.
- Identification of watershed restoration opportunities and problems.
- Predicting the distribution of special habitats.
- Establishing priorities for road decommissioning or long-term road maintenance needs.
- Provide recommendations for timber harvest practices**.**

Management Opportunities 3.2

The following activities may be implemented to restore and protect soils in the Weaverville Watershed.

- Decrease compaction in the Musser Hill area to acceptable SQS levels.

- Increase soil cover on granitics by lop and scatter fuels especially on south and west facing slopes.
- Increase LWD on nongranitic soils on south and west facing slopes.
- Masticate brush fields instead of burning to retain soil cover and return nutrients.

Appropriate treatment techniques to protect soil resources during projects are:

Adherence to the Region 5, Soil Quality Standards for land management (SQS, 1995) i.e.

- Soil Stability – Soil Cover and Erosion Standards
- Soil Hydrology – Soil Compaction and Porosity Standards
- Nutrient Cycling – Soil Fertility and Nutrient Banks Standards

Adherence to the Region 5, Water Quality Best Management Practices (BMP, 2000) i.e.

- Timber Management Practices – Index 12.11
- Vegetation Manipulation Practices – Index 12.51
- Fire and Fuel Management Activities – Index 12.61

Management Opportunities 3.3

The following recommendations were developed using findings from this CWE analysis, the Trinity River TMDL (EPA, 2001), and the priorities of the Trinity Management Council.

The following actions may be implemented to improve the condition of watersheds within the Weaverville Watershed analysis area:

- Perform a comprehensive sediment budget and sediment source analysis for the following watersheds in order of priority: Rush Creek, Little Browns Creek, West Weaver Creek, and East Weaver Creek.
- Inventory, implement, and track watershed improvement needs on Forest Service lands.
- Cooperate and participate with the Trinity River Management Council, Trinity River Restoration Program, and the Trinity County Resource Conservation District.
- Work with private timber companies to improve harvest practices and road management.
- Reduce probability of large high burn severity wildland fire by reducing fuel load on a landscape scale.
- Evaluate and limit effects of suction dredge operations in stream reaches that overlap spawning sites.
- Evaluate and limit effects of storm water runoff from Weaverville and other urban areas.
- Evaluate and implement water conservation practices in Weaverville and other urban areas.
- Evaluate and stabilize existing mass wasting features where possible.

- Prevent new mass wasting features by using geoscience and geotechnical experts to help locate and design new roads, timber harvest units, prescribed fires, and urban development.
- Upgrade culverts to pass the 100-year flood event and allow fish passage.
- Reduce road diversion potential by upgrading, maintaining, or decommissioning roads.
- Limit new road construction.
- Design new roads to current standards and best management practices.

Issue #4: Aquatic Systems and Species

Management Opportunities 4.1

The following actions may be implemented to improve the condition of aquatic habitat within the Weaverville Watershed analysis area:

- Manage Riparian Reserve vegetation to promote tree growth and maintain riparian function.
- Use instream habitat structures to create complex habitat were Riparian Reserve function is impaired and stream channels are stable.
- Modify man-made migration barriers to allow anadromous fishes full access to the watersheds.
- Decommission roads within Riparian Reserves; priority should be give to roads near stream reaches occupied by anadromous fishes.
- Reduce cumulative watershed impacts to restore a more natural flow regime.

Issue #5: Terrestrial Wildlife Habitat and Species

Management Opportunities 5.1

The following activities may be used to meet the intent of the 15 percent retention standard and guideline and to maintain our options for meeting this S&G into the future within the Weaverville Watershed:

- The GIS databases used for this analysis are an appropriate “coarse grain’ tools for landscape level (i.e., 5th field watershed) analyses. At the project level, individual stands proposed for treatment should be examined to determine what ecological role they are filling related to old-growth habitat.
- Defer timber harvesting in all 4G and 4N stands (2,300 acres). These stands are likely the highest quality old-growth habitat and currently comprise only 11 percent of the watershed. Timber harvesting may become appropriate within

these stands that lie within MATRIX when we can demonstrate that other 3G stands are meeting the ecological roles of old-growth habitat.

- Prescriptions designed to reduce fuel ladders within 4G and 4N stands may be appropriate in strategically located areas where community fire protection is a concern. Prescriptions should be designed to maintain LSOG conditions to the extent practicable. *For example, areas of Musser Hill in the Browns Integrated Project Area*.

Management Opportunities 5.2

The following activities may be used to maintain and improve deer habitat within the Weaverville Watershed:

- The GIS databases used for this analysis are an appropriate "coarse grain' tools for landscape level (i.e., 5th field watershed) analyses. At the project level, individual areas proposed for treatment should be examined to determine current conditions and appropriate treatments related to deer habitat.
- Defer timber harvesting in all 4G and 4N (i.e., old-growth) stands (2,300 acres). With the large deep-crowned conifers, these stands are likely the highest quality deer cover habitat and currently comprise only 11 percent of the watershed. Timber harvesting may become appropriate within these stands that lie within MATRIX when we can demonstrate that other younger stands are meeting the ecological roles of old-growth habitat.
- Utilize prescribed burning or mechanical methods (e.g., mastication) within existing decadent foraging habitat to stimulate new nutritious growth and improve access for deer (see Gartner 1991).
- Thin around existing viable black oak within conifer stands to maintain and improve acorn production.
- Give priority to treatments within deer winter range.

Issue #6: Fire, Fuels, and Air Quality

Management Opportunities 6.1

Reduce Hazardous Fuel

- Reduce the total number of acres at risk to severe wildland fire.
- Ensure communities most at risk in the wildland-urban interface receive priority for hazardous fuels treatment.
- Expand and improve integration of the hazardous fuels management program to reduce severe wildland fires to protect communities and the environment.
- Incorporate public health and environmental quality considerations in fire management activities undertaken for the hazardous fuels management program.

- Develop smoke management plans in conjunction with prescribed fire planning and implementation.
- Develop strategies to address fire-prone ecosystem problems that augment fire risk or threaten sustainability of these areas.
- Assure maintenance of areas improved by fuels treatment by managing activities permitted on the restored lands to maintain their resiliency.
- Conduct and utilize research to support the reduction of hazardous fuels in wildland urban interface communities and environments.
- Ensure local environmental conditions are factored into hazardous fuels treatment planning.

Promote Community Assistance

- Reduce the losses to communities and individuals from wildland fire.
- Promote markets for traditionally underutilized wood as a value-added outlet for by-products of hazardous fuel reduction and ecosystem restoration efforts.
- Increase incentives for private landowners to address defensible space and fuels management needs on private property through local land use policies.
- Promote local government initiatives to implement fire-sensitive land use planning.
- Promote public knowledge and understanding of wildland fire, including risks and the role of fire in natural ecosystem processes.

The Shasta-Trinity Forest Standards and Guidelines as described in the Land and Resource Management Plan (SHF-LRMP) for this specific land allocation that pertains to fire and fuels states:

- Remove only biomass material that is in excess of that required to meet the standards for soil quality, wildlife diversity, and natural fire regimes (pg. 4-15, LRMP # 3).
- Assess brush fields for multi-resource management opportunities such as the natural fire regime (pg. 4-16, LRMP # 5).
- Plan and implement fuel treatments emphasizing those treatments that will replicate fires natural role in the ecosystems (pg. 4-18, LRMP # 8d).
- Natural fuels will be treated in the following order of priority: (1) public safety; (2) high investment situations (structural improvements, powerlines, plantations, etc.); (3) known high fire occurrence areas; and (4) coordinated resource benefits, i.e., ecosystem maintenance for natural fire regimes (pg. 4-18, LRMP # 8e).
- Consider fuelbreak construction investments when they compliment Forest health/biomass reduction needs, very high and extensive resource values are at risk, and to protect Forest communities (pg. 4-18, LRMP # 8f).

To implement the above fuels management goals and directions, **fuel management zones** have been designated for the proposed Brown's project area. See map 5 for the specific locations that following management prescriptions may be applied.

Management prescriptions by fuel management zones in closed timber (< 40 % Slope) for the proposed Brown's project.

Fuel Management Zone 0-150 feet	**Fuel Management Zone 150-300 feet**	**Fuel Management Zone 300-450 feet**	**Fuel Management Zone 450-600 feet**
Desired "light" Fuel Model 8. Cut all conifers <12"on 20' spacing. Pile activity slash and natural fuels >10 hr. and <20" and burn. Cut suspended logs to ground level. Thin hardwoods to 10' spacing. Fuelwood utilization. Minimum canopy closure of 40%	Desired Fuel Model 8. Cut all conifers <10" on 20' spacing. Cut dead hardwoods and snags to 24" Cut suspended logs to ground level. Pile activity slash and natural fuels >10hr. and <20" and burn. Cut and burn all brush species. Minimum canopy closure of 40%.	Desired Fuel Model 8. Cut all conifers <8" on 20' spacing. Pile activity slash and natural fuels >3" and <20" and burn. Thin brush species. Cut suspended logs to ground level. Retain snags >24" Minimum canopy closure of 40%.	Desired Fuel Model 8. Cut all conifers <4" on 20' spacing. Cut snags to 10" Lop and scatter slash (buck to 8' and limb to 18"). Spot burn fuel concentrations.

Management prescriptions by fuel management zones for closed timber and brush areas (>40% Slope) for the proposed Brown's project.

Fuel Management Zones	**0-600 feet-Timber**	**0-600 feet-brush**
	Desired Fuel Model 8. Masticate 30' to as far as possible. Cut all conifers <6" on 20' spacing. Lop and scatter slash (buck to 8' and limb to 18") and pile where feasible. Minimum canopy closure of 40%.	Masticate as far as possible. Spot burn concentrations.

Management prescriptions for roadside fuel management zones on Rush Creek road for the proposed Brown's project.

Fuel Management Zones	**0-150 feet Riparian Reserve**	0-150 feet (< 25% slopes) **Non-riparian Reserve**	**0-150 feet (>25%) Decomposed Granite Slopes**
	Desired "light" Fuel Model 8. Cut all conifers <6" on 16' spacing. Pile activity slash and natural fuels >10 hr. and <20" and burn. Retain brush species.	Desired "light" Fuel Model 8. Cut all conifers <10" on 16'spacing. Thin brush species, pile and burn. Cut and remove dead and dieing hazard trees that compromise fire fighter and public safety. Pile activity slash and natural fuels >10 hr and <20" and burn. Fuelwood utilization.	Desired "light" Fuel Model 8. Cut all conifers <6" on 16' spacing. Lop and scatter to meet soils requirements; pile and burn on benches if available. Retain material >4"

Management prescriptions for roadside fuel management zones on Highway 3 for the Brown's project.

Fuel Management Zones	**0-150 feet Timber**	**0-150 feet** Brush
	Desired "light" Fuel Model 8. Cut all conifers <12" on 20' spacing. Pile activity slash and natural fuels >10 hr. and <20" and burn. Cut dead hardwoods. Cut and remove dead and dieing hazard trees that compromise fire fighter and public safety. Thin hardwoods to 10' spacing. Cut and burn all dry site brush species. Fuelwood utilization.	Desired "light" Fuel Model 5. Cut, pile, and burn brush to meet Fuel Model 5 specifications (leave scattered brush species required for soil stabilization). Cut all dead oaks and snags. Cut oak clumps to 1 to 2 main stems. Cut and remove dead and dieing hazard trees that compromise fire fighter and public safety. Prune conifers to 7' or 50% of total height.

Issue #7: Plant Communities

Management Opportunities 7.1

- Reduce fuel loadings in conifer plant communities to reduce the risk of stand-replacement fire in habitat for mountain and Brownie lady slipper, English Peak greenbriar and Canyon Creek stonecrop habitat.

Management Opportunities 7.2

- Discourage creation of user-created trails to reduce creation of habitat suitable for invasive weeds and reduce ignitions of human-caused wildfires.
- Develop a designated trail plan that will lessen impacts to soil and will reduce spread of invasive weeds
- Use signs to provide information to off-road vehicle and other recreational users on weed introduction and spread.

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Appendix A: Browns Area RAP

Executive Summary

A. Project Proposals

The proposed activities within the Browns area include some additional roads to access unroaded areas and for the decommissioning/obliteration of existing non-system roads and trails. Many of those roads and trails have been "user-created" – but have utility as part of proposed modified fuel profile zones, access to managed timber stands, and/or serve to benefit an expanded recreational trail system. This document examines the long term needs and direction of management of the network of roads and trails in the project area.

B. Issues

The high road density of non-system roads, partly resultant from high levels of recreational activity adjacent to Weaverville, and ground disturbing impacts on privately owned land likely combine for a cumulative watershed effect approaching or exceeding the threshold of concern – Associated effects to stream channels and aquatic habitat are directly related to this water quality issue.

Most of the area under consideration is within a Wildland-Urban Interface (WUI); thereby introducing community fire protection needs as an important issue to affect project proposals.

The project area is within the Weaverville/Lewiston management area as identified in the Forest Plan. Specific management prescriptions are dominated by the Roaded Recreation prescription within Matrix Lands – emphasizing vegetation management activities to meet recreation, visual, and wildlife objectives while maintaining healthy and vigorous ecosystems. Relative to this prescription, the management issues for the project include access needs for timber management.

Since the project is adjacent to the town of Weaverville, community members frequently travel through and recreate in the project area. In addition, there is a well-developed trail system within the project area that is "growing" due to increased user-created trails. Therefore, project issues include the need for appropriate management of the roads and trails for public use and recreation.

C. Evaluations Completed

Specialists evaluated the risks and benefits in the subject areas of hydrologic process, water quality, fire and fuels management accessibility needs, timber management, and recreational/social aspects.

D. Management Recommendations

The management recommendations are to obliterate most non-system roads (refer to Table 1), decommission selected system roads, and to improve the condition and maintenance of the system roads to be retained.

Step 1 – Setting Up the Analysis

1-A. Objectives of the Analysis

The initial RAP meeting was held on Tuesday, January 27, 2004. Line Officer Joyce Andersen, Bill Branham, Sam Frink, Dale Stanley, Mike Archibald, Mike Mitchell, Jon Sandstrom, Steve Graves, and Tom Quinn attended this meeting. Joyce identified the "Objective of the Analysis" was to prepare an ISSUE-DRIVEN and FOCUSED road analysis considering the roads affected by the Browns Integrated Project proposal: The analysis would consider: 1) system roads and trails with proposed reconstruction or decommissioning; 2) non-system roads and trails (with "obvious" public use) which may be affected by project related reconstruction and/or decommissioning; and 3) all proposed new construction of roads and trails.

1-B. Interdisciplinary Team Members and Participants

Joyce identified the following core team members: Sam Frink (team leader and addressing Commodity Protection/Timber Management - TM), Dale Stanley (General Public Transportation - GT), Jon Sandstrom (Road-Related Recreation – RR), Steve Graves (Fire Protection – PT), & Loren Everest (Water Quality, Fishery Habitat, Riparian Zones – AQ).

1-C. Information Needs

Since much of the background analysis information considered necessary to make an informed decision on the road system had been captured in the 2003 OHV inventory and the ongoing field reviews for the planned Browns Integrated Project, the line officer directed the core team to identify specific information needs and questions to be answered.

The core team was directed to review the 71 questions in Chapter 5 and the Resource Risks and Benefits table in Chapter 6 to aid in identifying needs and questions subject to approval by the line officer.

Area maps with road locations and identifiers for non-system roads were needed. Coordination between Dale Stanley, Karol McGuire, Lindsay Large, and Mike Archibald was necessary to produce the appropriate map for the RAP.

Tables to document the road-by-road analysis were identified as a need that would be provided to the core team by transportation planner Dale Stanley.

1-D. Analysis Plan

Since this RAP is being prepared subsequent to the initiation of the planning process for the Browns Integrated Project, the RAP is being adopted into the final stages of the NEPA process. NEPA completed for the project area has already included public involvement through the scoping process, an inventory of the area and road system, and review of the project area by an interdisciplinary team. As such, the projected timeline for completing the six steps is proposed to reach completion prior to the Notice for Comment for the Browns Integrated Project EA.

Step 2 – Describing the Situation

2-A. Existing Road System and Access Needs

In general, the existing road system consists of 55 segments of system roads, 5 segments of planned system roads, and 78 segments of inventoried non-System roads (additional non-system roads are expected to be identified as field surveys continue). The system roads provide the access to trailhead features, permitted uses, interspersed Sierra Pacific land holdings, other private inholdings, recreational hunting and woodcutting opportunities, and National Forest management activities. This document should be viewed as a companion to the Weaverville Watershed Analysis (WA), which contains much more detailed project area descriptions and settings. The primary resource uses are recreation, due to proximity to the population center, with primary feature being the Weaver Basin Trail, with the remainder of the resource needs including plantation tending, fire access, and timber management activities.

