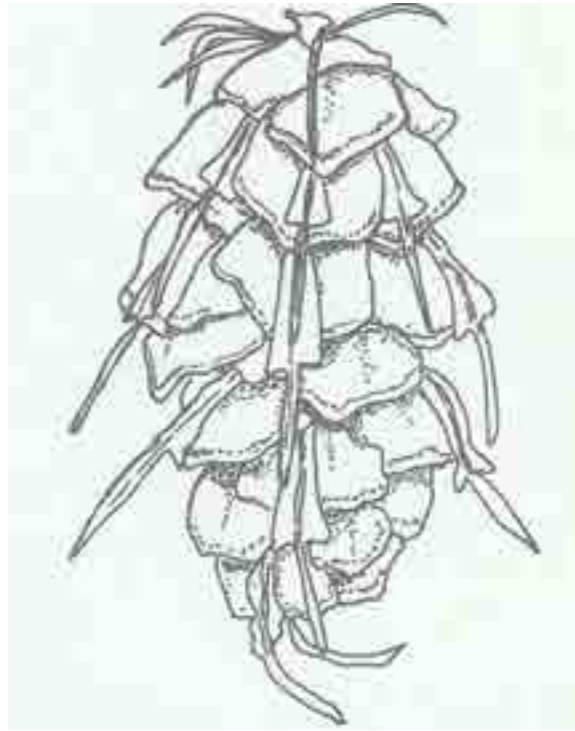


Brooktrails Greenbelt Forest Management Plan
December 7, 2004



***Prepared by Roger Sternberg Forestry and
Land Conservation Consulting Services
P.O. Box 1211
Mendocino, California 95460
(707) 937-0776***

***Preparers: Roger Sternberg, RPF #2620
Jerry Garvey, RPF #1743***

BOOKTRAILS GREENBELT AND CALIFORNIA FOREST IMPROVEMENT PROGRAM

MANAGEMENT PLAN ELEMENTS AND TABLE OF CONTENTS

Plan Elements	Page
1. Landowner's name, address, county, and phone number	1
2. Legal Description of Site	2
3. Land Use History	2
4. Management Objectives	2
5. Transportation System	3
6. Description of elevation, aspect, soils and site potential	4
7. Growing Stock--species and age class distribution (general)	10
8. Growth/Potential Yields	12
9. Regeneration	13
10. Socio-cultural Considerations: Markets, limitations	13
11. Current Silvicultural system(s)--rotation, cutting cycle, etc.	15
12. Land Conservation Practice Needs	16
13. Fish, Wildlife, and Plants	17
14. Fire Protection	20
15. Insect and Disease Problems	23
16. Proposed Alternatives; cost/benefit analysis of investments	24
17. Property Security/Improvements	29
18. Community/Agency Assistance/Potential Funding Sources	29
19. Recreational Resources	30
20. Aesthetics	31
21. Archaeological, Historical, Cultural Resources	31
22. Financial projections (approximate) for remainder of Greenbelt	39
23. Summary of Key Management Recommendations and Timetable	40
24. Persons Contacted in the Development of the Plan	42
25. References	42
26. Certification	43
Appendices	
USGS quadrangle map with topography and physical features (scale: 1" = 1,500 feet)	44
Map of Soils, Geology, and Erosion Control	45
Map of Public Roads and Trails	46
Stand Table: South District Inventory of Non-Riparian Timberland Areas	48
Stand Table: South District Inventory of Riparian Timberland Areas	53
Map of Inventory Plots	58
Assessors Parcel Numbers	59
Glossary	63
Summary and minutes from meetings with the Brooktrails Community District Board of Directors, Greenbelt and Recreation Committee and residents	65

INTRODUCTION

The scope of the Brooktrails Greenbelt Forest Management Plan is 800 acres of the 2,500-acre (+/-) Greenbelt Area. Elements of the Plan are based on the standard format provided by California Forest Improvement Program (CFIP), which provided partial funding for the Plan.

The Plan was initiated at the request of the Brooktrails Recreation, Greenbelt, and Conservation Committee in response primarily to broad-based community concerns about the potential for wildfire in the Greenbelt Area and its impact on adjacent private residences and property.

Several meetings of the Committee were held between 2002 and 2004 to discuss management of the Greenbelt Area, which culminated in a grant request to the California Department of Forestry and Fire Protection for the development of a Forest Management Plan. Cost-share funds were obtained in February 2004. In April 2004, a Special Meeting was held to explain the basic elements of the Plan and to secure input from Brooktrails residents on issues that they wanted addressed. These issues were incorporated into the "Management Objectives" section of the Plan.

Subsequently, a set of "Preliminary Findings" were drafted and shared at three meetings in late October 2004 with the Board of Directors, Greenbelt and Recreation Committee, and Brooktrails Community residents. Comments from these meetings helped shape the final management plan and have been included in the Appendix.

This Plan identifies proposed management activities over time, but it should be stressed that it does not enable any substantial commercial harvesting of timber or fuelwood to occur. Either a Timber Harvest Plan or other planning document is required under the California Forest Practices Act prior to any substantive commercial harvesting.¹ Three alternative management options are presented in the Plan: 1) fuels management only; 2) fuels management with commercial fuelwood harvesting and timber stand improvement activities (non-commercial thinning); 3) fuels management with commercial firewood harvest and limited commercial timber harvest. It will be up to the Brooktrails Board of Directors to ultimately decide upon which alternative to select. The decision making process will require additional community input and will likely evolve as some of the plan recommendations are implemented and the results evaluated.

1. Landowner's name, address, county, and phone number

Name	Mike Chapman, General Manager Brooktrails Community Services District				
Address:	24860 Birch Street				
City:	Willits	County	Mendocino	State	CA ZIP 95490-9475
Phone:	(707) 459-2494	Fax:	(707) 459-0358	E-mail:	btcSD@pacific.net

¹ Emergency rules promulgated by the California Board of Forestry currently allow the sale of timber and fuelwood resulting from the establishment of shaded fuel breaks and other activities associated with fire prevention for "communities at risk" as defined in the rules.

2. Legal Description of Site

Section	Township	Range	Approx. Acreage	County	Assessors Parcel Number (Optional)
2	18N	14W	036	MEN	Refer to list in Appendices
3	18N	14W	220	MEN	“
10	18N	14W	240	MEN	“
11	18N	14W	154	MEN	“
15	18N	14W	150	MEN	“

Total Acreage 800

Planning Watershed: CALWATER Version, Identification Number, and Name:

CALWATER version 2.2, Watershed # 1111.610104. Willits Creek Planning Watershed

3. Land Use History

The first logging in the Brooktrails area occurred in the 1860's. A small sawmill was built near the site currently occupied by the water treatment plant. The mill changed hands and was enlarged in 1877. The mill continued to process local timber until 1924 when it was shut down. Logging in the area continued into the early 1960's. Additional details of the historic and prehistoric conditions are included in Section 21.

4. Management Objectives

The overall goal of the Brooktrails Township Community Services District for the Greenbelt Area is to maintain the health of the forest ecosystem, promotes its passive enjoyment by District residents, and protect residents' properties. Ideally, all management activities in the Greenbelt Area should ultimately be self-sustaining. The following management priorities have been identified:

- 1) Protect both the Greenbelt Area and adjacent private property from wildfire through the establishment and maintenance of shaded fuel breaks and other forest management techniques.
- 2) Maintain or increase aesthetic values and private recreational potential.
- 3) Protect wildlife and plant habitat, with particular attention paid to creeks and associated riparian areas.
- 4) Preserve areas within the Greenbelt in their natural state.
- 5) Maintain the diversity of vegetative types and maintain or increase structural diversity
- 6) Control human-caused soil erosion and rehabilitate areas that are eroding, resulting in stream sedimentation.
- 7) Protect and conserve historic and archaeological features.
- 8) Generate capital to help pay for fire prevention and maintenance activities, recreation and wildlife habitat improvement, trail/road maintenance and stream restoration -- potentially through limited commercial fuelwood and selection timber harvesting.

5. Transportation System

Existing paved road system

A total of about 60 miles of paved roads exist in the Township. Generally, the Mendocino County Department of Transportation is responsible for the maintenance and repairs of the public roads within the township. Brooktrails Township is responsible for the maintenance of the unsurfaced, nonpublic roads that serve as access to the interior of the Greenbelt and other public facilities controlled by the district.

Existing unpaved roads and trails

There are approximately 18 miles of unsurfaced roads within in the 800-acre study area. These roads are part of the old logging road and skid trail system that have been kept open for use as management access roads and/or recreational hiking trails. Some of the more popular trails in the system include the Rockefeller, Nutmeg, Moss Rock, Oregon Grape and Chain Fern trails. The condition of the roadbeds on these old logging roads varies from good to bad. A portion of these old logging roads and trails are located within or adjacent to watercourses and are potential or actual sources of sediment contribution to the watershed. The old road segments that are not actively used for management access have never been upgraded to current erosion control standards, and the culverts that were installed during the last logging entry are now 40+ years old and rusting out, partially plugged or have failed. Many of these old watercourse crossings and cross-drains will need to be replaced in the next 10 years.

Existing skid trails

The entire study area was tractor logged during the 1950's and 1960's, resulting in numerous skid trails that were used to drag or skid the logs to a landing next to a truck road for sorting and loading onto log trucks. A few of the old skid trails were incorporated into the recreational trail system. Most of the skid trails located on the ridges and midslope areas have revegetated and stabilized. The skid trails that were located within watercourse channels and swales have either already washed out or become V-shaped Class III channels. Only a few of the old watercourse skid trails can still benefit from erosion control and restoration efforts. Most have long since failed and stabilized. If an area is entered for management purposes in the future, the old skid trails and logging roads should be evaluated and upgraded to current erosion control standards if necessary while the proper equipment is available in the area.

Access issues

When the current public roads were laid out during the construction of the subdivision infrastructure, they often intersected and cut off the older and steeper logging roads and trails. Many of the old roads were also cut off from the public road system by private parcels. Some of these old roads may be necessary for management access and/or recreational access to the Greenbelt. A few private lots blocking desirable access points to the Greenbelt have been identified and put on a watch list for possible acquisition should they come up for sale.

Management Recommendations:

- 1) Apply for cost-sharing through the Environmental Quality Improvement Program (EQIP) at the Mendocino County Resource Conservation District to conduct a systematic road assessment for the old logging roads and trails in the interior Greenbelt area. Assessment should identify priorities for road stabilization and erosion control, a budget and timetable.
- 2) Work with the Mendocino County Department of Transportation to coordinate implementation of the recommendations generated for the public roads in Brooktrails described in the county's "DIRT" survey of 2002.
- 3) See Section 14 (Fire Protection) for recommendation on upgrading Greenbelt roads for fire prevention.
- 4) Continue the evaluation of private lots at key Greenbelt access points for possible acquisition and make recommendations to the District.

6. Description of elevation, aspect, soils and site potential

Elevation of the study area ranges from 1500 feet to 2,600 feet. Slopes range from approximately 0% to 90%, averaging 40%. While all aspects are represented, the study area has a generally eastern orientation.

According to the Eastern Mendocino County Soil Survey (1979), the study area contains the following six soils complexes, all of which are rated as Site Class III in forest productivity.

Ornbaun-Zeni complex, 30 to 50 percent slopes

This map unit is on hills and mountains. The vegetation is mainly Douglas-fir and redwood. Elevation ranges from 200 to 2,000 feet. The average annual precipitation is 40 to 70 inches, the average annual air temperature is about 53 degrees F, and the average frost-free period is 220 to 320 days.

This unit is about 45 percent Ornbaun loam and 40 percent Zeni loam. The Ornbaun and Zeni soils occur as areas so intricately intermingled that it was not practical to map them separately at the scale used.

Included with these soils in mapping are small areas of Yellowhound and Kibesillah soils and small areas of soils that have been altered by skid trails, landings, and roads. Also included are small areas that have slopes of 15 to 30 percent or 50 to 75 percent. Included areas make up about 15 percent of the total acreage of the unit. The percentage varies from one area to another.

The Ornbaun soil is deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is light yellowish brown loam about 3 inches thick. The upper 37 inches of the subsoil is light brown, yellowish red, and reddish yellow loam. The lower 19 inches is reddish yellow and pink clay loam. Soft, fractured sandstone is at a depth of about 59 inches.

Permeability is moderate in the Ornbaun soil. Available water capacity is high. The effective rooting depth is limited by weathered bedrock at a depth of 40 to 60 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

The Zeni soil is moderately deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1 inch thick. The surface layer is pale brown loam about 4 inches thick. The subsoil is yellow and light brown loam about 26 inches thick. Soft, fractured sandstone is at a depth of about 30 inches.

Permeability is moderate in the Zeni soil. Available water capacity is low or moderate. The effective rooting depth is limited by weathered bedrock at a depth of 20 to 40 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

This unit is used for timber production or as watershed.

Douglas-fir, redwood, tanoak, and Pacific madrone are the main tree species on this unit. On the basis of a 100-year site curve, the mean site index for Douglas-fir is 155 on the Ornbaun soil and 129 on the Zeni soil. The potential annual production from a fully stocked stand of Douglas-fir is 770 board feet per acre on the Ornbaun soil and 525 board feet per acre on the Zeni soil. On the basis of a 100-year site curve, the mean site index for redwood is 152 on the Ornbaun soil and 130 on the Zeni soil.

The main limitations affecting the harvesting of timber are the slope, the hazard of erosion, and seasonal wetness. Wheeled and tracked equipment can be used in the more gently sloping areas, but cable yarding systems generally cause less disturbance of the soil in the steeper areas. Disturbance of the protective layer of duff can be minimized by the careful use of either wheeled and tracked equipment or cable yarding systems. Unless adequate plant cover or water bars are provided, steep yarding paths, skid trails, and firebreaks are subject to rilling and gullying. Establishing plant cover on steep cut and fill slopes reduces the hazard of surface erosion. Using wheeled and tracked equipment when the soils are wet produces ruts, compacts the surface, and can damage the roots of trees. Roads on this unit are dusty when dry. Surface treatment may be desirable during periods of heavy use. Unsurfaced roads and skid trails are slippery when wet. They may be impassable during rainy periods. Suitable surfacing of roads is needed for use during wet seasons. Rock for construction of roads generally is not available in areas of this unit.