In addition, the existing trail system consists of 16 segments of system trails and 48 segments of inventoried non-System trails (additional non-system trails are expected to be identified as field surveys continue).

2-B. Data Needs and Sources

Identification of non-system roads & trails and the information about access needed for permitted uses and private land owners was assembled using local knowledge, field verification, and a search of Special Use Permits. It was made into a GIS coverage to facilitate analysis efficiency.

2-C. Map of the existing project area and road system

The project area map is included in the project file including the WA and RAP.

Step 3 – Identifying Issues

3-A. Issue Summary

For this streamlined RAP, the line officer has determined that the categories of issues to be considered are:

1. Water Quality, Fishery Habitat, Riparian Zones
2. Community Fire Protection needs
3. Commodity Production/Timber Management
4. Traditional Recreational Uses and Weaver Basin Trail
5. General Public Transportation

To address the Issues specific to this project in the context of RAP, the line officer identified the following RAP Questions from the Project Level Handbook to be answered:

Questions AQ(2), AQ(4), AQ(6), and AQ(9) to be addressed by Loren Everest
Questions PT(1), PT(2), and PT(3) to be addressed by Steve Graves
Question TM(3) to be addressed by Sam Frink
Question GT(3) to be addressed by Dale Stanley
Questions RR(4) and RR(5) to be addressed by John Sandstrom

The questions are answered in tabular form on the attached Tables 1 through 3, and are incorporated in the narrative in the section "Ability of the Road System to Meet Objectives."

Step 4 – Assessing Benefits, Problems, and Risks

4-A. Current Road System Benefits, Problems, and Risks

The project area currently has a high density of roads & trails with many user-defined roads & trails that lack engineered drainage structures. The current roads and trails benefit access to the area for public recreation, woodcutting, and fire suppression. Periodic timber harvest opportunities are benefited from the existing road system.

Roads in the Weaverville Watershed have a profound influence on stream systems and aquatic habitats. Road densities are very high in many areas of the watershed leading to changes in timing, magnitude and duration of stream flow. These changes, coupled with surface erosion and disruption of physical channel dynamics, have greatly reduced the quality of aquatic habitat in most areas of the watershed.

4-B. Ability of the Road System to Meet Objectives

This section of the RAP addresses the issues to be considered as identified by the line officer.

<u>Water Quality, Fishery Habitat, Riparian Zones</u>

Questions AQ(2), AQ(4), AQ(6), and AQ(9) have been consolidated to address the question of "How does the road system affect surface erosion, aquatic habitat, and water quality and quantity?"

The primary factor evaluated for each road is the percent of road located in the Riparian Reserve. Roads located close to stream channels have the greatest chance of delivering surface erosion to streams, influencing stream channel migration, connecting hydrologicly, and disrupting the input of large woody debris.

Steelhead and Coho salmon are commonly found in streams of the Weaverville watershed. Chinook are found only in years of early heavy rainfall. No physical barriers to adult salmonid migration are found on forest system or non-system roads however altered flow timing reduces migration windows at the beginning of adult migration and end of juvenile out migration.

Decommissioning of roads near channels will directly benefit stream channels by reducing the input of sediment and allowing natural channel forming processes to resume. Decommissioning roads throughout the watershed regardless of location will benefit streams by restoring a more natural flow regime.

Community Fire Protection needs

PT(1) How does the road system affect fuels management?

Fuel Management Zones are planned for Forest Service Roads 34N95, 34N95C, 34N95E, 33N39, and U34N96D. These roads are strategically located along ridge tops and allow access for the construction and maintenance of the proposed fuel management zones. A 545-acre wildlife forage enhancement and mechanical fuels reduction project is planned for the Weaver Basin Trail area in sections 30 and 31. The only road access to this area is the unclassified road system located off County Road 236 in the southeast corner of section 31. The funding needed to implement and maintain these projects and future fuels project opportunities would increase dramatically if road access to the area was no longer available.

PT(2) How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The Forest Service and cost share road system provides the only access to a majority of the analysis area. The county and state road systems typically follow drainages and afford little strategic value for suppression forces. The fuels surrounding Weaverville are in a highly flammable state as demonstrated by the 2001 Oregon Fire. The Forest Service roads allow federal, state, and county suppression forces access to reported wildfires. The road system is an intricate part of the proposed fuel management zones. The effectiveness of these fuel management zones decreases significantly with limited accessibility; ground based suppression forces need good access to be effective.

PT(3) How does the road system affect risk to firefighters and to public safety?

The roads being analyzed are within close proximity to the town of Weaverville. Weaverville is designated as a "Community at Risk" in the National Fire Plan. Individual residences and small communities are also located within the analysis boundary. The level of fire protection that agencies can provide for public safety is directly dependent upon the ability to access a wildfire in a timely manner. The road system reduces the amount of exposure to firefighters by allowing more fires to be contained at the initial attack stage and at a relatively small size. In most all circumstances, utilizing roads as planned escape routes enhances the safety of firefighters.

Commodity Production/Timber Management

TM(3) How does the road system affect access to timber stands needing silvicultural treatment?

Timber land access is needed roughly every 10 years for planned timber harvest activities throughout the RAP area. In addition, annual access is needed for timber stand tending analysis and timber salvage opportunities. With the exception of the areas accessed by roads proposed for new construction (34N47, 34N47A, 34N87, 34N87A, and 34N88), the RAP area is adequately accessed for planned silvicultural treatments (assuming non-system roads are available to be used).

Traditional Recreational Uses and Weaver Basin Trail

RR (4) Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning?

The participants of roaded recreation in the Browns Integrated Project area are primarily local users. There is a wide age range among the users, while the gender is predominately male. The participants are generally in small groups or solo, but sometimes take part as a family group.

The road-related recreation includes motorized recreation with motorcycle, quads, 4x4, and touring vehicles on system roads – as well as access by OHV's for off-road travel. Other activities related to roaded recreation are horse riding, hiking, biking, jogging, hunting, sightseeing, historical exploring, and occasional dispersed camping.

The road system also provides access to the Weaver Basin Trail system. There have been commercial mountain bike races utilizing portions of the road system and the Weaver Basin trail system. The participants of the mountain bike races are mostly seasoned racers from out of the area.

RR(5) What are these participants' attachment to the area, how strong are their feelings, and are alternative opportunities and locations available?
The participants' attachment to the area is deep-seated and concerned. The Browns Integrated Project is adjacent to Weaverville and the proximity puts the study area in the communities 'back-yard.' Many of the roads in the area have provided access for many

unauthorized recreation uses of National Forest lands: a gun range in Sidney Gulch; organized paintball games; and traditional party spots for teenagers. The roads have also provided access for illegal dumping of vegetation and trash, and unmanaged recreation with OHV use. Many people in the community are accustomed to doing whatever they want in the area, without regard health and safety or resource issues.

There are no other opportunities on public lands adjacent to town for unauthorized and/or unmanaged types of recreation (paintball play / OHV use). There are opportunities to improve the Weaver Basin Trail system, and to develop some limited OHV routes in the Browns Integrated Project area.

General Public Transportation

GT (3): How does the road system affect managing roads with shared ownership or with limited jurisdiction?

State Highways 299 west and 3 are both found within the perimeter of the assessment area. In addition, Trinity County roads 236, 228, 230, 232, 229, and 204 are also located within the boundary. All of these are under the jurisdiction of the respective State and County government agency. They are part of the transportation system in that they lead to the National Forest road network.

The only adjacent corporate landholder is Sierra Pacific Industries (SPI). Many of the roads with the assessment area are cooperatively owned. The government manages them. Maintenance and repair are jointly shared. Upgrades must be jointly agreed upon. Decommissioning and or obliteration of any co-op roads are seriously frowned upon as the official recorded easements i.e. rights-of-way have been exchanged.

Smaller in holdings are also found within the project boundary. The property owners use Forest Developed road system and unclassified roads to access their properties. Many have no easements or permits.

Also found within the area are unclassified roads. Even though many have existed for many, many years, they were never added to Forest road system network. By today's standard, most are considered to be the problem roads. In several examples utility companies use these routes to access poles and transmission/distribution lines. This RAP recommends closing/decommissioning a high percentage of all identified "U" roads.

Step 5 – Describing Opportunities and Setting Priorities

5-A. Problems and Risks Posed by the Current Road System

The primary risk posed by the current road system is to the cumulative watershed effects (CWEs) and the fisheries resource, as unmaintained non-system roads and trails can be significant contributors of sediment to the streams. In addition, unregulated travel on those roads can degrade the quality of experience to hikers on the trail system.

5-B. Opportunities for Road Management

The segment-by-segment description of the management opportunities is displayed on Table 3. In general, the recognized opportunities for road management are to improve the road surfaces of system roads and to eliminate roads and trails that are in excess of management and/or resource protection objectives.

5-C. Recommendations

It is recommended that the management opportunities on Table 3 be met by moving toward the "Recommended Road Status" as displayed on Table 1. The decommissioning will be delayed on segments needed for implementation of the Browns Integrated Project. The NEPA document will incorporate these recommendations into the decision.

Project Level Roads Analysis
Current and Recommended Road System Status

Current Road Status							Recommended Road Status				
Road Number	Road Length	Any Agree.	Road Status	Road Main. Level	Surface	Land Use Desig.		Road Length	Road Status	Road Main. Level	Remarks
33N01	0.40	WVC	Gate	2	AGG			0.40	Open	2	WVC Water System-OR RAP
33N38	6.10	SPI	Open	3	AGG			6.10	Open	3	Weaver Bally-Forest RAP
33N38F	0.80	N	Gate@	1	NAT			0.80	Decom	0	NE23
33N39	1.20	SPI	Gate	2	NAT			1.20	Open	2	Glennison Gap
33N39B	0.90	UNK	Gate@	1	NAT			0.90	Open	2	PVT agreement-Beans
33N39D	0.20	N	Gate@	2	NAT			0.20	Decom	0	NW27
33N40	0.14	N	Gate	2	AGG			0.14	Open	2	Bone Yard
33N40A	0.01	N	Gate@	2	AGG			0.01	Open	2	Bone Yard
33N42	1.75	SPI	Gate	2	AGG			1.75	Open	2	Sidney-OR RAP
33N42A	0.35	N	Gate@	2	NAT			0.35	Decom	2	Sidney-OR RAP
33N69	0.16	N	Open	1	NAT			0.16	Open	1	Grub Gulch - OR RAP
33N73	0.10	N	Open	2	AGG			0.10	Open	2	Glennison Ditch-SW2-OR RAP
33N76	0.10	Y	Open	2	AGG			0.10	Open	2	Beans-SW2
34N01Y	1.40	SPI	Gate	2	NAT			1.40	Open	2	Garden Gulch-NW25
34N01YC	0.40	SPI	Gate@	2	NAT			0.40	Open	2	Garden Gulch-NE25
34N05Y	1.62	N	Gate@	2	NAT			1.62	Open	2	Musser Home Site-NW33
34N22	1.30	SPI	Open	2	NAT			1.30	Open	2	Baxter-NE22
34N24	0.57	SPI	Gate	2	AGG			0.57	Open	2	Deer Creek- Non Cost Share-SE26
34N28	1.30	N	Gate	2	NAT			1.30	Open	2	Old County - PUD access-Yellowjacket-SE21
34N28A	0.80	N	Gate@	2	NAT			0.80	Open	2	PUD ACCESS
34N28B	0.30	N	Gate@	2	NAT			0.30	Open	2	Yellowjacket plantation
34N33	0.60	SPI	Gate	2	NAT			0.60	Open	2	S-China-NW27
34N33Y	0.74	SPI	Gate	2	A/N			0.74	Open	2	S27 - Non Cost Share
34N34	3.90	SPI	Gate	2	NAT			3.90	Open	2	East Branch - Microwave access-SW19
34N34A	0.02	N	Gate@	2	NAT			0.02	Open	2	Arbuckle Mine (PVT) & Microwave Access-SE13
34N41	1.00	SPI	Gate	2	NAT			1.00	Open	2	China Area-NW27
34N41A	0.40	SPI	Gate@	1	NAT			0.40	Open	2	China Area
34N41Y	0.10	N	Open	3	AC			0.10	Open	3	Rush Creek Vista
34N42	0.90	SPI	Open	2	AGG			0.90	Open	2	Baxter Ridge-NE22
34N42A	0.20	N	Closed	1	NAT			0.20	Decom	0	Baxter Ridge-NE22-Barrier
34N52Y.1	0.50	N	Open	2	NAT			0.50	Open	2	Long Gulch
34N52Y.2	0.93	N	Closed	I	NAT			0.93	Decom	0	Long Gulch - Closed by Barrier
34N52YA	0.80	N	Gate@	2	NAT			0.80	Open	2	Long Gulch
34N68	1.60	SPI	Gate	2	NAT			1.60	Open	2	Upper Sidney-S26
34N68A	0.50	SPI	Gate	2	NAT			0.50	Open	2	Upper Sidney
34N77	1.30	N	Open	2	AGG			1.30	Open	2	Browns Mtn. - Needs Agreements both PVT & SPI
34N82	1.19	N	Gate	2	NAT			1.19	Open	2	Monument S13
34N82A	0.40	N	Gate	2	NAT			0.40	Open	2	Monument NE24
34N83	1.00	SPI	Gate@	2	NAT			1.00	Open	2	S24
34N83A	0.30	N	Gate@	1	NAT			0.30	Decom	0	S24-Currently Bermed & Overgrown
34N83B	0.30	N	Gate@	2	NAT			0.30	Decom	0	S24-Currently Bermed & Overgrown
34N89	0.90	N	Gate	2	NAT			0.90	Decom	0	Low Gap-S23
34N89A	0.40	N	Gate@	2	NAT			0.40	Decom	0	Low Gap-S23
34N95	5.50	SPI	Gate	3	A/N			5.50	Open	3	Musser Hill-Forest RAP
34N95A	0.70	N	Closed	1	NAT			0.70	Decom	0	MusserHill-Barrrier
34N95B	0.30	N	Closed	1	NAT			0.30	Decom	0	Musser Hill-Barrier S32
34N95C	0.40	N	Closed	1	NAT			0.40	Decom	0	Musser Hill-Barrier S20

Project Level Roads Analysis
Current and Recommended Road System Status

Current Road Status							Recommended Road Status				
Road Number	Road Length	Any Agree.	Road Status	Road Main. Level	Surface	Land Use Desig.		Road Length	Road Status	Road Main. Level	Remarks
34N95E	0.60	N	Closed	1	NAT			0.60	Decom	0	Musser Hill- Barrier S28
34N95F	0.27	N	Closed	1	NAT			0.27	Decom	0	Musser Hill - Barrier S29
34N95G	0.20	SPI	Gate@	2	NAT			0.20	Open	2	Musser Hill - Barrier S18
34N96	1.69	N	Gate	2	NAT			1.69	Open	2	North Roundys
34N96A	0.80	N	Open	2	NAT			0.80	Open	2	S17
34N96B	0.55	N	Open	2	NAT			0.55	Decom	0	S20/21-last .10 miles behind barrier
34N96C	0.60	N	Open	2	NAT			0.60	Decom	0	S20/21
34N99	0.20	N	Open	3	AGG			0.20	Open	3	East Weaver CG
U09W95A	0.0917	N	Gate@	0	NAT			0.0917	Decom	0	NE2
U228A	0.9570	UNK	Open	2	NAT			0.9570	Open	2	East Branch-Home Access
U230A	0.2890	UNK	Open	0	NAT			0.2890	Decom	0	Old Homesite-Sorensen Well-NE33
U232A	0.4255	N	Open	0	NAT			0.4255	Decom	0	Off S. Roundy-NE33
U232B	0.1480	N	Open	0	NAT			0.1480	Decom	0	Head Gate-SW28
U236A	0.6310	UNK	UNK	0	NAT			0.6310	Open	2	Off Airport Road-SE31-Add to system
U236AA	0.1445	UNK	UNK	0	NAT			0.1445	Decom	0	5 Cent Gulch-SE31
U236AB	0.1742	UNK	UNK	0	NAT			0.1742	Decom	0	
U236AC	0.1665	UNK	UNK	0	NAT			0.1665	Decom	0	
U236AD	0.4263	UNK	UNK	0	NAT			0.4263	Decom	0	
U33N01A	0.2938	N	Gate@	2	NAT			0.2938	Decom	0	OR RAP - Shown as 09W84 - Moon Lee Ditch - S2 ,Convert Road to Trail
U33N01B	0.3248	N	Gate@	0	NAT			0.3248	Decom	0	OR RAP
U33N01BA	0.1730	N	Gate@	0	NAT			0.1730	Decom	0	OR RAP
U33N01C	0.0332	UNK	Gate@	0	NAT			0.0332	Decom	0	WVC Water Intake-OR RAP
U33N01K	0.4296	N	Open	0	NAT			0.4296	Decom	0	OR RAP
U33N38A	0.5290	UNK	Gate	0	NAT			0.5290	Open	0	Garden Gulch S36-PVT Access
U33N38B	0.4323	N	Open	0	NAT			0.4323	Decom	0	OR RAP-McKinzey-SW1
U33N38D	0.1019	N	Open	0	NAT			0.1019	Decom	0	Paintball-NW1
U33N38E	0.0847	N	O/C	0	NAT			0.0847	Decom	0	OR RAP-Shown as 09W86-NW1
U33N38F	0.2753	N	UNK	0	NAT			0.2753	Decom	0	NE S1
U33N38G	0.1029	UNK	UNK	0	NAT			0.1029	Decom	0	NE1
U33N42C	0.0181	N	Gate@	0	NAT			0.0181	Decom	0	NW1
U33N42R	1.8040	UNK	Gate@	0	NAT			1.8040	Decom	0	OR RAP- Greasey Loop
U33N42RD	0.0477	N	Gate@	0	NAT			0.0477	Decom	0	OR RAP
U34N05YA	0.0213	N	Gate@	0	NAT			0.0213	Decom	0	SW S28
U34N05YB	0.0328	N	Gate@	0	NAT			0.0328	Decom	0	Musser SW 28
U34N05YC	0.1259	N	Gate@	0	NAT			0.1259	Decom	0	NE32
U34N05YD	0.0330	No	Open	0	NAT			0.0330	Decom	0	
U34N05YE	0.1290	No	Open	0	NAT			0.1290	Decom	0	
U34N22A	0.1520	No	Open	0	NAT			0.1520	Decom	0	
U34N33YA	0.4890	No	Open	0	NAT			0.4890	Decom	0	NE27
U34N34B	0.8210	UNK	Gate@	0	NAT			0.8210	Decom	0	NE18
U34N42B	0.0810	No	Open	0	NAT			0.0810	Decom	0	
U34N42C	0.2370	No	Open	0	NAT			0.2370	Decom	0	
U34N52YAA	0.0580	No	Open	0	NAT			0.0580	Decom	0	
U34N52YB	0.3370	N	Gate@	0	NAT			0.3370	Decom	0	NW33
U34N52YC	0.5820	N	Gate@	0	NAT			0.5820	Decom	0	NW33
U34N52YCA	0.0440	N	Open	0	NAT			0.0440	Decom	0	NW33

Project Level Roads Analysis
Current and Recommended Road System Status

Current Road Status							Recommended Road Status				
Road Number	Road Length	Any Agree.	Road Status	Road Main. Level	Surface	Land Use Desig.		Road Length	Road Status	Road Main. Level	Remarks
U34N52YCB	0.0440	N	Open	0	NAT			0.0440	Decom	0	NW33
U34N52YD	0.9230	N	Open	0	NAT			0.9230	Decom	0	
U34N52YE	0.0550	No	Open	0	NAT			0.0550	Decom	0	NW33
U34N52YF	0.1440	No	Open	0	NAT			0.1440	Decom	0	
U34N52YG	0.0260	No	Open	0	NAT			0.0260	Decom	0	NW33
U34N77A	0.3778	UNK	Open	0	NAT			0.3778	Decom	0	SE 33 Along Browns CR-PUD Access
U34N77AA	0.5555	No	Open	0	NAT			0.5555	Decom	0	SW34
U34N77AAB	0.0292	No	Open	0	NAT			0.0292	Decom	0	Homesite Bypass
U34N77AB	0.0180	No	Open	0	NAT			0.0180	Decom	0	SE33-PUD
U34N77B	0.1566	No	Open	0	NAT			0.1566	Decom	0	Sorensen Water Tank
U34N77C	0.1700	No	Open	0	NAT			0.1700	Decom	0	Cabin Site-SW34
U34N77CA	0.0572	No	Open	0	NAT			0.0572	Decom	0	SW34
U34N77CB	0.0329	No	Open	0	NAT			0.0329	Decom	0	SW34
U34N77D	0.2700	No	Open	2	AGG			0.2700	Open	0	Private Home Access-SE34
U34N95A	0.2216	No	UNK	0	NAT			0.2216	Decom	0	Musser-NE29
U34N95A2	0.0440	No	Closed	0	NAT			0.0440	Decom	0	NW20
U34N95A4	0.0730	No	Closed	0	NAT			0.0730	Decom	0	NW20
U34N95AA	0.4016	UNK	UNK	0	NAT			0.4016	Decom	0	Musser-NE29
U34N95AB	0.0290	N	Open	0	NAT			0.0290	Decom	0	SW33
U34N95B	0.3114	N	UNK	0	NAT			0.3114	Decom	0	Musser-NE29
U34N95C	0.7840	N	Open	0	NAT			0.7840	Decom	0	NW21
U34N95H	0.5623	N	Open	0	NAT			0.5623	Decom	0	Musser SW33
U34N95I	0.2449	N	Open	0	NAT			0.2449	Decom	0	Musser-SE32
U34N95I	0.4830							0.4830			
U34N95J	0.4961	N	Open	0	NAT			0.4961	Decom	0	Musser-NE29
U34N95JA	0.1340	N	Open	0	NAT			0.1340	Decom	0	E1/2, S29
U34N95JAA	0.0390	N	Open	0	NAT			0.0390	Decom	0	E1/2, S29
U34N95K	0.1331	N	Open	0	NAT			0.1331	Decom	0	Musser-NE29
U34N95L	0.0394	N	UNK	0	NAT			0.0394	Decom	0	Musser-SE29
U34N95M	0.2263	N	Open	0	NAT			0.2263	Decom	0	Musser-SE32
U34N95N	0.2879	N	Open	0	NAT			0.2879	Decom	0	Musser-NW20
U34N95O	0.8484	N	UNK	0	NAT			0.8484	Decom	0	Musser-SW20
U34N95P	0.0291	N	UNK	0	NAT			0.0291	Decom	0	Musser-WHERE??
U34N95Q	0.1170	No	Open	0	NAT			0.1170	Decom	0	SW20
U34N95S	0.0330	No	Open	0	NAT			0.0330	Decom	0	NE18
U34N95V	0.3140	Yes	Gate	2	NAT			0.3140	Open	2	Fire Escape Gate-RAC-Add to system
U34N95VC	0.0950	No	Open	0	NAT			0.0950	Decom	0	SESE20
U34N95VCA	0.0680	No	Open	0	NAT			0.0680	Decom	0	SESE20
U34N95VCB	0.0360	No	Open	0	NAT			0.0360	Decom	0	SESE20
U34N95W	0.0620	No	Open	0	NAT			0.0620	Decom	0	NWNW20
U34N95Z	0.0360	No	Open	0	NAT			0.0360	Decom	0	NWNW20
U34N96	0.2900	No	Open	2	NAT			0.2900	Close	1	SE17
U34N96AA	0.1983	UNK	Open	0	NAT			0.1983	Open	2	N. Roundy SE17
U34N96AB	0.0838	UNK	Open	0	NAT			0.0838	Decom	0	N. Roundy SE17
U34N96AC	0.2295	UNK	Open	0	NAT			0.2295	Decom	0	N. Roundy SE17
U34N96AD	0.0421	UNK	Open	0	NAT			0.0421	Decom	0	N.Roundy SE17
U34N96AE	0.0544	UNK	Open	0	NAT			0.0544	Decom	0	N.Roundy SE17

Project Level Roads Analysis
Current and Recommended Road System Status

Current Road Status							Recommended Road Status				
Road Number	Road Length	Any Agree.	Road Status	Road Main. Level	Surface	Land Use Desig.		Road Length	Road Status	Road Main. Level	Remarks
U34N96B	0.2460	No	Closed	0	NAT			0.2460	Decom	0	NE20
U34N96BA	0.0690	No	UNK	0	NAT			0.0690	Decom	0	NE21
U34N96BB	0.1520	No	Open	0	NAT			0.1520	Decom	0	NW21
U34N96BC	0.0540	No	Open	0	NAT			0.0540	Decom	0	NE20
U34N96D	1.0146	No	Barrier	0	NAT			1.0146	Decom	0	N.Roundy-NW21
U34N96E	0.0413	No	Open	0	NAT			0.0413	Decom	0	N.Roundy SW16
U34N96F	0.7025	No	Closed	0	NAT			0.7025	Decom	0	N.Roundy-SE17
U34N96G	0.0400	No	UNK	0	NAT			0.0400	Decom	0	SW21
U34N96H	0.1300	No	UNK	0	NAT			0.1300	Decom	0	NW21
U34N96I	0.3500	No	Open	0	NAT			0.3500	Decom	0	SE17
U34N96J	0.0670	No	Open	0	NAT			0.0670	Decom	0	SW16
U34N96K	0.1400	No	Open	0	NAT			0.1400	Decom	0	SW16
U34N96L	0.1430	No	Open	0	NAT			0.1430	Decom	0	SW16
U3TRI01	0.1271	UNK	Open	0	NAT			0.1271	Decom	0	SE33-PUD
U3TRI01A	0.0568	UNK	Open	0	NAT			0.0568	Decom	0	SE33-PUD
U3TRI02	0.0412	UNK	Open	0	NAT			0.0412	Decom	0	SE33-PUD
U3TRI03	0.5286	UNK	UNK	0	NAT			0.5286	Decom	0	SE32
U3TRI03A	0.2030	UNK	UNK	0	NAT			0.2030	Decom	0	SE32
U3TRI03B	0.1130	UNK	UNK	0	NAT			0.1130	Decom	0	SE32
U3TRI03C	0.0287	UNK	UNK	0	NAT			0.0287	Decom	0	SE32
U3TRI03D	0.0546	UNK	UNK	0	NAT			0.0546	Decom	0	SE32
U3TRI03E	0.0407	UNK	UNK	0	NAT			0.0407	Decom	0	WHERE??
U3TRI03F	0.1554	UNK	UNK	0	NAT			0.1554	Decom	0	SE33-PUD
U3TRI03G	0.0390	UNK	UNK	0	NAT			0.0390	Decom	0	SE32
U3TRI04	0.1450	No	UNK	0	NAT			0.1450	Decom	0	S.Line 21
U3TRI04A	0.0538	No	UNK	0	NAT			0.0538	Decom	0	S.Line 21
U3TRI05	0.1260	No	UNK	0	NAT			0.1260	Decom	0	SW21
U3TRI05A	0.0560	No	UNK	0	NAT			0.0560	Decom	0	S.Half 21
U3TRI06	0.0700	No	Open	0	NAT			0.0700	Decom	0	NE33
								26.1417			
34N47	0.8700	No	PL	0	NAT			0.8700	Decom	2	Planned New Construction-Musser S33
34N47A	0.2900	No	PL	0	NAT			0.2900	Decom	2	" " "
34N87	1.2600	No	PL	0	NAT			1.2600	Restrict	2	Planned New Construction-Browns Mtn-S34
34N87A	0.8900	No	PL	0	NAT			0.8900	Decom	2	" " " " "
34N88	1.2600	No	PL	0	NAT			1.2600	Decom	2	Planned New Construction-The Pond-SE28

Resource Risks and Benefits Table

Project-Level Roads Analysis
Shasta-Trinity National Forest

Road Number	Current Resource Risks (IMPACTS)						**Total Current Environ. Risk Rating**	Current Resource Benefits (ACCESS)								**Total Current Environ. Benefit Rating**
	Aquatic, Riparian	Hydrologic Process	Water Quality	Ecosystem Function	Terrestrial Wildlife	Public Use		Fire Protection	Fuels Management	Air Quality	Ecosystem Function	Commodity Production	Public Use	Social Issues	Access	
33N01	5	5	5			4	**19**	3	1			4			1	**9**
33N38	1	1	2			4	**8**	5	5			5			5	**20**
33N38F	2	3	5			1	**11**	1	1			2			1	**5**
33N39	2	3	3			4	**12**	3	3			2			5	**13**
33N39B	1	1	2			0	**4**	3	3			2			3	**11**
33N39D						4	**4**					1			1	**2**
33N40	1	1	1			0	**3**	3	1			1			1	**6**
33N40A	1	1	1			0	**3**	3	1			1			1	**6**
33N42	5	5	5			3.8	**19**	3	3			3			5	**14**
33N42A	2	2	3			3.3	**10**	3	1			3			1	**8**
33N69	1	1	2			0	**4**	1	3			1			1	**6**
33N73	1	1	1			0	**3**	0	0			1			1	**2**
33N76	1	1	1			0	**3**	3	1			1			3	**8**
34N01Y	1	1	2			3	**7**	3	1			3			5	**12**
34N01YC						1	**1**	1	3			1			5	**10**
34N05Y	1	1	2			3	**7**	3	3			4			1	**11**
34N22	1	2	2			3	**8**	3	3			4			5	**15**
34N24	5	5	5			3	**18**	3	3			1			5	**12**
34N28	1	4	5			0	**10**	3	3			4			1	**11**
34N28A	5	5	5			0	**15**	1	1			3			1	**6**
34N28B	1	1	2			0	**4**	1	1			3			1	**6**
34N33	1	1	1			0	**3**	3	1			2			5	**11**
34N33Y	1	2	3			3	**9**	1	1			3			5	**10**
34N34	1	2	5			3.5	**12**	3	3			4			5	**15**
34N34A	1	1	5			1	**8**	1	1			0			1	**3**
34N41	1	1	2			0	**4**	1	1			3			5	**10**
34N41A	1	1	1			0	**3**	1	1			2			5	**9**
34N41Y	0	1	0			4	**5**	1	1			0			1	**3**
34N42	1	1	1			3	**6**	3	3			5			1	**12**
34N42A	1	1	1			1	**4**	1	1			1			1	**4**
34N52Y.1						3	**3**	3	3			4			1	**11**
34N52Y.2						2	**2**	3	3			2			1	**9**
34N52YA	1	1	3			3	**8**	3	3			4			1	**11**
34N68	1	2	2			2	**7**	3	1			3			5	**12**
34N68A	1	1	1			2	**5**	3	1			2			5	**11**

Resource Risks and Benefits Table

Project-Level Roads Analysis
Shasta-Trinity National Forest

Road Number	Current Resource Risks (IMPACTS)						**Total Current Environ. Risk Rating**	Current Resource Benefits (ACCESS)								**Total Current Environ. Benefit Rating**
	Aquatic, Riparian	Hydrologic Process	Water Quality	Ecosystem Function	Terrestrial Wildlife	Public Use		Fire Protection	Fuels Management	Air Quality	Ecosystem Function	Commodity Production	Public Use	Social Issues	Access	
34N77	1	2	3			3.5	**10**	5	3			4			5	**17**
34N82	1	1	5			1	**8**	3	1			2			1	**7**
34N82A	1	1	5			1	**8**	3	1			2			1	**7**
34N83	1	1	1			1	**4**	3	1			3			5	**12**
34N83A	1	1	1			1	**4**	3	1			2			1	**7**
34N83B	1	1	1			1	**4**	3	1			2			1	**7**
34N89	1	4	5			1	**11**	3	1			2			1	**7**
34N89A	2	5	5			1	**13**	3	1			2			1	**7**
34N95	1	1	2			4	**8**	5	5			5			5	**20**
34N95A	2	2	3			2	**9**	3	3			3			1	**10**
34N95B	1	1	2			1	**5**	1	1			3			1	**6**
34N95C	1	1	3			2	**7**	3	3			3			1	**10**
34N95E	1	2	3			2	**8**	3	5			3			1	**12**
34N95F	1	1	2			2	**6**	1	1			3			1	**6**
34N95G	1	2	2			2	**7**	1	1			3			3	**8**
34N96	5	5	5			3.5	**19**	3	3			5			1	**12**
34N96A	1	2	3			2.5	**9**	3	3			4			1	**11**
34N96B	5	5	5			2.5	**18**	1	1			4			1	**7**
34N96C	5	5	5			2.5	**18**	1	3			3			1	**8**
34N99	5	5	5			4	**19**	1	1			5			1	**8**
							0									**0**
U09W95A	1	1	1			1	**4**	1	1			2			1	**5**
U228A	5	5	5			1	**16**	3	1			2			3	**9**
U230A	5	5	5			1	**16**	1	1			1			1	**4**
U230B						0	**0**	3	1			0			5	**9**
U232A	0	1	1			1	**3**	3	1			2			1	**7**
U232B	0	1	1			1	**3**	1	1			1			1	**4**
U236A	2	2	2			1	**7**	3	3			2			1	**9**
U236AA	5	5	5			1	**16**	1	3			0			1	**5**
U236AB	0	1	1			1	**3**	1	3			0			1	**5**
U236AC	5	5	5			1	**16**	1	3			0			1	**5**
U236AD						1	**1**					0			1	**1**
U33N01A	1	1	1			4	**7**	1	1			1			1	**4**
U33N01B	1	5	2			2	**10**	1	1			1			1	**4**
U33N01BA	1	5	5			2	**13**	1	1			1			1	**4**
U33N01C	1	5	5			3	**14**	1	1			1			1	**4**
U33N01K	3	5	5			1	**14**	1	1			1			1	**4**
U33N38A	1	2	2			1	**6**	3	3			2			1	**9**
U33N38B	5	5	5			2	**17**					1			1	**2**