Plant competition is a concern affecting the production of timber. When openings are made in the canopy, invading brushy plants that are not controlled can prevent the establishment of seedlings. Reforestation can be accomplished by planting Douglas-fir and redwood seedlings. If seed trees are present, natural reforestation of cutover areas by Douglas-fir occurs infrequently. After it is cut, redwood can regenerate by sprouting. These sprouts seldom provide optimum stocking.

Among the common forest understory plants are California huckleberry, iris, and brackenfern.

The capability classification is VIe(4), nonirrigated.

Casabonne-Wohly complex, 30 to 50 percent slopes

This map unit is on hills and mountains. The vegetation is mainly Douglas-fir and tanoak. Elevation ranges from 700 to 4,000 feet. The average annual precipitation is 40 to 70 inches, the average annual air temperature is about 55 degrees F, and the average frost-free period is 150 to 250 days.

This unit is about 55 percent Casabonne gravelly loam and 30 percent Wohly loam. The Casabonne and Wohly soils occur as areas so intricately intermingled that it was not practical to map them separately at the scale used.

Included with these soils in mapping are small areas of Pardaloe and Woodin soils and small areas of soils that have been altered by skid trails, landings, and roads. Also included are small areas that have slopes of 15 to 30 percent or 50 to 75 percent. Included areas make up about 15 percent of the total acreage of the unit. The percentage varies from one area to another.

The Casabonne soil is deep to bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is brown gravelly loam about 11 inches thick. The upper 25 inches of the subsoil is brown clay loam. The lower 13 inches is reddish yellow clay loam. Hard, fractured sandstone is at a depth of about 49 inches. In some areas the surface layer is loam.

Permeability is moderate in the Casabonne soil. Available water capacity is moderate or high. The effective rooting depth is limited by bedrock at a depth of 40 to 60 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

The Wohly soil is moderately deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is pale brown loam about 4 inches thick. The upper 6 inches of the subsoil is light yellowish brown and strong brown loam. The next 16 inches is very pale brown and reddish yellow clay loam. The lower 5 inches of the subsoil is very pale brown gravelly clay loam. Soft, fractured sandstone is at a depth of about 31 inches. In some areas the surface layer is gravelly loam.

Permeability is moderate in the Wohly soil. Available water capacity is low. The effective rooting depth is limited by weathered bedrock at a depth of 20 to 40 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

This unit is used for timber production or as watershed.

Douglas-fir, tanoak, and Pacific madrone are the main tree species on this unit. On the basis of a 100-year site curve, the mean site index for Douglas-fir is 144 on the Casabonne soil and 118 on the Wohly soil. The potential annual production from a fully stocked stand of Douglas-fir is 665 board feet per acre on the Casabonne soil and 420 board feet per acre on the Wohly soil.

The main limitations affecting the harvesting of timber are the slope, the hazard of erosion, and seasonal wetness. Wheeled and tracked equipment can be used in the more gently sloping areas, but cable yarding systems generally cause less disturbance of the soil in the steeper areas. Disturbance of the protective layer of duff can be minimized by the careful use of either wheeled or tracked equipment or cable yarding systems. Unless adequate plant cover or water bars are provided, steep yarding paths, skid trails, and firebreaks are subject to rilling and gullying. Establishing plant cover on steep cut and fill slopes reduces the hazard of erosion. Using wheeled and tracked equipment when the soils are wet produces ruts, compacts the surface, and can damage the roots of trees. Roads on this unit are dusty when dry. Surface treatment may be desirable during periods of heavy use. Unsurfaced roads and skid trails are slippery when wet and may be impassable during rainy periods. Suitable surfacing of roads is needed for use during wet seasons. Rock for construction of roads generally is not available in areas of this unit.

Plant competition is a concern affecting the production of timber. When openings are made in the canopy, invading brushy plants that are not controlled can prevent the establishment of seedlings. Reforestation can be accomplished by planting Douglas-fir and ponderosa pine seedlings. If seed trees are present, natural reforestation of cutover areas by Douglas-fir occurs infrequently. The high soil temperature and low content of soil moisture during the growing season cause a high seedling mortality rate, especially in areas of the Wohly soil on south- and southwest-facing slopes.

Among the common forest understory plants are brackenfern, blue wildrye, and perennial bromes and fescues.

Desirable forage species, such as Harding grass and soft chess, have grown well in previously wooded areas that have been cleared and seeded. Because these soils have a natural tendency to produce woody species, however, grass is difficult to maintain in most areas.

The capability classification is VIe(5), nonirrigated.

Casabonne-Wohly-Pardaloe complex, 50 to 75 percent slopes

This map unit is on hills and mountains. The vegetation is mainly Douglas-fir and tanoak. Elevation ranges from 700 to 4,000 feet. The average annual precipitation is 40 to 70 inches, the average annual air temperature is about 55 degrees F, and the average frost-free period is 150 to 250 days.

This unit is about 35 percent Casabonne gravelly loam, 35 percent Wohly loam, and 15 percent Pardaloe very gravelly loam. The three soils occur as areas so intricately intermingled that it was not practical to map them separately at the scale used.

Included with these soils in mapping are small areas of Woodin soils and small areas of soils that have been altered by skid trails, landings, and roads. Also included are small areas that have slopes of 30 to 50 percent or 75 to 99 percent. Included areas make up about 15 percent of the total acreage of the unit. The percentage varies from one area to another.

The Casabonne soil is deep to bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is brown gravelly loam about 11 inches thick. The upper 25 inches of the subsoil is brown clay loam. The lower 13 inches is reddish yellow clay loam. Hard, fractured sandstone is at a depth of about 49 inches. In some areas the surface layer is loam.

Permeability is moderate in the Casabonne soil. Available water capacity is moderate or high. The effective rooting depth is limited by bedrock at a depth of 40 to 60 inches. Surface runoff is very rapid, and the hazard of water erosion is very severe if the surface is left bare.

The Wohly soil is moderately deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is pale brown loam about 4 inches thick. The upper 6 inches of the subsoil is light yellowish brown and strong brown loam. The next 16 inches is very pale brown and reddish yellow clay loam. The lower 5 inches of the subsoil is very pale brown gravelly clay loam. Soft, fractured sandstone is at a depth of about 31 inches. In some areas the surface layer is gravelly loam.

Permeability is moderate in the Wohly soil. Available water capacity is low. The effective rooting depth is limited by weathered bedrock at a depth of 20 to 40 inches. Surface runoff is very rapid, and the hazard of water erosion is very severe if the surface is left bare.

The Pardaloe soil is deep to bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface layer is pink very gravelly loam about 11 inches thick. The upper 15 inches of the subsoil is very pale brown extremely gravelly sandy loam. The lower 28 inches is brownish yellow and reddish yellow extremely gravelly sandy clay loam. Hard, fractured sandstone is at a depth of about 54 inches. In some areas the surface layer is gravelly sandy loam, gravelly loam, or very gravelly sandy loam.

Permeability is moderate in the Pardaloe soil. Available water capacity is low. The effective rooting depth is limited by bedrock at a depth of 40 to 60 inches. Surface runoff is very rapid, and the hazard of water erosion is very severe if the surface is left bare.

This unit is used for timber production or as watershed.

Douglas-fir, tanoak, and Pacific madrone are the main tree species on this unit. On the basis of a 100-year site curve, the mean site index for Douglas-fir is 144 on the Casabonne soil, 118 on the Wohly soil, and 122 on the Pardaloe soil. The potential annual production from a fully stocked stand of Douglas-fir is 665 board feet per acre on the Casabonne soil, 420 board feet per acre on the Wohly soil, and 455 board feet per acre on the Pardaloe soil.

The main limitations affecting the harvesting of timber on this unit are the slope and the hazard of erosion. Seasonal wetness is also a limitation on the Casabonne and Wohly soils. When timber is harvested, the slope limits the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally cause less disturbance of the soil. Unless adequate plant cover or water bars are provided, steep yarding paths, skid trails, and firebreaks are subject to rilling and gullyng. Harvesting systems that lift logs entirely off the ground minimize the disturbance of the protective layer of duff. Establishing plant cover on steep cut and fill slopes reduces the hazard of surface erosion. Roads may fail and landslides may occur following deep soil disturbance in the steeper areas. Roads are dusty when dry. Surface treatment may be desirable during periods of heavy use. Unsurfaced roads and skid trails are slippery when wet. They may be impassable during rainy periods. Rock for construction of roads generally is not available in areas of this unit.

Plant competition is a concern affecting the production of timber. When openings are made in the canopy, invading brushy plants that are not controlled can prevent the establishment of seedlings. Reforestation can be accomplished by planting Douglas-fir and ponderosa pine seedlings. If seed trees are present, natural reforestation of cutover areas by Douglas-fir occurs infrequently. The high soil temperature and low content of soil moisture during the growing season cause a high seedling mortality rate, especially in areas of the Wohly and Pardaloe soils on south- and southwest-facing slopes.

Among the common forest understory plants are brackenfern, blue wildrye, and perennial bromes and fescues.

The capability classification is VIIe(5), nonirrigated.

Ornbaun-Zeni complex, 50 to 75 percent slopes

This map unit is on hills and mountains. The vegetation is mainly Douglas-fir and redwood. Elevation ranges from 200 to 2,000 feet. The average annual precipitation is 40 to 70 inches, the average annual air temperature is about 53 degrees F, and the average frost-free period is 220 to 320 days.

This unit is about 40 percent Ornbaun loam and 40 percent Zeni loam. The Ornbaun and Zeni soils occur as areas so intricately intermingled that it was not practical to map them separately at the scale used.

Included with these soils in mapping are small areas of Yellowhound and Kibesillah soils and small areas of soils that have been altered by skid trails, landings, and roads. Also included are small areas that have slopes of 30 to 50 percent or 75 to 99 percent. Included areas make up about 20 percent of the total acreage of the unit. The percentage varies from one area to another.

The Ornbaun soil is deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1/2 inch thick. The surface layer is light yellowish brown loam about 3 inches thick. The upper 37 inches of the subsoil is light brown and reddish yellow loam. The lower 19 inches is reddish yellow and pink clay loam. Soft, fractured sandstone is at a depth of about 59 inches.

Permeability is moderate in the Ornbaun soil. Available water capacity is high. The effective rooting depth is limited by weathered bedrock at a depth of 40 to 60 inches. Surface runoff is very rapid, and the hazard of water erosion is very severe if the surface is left bare.

The Zeni soil is moderately deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1 inch thick. The surface layer is pale brown loam about 4 inches thick. The subsoil is yellow and light brown loam about 26 inches thick. Soft, fractured sandstone is at a depth of about 30 inches.

Permeability is moderate in the Zeni soil. Available water capacity is low or moderate. The effective rooting depth is limited by weathered bedrock at a depth of 20 to 40 inches. Surface runoff is very rapid, and the hazard of water erosion is severe if the surface is left bare.

This unit is used for timber production or as watershed.

Douglas-fir, redwood, tanoak, and Pacific madrone are the main tree species on this unit. On the basis of a 100-year site curve, the mean site index for Douglas-fir is 155 on the Ornbaun soil and 129 on the Zeni soil. The potential annual production from a fully stocked stand of Douglas-fir is 770 board feet per acre on the Ornbaun soil and 525 board feet per acre on the Zeni soil. On the basis of a 100-year site curve, the mean site index for redwood is 152 on the Ornbaun soil and 130 on the Zeni soil.

The main limitations affecting the harvesting of timber are the slope, the hazard of erosion, and seasonal wetness. When timber is harvested, the slope limits the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally cause less disturbance of the soil. Unless adequate plant cover or water bars are provided, steep yarding paths, skid trails, and firebreaks are subject to rilling and gullying. Harvesting systems that lift logs entirely off the ground minimize the disturbance of the protective layer of duff. Establishing plant cover on steep cut and fill slopes reduces the hazard of surface erosion. Roads may fail and landslides may occur following deep soil disturbance in the steeper areas. Roads are dusty when dry. Surface treatment may be desirable during periods of heavy use. Unsurfaced roads and skid trails are slippery when wet. They may be impassable during rainy periods. Suitable surfacing of roads is needed for use during wet seasons. Rock for construction of roads generally is not available in areas of this unit.

Plant competition is a concern affecting the production of timber. When openings are made in the canopy, invading brushy plants that are not controlled can prevent the establishment of seedlings. Reforestation can be accomplished by planting Douglas-fir and redwood seedlings. If seed trees are present, natural reforestation of cutover areas by Douglas-fir occurs infrequently. After it is cut, redwood can regenerate by sprouting. These sprouts seldom provide adequate stocking.

Among the common forest understory plants are California huckleberry, iris, and brackenfern.

The capability classification is VIIe(4), nonirrigated.

Yorkville-Hopland association, 30 to 50 percent slopes

This map unit is on hills and mountains. The vegetation is mainly annual grasses and forbs on the Yorkville soil and hardwoods on the Hopland soil. Elevation ranges from 500 to 2,000 feet. The average annual precipitation is 45 to 60 inches, the average annual air temperature is about 57 degrees F, and the average frost-free period is 150 to 250 days.

This unit is about 40 percent Yorkville clay loam and 35 percent Hopland loam.

Included with these soils in mapping are small areas of Bearwallow, Squawrock, Witherell, and Yorktree soils and areas of Rock outcrop. Also included are small areas that have slopes of 15 to 30 percent or 50 to 75 percent. Included areas make up about 25 percent of the total acreage of the unit. The percentage varies from one area to another.

The Yorkville soil is very deep to weathered bedrock and is moderately well drained. It formed in material derived from schist. Typically, the surface layer is very dark grayish brown clay loam about 12 inches thick. The upper 5 inches of the subsoil is very dark grayish brown clay. The lower 45 inches is grayish brown clay that has reddish yellow mottles. In some areas the surface layer is loam.

Permeability is very slow in the Yorkville soil. Available water capacity is high. The effective rooting depth is limited by weathered bedrock at a depth of 60 to 80 inches. During periods of intensive rainfall, the soil is partially saturated above the subsoil for very brief periods from December through April. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare. The soil is subject to landsliding and slumping.

The Hopland soil is moderately deep to weathered bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface is covered with a mat of leaves and twigs about 1 inch thick. The surface layer is yellowish brown loam about 15 inches thick. The subsoil is reddish yellow loam about 15 inches thick. Soft sandstone bedrock is at a depth of about 30 inches.

Permeability is moderately slow in the Hopland soil. Available water capacity is low or moderate. The effective rooting depth is limited by weathered bedrock at a depth of 20 to 40 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

The Yorkville soil is used for livestock grazing, and the Hopland soil is used for firewood production. This unit is also used as wildlife habitat or as watershed.