Resource Risks and Benefits Table

Project-Level Roads Analysis
Shasta-Trinity National Forest

Road Number	Current Resource Risks (IMPACTS)						Total Current Environ. Risk Rating	Current Resource Benefits (ACCESS)								Total Current Environ. Benefit Rating
	Aquatic, Riparian	Hydrologic Process	Water Quality	Ecosystem Function	Terrestrial Wildlife	Public Use		Fire Protection	Fuels Management	Air Quality	Ecosystem Function	Commodity Production	Public Use	Social Issues	Access	
U33N38D	0	1	1			3.5	**6**	3	1			1			1	**6**
U33N38E	1	1	2			2	**6**	3	1			1			1	**6**
U33N38F	1	1	1			2	**5**	1	3			1			1	**6**
U33N38G						2	**2**					1			1	**2**
U33N42C	1	5	5			2	**13**					0			1	**1**
U33N42R	1	1	1			2	**5**	3	3			1			1	**8**
U33N42RD	1	1	1			0	**3**	1	1			0			1	**3**
U34N05YA	1	1	1			3	**6**	1	1			0			1	**3**
U34N05YB						2	**2**	1	1			0			1	**3**
U34N05YC	1	1	1			2	**5**	1	1			2			1	**5**
U34N05YD								1	1			0			1	**3**
U34N05YE								1	1			0			1	**3**
U34N22A								1	1			0			1	**3**
U34N33YA	2	3	4			3	**12**	3	1			2			1	**7**
U34N34B	1	2	2			3	**8**	3	1			2			1	**7**
U34N42B								1	1			0			1	**3**
U34N42C								1	1			0			1	**3**
U34N52YAA								1	1			0			1	**3**
U34N52YB	1	1	1			2	**5**	3	1			2			1	**7**
U34N52YC	1	2	2			2	**7**	1	1			2			1	**5**
U34N52YCA								1	1			0			1	**3**
U34N52YCB								1	1			0			1	**3**
U34N52YD								1	1			0			1	**3**
U34N52YE								1	1						1	
U34N52YF								1	1						1	
U34N52YG								1	1						1	
U34N77A	5	5	5			3	**18**	1	1			2			1	**5**
U34N77AA	5	5	5			3	**18**	1	1			2			1	**5**
U34N77AAB	4	5	5			3	**17**	1	1			0			1	**3**
U34N77AB								1	1						1	
U34N77B	1	2	2			2.5	**8**	1	1			2			1	**5**
U34N77C	1	2	4			2.5	**10**	1	1			2			1	**5**
U34N77CA	1	2	2			2.5	**8**	1	1			0			1	**3**
U34N77CB						2.5	**3**					0			1	**1**
U34N77D	1	1	1			1	**4**	3	1			0			1	**5**
U34N95A	1	1	2			3	**7**	1	1			1			1	**4**
U34N95A2								1	1						1	
U34N95A4								1	1						1	
U34N95AA	1	1	2			2	**6**	1	1			1			1	**4**

Resource Risks and Benefits Table

Project-Level Roads Analysis
Shasta-Trinity National Forest

Road Number	Current Resource Risks (IMPACTS)						Total Current Environ. Risk Rating	Current Resource Benefits (ACCESS)								Total Current Environ. Benefit Rating
	Aquatic, Riparian	Hydrologic Process	Water Quality	Ecosystem Function	Terrestrial Wildlife	Public Use		Fire Protection	Fuels Management	Air Quality	Ecosystem Function	Commodity Production	Public Use	Social Issues	Access	
U34N95AB								1	1						1	
U34N95B	1	1	1			3	**6**	1	1			1			1	**4**
U34N95C								1	1			0			1	
U34N95H	1	2	4			3	**10**	1	3			2			1	**7**
U34N95I	1	2	4			3	**10**	1	3			0			1	**5**
U34N95I								1	1						1	
U34N95J	1	1	2			3	**7**	1	3			2			1	**7**
U34N95JA								1	1						1	
U34N95JAA								1	1						1	
U34N95K	1	1	2			2.5	**7**	1	1			2			1	**5**
U34N95L	1	1	2			2	**6**	1	1			2			1	**5**
U34N95M	1	1	2			2	**6**	1	1			2			1	**5**
U34N95N	1	1	2			2.5	**7**	1	1			2			1	**5**
U34N95O	1	2	2			3	**8**	1	1			2			1	**5**
U34N95P							**0**					0			1	**1**
U34N95Q								1	1			0			1	
U34N95S								1	1						1	
U34N95V								1	1						1	
U34N95VC								1	1						1	
U34N95VCA								1	1						1	
U34N95VCB								1	1						1	
U34N95W								1	1						1	
U34N95Z								1	1						1	
U34N96								1	1						1	
U34N96AA	1	1	2			2.5	**7**	3	1			1			1	**6**
U34N96AB	1	1	2			2.5	**7**	1	1			1			1	**4**
U34N96AC	1	1	2			2.5	**7**	3	1			1			1	**6**
U34N96AD	1	1	2			2.5	**7**	1	1			0			1	**3**
U34N96AE	1	1	2			2.5	**7**	1	1			0			1	**3**
U34N96B								1	1						1	
U34N96BA												0			1	
U34N96BB								1	1						1	
U34N96BC								1	1						1	
U34N96D	1	2	2			2.5	**8**	1	3			0			1	**5**
U34N96E	1	1	2			2	**6**	1	1			0			1	**3**
U34N96F	1	2	2			2.5	**8**	1	3			2			1	**7**
U34N96G												0			1	
U34N96H												0			1	
U34N96I								1	1						1	

Resource Risks and Benefits Table

Project-Level Roads Analysis
Shasta-Trinity National Forest

Road Number	Current Resource Risks (IMPACTS)						**Total Current Environ. Risk Rating**	Current Resource Benefits (ACCESS)								**Total Current Environ. Benefit Rating**
	Aquatic, Riparian	Hydrologic Process	Water Quality	Ecosystem Function	Terrestrial Wildlife	Public Use		Fire Protection	Fuels Management	Air Quality	Ecosystem Function	Commodity Production	Public Use	Social Issues	Access	
U34N96J								1	1						1	
U34N96K								1	1						1	
U34N96L								1	1						1	
U3TRI01	3	3	5			2	**13**	1	1			0			1	**3**
U3TRI01A	3	3	5			2	**13**	1	1			0			1	**3**
U3TRI02	3	3	3			2	**11**	1	1			0			1	**3**
U3TRI03	1	3	5			2	**11**	3	1			2			1	**7**
U3TRI03A	1	2	3			2	**8**	3	1			2			1	**7**
U3TRI03B	1	1	3			2	**7**	1	1			2			1	**5**
U3TRI03C	1	1	2			2	**6**	1	1			0			1	**3**
U3TRI03D	1	1	3			2	**7**	1	1			1			1	**4**
U3TRI03E							**0**					0			1	**1**
U3TRI03F	1	1	3			2	**7**	1	1			1			1	**4**
U3TRI03G	1	1	3			2	**7**	1	1			0			1	**3**
U3TRI04												0			1	
U3TRI04A												0			1	
U3TRI05												0			1	
U3TRI05A								1	1			0			1	
U3TRI05A												0			1	
U3TRI06								1	1						1	
34N47	1	1	2			2	**6**	3	3			2			1	**9**
34N47A	1	1	2			2	**6**	3	3			2			1	**9**
34N87	1	1	2			2	**6**	3	3			2			1	**9**
34N87A	1	1	2			2	**6**	3	3			2			1	**9**
34N88	1	1	2			2	**6**	3	3			2			1	**9**

Project Level Roads Analysis
Management Opportunities and Their Predicted Effects on the Resources

Road Number	Management Opportunities						Effects of Opportunities on the Resources												
	Repair or Upgrade	Decom	Restrict Travel	Change Mtc. Lvl.	Relocate	No action	Aqua, Rip	Hydro Process	Water Qual.	Eco Funct	Terr Wldf	Fire Prot.	Fuels Mgt	Air Qual	Com. Prod.	Public Use	Social	Change in Maint. Costs	Notes
33N01						X						0	0		0	0			
33N38			X									0	0		0	0			Install gate
33N38F		X										0	0		-	0			UNK
33N39						X						0	0		0	0			SPI, fuel break acces
33N39B						X						0	0		0	0			SPI/RW
33N39D		X										-	-		-	-			UNK
33N40						X						0	0		0	0			Bone Yard
33N40A						X						0	0		0	0			Bone Yard
33N42						X						0	0		0	0			OR RAP
33N42A		X										-	0		-	-			OR RAP
33N69						X						0	0		0	0			OR RAP
33N73						X						0	0		0	0			OR RAP
33N76						X						0	0		0	0			OR RAP
34N01Y						X						0	0		0	0			SPI
34N01YC						X						0	0		0	0			SPI, fuel treatment ac
34N05Y	X											+	+		+	+			
34N22						X						0	0		0	0			SPI
34N24						X						0	0		0	0			SPI
34N28	X											+	+		+	+			PUD access
34N28A		X										-	0		-	0			PUD access
34N28B		X										-	0		-	0			Plantation access
34N33						X						0	0		0	0			SPI, Plantation acces
34N33Y						X						0	0		0	0			SPI
34N34						X						0	0		0	0			SPI
34N34A			X									-	0		0	-			Micro Access
34N41						X						0	0		0	0			SPI
34N41A						X						0	0		0	0			SPI
34N41Y						X						0	0		0	0			Rush Cr. Vista
34N42						X						0	0		0	0			SPI

Project Level Roads Analysis
Management Opportunities and Their Predicted Effects on the Resources

Road Number	Management Opportunities						Effects of Opportunities on the Resources												
	Repair or Upgrade	Decom	Restrict Travel	Change Mtc. Lvl.	Relocate	No action	Aqua, Rip	Hydro Process	Water Qual.	Eco Funct	Terr Wldf	Fire Prot.	Fuels Mgt	Air Qual	Com. Prod.	Public Use	Social	Change in Maint. Costs	Notes
34N42A		X										-	0		-	0			
34N52Y.1	X											+	+		+	+			Gate & Rock, escape
34N52Y.2		X										-	-		-	-			Slump
34N52YA	X											+	+		+	+			Road to OHV Trail
34N68						X						0	0		0	0			SPI
34N68A						X						0	0		0	0			SPI
34N77	X											+	+		+	+			Private home access
34N82						X						0	0		0	0			Steep-Needs maint
34N82A						X						0	0		0	0			Overgrown
34N83						X						0	0		0	0			SPI
34N83A		X										-	0		-	0			Bermed-Overgrown
34N83B		X										-	0		-	0			Bermed-Overgrown
34N89		X										-	0		-	0			UNK
34N89A		X										-	0		-	0			UNK
34N95	X											+	+		+	+			Surface Rock
34N95A						X						0	0		0	0			
34N95B		X										-	0		-	0			
34N95C		X										-	-		-	+			Road to OHV Trail, fu
34N95E			X									0	0		0	0			Fuel break road
34N95F		X										-	-		-	0			
34N95G						X						0	0		0	0			SPI
34N96	X											+	+		+	+			Rock dips
34N96A	X											+	+		+	+			Rock dips
34N96B		X										-	0		-	-			
34N96C		X										-	-		-	-			
34N99						X						0	0		0	0			E. Weaver CG
U09W95A		X										-	0		-	0			
U228A						X						0	0		0	0			Home Access
U230A		X										-	0		0	-			
U230B						X						0	0		0	0			SPI Only Rd.
U232A		X										-	0		-	-			

Project Level Roads Analysis
Management Opportunities and Their Predicted Effects on the Resources

Road Number	Management Opportunities						Effects of Opportunities on the Resources												
	Repair or Upgrade	Decom	Restrict Travel	Change Mtc. Lvl.	Relocate	No action	Aqua, Rip	Hydro Process	Water Qual.	Eco Funct	Terr Wldf	Fire Prot.	Fuels Mgt	Air Qual	Com. Prod.	Public Use	Social	Change in Maint. Costs	Notes
U232B		X										-	0		0	0			
U236A			X									0	0		-	-			Improve for Fire only,
U236AA		X										-	-		0	-			
U236AB		X										-	-		0	-			
U236AC		X										-	-		0	-			
U236AD		X										0	0		0	-			
U33N01A		X										0	0		0				OR RAP
U33N01B		X										0	0		0	-			OR RAP
U33N01BA		X										0	0		0	-			OR RAP
U33N01C		X										0	0		0	-			OR RAP
U33N01K		X										0	0		0	-			OR RAP
U33N38A						X						0	0		0	0			PVT Access
U33N38B		X										-	-		0	0			OR RAP
U33N38D		X										-	0		0	-			
U33N38E		X										-	-		0	0			OR RAP
U33N38F		X										-	-		0	-			
U33N38G		X										0	0		0	-			
U33N42C		X										0	0		0	0			
U33N42R		X										-	-		0	0			
U33N42RD		X										0	0		0	0			
U34N05YA		X										0	0		0	-			
U34N05YB		X										0	0		0	-			
U34N05YC		X										0	0		-	-			
U34N05YD		X										0	0		0				
U34N05YE		X										0	0		0				
U34N22A		X										0	0		0				
U34N33YA		X										-	0		-	-			
U34N34B		X										-	0		-	-			
U34N42B		X										0	0		0				
U34N42C		X										0	0		0				
U34N52YAA		X										0	0		0				
U34N52YB		X										-	0		-	-			
U34N52YC		X										0	0		-	-			

Project Level Roads Analysis
Management Opportunities and Their Predicted Effects on the Resources

Road Number	Management Opportunities						Effects of Opportunities on the Resources												
	Repair or Upgrade	Decom	Restrict Travel	Change Mtc. Lvl.	Relocate	No action	Aqua, Rip	Hydro Process	Water Qual.	Eco Funct	Terr Wldf	Fire Prot.	Fuels Mgt	Air Qual	Com. Prod.	Public Use	Social	Change in Maint. Costs	Notes
U34N52YCA		X										0	0		0				
U34N52YCB		X										0	0		0				
U34N52YD		X										0	0		0				
U34N52YE		X										0	0						
U34N52YF		X										0	0						
U34N52YG		X										0	0						
U34N77A		X										-	0		-	-			PUD-Decom beyond
U34N77AA		X										-	0		-	-			
U34N77AAB		X										0	0		0	0			
U34N77AB		X										0	0						
U34N77B		X										-	0		-	0			
U34N77C		X										-	0		-	-			
U34N77CA		X										-	0		0	0			
U34N77CB		X										-	0		0	0			
U34N77D	X											+	+		0	+			Home Access
U34N95A		X										0	0		0	+			Road to OHV Trail
U34N95A2		X										0	0						
U34N95A4		X										0	0						
U34N95AA		X										0	0		0	-			
U34N95AB		X										0	0						
U34N95B		X										0	0		0	+			Road to OHV Trail
U34N95C		X										0	0		0				
U34N95H		X										-	-		-	-			Fuels access
U34N95I		X										-	-		0	-			Fuels access
U34N95I		X										0	0						
U34N95J		X										-	-		-	+			Road to OHV Trail
U34N95JA		X										0	0						
U34N95JAA		X										0	0						
U34N95K		X										0	0		-	-			
U34N95L		X										0	0		-	0			
U34N95M		X										0	0		-	0			
U34N95N		X										0	0		-	-			
U34N95O		X										0	0		-	-			

Project Level Roads Analysis
Management Opportunities and Their Predicted Effects on the Resources