The characteristic plant community on the Yorkville soil is mainly wild oat, soft chess, burclover, and ripgut brome. The main limitations affecting range management are the slope and the seasonal wetness. The wetness limits the use of equipment to dry periods. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. The slope limits access by livestock and results in overgrazing of the less sloping areas. Fencing, water development, and the strategic location of salt blocks can improve the distribution of livestock.

California black oak, Pacific madrone, and interior live oak are the main tree species on the Hopland soil. On the basis of a 50-year site curve, the mean site index is 44 for California black oak. The Hopland soil can produce about 30 to 35 cords per acre from a stand of trees 50 years old. Trees of limited extent include canyon live oak.

The main limitations affecting the harvesting of firewood are the slope, the hazard of erosion, and the seasonal wetness. Wheeled and tracked equipment can be used in the more gently sloping areas, but cable yarding systems generally cause less disturbance of the soil in the steeper areas. Disturbance of the protective layer of duff can be minimized by the careful use of either wheeled and tracked equipment or cable yarding systems. Unless adequate plant cover or water bars are provided, steep yarding paths, skid trails, and firebreaks are subject to rilling and gullyng. Establishing plant cover on steep cut and fill slopes reduces the hazard of surface erosion. Using wheeled and tracked equipment when the soil is wet produces ruts, compacts the surface, and can damage the roots of trees. Roads on this unit are dusty when dry. Surface treatment may be desirable during periods of heavy use. Unsurfaced roads and skid trails are slippery when wet. They may be impassable during rainy periods. Suitable surfacing of roads is needed for use during wet seasons. Rock for construction of roads generally is not available in areas of this unit. After they are cut, hardwoods can regenerate by sprouting. Regrowth is most successful if cutting is done between December and May.

Among the common forest understory plants are blue wildrye and melic grass.

The capability classification is Vle(15), nonirrigated.

Yorkville-Squawrock-Witherell complex, 30 to 50 percent slopes

This map unit is on hills and mountains. The vegetation is mainly annual grasses and forbs. Elevation ranges from 500 to 2,000 feet. The average annual precipitation is 45 to 60 inches, the average annual air temperature is about 57 degrees F, and the average frost-free period is 150 to 250 days.

This unit is about 35 percent Yorkville clay loam, 30 percent Squawrock gravelly loam, and 15 percent Witherell loam. The three soils occur as areas so intricately intermingled that it was not practical to map them separately at the scale used.

Included with these soils in mapping are small areas of Bearwallow, Hopland, and Yorktree soils and areas of Rock outcrop. Also included are small areas that have slopes of 15 to 30 percent or 50 to 75 percent. Included areas make up about 20 percent of the total acreage of the unit. The percentage varies from one area to another.

The Yorkville soil is very deep to weathered bedrock and is moderately well drained. It formed in material derived from schist. Typically, the surface layer is very dark grayish brown clay loam about 12 inches thick. The upper 5 inches of the subsoil is very dark grayish brown clay. The lower 45 inches is grayish brown clay that has reddish yellow mottles. In some areas the surface layer is loam.

Permeability is very slow in the Yorkville soil. Available water capacity is high. The effective rooting depth is limited by weathered bedrock at a depth of 60 to 80 inches. During periods of intensive rainfall, the soil is partially saturated above the subsoil for very brief periods from December through April. The soil is also subject to landsliding and slumping. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

The Squawrock soil is moderately deep to bedrock and is well drained. It formed in material derived from sandstone. Typically, the surface layer is pale brown gravelly loam about 7 inches thick. The upper 11 inches of the subsoil is pale brown very gravelly loam. The lower 14 inches is very pale brown very gravelly clay loam. Hard, fractured sandstone is at a depth of about 32 inches. In some areas the surface layer is loam.

Permeability is moderate in the Squawrock soil. Available water capacity is low. The effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

The Witherell soil is shallow to bedrock and is somewhat excessively drained. It formed in material derived from sandstone. Typically, the surface layer is brown loam about 1 inch thick. The subsoil is light yellowish brown loam about 11 inches thick. Hard, fractured sandstone is at a depth of about 12 inches. In some areas the surface layer is gravelly loam.

Permeability is moderate in the Witherell soil. Available water capacity is very low. The effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. Surface runoff is rapid, and the hazard of water erosion is severe if the surface is left bare.

This unit is used for livestock grazing or wildlife habitat.

The characteristic plant community on the Yorkville soil is mainly wild oat, soft chess, burclover, and ripgut brome. The main limitation affecting range management on this soil is the seasonal wetness. The seasonal saturation limits the use of equipment to dry periods. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The characteristic plant community on the Squawrock soil is mainly wild oat, soft chess, and filaree. The main limitation affecting range management on this soil is the low available water capacity. The production of forage is limited by the amount of moisture available for plant growth. If seeding is considered, species that are tolerant of droughty conditions should be selected.

The characteristic plant community on the Witherell soil is mainly soft chess, filaree, and wild oat. The main limitation affecting range management on this soil is the shallow effective rooting depth, which limits the production of forage. If seeding is considered, species that are tolerant of droughty conditions should be selected.

The slope is also a limitation if this unit is used for livestock grazing. It limits access by livestock and results in overgrazing of the less sloping areas. Fencing, water development, and the strategic location of salt blocks can improve the distribution of livestock.

The capability classification is VIe(15), nonirrigated.

7. **Growing Stock--species and age class distribution (general)** (refer to Stand Tables in Appendix)

Two stand tables were developed to differentiate between forestland within and outside the Greenbelt riparian areas. The purpose for separating the two was based on the assumption that forest management activities, particularly timber harvesting, would largely occur outside the riparian areas.

The following table synthesizes the information found in the Stand Table of Non-Riparian Areas within the study area.

Forest Composition Outside Riparian Areas

<i>Species</i>	<i>Basal Area/Acre</i>	<i>Volume/Acre ≥10" DBH</i>	<i>Trees/Acre ≥10" DBH</i>	<i>Total Trees/Acre ≥1" DBH</i>
Redwood	39 sq. ft.	4,700 bd. ft.	20	44
Douglas-fir	52 sq. ft.	8,900 bd. ft.	28	72
Hardwoods	122 sq.ft.	6,300 bd.ft.	86	298
Totals	213 sq. ft.	19,900 bd.ft.	134	414

Some key findings based on the field survey include:

- The conifers within the plan area range from 20 to 100+ years of age with most of the larger trees in the 70 to 90 year age class.
- The forest in the study area is clearly dominated by tanoak, both in terms of basal area and trees per acre.

- Natural regeneration of both redwood and Douglas-fir seedlings and saplings is adequate in most areas. However, hardwood competition has suppressed the majority of the conifer regeneration.

Management recommendations:

- 1) Reduce tanoak component to an average of 20% of the basal area of the forest, setting aside stands which are naturally tanoak versus conifer or conifer and tanoak.
- 2) Manage to achieve a multi-aged stand to present a range of seral conditions and a varied mosaic of habitats to enhance wildlife and aesthetic values.
- 3) Overstocked stands should be thinned from below to reduce the number of trees per acre to encourage growth of healthier conifers. Successive thinnings should result in an average of 300 trees per acre $\geq 1"$ DBH initially, leading to a goal of an average of 100 trees per acre $\geq 14"$ DBH.

8. Growth/Potential Yields

PERIOD 1	GREENBELT MANAGEMENT PLAN GROWTH & YIELD BASED ON 1994-2004 GROWTH COMPOUNDED ANNUALLY & ASSUMING 10% MORTALITY FOR THE PERIOD							
Species	MBF/ac beginning of period (P)	Annual Growth Rate (i)	Period length in Years (n)	MBF/ac end of period (A) <i>Assuming harvest in year 1 of period[1]</i>	Estimated Harvest Volume/ac over 250-ac area for Period	Total MBF Harvested (250-ac area)	MBF/ac Growth (After Harvest)	Annual harvest as % of Inventory
Redwood	4.700	0.024	15	6.214	0.346	86.500	1.514	0.5%
Douglas-fir	8.900	0.034	15	13.675	0.654	163.500	4.775	0.5%
TOTAL	13.600		15	19.890	1.000	250.000	6.290	0.5%

PERIOD 2	GREENBELT MANAGEMENT PLAN GROWTH & YIELD BASED ON 1994-2004 GROWTH COMPOUNDED ANNUALLY & ASSUMING 10% MORTALITY FOR THE PERIOD							
Species	MBF/ac beginning of period (P)	Annual Growth Rate (i)	Period length in Years (n)	MBF/ac end of period (A) <i>Assuming harvest in year 1 of period[4]</i>	Estimated Harvest Volume/ac over 250-ac area for Period	Total MBF Harvested (250-ac area)	MBF/ac Growth (After Harvest)	Annual harvest as % of Inventory
Redwood	5.593	0.024	15	6.785	0.839	209.730	1.192	1.0%
Douglas-fir	12.308	0.034	15	17.350	1.846	461.546	5.042	1.0%
TOTAL	17.901		15	24.135	2.685	671.276	6.234	1.0%

PERIOD 3	GREENBELT MANAGEMENT PLAN GROWTH & YIELD BASED ON 1994-2004 GROWTH COMPOUNDED ANNUALLY & ASSUMING 10% MORTALITY FOR THE PERIOD							
Species	MBF/ac beginning of period (P)	Annual Growth Rate (i)	Period length in Years (n)	MBF/ac end of period (A) <i>Assuming harvest in year 1 of period[7]</i>	Estimated Harvest Volume/ac over 250-ac area for Period	Total MBF Harvested (250-ac area)	MBF/ac Growth (After Harvest)	Annual harvest as % of Inventory
Redwood	6.106	0.024	15	6.101	1.832	457.986	0.006	2.0%
Douglas-fir	15.615	0.034	15	18.128	4.685	1,171.128	2.513	2.0%
TOTAL	21.722		15	24.228	6.516	1,629.114	2.507	2.0%

Based on current conifer volumes and growth rates, the study area is increasing in conifer volume at approximately 415 board feet/acre/year. According to the soils information, the area is capable of growing at a rate of 650 board feet/acre/year if it is managed.

Conifer volume per acre is relatively low – about half of its potential. However, conifer volume has, in fact, tripled since the 1984 Management Plan by submitted by forester Larry Camp. The rate of volume growth would be even greater with the thinnings proposed in the plan.

9. Regeneration

As stated previously, conifer regeneration in the study area is being suppressed by tanoak. Precommercial thinnings and release work will result in an increase in the conifer stand component in many areas without the need to plant. Other areas that have a heavy concentration of hardwoods or where the natural conifer regeneration has already succumbed to the dominant hardwood canopy will require the planting of conifer seedlings to return the stand to a more natural conifer-hardwood ratio. Planting will also be required in order to increase the redwood stocking level in those areas that are suited to growing redwoods. In most cases, site preparation need only consist of the removal of competing hardwoods and opening up of the canopy to allow sufficient light to stimulate growth of conifer regeneration.

Strong opposition to the use of herbicides was, in part, responsible for the 1984 Forest Management Plan not being implemented. However, it needs to be recognized that herbicide use remains the most effective method currently available to prevent tanoak regeneration for both fire prevention and re-establishment of conifer. Its use should be based only upon the approval of Brooktrails Board of Directors and only after a thorough analysis and review by Brooktrails residents.

Fred Euphrat, PhD and a Registered Professional Forester from Santa Rosa has done research on alternatives to herbicide treatment and reports fair-to-good results with a specific cutting regime, which requires further investigation.

Management recommendations:

- 1) Planting should focus on slopes less than 40%
- 2) Plant redwood over Douglas-fir if the site supports redwood
- 3) Investigate a cooperative agreement with other forest landowners to secure quality planting stock suited to local conditions
- 4) Investigate alternatives to herbicide for tanoak suppression

10. Socio-cultural considerations: limitations; markets

Three alternatives for management of the Greenbelt Area have been identified (see Section 16.) Although the ultimate decision on management lies with the Board of Directors, clearly it needs to be supported by the majority of the residents – something that did not occur with the 1984 Greenbelt Forest Management Plan.

Social Conditions

There are currently 1500 residences and 3,800 residents in Brooktrails Township. This presents a daunting, but not insoluble challenge to securing community “buy-in” on the management of the Greenbelt. Communities like Brooktrails have worked/are working together on extensive fire prevention programs, primarily motivated by the recognition that fuel hazard reduction in nearby forestland is critical. As CDF Fire Battalion Chief Mark Tolbert has suggested, there are community models already in place that should be investigated.

Strongly-held concerns about cutting trees and, in particular, timber harvesting were voiced by a number of the participants in the meetings that were held. Questions were raised about the impact of proposed fuel load management activities and timber harvesting on the full range of forest values currently provided by the Greenbelt. There is a clear need for additional dialogue and education about forest management techniques, including on-the-ground demonstration.

Opinions varied at the meetings, suggesting that some forest management actions, e.g., prescribed burns, might be acceptable in particular neighborhood, while they would be unacceptable in others. This suggests that a neighborhood approach to fire prevention activities is worth investigating.

The time that it will take to build community support for Greenbelt forest management activities needs to be factored in to any management strategy. Further, working with individual landowners on the activities that should occur on/adjacent to their property will take time as well. For example, the Fire Safe Council of Nevada County reports that it took about 12 hours of staff time per landowner to define site specific fire prevention activities on their individual properties.

Market/Economic Conditions

While there seem to be no market constraints on the sale of timber that could be harvested from the Greenbelt, there is currently no viable market for the extensive amount of chips (as much as 60 tons/acre) that may be a by-product of fuel break establishment. Further, it is difficult for an operator to make money solely on firewood – another significant by-product of the fuel breaks. The prospect, however, of an operator selling firewood cut from the Greenbelt needs further investigation. The intensive labor costs and relatively low return in the firewood market suggest that firewood sales should be considered as a means to decrease the cost of fuel break establishment, rather than a significant revenue source.

Local markets for timber continue to be strong, as is the general trend in timber prices, which have increased 5-8% annually over the past 25 years (Smythe, 2004). The most likely markets include Harwood Forest Products in Branscomb, Mendocino Forest Products in Calpella, and Willits Redwood in Willits.

Market/Economic Conditions

While there seem to be no market constraints on the sale of timber that could be harvested from the Greenbelt, there is currently no viable market for the extensive amount of chips (as much as 60 tons/acre) that may be a by-product of fuel break establishment. Further, it is difficult for an operator to make money solely on firewood – another significant by-product of the fuel breaks. The prospect, however, of an operator selling firewood cut from the Greenbelt needs further investigation. The intensive labor costs and relatively low return in the firewood market suggest that firewood sales should be considered as a means to decrease the cost of fuel break establishment, rather than a revenue stream to significantly offset establishment costs.

Local markets for timber continue to be strong, as is the general trend in timber prices, which has increase 5-8% annually over the past 25 years (Smythe, 2004). The most likely markets include Harwood Forest Products in Branscomb, Mendocino Forest Products in Calpella, and Willits Redwood in Willits.

Management recommendations:

- 1) Continue facilitated meetings on a quarterly basis to provide community input and to ensure progress in management of the Greenbelt.
- 2) Hold periodic workshops on fire prevention, emphasizing demonstration, ideally sponsored and led by CDF and the Brooktrails Fire Department.
- 3) Sample mark a five-acre demonstration fuel break and invite Brooktrails residents to view and discuss the cutting that is proposed. Estimate the income and expenses associated with the demonstration fuel break.
- 4) Firewood harvesting should be conducted by a single operator who has a contract with the District. Past experience at Brooktrails and elsewhere in the county suggests that it is inadvisable to open up the Greenbelt for cutting by residents.
- 5) Work with the Mendocino County Fire Safe Council to learn what other communities have already accomplished. Determine what has worked/what hasn't and the costs associated with different actions.

11. Current silvicultural system(s)--rotation, cutting cycle, etc

The timber tax system in place prior to 1974 and logging practices at that time resulted in what amounted to “high-grading” by today’s forestry standards: taking the largest, best trees and leaving the poor quality trees behind. The practices proposed under this plan will result in the establishment of a multi-aged stand dominated by high-quality conifers and hardwoods that balances timber and nontimber values (wildlife habitat, watershed & recreation).

The following sample guidelines for commercial timber harvesting are proposed as a means to meet the management objectives identified in Section 4. Adjustments in the guidelines will occur based on community input and conditions on the ground.

- No cutting in Class I Watercourse and Lake Protection Zones, except for stream restoration activities, e.g., reintroduction of large woody debris
- Limited harvesting in Class II riparian areas, retaining 80% canopy cover.

- Retain 65% canopy cover along Class III watercourses for a distance of 25 feet. No harvesting within 10 feet of edge of watercourse.
- Selection harvest only; emphasis on single tree selection, with group selection limited to ½ acre in size. (Use group selection size for rehabilitation cuts in tan oak.)
- Retain an average 3-4 legacy trees per acre that will never be cut. Legacy trees are defined as all old growth and/or the largest conifer or hardwoods in the stand.²
- Slash treatment: lopping to two feet and scattering. On slopes 30% or less, where there is adequate room at landings, trees should be skidded to the landing and tops chipped or burned. If landing area is not of sufficient size, pile and burn slash in shaded fuel breaks. Chips to be made available to Brooktrails residents as an alternative to burning.
- Retain all snags, unless they present a safety hazard.
- Retain all downed logs.
- Residual basal area of conifer will average 100 square feet per acre.

Management recommendations:

- 1) A cutting cycle (the time at which some of the trees will be harvested) of 10-15 years is recommended.
- 2) Establish an effective rotation age (the time at which dominant trees are finally harvested) for Douglas-fir of 80 years and 120 years for redwood. This standard will result in numerous large diameter mature trees in managed stands.

12. Land Conservation Practice Needs

Soil Erosion and Sedimentation of Streams

Soil erosion and sedimentation of fish-bearing creeks are serious problems in a number of locations in the study area, including Willits Creek (refer to map of Soils, Geology, and Erosion Control). Although a thorough analysis was not conducted, it appears that poor location and closure of logging roads (occurring prior to the adoption of the California Forest Practice Rules) are a contributing factor to this problem. However, the primary source of active soil erosion and sedimentation appears to be the down-cutting action of culverts draining the Brooktrails paved road system. There seemed to be a consensus at the Greenbelt Management Plan meetings that reducing soil erosion and reducing stream sedimentation was an important priority.

As part of the University of California Cooperative Extension's "Five County Salmonid Restoration Plan (1998), a survey of active soil erosion sites along the Brooktrails road system (not in the Greenbelt) was conducted. 471 sites were identified and prioritized. The County Department of Transportation (DOT) and/or Brooktrails Community Services District is responsible for rehabilitation of these sites.

² The initial guidelines proposed no harvesting of trees greater than 40" DBH. However, in the study area, this meant less than one tree per acre. The legacy provision has been incorporated as an alternative to increase the number of permanently protected trees per acre.

Based on information available from staff at the North Coast Regional Water Quality Control Board, the identification and implementation phases of for the Total Maximum Daily Load (TMDL) within the NCQCB Basin Plan will require the County and District to identify and quantify active and potentially active sediment sources at some point by 2015. The County and District will eventually be required to rehabilitate these sites.

Management Recommendations:

- 1) Review the Extension survey and work with the County to implement highest priority areas for remediation.
- 2) Apply for cost-sharing funds to conduct additional road and stream assessments within the Greenbelt that are the District's responsibility.

13. Fish, Wildlife, and Plants

The plant and animal species listed in the following tables are those special status species that could be present in the Greenbelt Area or that have habitat components in or near the Greenbelt. The lists are based on known local occurrences of these species (from the Department of Fish and Game's Natural Diversity Data Base and the California Native Plant Society), on information provided by foresters and biologists familiar with the area, and on information contained in nearby Timber Harvest Plans. The assessment area in the Animal Taxa table denotes the general vicinity around the Greenbelt where management activities could likely impact a particular species.

Botanical Taxa - Rare Plants with Known Regional Occurrence

Scientific Name Common Name	Associated Habitat	Habitat in Greenbelt
<i>Alisma gramineum</i> narrow-leaved water-plantain	Marshes and swamps (assorted shallow freshwater). Elevation 390-1800 m.	Yes
<i>Fritillaria roderickii</i> Roderick's fritillary	Coastal bluff scrub. Coastal prairie, Valley and foothill grassland. Elevation 15-120 m.	Yes
<i>Gilia capitata ssp. pacifica</i> Pacific gilia	Coastal bluff scrub, Coastal prairie. Elevation 5-300 m.	No
<i>Hesperolinon adenophyllum</i> Glandular western flax	Chaparral, Cismontane woodland, Valley and foothill grassland / serpentine. Elevation 150-1315 m.	Yes
<i>Lasthenia burkei</i> Burke's goldfields	Meadows (mesic), Vernal pools. Elevation 15-600 m.	Yes
<i>Limnanthes bakeri</i> Baker's meadowfoam	Meadows, marshes and swamps (freshwater), Valley and foothill grassland (vernally mesic), Vernal pools. Elevation 175-920 m.	Yes
<i>Navarretia leucocephala ssp. bakeri</i> Baker's navarretia	Cismontane woodland, lower montane coniferous forest, meadows, Valley and foothill grassland, Vernal pools / mesic. Elevation 15-1740 m.	Yes
<i>Pleuropogon hooverianus</i> North Coast semaphore grass	Broadleafed upland forest, Meadows, Marshes and Swamps (freshwater), North Coast coniferous forest, Vernal pools / mesic. Elevation 10-635 m.	Yes
<i>Potamogeton epihydrus ssp. nutallii</i> Nuttall's pondweed	Marshes and Swamps (assorted shallow freshwater). Elevation 400-1900 m.	Yes

Scientific Name Common Name	Associated Habitat	Habitat in Greenbelt
<i>Sanguisorba officinalis</i> great burnet	Bogs and fens, Broadleaved upland forest, Meadows, Marshes and Swamps, North Coast coniferous forest, Riparian forest / often serpentine. Elevation 60-1400 m.	Yes
<i>Trifolium amoenum</i> showy Indian clover	Coastal bluff scrub, Valley and foothill grassland (sometimes serpentine). Elevation 5-415 m.	Yes
<i>Viburnum ellipticum</i> oval-leaved viburnum	Chaparral, Cismontane woodland, Lower montane coniferous forest. Elevation 215-1400 m.	Yes

Animal Taxa.

Species	Status As of June 2004	Habitat known to be present within assessment area	Species known to be present within assessment area.	Habitat known to be present within Greenbelt.	Species known to be present within Greenbelt.
FISH					
Coho salmon ^{1.} (<i>Oncorhynchus kisutch</i>)	FT, CSC, SCT	Yes	Yes	Yes	Yes
Chinook salmon ^{2.} (<i>Oncorhynchus tshawytscha</i>)	FT, CSC	Yes	Yes	Yes	Yes
Steelhead trout ^{3.} (<i>Oncorhynchus mykiss</i>)	FT, SCE	Yes	Yes	Yes	Yes

1. Federal listing of Threatened in the So. Oregon/No. California ESU that includes the coastal streams from Cape Blanco, OR to Punta Gorda, CA.
2. Federal listing of Threatened for the naturally spawned coastal spring & fall Chinook salmon in the California Coastal ESU that includes the area between Redwood Cr., in Humboldt Co. and the Russian River in Sonoma Co.
3. Federal listing of Threatened in the No. California ESU that includes the coastal streams from Redwood Cr., in Humboldt Co. to the Gualala River in Mendocino Co.

AMPHIBIANS

Tailed frog (<i>Ascaphus truei</i>)	SP, CSC	Yes	No	No	No
Northern red-legged frog (<i>Rana aurora</i>)	SP, CSC	Yes	No	Yes	No
Foothills yellow-legged frog (<i>Rana boylei</i>)	CSC	Yes	Yes	Yes	Yes
Southern torrent salamander (<i>Rhyacotriton variegatus</i>)	SP, CSC	No	No	No	No

REPTILES

Northwestern pond turtle (<i>Clemmys marmorata marmorata</i>)	SP, CSC	Yes	Yes	Yes	No
--	----------------	------------	------------	------------	-----------

BIRDS

Cooper's hawk (<i>Accipiter cooperii</i>)	CSC	Yes	Yes	Yes	Yes
Northern goshawk (<i>Accipiter gentilis</i>)	FSC, CSC, BFS	Yes	No	Yes	No
Sharp-shinned hawk (<i>Accipiter striatus</i>)	CSC	Yes	Yes	Yes	Yes

Animal Taxa.

Species	Status As of June 2004	Habitat known to be present within assessment area	Species known to be present within assessment area.	Habitat known to be present within Greenbelt.	Species known to be present within Greenbelt.
Great blue heron (<i>Ardea herodias</i>)	BFS	Yes	No	Yes	No
Golden eagle (<i>Aquila chrysaetos</i>)	SP, CSC, BFS	Yes	No	Yes	No
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	FSC, CSC, BFS	No	No	No	No
Great egret (<i>Casmerodius albus</i>)	BFS	Yes	No	Yes	No
Vaux's swift (<i>Chaetura vauxi</i>)	CSC	Yes	No	Yes	No
Northern harrier (<i>Circus cyaneus</i>)	CSC	Yes	No	Yes	No
Yellow warbler (<i>Dendroica petechia</i>)	CSC	Yes	No	Yes	No
Willow flycatcher (<i>Empidonax traillii</i>)	SE	Yes	No	Yes	No
Merlin (<i>Falco columbarius</i>)	CSC	Yes	No	Yes	No
American Peregrine falcon ³ (<i>Falco peregrinus</i>)	SP, SE, BFS	Yes	Yes	Yes	Yes
Bald eagle (<i>Haliaeetus leucocephalus</i>)	FPD, SE, SP, BFS	Yes	Yes	Yes	Yes
Yellow-breasted chat (<i>Icteria virens</i>)	CSC	Yes	No	Yes	No
Mountain Quail (<i>Oreortyx pictus</i>)	FSC	Yes	No	Yes	No
Osprey (<i>Pandion haliaetus</i>)	CSC, BFS	Yes	Yes	Yes	Yes
Purple martin (<i>Progne subis</i>)	CSC	Yes	No	Yes	No
Northern spotted owl (<i>Strix occidentalis caurina</i>)	FT, BFS	Yes	Yes	Yes	No
MAMMALS					
Pallid bat (<i>Antrozous pallidus</i>)	CSC	Yes	No	Yes	No
Red tree vole (<i>Arborimus pomo=longicaudus</i>)	FSC, CSC	Yes	No	Yes	No
Ringtail (<i>Bassariscus astutus</i>)	SP	Yes	No	Yes	No
Townsend's western big-eared bat (<i>Corynorhinus townsendii townsendii</i>)	FSC, CSC	Yes	No	Yes	No
Pacific fisher (<i>Martes pennanti pacifica</i>)	CSC	Yes	No	Yes	No
Badger (<i>Taxidea taxus</i>)	CSC	Yes	No	Yes	No

³ The peregrine falcon was delisted by the federal government in August, 1999.

The following listing-status abbreviations are used in the above table to describe the most recent state and federal listing status for each species considered. The listing status was current as of June 2004.

SE = State-listed Endangered,
SCE = State candidate (Endangered),
BFS = Board of Forestry Sensitive Species,

ST = State-listed Threatened,
SCT = State candidate (Threatened),
CSC = California Species of Concern,
SP = Protected Species by State of California

FE = Federal-listed Endangered,
FPE = Federally proposed (Endangered),
FPD = Federally proposed (Delisting),

T = Federal-listed Threatened,
FPT = Federally proposed (Threatened),
FSC = Federal Species of Concern

Management Recommendations

- 1) Consult with Department of Fish and Game wildlife biologist and botanist, as well as the Cooperative Extension Forest Advisor prior to the commencement of forest management activities within the Greenbelt Area.

14. Fire Protection

Fire History

Based on data gathered from the Jackson Demonstration State Forest, low-intensity wildfires in pre-settlement times occurred at intervals of approximately 12-17 years in this part of Mendocino County. This level of fire activity resulted in a natural reduction in fuel loads that is no longer occurring due to present-day fire suppression activities.

Major wildfires have periodically occurred in Mendocino County. One of the most significant occurred in the 1930s in the Comptche area, where some 60,000 acres burned in a day and one-half (Baxter, 2004). In the last sixty years, three significant wildfires occurred in the Greenbelt Area and vicinity prior to the establishment of Brooktrails in the last sixty years.

<i>Name</i>	<i>Date</i>	<i>Size of Fire</i>
Ironles #2	August 1944	9,538 acres
Hayworth Ridge	August 1945	14,944 acres
Strong Mountain	September 1950	20,619 acres

Current Conditions; Future Risk

A visual assessment of fuel loads was conducted during the survey of the sample area using the U. S. Forest Service manual, "Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest." Levels of ladder fuels and fuel load on the ground were found to be light to moderate. However, the density of tree crowns was high, with average canopy closure of 80 percent. This finding is consistent with aerial photography, which shows the tanoak-dominated canopy increasing over the last 40 years.