Road Number	Management Opportunities						Effects of Opportunities on the Resources												
	Repair or Upgrade	Decom	Restrict Travel	Change Mtc. Lvl.	Relocate	No action	Aqua, Rip	Hydro Process	Water Qual.	Eco Funct	Terr Wldf	Fire Prot.	Fuels Mgt	Air Qual	Com. Prod.	Public Use	Social	Change in Maint. Costs	Notes
U34N95P		X										0	0		0	-			
U34N95Q		X										0	0		0				
U34N95S		X										0	0						
U34N95V		X										0	0						
U34N95VC		X										0	0						
U34N95VCA		X										0	0						
U34N95VCB		X										0	0						
U34N95W		X										0	0						
U34N95Z		X										0	0						
U34N96		X										0	0						
U34N96AA	X											+	+		0	+			fire escape route
U34N96AB		X										0	0		0	0			
U34N96AC		X										-	0		0	-			fire escape route
U34N96AD		X										0	0		0	0			

Roads Analysis
Current and Recommended

Road System Status
Shasta-Trinity National Forest

Current Trail Status								Recommended Trail Status			
Trail Number	Trail Length	Any Agree.	Trail Status	Trail Main. Level	Surface	Land Use Desig.		Trail Length	Trail Status	Trail Main. Level	Remarks
09W23	1.8953	N	EXIST	3	NAT			1.8953	EXIST	3	EAST WEAVER CREEK
09W84	0.4	N	EXIST	3	NAT			0.4	EXIST	3	WEST WEAVER - Refer to Oregon RAP
09W85	4.645	N	EXIST	3	NAT			4.645	EXIST	3	GREASY LOOP
09W86	0.2489	N	EXIST	3	NAT			0.2489	EXIST	3	SYDNEY GULCH
09W87	1.9397	N	EXIST	3	NAT			1.9397	EXIST	3	WEAVER BASIN
09W88	0.49	N	EXIST	3	NAT			0.49	EXIST	3	TEACHER ROCK
09W89	0.3512	N	PLANNED	3	NAT			0.3512	EXIST	3	TEACHER ROCK BYPASS - Planned
09W91	0.27	N	EXIST	3	NAT			0.27	EXIST	3	UPPER TEN CENT GULCH
09W92	0.8461	N	EXIST	3	NAT			0.8461	EXIST	3	HOWE DITCH
09W94	2.217	N	EXIST	3	NAT			2.217	EXIST	3	JACKASS RIDGE
09W95	1.2	N	EXIST	3	NAT			1.2	EXIST	3	DAY RANCH
09W96	0.4	N	EXIST	3	NAT			0.4	EXIST	3	RAINBOW HANSEN
09W97	1.549	N	EXIST	3	NAT			1.549	EXIST	3	MUSSER HILL
09W98	0.7	N	EXIST	3	NAT			0.7	EXIST	3	MUSSER HILL SPUR
09W99	0.144	N	EXIST	3	NAT				EXIST	3	SHASTA SPRING
10W12	0.5793	N	EXIST	2	NAT			0.5793	EXIST	2	DOLLY DITCH
UT09W85A	0.0262	N/A	USER	N/A	NAT			0.262	DECOM	N/A	WVBP1 OHV - Sydney Gulch / 33N42, OHV User Built, Decomission
UT09W85B	0.3248	N/A	USER	N/A	NAT			0.3248	DECOM	N/A	WVBP1 OHV - Sydney Gulch / 33N42, OHV User Built, Decmission
UT09W85BA	0.0372	N/A	USER	N/A	NAT			0.0372	DECOM	N/A	WVBP1 OHV - Sydney Gulch. OHV User Built, Decomission
UT09W85BB	0.0412	N/A	USER	N/A	NAT			0.0412	DECOM	N/A	WVBP1 OHV - Sydney Gulch, OHV User Built, Decomission
UT09W87A	1.5063	N/A	USER	N/A	NAT			1.5063	DECOM	N/A	WVBP1OHV - Jaclass Ridge, Decommission above UT09W87B, No Action below UT09W87B
UT09W87AA	0.2143	N/A	USER	N/A	NAT			0.2143	DECOM	N/A	WVBP1 OHV - Jackass Ridge trail, excessively steep grade, Decomission and build Planned
UT09W87AB	0.0424	N/A	USER	N/A	NAT			0.0424	DECOM	N/A	WVBP1 OHV - Jackass Ridge, spur trail, Decomission
UT09W87B	0.5903	N/A	USER	N/A	NAT			0.5903	EXIST	N/A	WVBP1OHV - Jackass Flat, Add segment below UT09W95A to WBT system, above No Action
UT09W87C	0.0963	N/A	USER	N/A	NAT			0.0963	DECOM	N/A	WVBP1 OHV - E.F. Five Cent Gulch, access to OHV impact areas, Decomission
UT09W87D	0.0311	N/A	USER	N/A	NAT			0.0311	DECOM	N/A	WVBP1 OHV - Garden Gulch, spur connecting 09W87 to UT33N38F, Decomission
UT09W88A	1.1062	N/A	USER	N/A	NAT			1.1062	PVT.	N/A	WVBP1 OHV - Garden Gulch, access to Al Broder Camp, Private Property, No Action
UT09W95A	0.3654	N/A	USER	N/A	NAT			0.3654	EXIST	N/A	WVBP1OHV - Jackass Flat, Add to Weaver Basin Trail system
UT09W97A	0.1935	N/A	USER	N/A	NAT			0.1935	DECOM	N/A	WVBP1 OHV - East Weaver to Musser Hill, Decomission
UT09W97B	0.1446	N/A	USER	N/A	NAT			0.1446	EXIST	N/A	WVBP1 OHV - East Weaver to Musser Hill, Excessively steep grade, used for Bike Race
UT09W99A	0.0325	N/A	USER	N/A	NAT			0.0325	DECOM	N/A	WVBP1 OHV - Shasta Spring, OHV User Created, Decomission
UT09W99B	0.0774	N/A	USER	N/A	NAT			0.0774	DECOM	N/A	WVBP1 OHV - Shasta Spring, OHV User Created, Decomission
UT09W99C	0.0492	N/A	USER	N/A	NAT			0.0492	DECOM	N/A	WVBP1 OHV - Shasta Spring, OHV User Created, Decomission
UT09W99D	0.0418	N/A	USER	N/A	NAT			0.0418	DECOM	N/A	WVBP1 OHV - Shasta Spring, OHV User Created, Decomission
UT09W99E	0.0149	N/A	USER	N/A	NAT			0.0149	DECOM	N/A	WVBP1 OHV - Shasta Spring, OHV User Created, Decomission
UT10W12	0.8242	N/A	USER	N/A	NAT				DECOM	N/A	WVBP1 OHV - Dolly Ditch / TAW boundary, Decomission
UT10W12A	0.4589	N/A	USER	N/A	NAT			0.4589	DECOM	N/A	WVBP1 OHV - Munger Gulch, Decomission

Roads Analysis
Current and Recommended

Road System Status
Shasta-Trinity National Forest

Trail Number	Trail Length	Any Agree.	Trail Status	Trail Main. Level	Surface	Land Use Desig.		Trail Length	Trail Status	Trail Main. Level	Remarks
UT228A	0.7523	N/A	USER	N/A	NAT			0.7523	PVT.	N/A	WVBP1 OHV - East Weaver, SPI, Bike Race route
UT228AA	0.0583	N/A	USER	N/A	NAT			0.0583	PVT.	N/A	WVBP1 OHV - East Weaver, SPI, Bike Race route
UT236A	0.7583	N/A	USER	N/A	NAT			0.7583	DECOM	N/A	WVBP1 OHV - Howe Ditch segment, no OHV use, no action
UT33N38A	0.3818	N/A	USER	N/A	NAT			0.3818	DECOM	N/A	WVBP1 OHV - Garden Gulch, Chinese Camp trail, Decomission
UT33N38AA	0.088	N/A	USER	N/A	NAT			0.088	DECOM	N/A	WVBP1 OHV - Gardedn Gulch, spur, Decomission
UT33N38B	0.4543	N/A	USER	N/A	NAT			0.4543	DECOM	N/A	WVBP1 OHV - Low Gap, inside TAW, Decomission
UT33N38C	0.4079	N/A	USER	N/A	NAT			0.4079	DECOM	N/A	WVBP1 OHV - Low Gap S23, 1987 fire line, extension of UT33N38D, Decomission
UT33N38D	0.7211	N/A	USER	N/A	NAT			0.7211	DECOM	N/A	WVBP1 OHV - Low Gap S24, 1987 fire line, extension of UT33N38C, Decomission
UT33N38F	0.6374	N/A	USER	N/A	NAT			0.6374	DECOM	N/A	WVBP1 OHV - Easter Avenue access, old Red Hill road, Decomission
UT34N28A	1.579	N/A	USER	N/A	NAT			1.579	DECOM	N/A	WVBP1 OHV - Little Browns Creek, Decomission
UT34N68A	0.4333		USER	N/A	NAT			0.4333	DECOM	N/A	WVBP1 OHV - Munger Gulch S 25, S 26, Decomission
UT34N77CA	0.087		USER	N/A	NAT			0.087	DECOM	N/A	WVBP1 OHV - Browns Mtn., SW1/4 S 34, in Drainage, Decomisssion
UT34N77CAA	0.033		USER	N/A	NAT			0.033	DECOM	N/A	WVBP1 OHV - Browns Mtn., SW1/4 S 34, in Drainage, Decomission
UT34N95AA	0.6701		USER	N/A	NAT			0.6701	SUP	N/A	WVBP1 OHV - East Branch Homeowners foot-trail, Special Use Permit or Decomission
UT34N95AB	0.0526		USER	N/A	NAT			0.0526	DECOM	N/A	WVBP1 OHV - East Branch Homeowners foot-trail, in Drainage, Decomission
UT34N95AC	0.0518		USER	N/A	NAT			0.0518	SUP	N/A	WVBP1 OHV - East Branch Homeowners foot-trail, Special Use Permit or Decomission
UT34N95B	1.045		USER	N/A	NAT			1.045	EXIST	N/A	WVBP1 OHV - La Grange Ditch, Historical, Bike Race
UT34N95C	0.2169		USER	N/A	NAT			0.2169	DECOM	N/A	WVBP1 OHV - Upper East Branch, SE 1/4 S 18, Decomission
UT34N95CB	0.0287		USER	N/A	NAT			0.0287	DECOM	N/A	WVBP1 OHV - Upper East Branch, SE 1/4 S 18, Decomission
UT34N95D	0.0586		USER	N/A	NAT			0.0586	DECOM	N/A	WVBP1 OHV - Upper East Branch, SE 1/4 S 18, Decomission
UT34N96A	0.1077		USER	N/A	NAT			0.1077	DECOM	N/A	WVBP1 OHV - Bear Gulch S 17, Decomisson
UT34N96AA	0.0052		USER	N/A	NAT			0.0052	DECOM	N/A	WVBP1 OHV - Bear Gulch S 17, spur off UT34N96A, Decomission
UT34N96BA	0.118		USER	N/A	NAT			0.118	DECOM	N/A	WVBP1 OHV - Bear Gulch, Decomission
UT3TRI04	0.0862		USER	N/A	NAT			0.0862	DECOM	N/A	WVBP1 OHV - Crotten, Decomission

Appendix B

Erosion Hazard Ratings for bare (red) and vegetated slopes (blue).

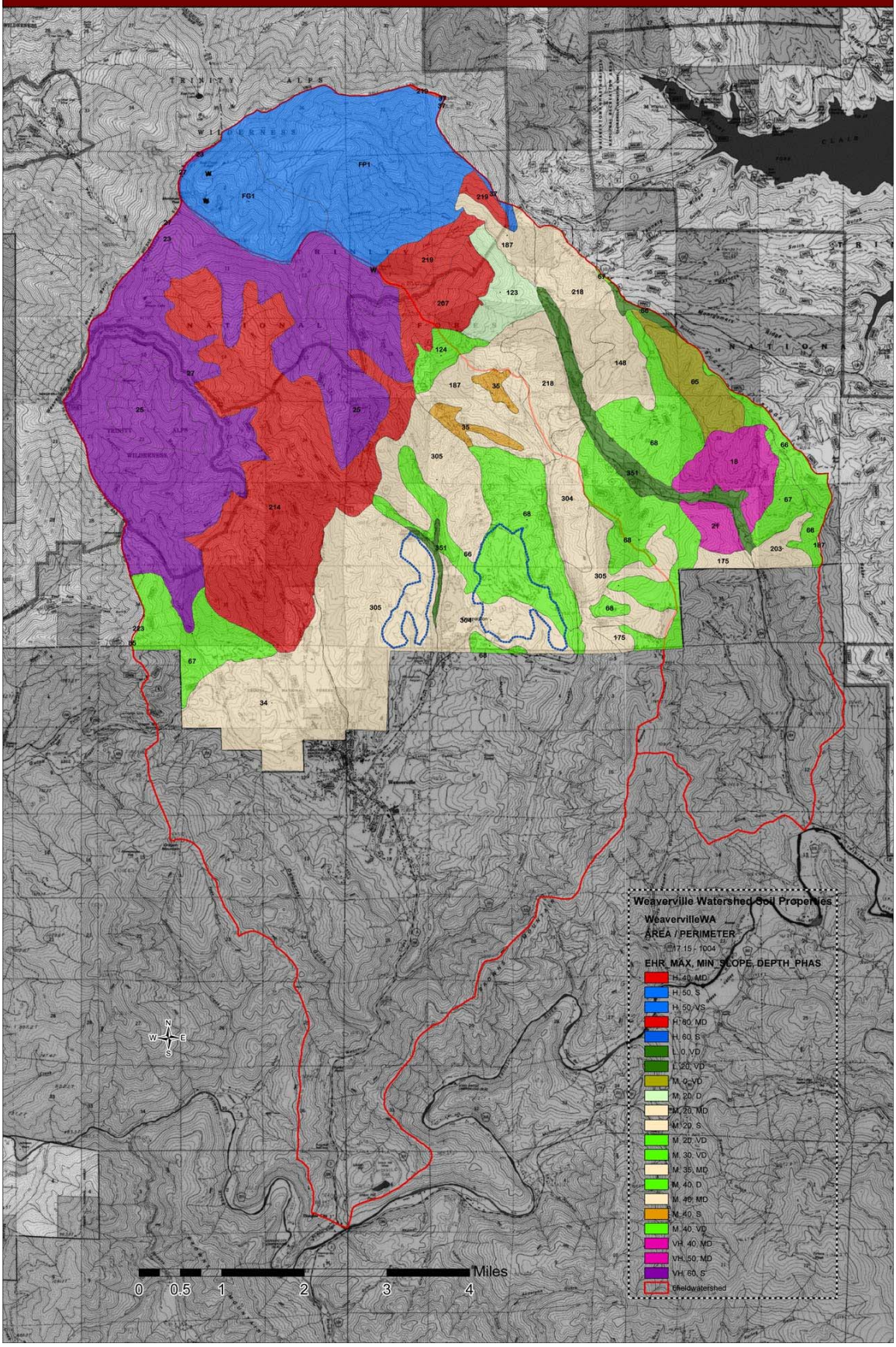
% Slope	Texture	Erodibility	Water Movement	Runoff Production	Runoff Production Rating	Slope	Runoff Energy Rating	Soil Cover %	Soil Cover Rating	**Erosion Hazard Rating**	**Rating**
Chaix											
40 - 60%	3	3	3	10	3.33	50	0.5	0-10	5	**25.0**	High
vegetated	3	3	3	10	3.33	50	0.5	50-70	2	**10.0**	Moderate
60 - 80%	3	3	3	10	3.33	70	0.7	0-10	5	**35.0**	V. High
vegetated	3	3	3	10	3.33	70	0.7	50-70	2	**14.0**	Moderate
Chawankee											
40 - 60%	3	2	3	11	3.67	50	0.5	0-10	5	**18.3**	High
vegetated	3	2	3	11	3.67	50	0.5	50-70	2	**7.3**	Moderate
60 - 80%	3	2	3	11	3.67	70	0.7	0-10	5	**25.7**	High
vegetated	3	2	3	11	3.67	70	0.7	50-70	2	**12.8**	Moderate
Deadwood											
20 - 40%	3	2	3	10	3.33	50	0.5	0-10	5	**10.0**	Moderate
vegetated	3	2	3	10	3.33	50	0.5	50-70	2	**4.0**	Moderate
40 - 60%	3	2	3	10	3.33	70	0.7	0-10	5	**16.7**	High
vegetated	3	2	3	10	3.33	70	0.7	50-70	2	**6.7**	Moderate
Forbes											
20 - 40%	4	4	3	9	3.00	50	0.5	0-10	5	**18.0**	High
vegetated	4	4	3	9	3.00	50	0.5	50-70	2	**7.2**	Moderate
40 - 60%	4	4	3	9	3.00	70	0.7	0-10	5	**30.0**	V. High
vegetated	4	4	3	9	3.00	70	0.7	50-7	2	**12.0**	Moderate
Goulding											
40 - 60%	3	2	3	11	3.50	50	0.5	0-10	5	**16.2**	High
vegetated	3	2	3	11	3.50	50	0.5	50-70	2	**5.5**	Moderate
60 - 80%	3	2	3	11	3.50	70	0.7	0-10	5	**22.1**	High
vegetated	3	2	3	11	3.50	70	0.7	50-70	2	**9.7**	Moderate
Holland											
40 - 60%	3	3	3	9	3.00	50	0.5	0-10	5	**22.5**	High
vegetated	3	3	3	9	3.00	50	0.5	50-70	2	**9.0**	Moderate
60 - 80%	3	3	3	9	3.00	70	0.7	0-10	5	**31.5**	V. High
vegetated	3	3	3	9	3.00	70	0.7	50-70	2	**12.6**	High
Ishi Pishi											
40 - 60%	3	2	4	10	3.33	50	0.5	0-10	5	**16.7**	High
vegetated	3	2	4	10	3.33	50	0.5	50-70	2	**6.7**	Moderate
60 - 80%	3	2	4	10	3.33	70	0.7	0-10	5	**23.3**	High
vegetated	3	2	4	10	3.33	70	0.7	50-70	2	**9.7**	Moderate