Approximately six fires occur at Brooktrails per year. To date they have been minor and suppressed without difficulty by CDF and Brooktrails fire fighting crews (Tolbert, 2004). While it is impossible to predict when a major wildfire might occur in the Greenbelt, the combination of weather, tanoak buildup, and increasing fuel load suggests that it is not a question of “if” there will be a wildfire, but “when.”

- The prospect of a stand replacing fire (one that kills mature trees) at Brooktrails is as high as 70 percent in the next 50 years, according to CDF Fire Captain Bill Baxter.
- Historical fire patterns suggest the most likely location of a wildfire to occur is in the vicinity of the Burbeck Creek watershed, which lies west of Ridge Road, and which is adjacent to the Skunk Train railroad track.
- A crown fire would travel at the rate of approximately 4 miles per hour. This would mean that residents threatened by the fire would have approximately 40 minutes to evacuate – the amount of time for the fire to travel from railroad to the ridge.

Among the many worthwhile points in the discussion on fire prevention at the three Greenbelt management plan meetings, the following were particularly noteworthy:

- Given the overgrown condition of the roads in the Greenbelt Area, Brooktrails Fire Chief Daryl Schoeppner has stated that he could not commit the Brooktrails fire crew and equipment to fight a fire in the Greenbelt interior, as it could place the crew at serious risk.
- Improving roads within the Greenbelt will provide better access for fighting fires, but also increases human activity, which may increase the potential for fire.
- CDF/other fire fighting units would be unlikely to stop a major forest fire in the Greenbelt Area, but would focus on directing it through the Area.
- CDF crews may not be available to fight a wildfire at Brooktrails during the height of the fire season, as they are often committed elsewhere in the state. Some back-up exists with other local fire fighting units.
- It was noted that Brooktrails currently has a problem legally enforcing the abatement of private lots to reduce fire hazard, which is a key component in the overall fire prevention program in the District and is linked to what needs to occur in the Greenbelt Area. Further, there also appears to be little control over the amount of clearing that occurs by private landowners. This is a concern of residents who wish to maintain the scenic quality of their neighborhoods.

Existing/Past Fire Prevention Activities in the Greenbelt Area

Efforts to date to create adequate defensible spaces along roads and homes adjacent to the Greenbelt Area have been important, but inadequate to the task. Fuel breaks that were cut in the 1980s by CDF crews, e.g., along Blue Lake and Terrace Roads have been reoccupied by tanoak, demonstrating the need to maintain fuel breaks regularly (at least every five years).

One of the most important considerations in planning the creation of fuel breaks is the amount of labor involved in their establishment, as the following information illustrates:

- Brooktrails: CDF crews from Parlin Forks spent an average of 170 person-hours/acre on cutting, pruning, piling, and burning slash. 18,000 person-hours were spent by crews to treat 105 acres.
- West side of Ukiah: in 2003, Chamberlain Creek crew spent 433 person-hours/acre, 10,530 person-hours on establishment of 2 miles of 100-foot wide shaded fuel break (24.3 acres) on steep, heavily-wooded slopes.
- Estimates from two companies currently operating in Brooktrails ranged from 200-400 hours/acre for establishing shaded fuel breaks based on the following guidelines.

Shaded Fuel Breaks: Guidelines; Effectiveness

The concept of a shaded fuel break is to create a zone that will slow the rate of travel of fire, reduce the likelihood of a crown fire, and provide a site from which firefighters can conduct suppression activities. Fuel breaks are not designed to stop fire, but have resulted in crown fires dropping to the ground, rendering them far easier and safer to suppress.

Guidelines for fuel break establishment include:

- Width: 100-400 feet, depending upon percent slope and whether a house is situated uphill or downhill;
- Canopy closure: 70 per cent, with 5-10 feet between crowns
- Vegetation treatment:
 - Trees cut to create space between crowns, leaving largest, mature trees consistent with crown spacing requirements; roughly 40 trees per acre, 33 feet apart
 - Ladder fuels and understory vegetation (saplings, shrubs) cut
- Piling and burning or chipping of cut material that cannot be utilized

While some participants in the Greenbelt management meetings expressed the opinion that reducing ground and ladder fuels might suffice in reducing the spread of fire, this approach does not address the critical need to reduce canopy levels; thereby reducing the prospect of a crown fire.

Emergency Regulations on Wildfire Hazard Reduction and AB 2420 (LaMalfa) on Forest Thinning

As of this writing, the opportunity exists to recover some of the costs of establishing fuel breaks via the sale of wood products. Normally, any commercial sale of wood products requires the preparation of a Timber Harvest Plan or Non-Industrial Timber Management Plan, either of which are quite costly. (It is estimated that an NTMP on the entire Greenbelt would cost approximately \$80,000.)

The Board of Forestry has, however, passed Emergency Regulations allowing “communities at risk” to sell chips, firewood, and timber associated with a fuel hazard reduction program. In addition, legislation has been passed (AB 2420 – La Malfa), which also provides for commercial activities linked with fuel hazard reduction. Both alternatives require treatment of slash that may not be economically feasible in the Greenbelt Area.

Of the two alternatives, the Emergency Regulations seems the most viable, as it allows for the harvest of trees 26" DBH, while AB 2420 limits cutting to 14-16" DBH, producing even less income to offset fire prevention and other management expenses. At this juncture, It is unclear if the Emergency Regulations will continue, although the prospects look good.

Management recommendations:

- 1) Develop a strategic fuel treatment plan. Map priority areas for shaded fuel breaks, including evacuation routes, houses, and service roads/main trails/old haul roads with Brooktrails Fire Prevention Officer, CDF Willits Battalion Chief, CDF Fire Captain, and other wildfire experts.
- 2) Develop a budget and apply for cost-sharing via the Fire Safe Council for state and federal funding after review and approval by the Recreation and Greenbelt Committee and Board of Directors. Involve the community in the process.
- 3) With step #1 in place, investigate a pilot project that combines shaded fuel break development, firewood and limited timber harvesting under the Fuel Hazard Reduction Emergency regulations adopted in June 2004 – if the rules are extended by Board of Forestry. Track income and expenses for future budgeting purposes. Determine if a group of adjacent homeowners will share in the cost of the pilot project behind their homes.
- 4) Inventory key access points for fire, resource management activities, and recreation and make recommendations on parcel acquisition.
- 5) Maintain/improve access for fire fighting and as fire breaks on service roads and former roads now used primarily as trails after thoroughly analyzing the pros and cons of improving a particular road.
- 6) Implement shaded fuel break activities in concert with an assured maintenance program or the investment in establishment will be lost.
- 7) Adopt shaded fuel break standards to address the issue of over cutting in abatement areas.
- 8) Investigate mechanical means to establish fuel breaks, e.g., excavators with a rotary head, which can reduce costs as much as 75 percent.

15. Insect and Disease Problems

The primary disease concern within the North Coast region is Sudden Oak Death (*Phytophthora ramorum*). Although the disease has not been identified in the Greenbelt to date, it is present in other parts of the county. However, another species of *Phytophthora* that has similar symptoms has been identified at several locations within the District. As the tanoak component of the Greenbelt stands age and weaken, more damage and windfall can be expected as a result of snow damage and winter storms. The potential for buildup of fuels and added potential for insect infestation could increase. Currently there are no significant disease or insect infestations within the Greenbelt, however an overstocked stand is more at risk and generally less healthy.

Management Recommendations:

- 1) The steps taken to manage fuels build up will also help alleviate conditions that favor insect and disease infestations.
- 2) Distinct staff should remain alert for clusters of dead and dying trees, especially oaks. The CDF Forest Pathologist or county Agricultural Commissioner's office should be contacted for assistance to determine if there is a serious problem and how best to treat it.

16. Proposed alternatives; cost/benefit analysis of investments

The table on page 27 projects the income and expenses associated with the three Greenbelt management alternatives identified in the Introduction. Specific notes and assumptions can be found on the page following the table.

Projected expenses in the first fifteen years for the 800-acre sample area range from an estimated \$2,000,000 for Alternative 1 (Fuels Management/Important Road Repairs & Stream Restoration) to \$2,148,000 for Alternative 2 (Fuels Management/Important Road Repairs & Stream Restoration).

Shaded Fuel Break Costs

Costs were estimated for the establishment of a 150-foot wide shaded fuel break along paved roads and private residences bordering the Greenbelt, which totaled 375 acres out of the 800-acre sample area.⁴ Based on discussions with local businesses that have worked on clearing jobs in Brooktrails, labor costs ranged from \$3,000-\$15,200/acre for fuel break establishment. Using the lower per acre rate, the projected establishment cost is projected to be \$1,125,000. Clearly, this is a sizable expenditure, and is likely beyond the capacity of the District and its residents to finance, particularly when the projected cost for the entire Greenbelt Area would be three times this amount.

As a result, it has been recommended (Section 14) that the establishment of fuel breaks be considered more strategically to bring costs in line with the District's and residents' financial capacity. Again, mechanized equipment needs to be fully explored as a lower cost method.

As the table on page 28 indicates, the cost for maintenance of shaded fuel breaks is far less expensive -- projected to be \$300/acre/5years or \$60/acre/year – a cost which it is suggested could be assumed by individual residents who will be the beneficiaries of the added fire protection afforded them by the fuel breaks.

Deferred Maintenance and Repair Costs

To date, Brooktrails' investments in the Greenbelt have largely been associated with the improvement of recreational opportunities for the community. It would appear that over the last thirty years, road maintenance and repair within the Greenbelt Area have largely been deferred.⁵ As a result, the road system has declined and soil erosion and stream sedimentation have increased – a situation that will only intensify and grow more costly without an annual investment in maintenance and repairs. As indicated previously, it is a matter of time – perhaps ten years – before the District will be required by the state to make necessary repairs.

⁴ Note that the width of fuel breaks is recommended to be as large as 400 feet for houses at the top of steep slopes.

⁵ It should be recognized that Brooktrails inherited many of the problems with roads within the Greenbelt from previous owners.

Income Projections (refer to Greenbelt Management Alternatives and Growth and Yield tables)

Alternative 3 includes an initial light selection harvest of approximately 1,000 board feet of conifer per acre on 250 acres of the sample area.⁶ Income in the first fifteen-year period of \$50,000 does little to offset management costs.

However, as the volume of standing conifer inventory builds over 45 years from the current 13,600 board feet/acre to an estimated 24,200 board feet/acre, harvest levels increase to 6,500 board feet/acre, even though the level of harvest is kept to a conservative 2% of inventory per year.

The result in the third period is an income from timber sales of \$326,000 that offsets projected expenses of \$540,000. A net loss is still projected in the third 15-year period of \$214,000 or \$14,300 per year. However, income from timber sales pays for 97% of the projected Greenbelt management costs and the District provides 3%. It should be emphasized that to get to this point, the District will need to invest in the development of a Non-Industrial Timber Management Plan and the precommercial thinning and planting work identified in the table of Greenbelt Management Alternatives.

Management Recommendations:

- 1) See recommendations 1-3 in Section 14 (Fire Protection).
- 2) Establish an annual Greenbelt Management budget, including a minimum of \$20,000 for unsurfaced road maintenance and repairs, which potentially can be used to leverage other cost-sharing monies. This amount will cover 10 days of time for a backhoe and operator, as well as capital costs for rock and culverts.
- 3) Investigate the costs and methods of funding used by other communities in the state for fuel load reduction programs, including contributions by community residents.

⁶ Approximately 250 acres of the sample area contain slopes \leq 30%.

Greenbelt Management Alternatives: Projected Expenses and Income – 800-Acre Sample Area

	Projected Expenses Yrs 1-15	Projected Income Yrs 1-15	Projected Net Yrs 1-15	Projected Expenses Yrs 16-30	Projected Income Yrs 16-30	Projected Net Yrs 16-30	Projected Expenses Yrs 31-45	Projected Income Yrs 31-45	Projected Net Yrs 31-45
Alternative 1 – Fuels Management / Important Road Repairs & Stream Restoration									
<i>Shaded Fuel Breaks: 150 ft average width = 375 acres</i>	\$1,125,000	\$0	-\$1,125,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Fuel Break Maintenance</i>	\$337,500	\$0	-\$337,500	\$337,500	\$0	\$337,500	\$337,500	\$0	-\$337,500
<i>Forest Rd/Trail Assessment</i>	\$20,000	\$0	-\$20,000	\$20,000	\$0	-\$20,000	\$20,000	\$0	-\$20,000
<i>Road Repair/Stabilization</i>	\$300,000	\$0	-\$300,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Stream restoration</i>	\$125,000	\$0	-\$125,000	\$125,000	\$0	\$125,000	\$125,000	\$0	-\$125,000
<i>Road Maintenance</i>	\$96,000	\$0	-\$96,000	\$96,000	\$0	\$96,000	\$96,000	\$0	-\$96,000
Totals	\$2,003,500	\$0	-\$2,003,500	\$578,500	\$0	\$578,500	\$578,500	\$0	-\$578,500
Alternative 2 – Fuels Management / Important Road Repairs & Stream Restoration / Commercial Firewood Harvesting / Precommercial Thinning									
<i>Shaded Fuel Breaks</i>	\$1,125,000	\$0	-\$1,125,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Fuel Break Maintenance</i>	\$337,500	\$0	-\$337,500	\$337,500	\$0	\$337,500	\$337,500	\$0	-\$337,500
<i>Forest Rd/Trail Assessment</i>	\$20,000	\$0	-\$20,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Road Repair/Stabilization</i>	\$300,000	\$0	-\$300,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Stream restoration</i>	\$125,000	\$0	-\$125,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Road Maintenance</i>	\$96,000	\$0	-\$96,000	\$96,000	\$0	-\$96,000	\$96,000	\$0	-\$96,000
<i>NTMP Development</i>	\$40,000	\$0	-\$40,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Timber Stand Improvement</i>	\$100,000	\$0	-\$100,000	\$0	\$0	\$0	\$100,000	\$0	-\$100,000
<i>Supervision of TSI</i>	\$5,000	\$0	-\$5,000	\$5,000	\$0	-\$5,000	\$5,000	\$0	-\$5,000
Totals	\$2,148,500	\$0	-\$2,148,500	\$438,500	\$0	\$438,500	\$538,500	\$0	-\$538,500
Alternative 3 – Fuels Management / Important Road Repairs & Stream Restoration / Commercial Firewood & Limited Commercial Timber Harvesting									
<i>Shaded Fuel Breaks</i>	\$1,125,000	\$0	-\$1,125,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Fuel Break Maintenance</i>	\$337,500	\$0	-\$337,500	\$337,500	\$0	-\$337,500	\$337,500	\$0	-\$337,500
<i>Forest Rd/Trail Assessment</i>	\$20,000	\$0	-\$20,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Road Repair/Stabilization</i>	\$300,000	\$0	-\$300,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Stream restoration</i>	\$0	\$0	\$0	\$125,000	\$0	-\$125,000	\$0	\$0	\$0
<i>Road Maintenance</i>	\$96,000	\$0	-\$96,000	\$96,000	\$0	-\$96,000	\$96,000	\$0	-\$96,000
<i>NTMP Development</i>	\$40,000	\$0	-\$40,000	\$0	\$0	\$0	\$0	\$0	\$0
<i>Timber Stand Improvement</i>	\$100,000	\$0	-\$100,000	\$0	\$0	\$0	\$100,000	\$0	-\$100,000
<i>Supervision of TSI</i>	\$5,000	\$0	-\$5,000	\$5,000	\$0	-\$5,000	\$5,000	\$0	-\$5,000
<i>Timber Sales</i>	\$1,000	\$50,000	\$49,000	\$1,000	\$134,255	\$133,255	\$1,000	\$325,823	\$324,823
Totals	\$2,024,500	\$50,000	-\$1,974,500	\$564,500	\$134,255	-\$430,245	\$539,500	\$325,823	-\$213,677

Refer to notes on next page.

Notes

- 1) Projected expenses are rough estimates.
- 2) Residents' contribution to shaded fuel break costs has not been incorporated.
- 3) Shaded fuel breaks are based upon .2 acre in the Greenbelt area.
- 4) Rate for fuel break establishment is based on low end of range: \$3,000/acre.
- 5) Road repairs and maintenance are based on 18 miles of unsurfaced roads and trails in the Greenbelt.
- 6) Cost-sharing funds have not been incorporated into projections, but the prospect for cost-sharing of some expenses is good.
- 7) No anticipated income is projected in this analysis from commercial fuel wood harvest. However, it may be an important means to reduce fuel loading and fuel break establishment costs.
- 8) Estimated cost for developing an Non-Industrial Timber Management Plan includes development of an Erosion Control Plan.
- 9) Timber Stand Improvement expenses are based on 25 acres/year @\$400/acre – possible cost share
- 10) All figures are based on 2004 dollars. No adjustments have been made for inflation.
- 11) Timber sales are based on a light selection harvest on 250 acres resulting in 250,000 board feet in period 1; 671,000 board feet in period 2; 1,630,000 board feet in period 3. Stumpage value (net all other costs including supervision) is estimated at \$200/thousand board feet.

Assumptions

- 1) Mills and loggers will be available.
- 2) There will be no market for chips that may be generated.
- 3) Sufficient access for harvesting operations can be identified, including areas for log landings.

Estimated Shaded Fuel Break Costs in Greenbelt

	Hours Per Acre	Labor Costs	Labor Costs Per Acre	Total for 250 acres (100 ft wide)	Total for 500 acres (200 ft wide)	Total for 750/2500 acres (100 ft wide)	Total for 1500/2500 acres (200 ft wide)
Establishment							
Public crews	170–433						
Private Crew #1	200	\$15/hour	\$3,000	\$750,000	\$1,500,000	\$3,000,000	\$6,000,000
Private Crew #2	400	\$38/hour	\$15,200	\$3,800,000	\$7,600,000	\$11,400,000	\$22,800,000
<u>Maintenance every 5 years</u>	20	\$60 per 1/5 ac.	\$300/acre	\$62,500	\$125,000	\$187,500	\$375,000

Notes:

- 1) Establishment figures based on discussions with CDF Ft. Bragg Battalion Chief Brad Bradley, John Wagenet, and Marvin Dixon.
- 2) Maintenance figures based on discussions with John Wagenet.
- 3) Assuming average lot size of .2 acres, cost per acre for shaded fuel break establishment/owner ranges from \$600 per lot to \$3,040 per lot to extend fuel break 150 feet into Greenbelt.
- 4) Establishment costs are equivalent to the value of replacing 30 – 114 homes, assuming a value of \$200,000 each.

17. Property Security/Improvements

The access points to the service roads and trails of the greenbelt are either gated or blocked off to four-wheeled vehicle traffic. All of the major recreational trails are attractively signed at the access points off of the public road system thanks to recent efforts by the district and the local hiking club. Future projects that have been discussed include a series of bridges to provide better winter access for pedestrian traffic on the trails as well as providing better access for fire suppression and maintenance vehicles. Additional recreational trail development will also require additional access controls and signage.

18. Community/Agency Resources

The following organizations provide technical assistance and/or funding for a variety of forest management activities.

1. California Department of Forestry and Fire Protection

- *Fire Prevention Technical Assistance.* Mark Tolbert, Willits Battalion Chief. 459-7412 mark.tolbert@fire.ca.gov; Bill Baxter, Fire Captain, Howard Forest. 14501 North Highway 101, Willits CA 95490.
- *California Forestry Improvement Program.* Provided assistance for the development of the CFIP Plan. Also provides cost-sharing funds for fire prevention activities in forestland, as well as reforestation, precommercial thinning, and other activities. \$50,000 every three years maximum. Jill Butler, Staff Forester, California Department of Forestry and Fire Protection, 135 Ridgway Ave., Santa Rosa, CA 95401. 576-2935. jill.butler@fire.ca.gov
- *Forest Management.* California Department of Forestry and Fire Protection. Contact: Charlie Martin, 459-7443; Jeanette Pederson, 459-7452; Craig Pederson, CDF Foresters. Howard Forest. 459-7451
- *California Vegetation Management Program.* Provided \$225,000 for fuel break work by Parlin Fork and Chamberlain Creek crews. Important source of labor in past, which is likely not to be available in the foreseeable future. Community provides operating funds, food. Ted Engberg, Division Chief, Operations. Howard Forest. 459-7414
- *Insect and Disease Problems.* California Department of Forestry and Fire Protection: Jack Marshall, Forest Pathologist. Howard Forest, 459-7448. jack.marshall@fire.ca.gov

2. California Department of Fish and Game.

- Technical assistance on wildlife and fisheries. Scott Harris, Associate Fisheries Biologist. P.O. Box 1690, Willits, CA 95490 459-2238. slharris@dfg.ca.gov
- Technical assistance on plants. Clare Golec, Environmental Scientist-Botanist. 964-1597. cgolec@dfg.ca.gov
- *Fisheries Restoration Grants Program:* Funds up to 80% of costs of road assessments. Normally want assessment costs not to exceed \$1,000/mile. Implementation grants available. Grant approval process is one year

3. Mendocino County Department of Transportation. Howard Dashiell. 467-2542.

County has funds via the Five County Salmonid Restoration Program. Prior funding priorities make funding for Brooktrails uncertain. County needs to define with District which entity is responsible for a particular site.

4. Mendocino County Resource Conservation District. Janet Olave, Executive Director. 468-9223. 405 South Orchard Ave, Ukiah 95482. janet.olave@ca.nacdn.net. Possible watershed assessments. Assistance with identification of funding sources.
5. Mendocino Fire Safe Council. Julie Rogers, P.O. Box 1488, Ukiah, CA 95482, 462-3662. firesafe@pacific.net. Provides assistance with grant writing for fire prevention activities.
6. North Coast Regional Water Quality Control Board. Holly Lundborg. 5550 Skylane Blvd. Suite A, Santa Rosa, CA. 95403. 576-2609. Funds for road and streambank restoration.
 - *WQ 319 Program – Clean Water Act Section 319(h) Nonpoint Source Implementation Grant*: funding for on-the-ground work.
7. University of California Cooperative Extension. Greg Giusti, Forest Advisor. 890 Bush Street, Ukiah, Ca., 95482. 463-4495. gagiusti@ucdavis.edu
8. USDA Natural Resource Conservation Service. Steve Smith, District Conservationist. 405 South Orchard Ave, Ukiah, 95482. 468-9223, ext 3. stphen.smith@ca.usda.gov Administers the Environmental Quality Incentive Program (EQIP), which pays for up to 50% for a variety of activities including road assessments. Unclear if available in 2005. Cost-sharing of fire prevention and pre-commercial forestry practices.

Management Recommendation:

1. Brooktrails should continue to take advantage of cost-sharing funds for activities like fire prevention, erosion control on roads, stream restoration, and pre-commercial timber management. However, it should not have a false sense of reliance that cost-sharing will generate the levels of income necessary to meet the management needs of the Greenbelt. It is critically important for the District to build a funding base that is primarily self-generated. This is the only way that an on-going Greenbelt management program can be sustained over time. It is the only way to create a “fire-safe” forest over time.

19. Recreational Resources

The Rockefeller, Nutmeg, Moss Rock, Oregon Grape, and Chain Fern trails lie within the study area. These trails are used regularly by the Brooktrails residents for hiking, exercise, and birding. During the survey of the Greenbelt Area, hikers were frequently encountered enjoying the outdoors.

As mentioned previously, all of the trails are former logging roads, some of which are used as access for District utilities management. Some trails and other roads will be needed in the future for fuels reduction and forest management activities within the Greenbelt. With particular care, former logging roads that are currently inaccessible might be upgraded to provide additional access for both recreational and management purposes.

Trails and roads in the Greenbelt provide important access for recreational purposes, but at the same time increase the potential for fires based on human activity.

Management recommendations:

- 1) Any forest management activities must consider the impact on trails and other recreational resources. Consultation with residents on proposed activities near trails is critical to avoid potential conflicts.
- 2) Buffers should be established along primary trails if timber management is going to occur in the vicinity.
- 3) Develop low-cost signs to be placed at trailheads that caution users to avoid smoking and building campfires in the Greenbelt.

20. Aesthetic considerations

Residents of Brooktrails have chosen to live in the Township in part because of the aesthetic appeal of Brooktrails. The combination of conifer and hardwood forest, grass land, and creeks found in the Greenbelt Area makes it a highly-valued scenic resource.

Management recommendations:

- 1) Fire prevention and any other forest management activities must take aesthetics into consideration and are a primary concern along recreational trails, roads, and along creeks.
- 2) Those trails that are most extensively used by residents, e.g., Rockefeller Trail, need to be treated with extreme care.
- 3) Greenbelt areas within 100 feet of private property should also be treated as highly-sensitive scenic areas.
- 4) Other actions that will result in protecting aesthetic value include: reserving “legacy” trees throughout managed areas; removing slash within 100 feet of highly traveled trails/roads; identification of natural areas and riparian buffer zones.

21. Archaeological, Historical, Cultural Considerations

Project Description:

The proposed project is a CFIP Management Plan. Most management activities that are suggested in this plan will be subject to some level of CEQA review and consequently a more detailed archaeological survey. Current management activities include the maintenance of existing roads and trails that occurs in already disturbed areas.

Native American Consultation

Consultation with Native American tribes in Mendocino County is required prior to the commencement of most forest management activities. This includes timber harvesting and practices funded by the California Forest Improvement Program (CFIP). In the latter case, the CDF coordinator of the CFIP Program currently takes responsibility for the consultation.

Pre-Field Research

Literature Reviewed: The two books referenced in “Instructions for completing CDF’s CAA Report Form” provide a valuable general overview of California Indians. In addition several other information sources were consulted that were made available by the staff of Campbell Timberland Management (CTM) at their office in Fort Bragg, CA. These sources provide a detailed accounting of the array of Native American groups which inhabited the Mendocino County area. Several of the articles listed below are taken from one of the recommended sources. While all of this information was available to the plan preparer, every document listed was not reviewed completely for the preparation of this plan. The CTM literature collection includes the following references:

1. Barrett, S.A., “Ethnography of the Pomo and Neighboring Indians”, University of California Publications in American Archaeology and Ethnography, Volume 6, No. 1, 1908
2. Barrett, S.A. “Pomo Buildings” Extract from Holmes Anniversary Volume, Washington Press, 1916
3. Barrett, S.A. “Material Aspects of Pomo Culture, Part I” Bulletin of the Public Museum of the City of Milwaukee Vol. 20, Part I, (March 1952) Pp 1 – 260, Plates 1-30, Text figs. 1-4
4. Baumhoff, M. A. “The Evolution of Pomo Society” Journal of California and Great Basin Anthropology Vol. 2 No. 2 (1980) Pp 175-185
5. Borden, Stanley T. “Caspar Lumber Company” in The Western Railroader, Ed. Francis A. Guido (San Mateo: Independently Published, 1966)
6. Cook, S.F. “The Aboriginal Population of the North Coast of California” University of California Publications, Anthropological Records Vol. 16, No. 3, (1956), Pp 81-129
7. Gifford, Edward W. “The Coast Yuki” Sacramento Anthropological Society No. 2 (Spring 1965) Pp. 5-13
8. Davis, James T. “Trade Routes and Economic Exchange Among The Indians of California” University of California Archaeological Survey Report #54 Undated
9. Bean, Lowell John & Dorthea Theodoratus “Western Pomo and Northeastern Pomo” in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
10. Myers, James E. “Cahto” in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
11. Kniffen, Fred B. “Pomo Geography” in University of California Publications in American Archaeology and Ethnology Ed. A.L. Kroeber, R.H. Lowie, R.L. Olson. Berkeley: University of California Press, July 1939
12. Fredrickson, David A, Early Cultures of the North Coast Ranges, California. Davis: Independently Published Doctoral Dissertation, 1973
13. Gifford, E.W. and A.L. Kroeber. “Culture Element Distributions: IV POMO” in University of California Publications in American Archaeology and Ethnology Vol 37, No. 4, (July 1937) Pp 117-254
14. Heizer, Robert F. “Trade and Trails” in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
15. Heizer, Robert F. and Albert B. Elsasser. The Natural World of the California Indians. Berkeley: University of California Press, 1980

16. Loeb, Edwin M. "Pomo Folkways" in University of California Publications in American Archaeology and Ethnology Vol 19, No 2 Berkeley: University of California Press, September, 1926 Pp 163-173
17. McLendon, Sally and Robert L. Oswalt "Pomo: Introduction" in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
18. Miller, Virginia P. "Yuki, Huchnom, and Coast Yuki" in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
19. Oswalt, Robert L. The Internal Relationships of the Pomo Family of Languages. Mexico: Actas y Memorias, 1962
20. Wallace, William J. "Post-Pleistocene Archaeology, 9000-2000 B.C." in Handbook of North American Indians Volume 8 California Ed. Robert F. Heizer. Washington: Smithsonian Institution 1978
21. Whistler, Kenneth W. "Pomo Pre-History: A Case For Archaeological Linguistics" Journal of the Steward Anthropological Society Vol. 15 Nos. 1 and 2 (Fall/Spring 1983-1984) Pp 64-97
22. Gray, A.J. and Sally Miklose. The Kid From Camp One (Fort Bragg, privately published, 1990) NOTE – This source is now out of print.
23. Mills of Mendocino County, MCHS 1996.
24. Hawk, Diane. Touring the Old Redwood Highway. Hawk Mountaintop Publishing, Piercy California 2001.
25. Kroeber, A. L. Handbook of the Indians of California. Dover Publications, Inc., New York 1925.
26. Powers, Stephen. Tribes of California. University of California Press, Berkeley and Los Angeles California 1877.
27. Chesnut, V. K. Plants Used by the Indians of Mendocino County, California 1902 (Reprinted by MCHS).