% Slope	Texture	Erodibility	Water Movement	Runoff Production	Runoff Production Rating	Slope	Runoff Energy Rating	Soil Cover %	Soil Cover Rating	**Erosion Hazard Rating**	**Rating**
Marpa											
40 - 60%	3	3	2	8	2.67	50	0.5	0-10	5	**20.0**	High
vegetated	3	3	2	8	2.67	50	0.5	50-70	2	**8.0**	Moderate
60 - 80%	3	3	2	8	2.67	70	0.7	0-10	5	**28.0**	High
vegetated	3	3	2	8	2.67	70	0.7	50-70	2	**10.2**	Moderate
Nenus											
40 - 60%	3	2	2	8	2.67	50	0.5	0-10	5	**13.3**	High
vegetated	3	2	2	8	2.67	50	0.5	50-70	2	**5.3**	Moderate
60 - 80%	3	2	2	8	2.67	70	0.7	0-10	5	**18.7**	High
vegetated	3	2	2	8	2.67	70	0.7	50-70	2	**7.5**	Moderate
Soulajule											
20 - 40%	4	3	3	9	3.00	50	0.5	0-10	5	**13.5**	High
vegetated	4	3	3	9	3.00	50	0.5	50-70	2	**5.4**	Moderate
40 - 60%	4	3	3	9	3.00	70	0.7	0-10	5	**22.5**	High
vegetated	4	3	3	9	3.00	70	0.7	50-70	2	**10.9**	Moderate

An erosion hazard rating (EHR) of 1 to 4 is low, 4 to 12 is moderate, 13 to 29 is high, and greater than 29 is very high. Soil cover can be any combination of duff mat, litter, fine organic materials (<3 in. dia.), coarse organic materials (>3 in. dia.), live vegetation in contact with soil, or rock fragments (>3/4 in. dia.).

This table shows (in red) when you change the cover amounts (removal by fire) that the erosion hazard is doubled (a factor of 2.5). It assumes a natural vegetative cover of 50 to 70% and the effect of complete vegetative cover removal leaving only 0 to 10% (hot intensity fire). Some soils can handle this without increasing erosion too much (Deadwood, Goulding, and Nenus). This is due to the rock content of the soil and rocky cover. Others are dependent of soil cover and without it come unraveled (Chaix, Chawankee, Forbes, Holland, and Soulajule). Areas of concern are the western 1/3 of the watershed and the Musserhill area above Weaverville.

Weaverville Watershed Erosion Hazard



Appendix C

The following tables document the ERA disturbance coefficients and sediment budget erosion rates used as part of the analysis.

Table 1. ERA disturbance factors for harvest history.

RxSys	Dist Factor
4111/420	0.25
4111/430	0.17
4113/420	0.30
4113/430	0.20
4131/420	0.20
4131/430	0.15
4143/420	0.22
4143/430	0.16

Explanation
4111 = patch clearcut
4113 = stand clearcut
4131 = shelterwood seed cut
4143 = overstory removal
420 = tractor yarding
430 = cable yarding

Table 2. ERA disturbance factors for proposed action harvest.

RxSys	Dist Factor
T/H	0.05
T/S	0.15
T/T	0.15

Explanation
T = thin from below 40 to 60 percent canopy closure
H = helecopter yarding
S = skyling yarding
T = mechanical yarding

Table 3. ERA disturbance factors for proposed action site treatment.

Site Prep	Dist Factor
HP-BP	0.01
TJP-BP	0.21
TOS	0.05
TOS1	0.1
WTY	0.01

Explanation
HP-BP = handpile and burn
TJP-BP = mechanical pile and burn
TOS = treat on site with mechanical harvester
TOS1 = treat on site with steep or adverse skid
WTY = whole tree yard

Table 4. ERA slope position, slope steepness, and adjacency to riparian areas weighting factors for proposed action harvest and roads.

Slp/RR	Factor
L/N	1.1
L/Y	1.5
M/N	0.9
M/Y	1.3
U/N	0.8
U/Y	1.1

Explanation
L = lower slope
M = middle slope
L = lower slope
Y = within or adjacent to riparian reserve
N = not within or adjacent to riparian reserve

Appendix D

15% Late-Successional and Old-Growth Retention Analysis and Recommendations

for the

Weaverville 5th Field Watershed

The distribution of old-growth stands throughout the landscape is an important component of ecosystem diversity, and plays a significant role in providing for biological and structural diversity across the landscape. (Record of Decision for the NW Forest Plan, page C-44)

Prepared by _____ Date_____
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INTRODUCTION
(Impatient readers are referred to the Recommendations section on the last page of this document.)

This document presents my analysis of the current condition of late-successional and old-growth conifer habitat within the Weaverville 5th field watershed and recommendations for meeting and maintaining future options to meet the intent of the ***provide for retention of old-growth fragments in watersheds where little remains*** standard and guideline (S&G, ROD page C-44).

I used two GIS databases for this analysis:

1) I used the *Shasta-Trinity Land and Resource Management Plan (Forest Plan) database (**LMP-90 database**)* to assess Forest Service land within the watershed. I updated this database to reflect the affects of the Oregon Fire (late summer of 2001) using aerial photographs taken shortly after the fire.
2) I used the *Remote Sensing Lab Database (**RSL database**)* to assess Bureau of Land Management land within the watershed.

Intent of the S&G
The intent of this standard and guideline is stated in the first paragraph of the S&G on page C-44 of the Record of Decision for the Northwest Forest Plan; e.g., *to protect ecologically significant patches and fragments of old-growth habitat that provide refugia for old-growth associated species* (memorandum from the Regional Ecosystem Office dated October 24, 1997). Our discretion to retain a variety of stand ages to meet the intent of the S&G should be applied **before** federal forest lands reach the 15 percent level of late-successional forest. Management discretion and options to select stands for retention and protection within a watershed only exist prior to late-successional forest reaching the 15 percent level. Old-growth stands would be retained and protected to meet the S&G in most instances; however, based on an assessment, younger (i.e., mature, late-successional) stands could be retained while older stands could be harvested (memorandum from the Regional Forester dated September 14, 1999).

DEFINITIONS & ASSUMPTIONS

- ***Federal Forest Land*** – Federal land that is now, or is capable of becoming, at least 10 percent stocked with forest trees (i.e., conifers) and that has not been developed for nontimber use. This acreage is the base (denominator) used to calculate the 15 percent retention S&G. **Within the watershed I assume Forest Service land of the forest types (LMP-90 database "*Vegtype1*") Douglas-fir, mixed conifer, ponderosa/Jeffrey pine, and white fir and Bureau of Land Management land Wildlife Habitat Relations vegetation types (RSL database "*WHRTYPE*") Douglas-fir, Klamath mixed conifer, ponderosa pine, and montane hardwood/conifer qualify as Federal Forest Land.**

- ***Late-Successional Forest*** **-** Forest seral stages that include old-growth and mature age classes.

    - ***Old-Growth*** – A forest stand usually at least 180-220 years old with moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood; numerous snags; and heavy accumulations of wood, including large logs on the ground. **Within the watershed I assume all size class 4 (or greater) stands with a canopy closure of G or N or canopy closure D or M are currently old-growth** (LMP-90 database *"Vegsize"* and *"Vegden"; RSL database "Vegsize" and "whrdensity"*).

    - ***Mature Stand*** – A mappable (>10 acres) stand of trees for which the annual rate of growth has peaked; generally greater than 80 years old but not yet old-growth. Mature stands generally contain trees with a smaller average diameter, less age class variation, and less structural complexity than old-growth stands of the same forest type. **Within the watershed I assume all size class 3 stands are mature stands. Because the definition of "mature" does not include a canopy closure criterion, I include size class 4 stands with an S or P canopy as mature.** Older mature stands with relatively high canopy closure (e.g., *"Vegden"* G or *"whrdensity"* D and to a lesser extent N or M) often provide suitable habitat for species associated with old-growth forests.

LMP-90 Database Assumptions

The Shasta-Trinity Land and Resource Management Plan (Forest Plan) database (LMP-90 database) is the best existing and available tool for vegetative analysis of Forest Service land within an area as large as the Weaverville Watershed. Using this database to analyze existing vegetative conditions as they relate to LSOG ecosystems requires a number of basic assumptions that long-term local experience suggests are valid for analyses at this scale. The information available in the LMP-90 database represents aerial photo interpretation from 1975 photos. The interpretation was conducted with purely timber production interests in mind. In 1990 and 1992 the database was updated to include recent harvest units (i.e., plantations) and stand replacing fires. Stand attributes in the database (the codes included in the LMP-90 database are included in parentheses) I used to infer potential and existing late-successional forest conditions were: **vegetation type** (LMP-90 database *Vegtype1*), **crown size** (LMP-90 database *Vegsize*), **canopy closure** (*Vegden*).

- **Vegetation Type**: I assume that within the Weaverville Watershed only "commercial conifer" types typically have the potential to provide habitat for species associated with old-growth conifer forests. That is to say, only these types move through the successional stages resembling those described on pages B-2 through B-4 in the ROD and develop LSOG stand structure and composition as described on page B-2 (and the Glossary) of the ROD. Within the watershed these types include Douglas-fir,

mixed conifer, ponderosa/Jeffrey pine, and white fir. Nonconifer and noncommercial conifer types almost never achieve the size, canopy closure, or generally complex vertical structure associated with old-growth habitat.

- **Vegsize** (crown diameter size class): I assume that the size classes included in the LMP-90 and RSL databases are a reasonable indicator of general stand age and their use is the only currently available tool for estimating seral stage development over large areas. I also use size classes as the major indicator of the level of decadence within stands (e.g., snags, logs, broken-top trees, etc.) since decadence is largely a function of stand age. That is to say, stands with larger trees are typically older than stands with smaller trees. Size class 4 (or greater) are typically old enough to have developed these attributes of old-growth conifer forests. Stands in size class 3 on sites highly capable of growing trees often are at least 21 inches dbh (diameter breast height) considering growth since 1975. Generally, if these stands are a result of natural regeneration (e.g., having developed after a stand replacing fire as opposed to past clearcutting) they include legacies from the previous stands (e.g., large trees, snags, logs, etc.) and likely provide at least some of the ecological roles of old-growth.

  Crown Size Classes (both LMP-90 & RSL databases):
  - **0** = shrub, forb, grass, noncommercial conifer, hardwood, and nonvegetated (no LSOG potential).
  - **1** = 0-5 foot crown diameter, seedling sapling; stand establishment stage; includes most contemporary plantations.
  - **2** = 6-12 foot crown diameter, poles; growth and maturation with little or no natural thinning; includes minor acreages of contemporary plantations.
  - **3** = 13-24 foot crown diameter, small to medium timber; continued growth and maturation and beginning natural thinning (current mature forest).
  - **4 or greater** = >24 foot crown diameter, large sawtimber; transition stage (current old-growth forest).

- **Vegden**: Moderate to dense canopy closure is typical of LSOG in the Weaverville Watershed. Local experience strongly suggests that canopy closure classes N & G or M & D typify current LSOG habitat. These classes were originally assigned based on predominant crown cover of only commercial conifer overstory species. When the understory component is included along with 20 years of growth these two classes commonly have a total canopy closure above 60 percent. In addition, the understory increases the complexity of vertical structure (an important attribute of LSOG in the area). Infrequently, class P and S stands may also provide LSOG conditions but would require stand-by-stand field verification.

  "Vegden" Canopy Closure Classes:
  - **S** = <20%
  - **P** = 20-39%
  - **N** = 40-69%
  - **G** = ≥70%

RSL Database Assumptions

Existing vegetation coverages were produced by the USDA Forest Service Remote Sensing Lab according to Regional vegetation mapping standards (FGDC compliant at existing definitions). Existing vegetation layers are tiled by ecological section/subsection as defined by the *Ecological Units of California* (Goudey and Smith, 1994). Vegetation tiles are aggregated by vegetation zone defined within the original CALVEG document. A staewide tile coverage and a statewide vegetation zone coverage (caltile94_1, calzone98_2) are provided for spatial reference.

Questions concerning the data or method/s of capture should be directed to:

USDA Forest Service
Region 5 Remote Sensing Lab
1920 20th Street
Sacramento, CA 95814

I applied the same general assumptions to the RSL database as used for the LMP-90 database.

- **whrtype**: I used this field to query for Federal Forest Land. The Wildlife Habitat Relations vegetation types that typically achieve the size, canopy closure, or generally complex vertical structure associated with old-growth habitat within the Weaverville Watershed include: Douglas-fir, Klamath mixed conifer, ponderosa pine, and montane hardwood/conifer. These types thus qualify as Federal Forest Land.

- **Vegsize** (crown diameter size class): I used this field to query for relative stand age. These size classes are the same as those described for the LMP-90 database.

- **whrdensity**: For this analysis "whrdensity" classes were lumped in with the following LMP-90 database "Vegden" classes.

  "whrdensity" Canopy Closure Classes:
  - S = 10-24% lumped in with LMP-90 class S for this analysis
  - **P** = 25-39% lumped in with LMP-90 class P for this analysis
  - M = 40-59% lumped in with LMP-90 class N for this analysis
  - D = ≥60% lumped in with LMP-90 class G for this analysis

Relative LSOG Habitat Quality

In general old-growth habitat quality can be listed from higher to lower quality as follows:

RELATIVE OLD-GROWTH HABITAT QUALITY RELATED TO SIZE CLASS AND CANOPY CLOSURE

4G	4N	3G	3N	4P	3P	4S	3S	remaining federal forest land

CURRENT CONDITIONS

Current conditions are reported in LMP 90 database terminology.

The Weaverville Watershed includes 20,533 acres of federal forest land (Figure 1). Table 1, Figure 2, and the attached map present the current conditions within the Weaverville Watershed related to size class and canopy closure. Old-growth (4N/G) comprises only 2,300 acres or roughly 11 percent of this land; the watershed is dominated by 12,937 acres of mature (i.e., late-successional) forest (63 percent of the federal forest land). Figure 3 displays the proportion of old-growth (4N/G), mature forest that has high enough canopy closure (i.e., G or N) to provide at least that aspect of old-growth habitat as well as the remaining federal forest land within the watershed.

Table 1. Size Class and Canopy Closure distribution within the Weaverville 5th field watershed. Includes only federal land that is now, or is capable of becoming, at least 10 percent stocked with forest trees (i.e., conifers) and that has not been developed for nontimber use.