Persons Contacted:

In addition to the Native American Groups contacted, the following additional individuals were contacted:

Person(s) Contacted	Response(s) and Information Received.
Whatford, Chuck, CDF Arch. California Department of Forestry and Fire Protection 135 Ridgway Avenue Santa Rosa, CA 95401 707 576-2966	Preconsultation regarding requirements for CFIP documents and penalties for disturbing Arch sites. Mr. Whatford made recommendations regarding format of report and suitable protection measures for prehistoric artifacts and sites as well historic sites.
Doug Polson, Grounds Keeper for the Brooktrails Golf Course, Brooktrails Community Services District, 24860 Birch Street, Willits, CA 95490. (707) 459-2494.	Information gathered for THP 1-95-303 regarding area near the golf course. Mr. Pohlson described various historic and prehistoric artifacts found on the golf course over the years. The information was used in the THP arch addendum.

Summary of Results of Pre-Field Research

A harvest plan (THP 1-95-303 MEN) was prepared for the golf course area along Willits Creek in 1995. Pre-field research for the THP included querying the Historical Resources Information System at the Northwest Information Center at Sonoma State University. The response to the information request did not identify any previously recorded archaeological sites within or near the project site (the area of the golf course). The Confidential Archaeological Addendum for THP 1-95-303 recorded the golf course area as a historic and prehistoric site. The Willits Creek valley was used as a Chinese laborer's camp in the early days of Euro-American settlement and was apparently occupied by the Pomo prior to Euro-American settlement based on stone artifacts found on the golf course and along the creek over the years (personal communications with Mr. Doug Pohlson, Brooktrails Community Services District staff and former greens keeper).

Prior to the golf course THP, the Brooktrails Community Services District had an archeological survey done for an Environmental Impact Report (EIR) in preparation for the possible construction of an additional water supply reservoir proposed for an area on Willits Creek upstream from Poppy Drive. The report was prepared by William Self Associates under contract to EIP Associates, the District's EIR consultant.

According to the Self report, the Brooktrails area was inhabited by the Northern Pomo prior to European settlement. The report stated that the first logging in Willits Creek occurred in the 1860's when the Blosser Brothers built a sawmill near the site of the water treatment plant. The reservoir which now serves the water treatment plant was previously used as a log pond. The Self report also refers to a cultural resource site (CA-MEN-383) which was recorded in 1935. This site is located near the junction of Brooktrails Drive and Sherwood Road (refer to MAP 4 on page 62) Mr. Polson also stated that the area of the golf course and nearby District offices was originally occupied by housing for the mill workers, and later by the ranch workers when the area became the Brooktrails Ranch. He reported having found bits and pieces of old bottles and crockery, some with Chinese caricatures on it. He also reported hearing from some of the original District employees that old bottles and other artifacts were found during the construction of the golf course.

Although the area was a fairly heavily used prehistoric and early historic site, few obvious artifacts remain due to the intensive modern use and development of the area. It is possible that both prehistoric and historic artifacts exist beneath the streets, parking lots, and landscaping of the golf course and other District facilities in the near vicinity.

General Background

The general local pre-history and history of this area is fairly straight forward. Prior to European settlement the area was occupied by Native Americans belonging to the broadly defined 'Pomo' group which included many sub groups over the coastal and inland Mendocino County areas. European settlement along the coast, as well as on some of the major east/west trending ridges may have caused a shift in the seasonal migration patterns of Native Americans. Establishment of Fort Bragg in 1857 marked a basic change in the interaction between European settlers and the local Native Americans. Reservations were established, resulting in the relocation of most of the indigenous population. Logging, railroad construction, and homesteading opened up the interiors of the area often times taking advantage of the ideal locations used by native people. While this practice facilitated further European settlement, it did not provide for any preservation of Native American sites, and often times resulted in their direct destruction.

Over the last 15 years, foresters working for the large industrial timberland owners and the private nonindustrial timberland owners have located and recorded numerous archaeological sites throughout Mendocino County. Approximately 65% of the sites recorded are pre-historic in nature. The most typical type of pre-historic site found is the 'lithic scatter'. A close second would be small collections or isolated groundstone tool fragments. Another somewhat common type of pre-historic site found is isolated stone tools, pieces or projectile points. Shell middens have been found, usually in close proximity to the coast. As stated above, early settlement and logging commonly utilized the same locations that were utilized by the Native Americans. This usage typically caused severe disruption, resulting in the apparent loss of contextual relevance of most Native American sites.

The most common type of historical sites found on Mendocino County timberlands are linear and point features associated with the early railroad construction for logging access to the inland areas. In most instances these railroad grades were in close proximity, if not located directly within, watercourse channels. Over the last 75+ years many of these grades have either been reclaimed by native vegetation or reconstructed as logging roads. Additionally, during the war efforts of the early 1940's most of the track associated with these grades was salvaged for steel. During these efforts other 'valuable' materials were also removed, such as large bridge or trestle timbers. The point features noted consist of railroad trestles. In a few instances these structures have remained somewhat intact; however, a majority of these features have been destroyed over time, either through the effects of forest fires, salvage efforts, or natural decay. The second most common type of historic site consists of the remains of early homesteads. These generally consist of dilapidated structure remnants, old orchards, etc. In most cases these sites have been reclaimed by the forest environment. Other common historic sites include trails (usually converted to logging roads), orchards (associated with homesteads), logging camps, and can dumps (usually associated with logging camps or railroad grades).

Prehistoric Background of the Plan Area and Vicinity

The study area lies within the ethnographic territory of the Northern Pomo, members of the Hokan language family (Kroeber, 1925). The initial contact between Native Americans of Mendocino County and non-Indian groups may have occurred during the visits of Sir Francis Drake to the Mendocino Coast area in 1579. European trade goods were entering the Pomo area in the late 1700's. The Russians established a presence at Fort Ross in 1811 and employed local Pomoans as farm workers. The Mexicans took over the southern areas in the 1830's and the Indian population began to decline. Subsequent to the Mexican encroachment, disease, enslavement, displacement, massacres and the Anglo-European settlement in the 1850's led to rapid decimation of the Pomo culture.

*"The nearest known Pomo village was called Tsaka' and was defined by Barrett as a principal village, although Kroeber listed the location simply as an 'other village'. The site is believed to be near the entrance to Brooktrails at Sherwood Road. Most permanent villages appeared to be located inland from the dense redwood forest, with smaller, temporary settlements perhaps having been located within the forest. Smaller subsistence-related settlements tended to be tied to larger villages by kinship, economic and social attributes. Inland groups of Pomo traveled to the coast along principal trails which often followed ridgelines, as access was enhanced in those areas"*⁷

⁷ Archaeological Survey Report, Brooktrails Community Services District, Proposed Water Supply Reservoir, Mendocino County, California. Prepared for: EIP Associates, 150 Spear Street, Suite 1500, San Francisco, CA 94105. Prepared by William Self Associates, PO Box 2192, Orinda, CA 94563. November 1990.

"By 1811, when 95 Russian trappers, accompanied by 40 Aleut and Kodiak Indians, arrived from Alaska and established a fur trading colony at what is now Fort Ross, many Pomo had already been forced into Spanish missions or onto white reservations"⁸

The Pomo territory covered the area south to what is now the Sonoma County line and north to the Laytonville area occupied by the Cahto. Other neighboring tribes included the central and south Pomo as well as the Coast Yuki farther to the north, and the Huchnom (Yuki) to the east. The course of Sherwood Road from Brooktrails to Fort Bragg roughly follows one of the old principal trails to the coast used by the Pomo.

The types of pre-historic sites most likely to be encountered in the vicinity of the project area would be lithic scatter, midden scattered isolates and village sites.

Historic Background

The following excerpt is from the Willits History web site
<http://ntap.k12.ca.us/BGMS/W/willitshistory.html>:

"In 1855, brothers Sam and Harry Baechtel drove a herd of cattle up from Marin County in search of permanent grazing land and found a valley that fulfilled their requirements. They were the first non Indian settlers here, although A.E. Sherwood had settled Sherwood Valley, 10 miles to the northwest, in 1853. According to Sam Baechtel's notebook: "The valley has a large watershed and during our rainy seasons the water collects more rapidly than the outlet can carry it off, consequently it forms a lake in its northern end which is usually all drained off by May." That's one version of how the valley was called the Little Lake. Other settlers attribute the name to the little lake which is found in the south end of the valley.

'Sam Baechtel also mentioned that there were about 300 Indians who shared the valley, dividing it north and south. Evidently the Baechtels got along well with the Indians because the later generation remembered Indians working on the Baechtel's ranch and an Indian sweat house being across the road from their house.

'Some of the earliest settlers had worked their way through the mines and were now looking for land. In 1860 William James built the first grist mill in the valley and about the same time, the Blosser brothers built a water powered sawmill up Willits Creek. The town of Little Lake had sprung up on Baechtel land and consisted of a store, a meeting house, a blacksmith shop and a saloon. In 1865 Kirk Brier built a store to the north of Hiram Willits' land, and the town of Willitsville grew around it.

'The early settlers were self-sufficient and grew their own produce, raised their own meat, fruit and potatoes. What they didn't grow could be purchased at the local mercantile. By the end of the 1860's they were connected to the outside by a stage line. In 1888, with the advent of the railroad, Willitsville incorporated with a population of 720 and called itself, Willits. Lumbering had joined farming as a part of the local economy and the tanbark industry flourished. Farming and lumbering remain an integral part of present-day Willits economy.

The Northwestern Railroad reached Willits in 1901 followed by the "Skunk" line 10 years later. Northwestern completed the line to Eureka in 1914 making Willits the center of the line stretching from San Francisco to Eureka."

The types of historic cultural sites that would most likely be encountered include mill sites, early logging artifacts, cabins, barns, other outbuildings from homesteads, orchards, fences, dumps, old logging equipment, railroad grades and trails.

⁸ From the website: <http://www.gualala.com/history/pomo.htm>

Archaeological Training and Experience of Plan Preparers

Gerald M. Garvey, RPF # 1743

CDF Archaeological Training **Course #31**, September 15-17, 1993, Ukiah, CA.

CDF Archaeological Training **Course #57R**, October 6, 1998, Booneville, CA.

CDF Archaeological Training **Course #87R**, September 23, 2003, Ukiah, CA

Archaeological Survey for previous project within or near project area

1. A confidential archaeological survey and primary record for the area of the golf course was conducted by Gerald M. Garvey for **THP 1-95-303 MEN** in 1995. A preliminary site record was submitted as part of the CAA.
2. An archaeological survey for the EIR on the proposed dam on upper Willits Creek was conducted by William Self Associates in 1990. No new sites were recorded.
3. The Tsaka' village site (CA-MEN-383) was originally recorded by Omer Stewart in 1935.

Survey Methods and Procedures

Survey strategy:

Prior to any sight disturbing management activities, the Areas of High Probability shall be examined first by a qualified archaeological surveyor. These areas include gulch bottoms, trending ridges, stream confluences, mid slope benches, and areas near other non linear water sources. Other areas that will be surveyed as they are encountered include road cut-banks, slide areas, skid trails, game trails, gopher mounds, uprooted tree stumps, and ecotones.

The remainder of the project area shall be surveyed using an intuitive survey method. Survey intensity will be increased in areas that are more likely to contain cultural resources.

Survey coverage intensity levels:

Complete: The ridgetop areas will be completely surveyed, generally employing a 10 meter X 10 meter grid. Leaves and thick duff will be periodically scraped using boot scrapes. The average distance between scrapes should be about every 5 meters where the brush and understory will allow.

General: The midslope bench areas will be surveyed at a general level during road layout silvicultural investigations and other management activities within the project area. The stream channels will be traversed and flagged for the purposes of stream classification and mapping. Areas along stream banks having lower slopes or terraces and the areas where watercourse channel converged will be investigated. The areas that are not associated with springs or watercourses will be surveyed using traverses that are about 20 meters apart with increased intensity near springs or other areas that show promise of cultural use. Boot scrapes, old cut banks and slide scarps will be investigated. The ground cover density varies within the greenbelt from open hardwood understory with only leaves and duff to extremely thick huckleberry brush and small tanoak, but the area's understory is generally open and visible except for the duff and leaf litter.

Intuitive: The more promising areas that are encountered during cursory surveys on the steep sideslope areas in the project area will be surveyed at a general level during project layout. Any old skid trails, bare soil, rock outcrops, road cutbanks, appurtenant roads and occasional foot scrapes will be inspected for artifacts and midden. Any areas with chert outcrops will be of particular interest for investigation as a possible source of Native American chert mining.

Cursory: The low-probability areas of the project area will be subjected to a cursory survey during project layout and other management activities.

Ground visibility/other limitations:

The perimeter areas of the Greenbelt near home sites and road openings are more heavily vegetated with manzanita, salal, huckleberry and several other brush species as well as scattered conifer regeneration and tanoak. This condition severely limits ground visibility in these areas. Over the interior areas of the Greenbelt, the general ground visibility is fair to good.