Size Class	Canopy Closure				
	G	N	P	S	Total
≥4	1,864	436	141	40	2,481
3	5,131	3,813	2,492	1,501	12,937
2	2,495	726	494	304	4,019
1	18	1,035	18	25	1,096

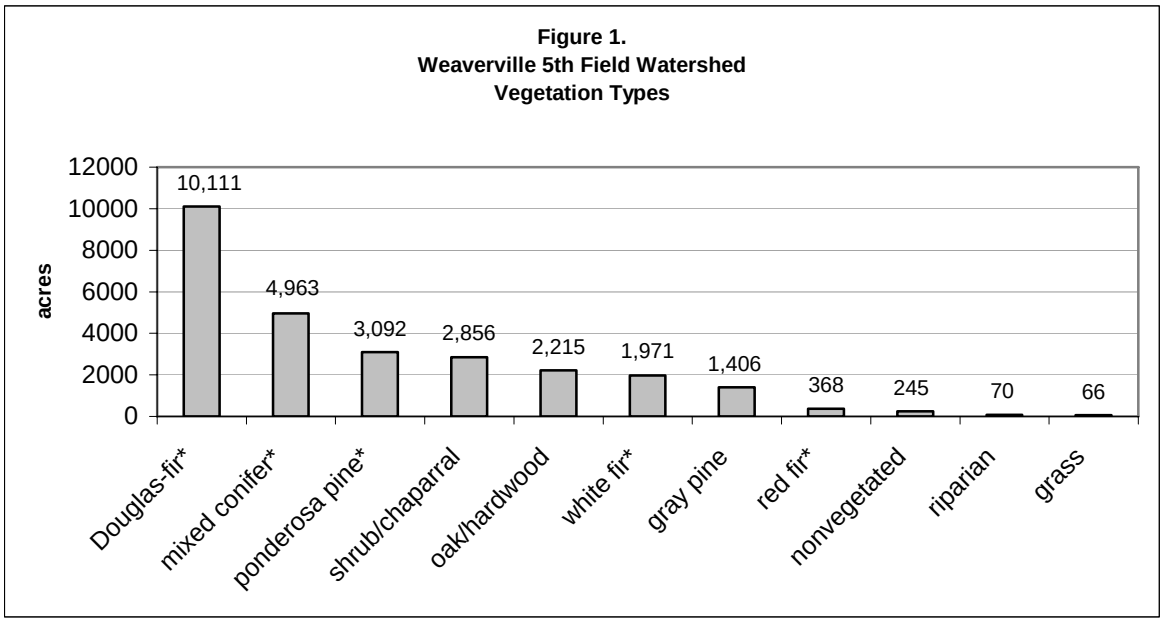
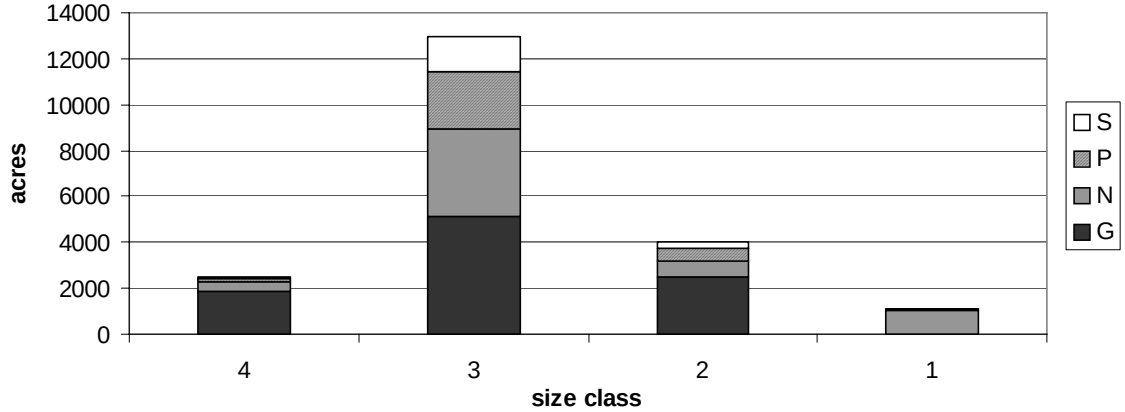
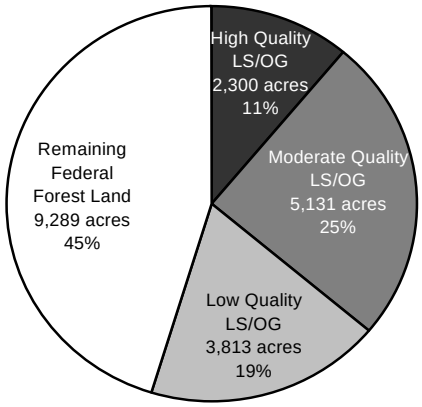


Figure 2.
Weaverville 5th Field Watershed
size class and canopy closure



Based upon a total of 20,533 "federal forest acres".

Figure 3.
Weaverville 5th Field Watershed
Late-Successional & Old-Growth (LS/OG)



LS/OG Relative Quality:
High = 4G & 4N
Moderate = 3G
Low = 3N

Percentages based upon a total of 20,533 "federal forest acres".

RECOMMENDATIONS

At this time I recommend the following to meet the intent of the 15 percent retention standard and guideline and to maintain our options for meeting this S&G into the future within the Weaverville Watershed:

1. **The GIS databases used for this analysis are an appropriate "coarse grain' tools for landscape level (i.e., 5th field watershed) analyses. At the project**

level, individual stands proposed for treatment should be examined to determine what ecological role they are filling related to old-growth habitat.

2. **Defer timber harvesting in all 4G and 4N stands (2,300 acres). These stands are likely the highest quality old-growth habitat and currently comprise only 11 percent of the watershed. Timber harvesting may become appropriate within these stands that lie within MATRIX when we can demonstrate that other 3G stands are meeting the ecological roles of old-growth habitat.**

3. **Prescriptions designed to reduce fuel ladders within 4G and 4N stands may be appropriate in strategically located areas where community fire protection is a concern. Prescriptions should be designed to maintain LSOG conditions to the extent practicable. *For example Unit #3 in the Browns Integrated Project Area*.**

Appendix E

Deer Habitat Conditions & Recommendations
for the
Weaverville 5th Field Watershed & Browns Integrated Project Area

Thomas A. Quinn
Wildlife Biologist
Trinity River Management Unit
Shasta-Trinity National Forest

INTRODUCTION

The creation of Trinity and Lewiston Reservoirs in 1963 inundated over 700,000 acres of land, much of it deer winter range habitat. This habitat loss was to be compensated for by increasing the carrying capacity of remaining habitats (USFWS 1975). Given the current legal, political, scientific and economic climate it is unrealistic to plan significant forage habitat creation projects such as clear-cutting existing forest habitats. Rather we must focus on maintaining and improving existing foraging habitat (Boroski 1998).

HABITAT DEFINITIONS & CONDITIONS

Deer habitat conditions are analyzed under the following basic criteria: cover habitat, foraging habitat, winter range, summer range and the ratio of cover/foraging habitat. As an edge species, black-tailed deer use areas where forest, shrub, and grassland habitats intersperse to meet foraging, breeding, and cover requirements. Since deer consistently feed in areas either contiguous to cover, or where food and cover occur together, the interspersion of food and cover affects the suitability of areas for deer (Boroski 1998). The same databases were used as in the ***15% Late-Successional and Old-Growth Retention Analysis and Recommendations for the Weaverville 5th Field Watershed*** (see project file). Slope steepness and aspect were not available for this rough preliminary analysis.

Cover Habitat

Cover habitat moderates environmental extremes that deer must face on a year-round basis. In the winter, tree crowns can intercept considerable amounts of snow, making it easier for deer to move about and find food. Wide, deep tree crowns intercept more snow than do thin narrow crowns. The denser the canopy the more snow is intercepted and wide deep crowns associated with older conifers are the most efficient at intercepting snow. The forest canopy acts as a shield by deer radiational heat loss to the open sky, especially at night. Conifer habitat can provide areas where air movement is reduced thereby protecting deer from the chill factor associated with low temperatures and increasing wind speed. In the heat of summer, conifer habitat can provide cool, moist areas for deer. Conifer habitat also provides security habitat (cover used by deer to conceal themselves). This is not to say that other habitat types (e.g., oak) do not provide cover habitat, but rather that conifer habitat's main role in the area is cover.

For this analysis relatively dense conifer habitat is considered deer cover habitat except for plantations, which are foraging habitat. General LMP-90 database habitat types used as "cover" in this analysis include: **Douglas-fir, Ponderosa pine, mixed conifer and white fir** with an "N" or "G" canopy closure (LMP-90 database).

Foraging Habitat

Year-round access to food is critical to deer survival and reproductive success. Deer reach their best condition during the summer and fall with abundant, high quality feed. If the foraging habitat conditions are not good, deer enter winter with reduced fat reserves

and have an increased chance of mortality during the stressful winter months. Adequate foraging habitat during winter is also critical.

For this analysis **sparse conifer habitat** (canopy closure "S" and "P"), **plantations**, **chaparral, hardwood, grass,** and **riparian** vegetation types (LMP-90 database) are considered foraging habitat. Leaf litter and individual oaks within conifer stands can provide deer forage. Most of the existing chaparral (and brush-dominated) foraging habitat is decadent and thus too thick to allow deer access and too woody and thus no longer providing nutritious browse (Gartner 1991). Much of the hardwood (i.e., acorn-producing) foraging habitat is overly dense and at risk to loss from wildfire. Individual oaks (especially black oak) within cover habitat are being shaded out by a dense conifer canopy and will likely drop out of the stands in the relatively near future.

Winter Range (and habitat ratio)
Winter range is defined as the area below roughly 4,000 feet elevation where snow depths are not extreme. Winter is the most critical season for deer. During winter deer must cope with the worst environmental conditions (i.e., adequate cover habitat needed) while consuming the poorest quality food (i.e., adequate foraging habitat needed).

Winter range deer habitat within the Weaverville 5th Field Watershed is currently not providing optimum habitat conditions for deer assuming a rough ideal deer habitat ratio of 40% cover and 60% foraging (Thomas el al. 1979). The winter range cover to forage ration in the watershed is currently 60% cover (10,862 acres) to 40% forage (7,307 acres). The Browns Integrated Project Area lies largely within winter range where the current ratio is 58% cover (5,526 acres) to 42% forage (4,083 acres). Again, much of the existing foraging habitat is in relatively poor condition.

Summer Range (and habitat ratio)
Summer range is defined as the area above roughly 4,000 feet elevation although roughly 20% of the deer population are "resident" and stay in the summer range year-round (Boroski 1998). Deer reach their best condition during the summer and fall with abundant, high quality feed. If the foraging habitat conditions are not good, deer enter winter with reduced fat reserves and have an increased chance of mortality during the stressful winter months.

Summer range deer habitat within the Weaverville 5th Field Watershed is currently close to providing optimum habitat conditions for deer assuming a rough ideal deer habitat ratio of 40% cover and 60% foraging (Thomas el al. 1979). The summer range cover to forage ration in the watershed is currently 38% cover (3,699 acres) to 62% forage (5,918 acres). A small portion of the Browns Integrated Project Area lies within summer range where the current ratio is 41% cover (527 acres) to 59% forage (757 acres). Again, much of the existing foraging habitat is in relatively poor condition.

Figures 1 and 2 display current conditions compared to optimal conditions related to the amount (acres) of cover and foraging habitat within the Weaverville 5th Field Watershed and Browns Project Area respectively.

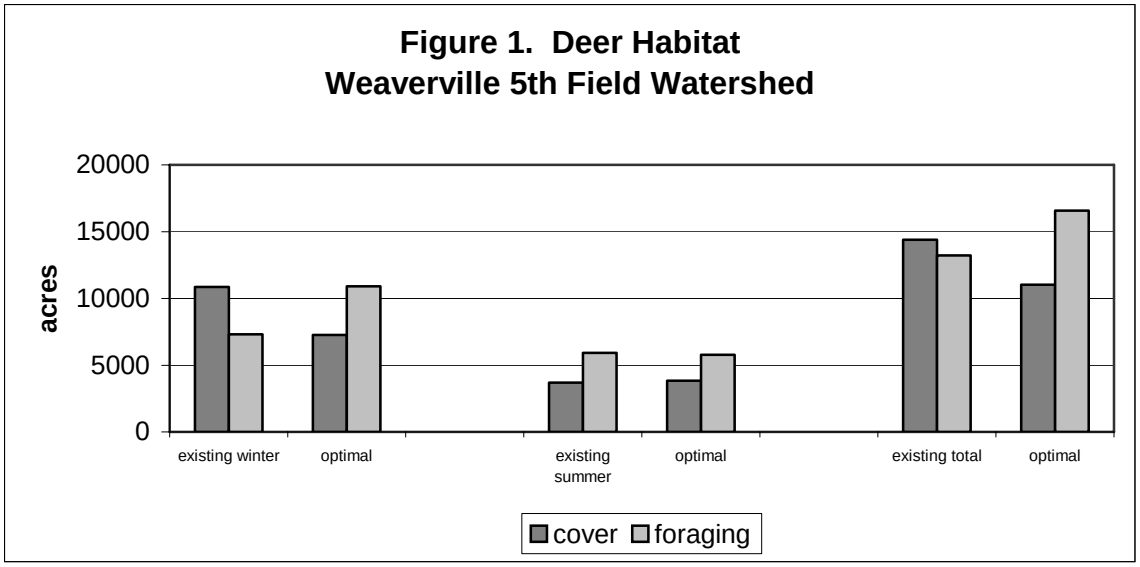


Figure 1. Deer Habitat
Weaverville 5th Field Watershed
acres
20000
15000
10000
5000
0
existing winter
optimal
existing summer
optimal
existing total
optimal
cover
foraging

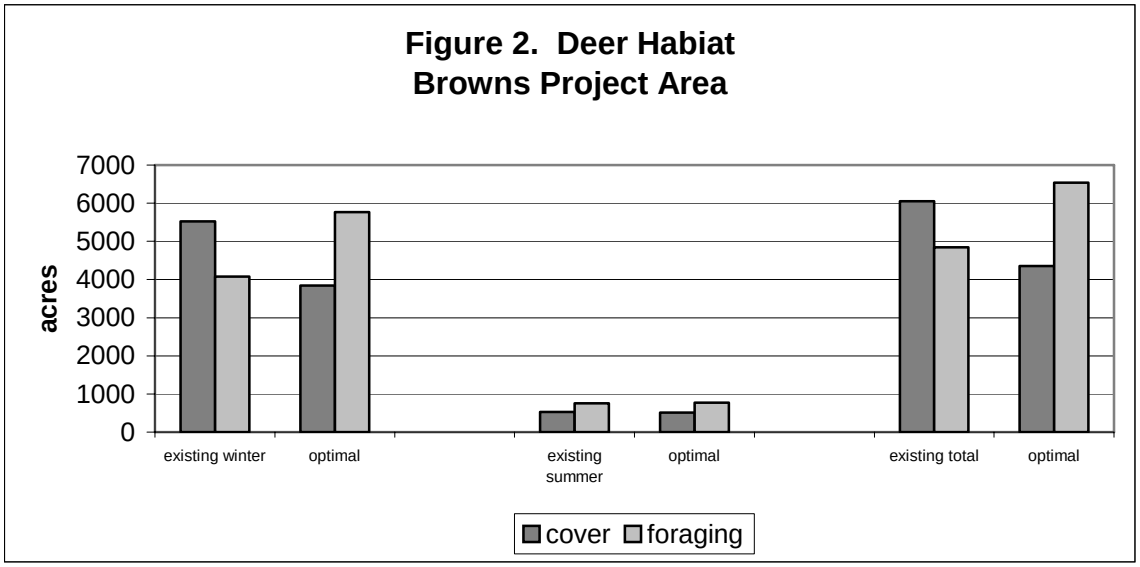


Figure 2. Deer Habiat
Browns Project Area
acres
7000
6000
5000
4000
3000
2000
1000
0
existing winter
optimal
existing summer
optimal
existing total
optimal
cover
foraging

RECOMMENDATIONS

At this time I recommend the following to maintain and improve deer habitat within the Weaverville Watershed:

1. **The GIS databases used for this analysis are an appropriate "coarse grain' tools for landscape level (i.e., 5th field watershed) analyses. At the project level, individual areas proposed for treatment should be examined to determine current conditions and appropriate treatments related to deer habitat.**

2. **Defer timber harvesting in all 4G and 4N (i.e., old-growth) stands (2,300 acres). With the large deep-crowned conifers, these stands are likely the highest quality deer cover habitat and currently comprise only 11 percent of the watershed. Timber harvesting may become appropriate within these stands that lie within MATRIX when we can demonstrate that other younger stands are meeting the ecological roles of old-growth habitat.**

3. **Utilize prescribed burning or mechanical methods (e.g., mastication) within existing decadent foraging habitat to stimulate new nutritious growth and improve access for deer (see Gartner 1991).**

4. **Thin around existing viable black oaks within conifer stands to maintain and improve acorn production.**

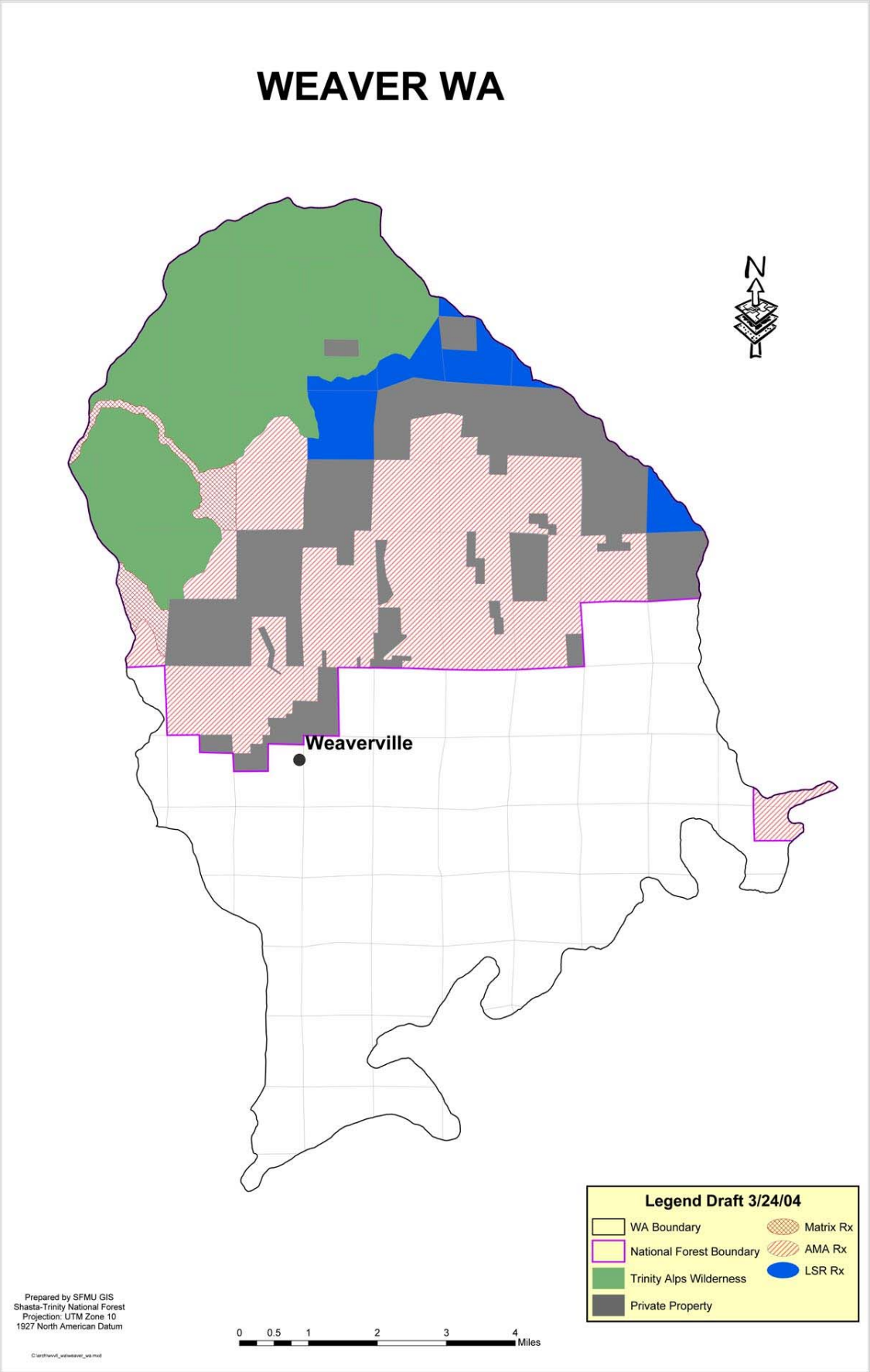
5. **Give priority to treatments within deer winter range.**

REFERENCES:

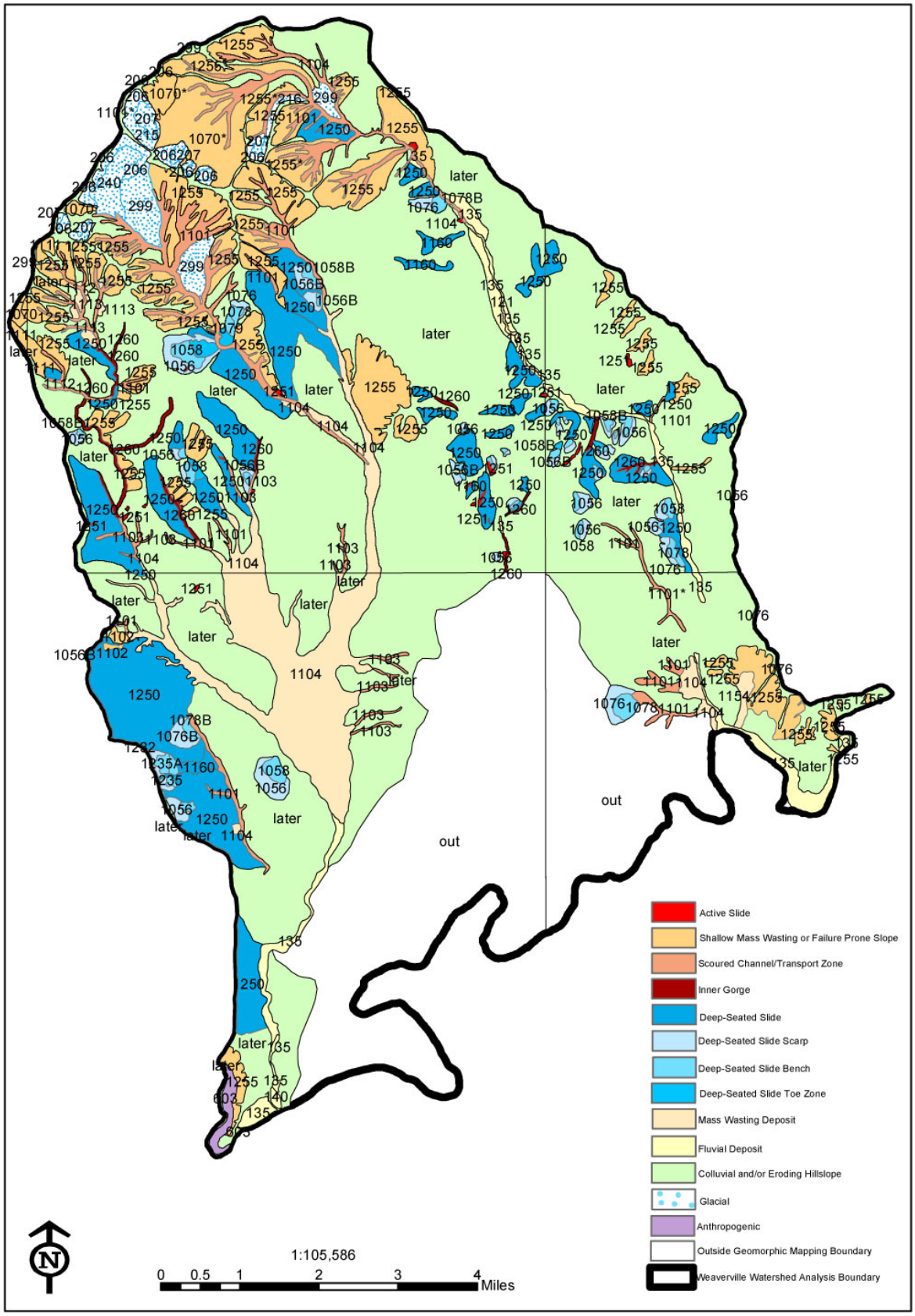
Gartner, Rosemary A. (analyst and editor), 1991. Weaverville deer herd winter range habitat plan prepared for United States Department of Interior Fish and Wildlife Service and Bureau of Reclamation Trinity River Basin Field Office Weaverville California.

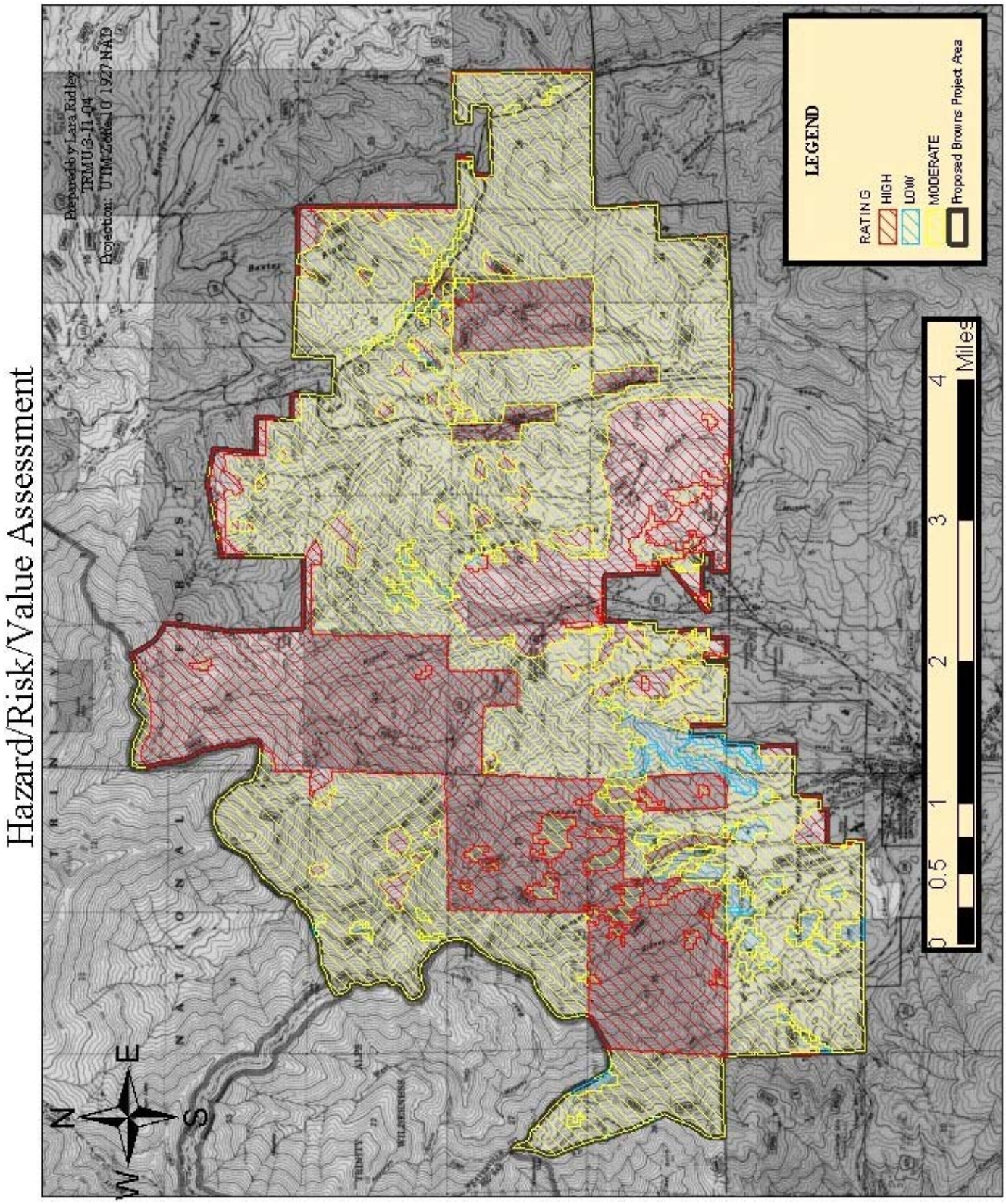
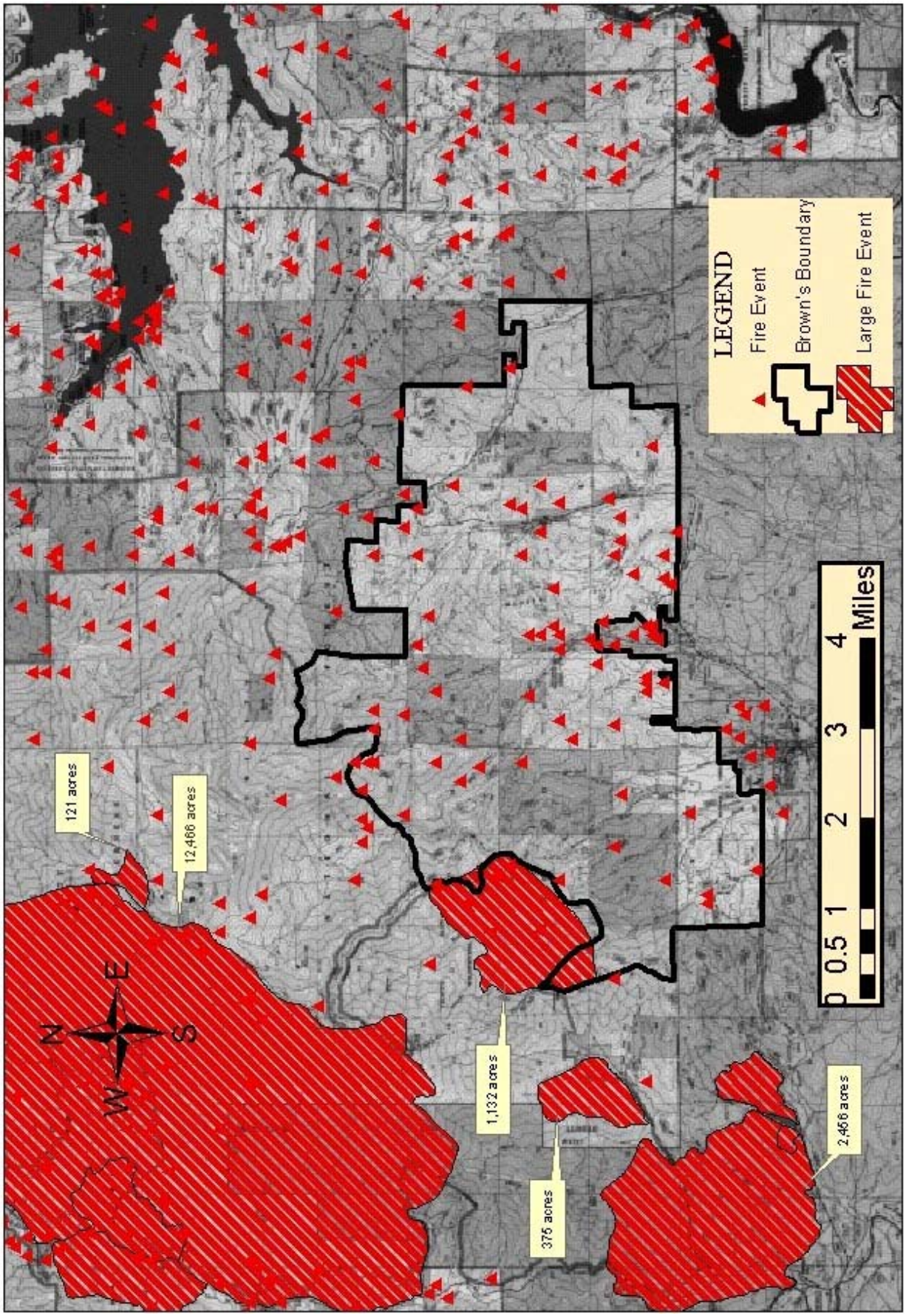
Thomas, J.W., H. Black, Jr., R.J. Pederson. 1979. Deer and elk. Pages 104-127 in J.W. Thomas, ed. Wildlife habitats in managed forests – the Blue Mountains of Oregon and Washington. USDA For. Serv. Agric. Handb. 553. 512pp.

U.S. Fish and Wildlife Service. 1975. Deer loss compensation program resulting from Trinity River Division, Central Valley Project, California: A report to the Trinity River Basin Fish and Wildlife Task Force. U.S. Fish and Wildl. Serv., Portland, Oreg. 30pp.


WEAVER WA
N
Weaverville
Legend Draft 3/24/04
WA Boundary
National Forest Boundary
Trinity Alps Wilderness
Private Property
Matrix Rx
AMA Rx
LSR Rx
Prepared by SFMU GIS
Shasta-Trinity National Forest
Projection: UTM Zone 10
1927 North American Datum
0 0.5 1 2 3 4 Miles

GEOMORPHIC MAP FOR THE WEAVERVILLE WATERSHED ANALYSIS




Hazard/Risk/Value Assessment
Prepared by Lara Ridley
TRMU3-11-04
Projection: UTM Zone 10 1927 NAD
LEGEND
RATING
HIGH
LOW
MODERATE
Proposed Browns Project Area
0
0.5
1
2
3
4
Miles
N
E
S
W

FIRE HISTORY 1917-2000