Evaluation of Significance

No new sites were found on the project area during the field survey. If any sites are discovered in future surveys, the following criteria will be used to evaluate significance:

Significant archaeological or historical site means a specific location which may contain artifacts, or objects and where evidence clearly demonstrates a high probability that the site meets one or more of the following criteria:

- (a) Contains information needed to answer important scientific research questions.
- (b) Has a special and particular quality such as the oldest of its type or best available example of its type.
- (c) Is directly associated with a scientifically recognized important prehistoric or historic event or person.
- (d) Involves important research questions that historical research has shown can be answered only with archaeological methods.
- (e) Has significant cultural or religious importance to Native Americans as defined in 14 CCR § 895.1.

Protection Measures

The locations of any sites found will be flagged on the ground with *Special Treatment Zone* flagging in a manner so as to ensure that the flagging will be easily visible to those working near the site. Prior to the commencement of any management activities in the vicinity of a site, the administering RPF and/or a qualified designee will be responsible for showing the site location to personnel working nearby and apprising them of the need for confidentiality. Personnel working near a site will also be instructed that excavation, collection of artifacts, vandalism or looting of a site is in violation of the law and the state forest practice regulations. If any trees are to be felled within 100 feet of a site, personnel shall be instructed to fall away from the site.

Post-Review Site Discovery (Section 929.3);

If a person discovers a potentially significant archaeological or historical site after a plan, Emergency Notice, or Exemption is accepted by the Director, the following procedures apply:

- (a) The person who made the discovery shall immediately notify the Director, LTO, RPF, or timberland owner of record.
- (b) The person first notified in (a) shall immediately notify the remaining parties in (a).
- (c) No timber operations shall occur within 100 feet of the identified boundaries of the new site until the plan submitter proposes, and the Director agrees to, protection measures pursuant to 14CCR § 929.2 (949.2, 969.2).
- (d) A minor deviation shall be filed to the plan. The minimum information provided shall include:
 - (1) A statement that the information is confidential.
 - (2) The mapped location of the site.
 - (3) A description of the site.
 - (4) Protection measures, and
 - (5) Site records, if site records are required pursuant to 14 CCR §§ 929.1(g)(2)(b) and 929.5 [949.5, 969.5].
- (e) Upon receipt the Director shall immediately provide the proposed minor deviation or portions of the minor deviation, to Native Americans when Native American archaeological or cultural sites are involved.

Management recommendations:

1. Prior to commencement of management activities that could disturb significant cultural resources, an archaeological survey of the appropriate level of intensity shall be conducted by a person with the requisite training.

22. Financial projections (approximations) for the Entire Greenbelt Area

Approximations of income and expenses for management of the 2,500-acre Greenbelt Area can be extrapolated from the information obtained from the 800-acre survey area. The following table is a comparison of the first 15-year period of Greenbelt management, which incorporates the timber management outlined in Alternative 3.

It should be emphasized that these figures are very rough and would require additional survey work, assessments in the Greenbelt, and more detailed analyses to get a better understanding of costs.

	800 Acres	2,500 Acres
Income		
Timber sales	\$50,000	\$150,000
Resident contributions – fuel breaks		
Expenses		
Road assessment	20,000	40,000
Road repairs – initial	300,000	600,000
Stream restoration	125,000	375,000
Shaded Fuel Break Establishment	1,125,000	3,375,000
Fuel Break Maintenance	337,500	1,102,500
NTMP Development	40,000	80,000
Timber Stand Improvement	100,000	300,000
Timber Sales and Supervision	6,000	18,000
Annual road repairs and maintenance (total of 15 years)	96,000	192,000
Total Expenses	2,149,500	6,082,000
Net	(\$2,099,500)	(\$6,032,000)

No value has been attributed to Brooktrails residents' contributions to the cost of establishment of fuel breaks in the Greenbelt Area adjacent to their properties. Given the value of residences and other private property, this figure could be considerable and is worth exploring in the pilot project for fuel break establishment.

Management Recommendation:

- 1) Consistent with previous recommendations, develop a budget that is based on a strategic plan for fire prevention and other high-priority management activities and explore lower cost methods for fuel break establishment.

23. Summary of Key Management Recommendations and Proposed Timetable

The Greenbelt Area is a terrific resource for the Brooktrails Community. It provides important wildlife habitat and watershed protection, and it is a great recreational and scenic resource. My concern is that a major wildfire will destroy all of these forest values, not to mention the potential for loss of property and lives.

A forest management plan for the Greenbelt Area has been discussed for twenty years. It is great news that the Community has committed to the development of a California Forest Improvement Plan to define forest management activities within the Greenbelt. My recent experience with wildfires in Southern California, plus my knowledge of Brooktrails, suggests that the Community cannot afford to wait another 20 years before implementing a comprehensive management plan for the Greenbelt Area. The time for Brooktrails residents to act is now, while they still have options that a major wildfire will preclude.

Tom Schott, Watershed Recovery Program Manager, Natural Resource Conservation Service, former Mendocino County District Conservationist.

The following recommendations are a summary of those presented in the plan:

- 1) Continue periodic community meetings to discuss Greenbelt management issues and educate residents on particular topics like fire prevention.
- 2) Develop a strategic fire prevention plan. Map priority areas for shaded fuel breaks, including evacuation routes, houses, and service roads/main trails/old haul roads with Brooktrails Fire Prevention Officer, CDF Willits Battalion Chief, and other wildfire experts.
- 3) Develop a budget and apply for cost-sharing via the Fire Safe Council for state and federal funding after review and approval by Recreation and Greenbelt Committee and Board of Directors.
- 4) With step #1 in place, investigate a pilot project that combines shaded fuel break development, firewood and limited timber harvesting under the Fuel Hazard Reduction Emergency regulations adopted in June 2004 – if rules are extended by Board of Forestry. Determine if a group of adjacent homeowners will share in the cost of the pilot project behind their homes.
- 5) Inventory key access points for fire, resource management activities, and recreation and make recommendations on parcel acquisition.
- 6) Investigate grants/cost-sharing for a road and stream assessment and implementation program. Assess County's capacity to provide funding for road-related erosion work.
- 7) With assessments completed, begin highest priority road repairs/erosion controls and stream restoration.

DATE	ACTIVITY	LEAD PARTY
January 2005	Develop strategic fuel hazard reduction plan in conjunction with Greenbelt Committee, District Fire Dept. CDF fire experts, residents. With assistance of Fire Safe Council, investigate other community fire prevention programs.	To be identified
January 2005	Apply for fire prevention funding through the Fire Safe Council after consultation with Brooktrails Board, District staff, CDF, District Fire Dept, Greenbelt Committee and community representatives.	"
January 2005	Organize series of community workshops to continue dialogue and educational opportunities on Greenbelt management issues.	"
February 2005	Investigate and prepare grant applications for cost-sharing programs for road assessment.	"
February 2005	Adopt guidelines for fuel break establishment that could be applied to the abatement program and address enforcement problem.	"
March 2005	Mark 5-acre demonstration area to be treated. Estimate volumes of material to be removed and commercial value. Conduct tour for Brooktrails residents to discuss shaded fuel break marking.	Sternberg Forestry
March 2005	Determine feasibility of applying for Fuel Hazard Reduction Emergency regs to implement cutting on 5-acre area.	To be identified
April 2005	Inventory access points and submit report on recommended acquisitions to the District.	"
May 2005	Submit application to CDF for Fuels Hazard Reduction exemption.	"
July 2005	Identify contractor, funding, and cut 5-acre demonstration area and conduct tour of site for residents. Continue fuel break establishment, making adjustments based on community input	Sternberg Forestry
July 2005	Contingent on cost-sharing funding, initiate road assessment with the intent of commencing road repairs and stream restoration work the following year.	To be identified
Fall 2005	Schedule Greenbelt management activities and develop budget for consideration in District's overall budget for 2006.	"
July 2006 – July 2010	Fuel break establishment program continues.	"
January 2006	With support of majority of community, develop Non-Industrial Timber Management Plan, with goal of implementing selection harvest initially on 250 acres in the following summer.	"
July 2006	Initiate annual interior road repair and maintenance program.	"
January 2010	Maintenance activities on fuel breaks begins.	"

24. Persons Contacted in the Development of the Plan

Bill Baxter, CDF Fire Captain
Bob Whitney, President of Brooktrails-Sylvandale-Spring Creek Fire Safe Council
Brian Weller, Facilitator
Charlie Martin, CDF Forester II, Division Chief
Chuck Whatford, CDF Archaeologist
Clare Golec, California Department of Fish and Game
Daryl Schoeppner, Fire Chief, Brooktrails Township Community Services District
George Gentry, Jr. Executive Director, State of California Board of Forestry
Greg Giusti, Mendocino County Forestry Advisor, University of California Cooperative Extension
Holly Lundborg, North Coast Regional Water Quality Control Board
Howard Dashiell, Mendocino County Department of Transportation.
Jill Butler, Staff Forester, CDF
Jim Little, Harwood Forest Products
John Wagenet, Lot clearing services
Jon Noyor, Fire Captain, Brooktrails Township Community Services District
Julie Rogers, Fire Safe Council
Larry Camp, Registered Professional Forester
Les Day, Mountain Clearing & Brushing, Inc.
Mark Tolbert. CDF Willits Battalion Chief
Marvin Dixon, Marvin's Garden Tree Service
Mary Ziady, Chair, Brooktrails Recreation, Greenbelt, and Conservation Committee
Mike Chapman, Manager, Brooktrails Township Community Services District
Scott Harris, California Department of Fish and Game
Ted Engberg, CDF Division Chief, Howard Forest
Tom Smythe, Registered Professional Forester, Log Buyer, Harwood Products
Yana Volkovich, Humboldt County Forestry Advisor, University of California Cooperative Extension
William "Brad" Bradley, CDF Fort Bragg Battalion Chief

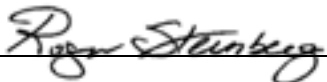
25. References

Brooktrails Road assessment
Brooktrails Conservation Areas Study Report. Partain and Kuehner. 1968
Brooktrails Redwood Park Master Plan. 1988
Management Plan for the Brooktrails Community Service District Greenbelt Area. Larry Camp. 1984
Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest.
Maxwell and Ward. U.S Forest Service. 1980
Summary of Management Recommendations for the Brooktrails Greenbelt. Larry Camp. 1984
Timber Inventory for Brooktrails Community Service District Greenbelt Area. Larry Camp. 1984

26. Registered Professional Forester (RPF) Certification

I certify that I, or my supervised designee, personally inspected this California Forest Improvement Program (CFIP) plan area, and that the plan fully complies with the CFIP and Professional Foresters Law. I further certify that this plan is based upon the best available site information, and if followed, will not be detrimental to the productivity of the natural resources associated with this property.

Name (Print or type): Roger Sternberg

Signature: 

Organization/Company: Roger Sternberg Forestry and Land Conservation Consulting Services

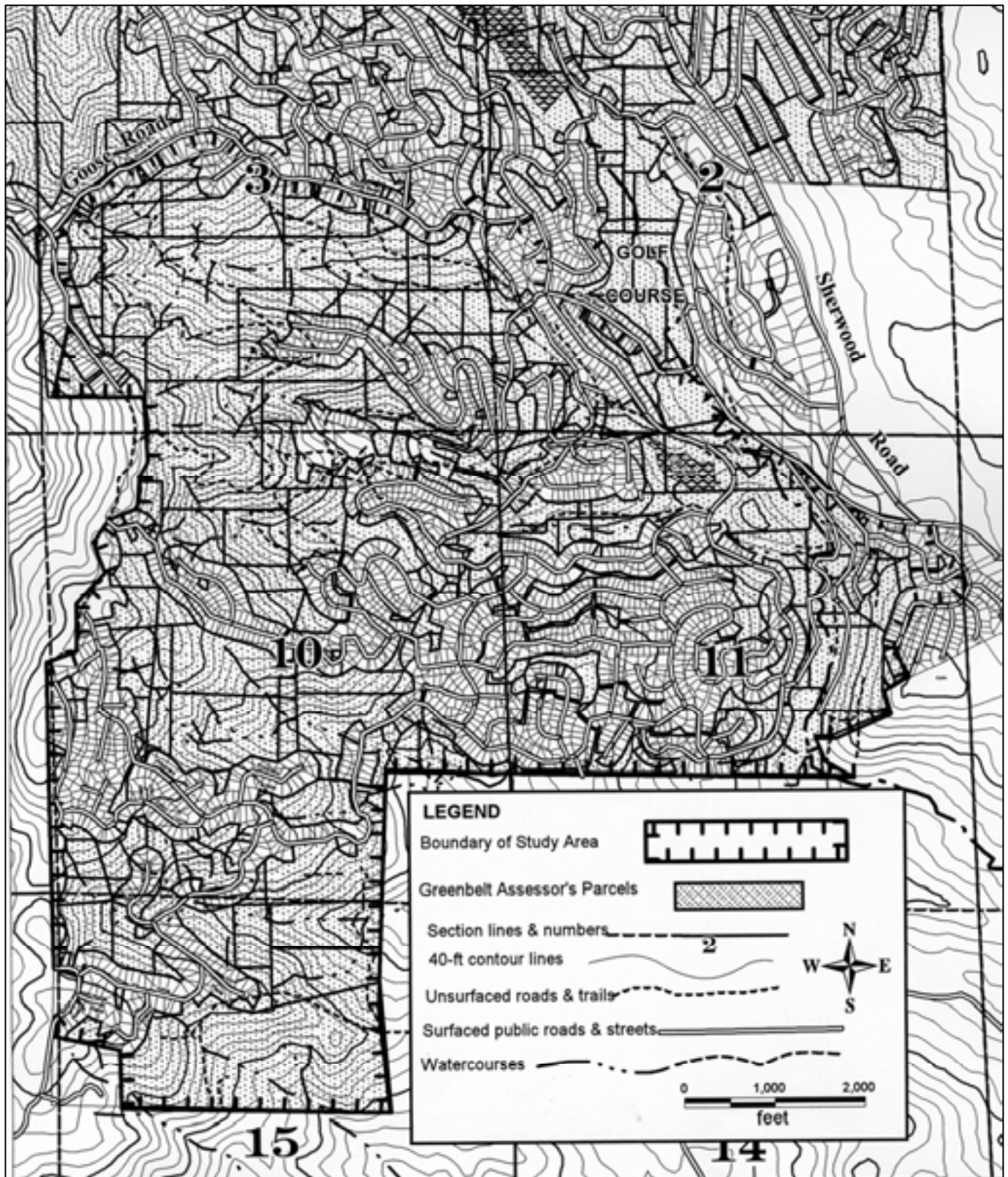
Address: P.O. Box 1211

Mendocino, CA 95460

Phone: 707-937-0776 **RPF:** # 2620

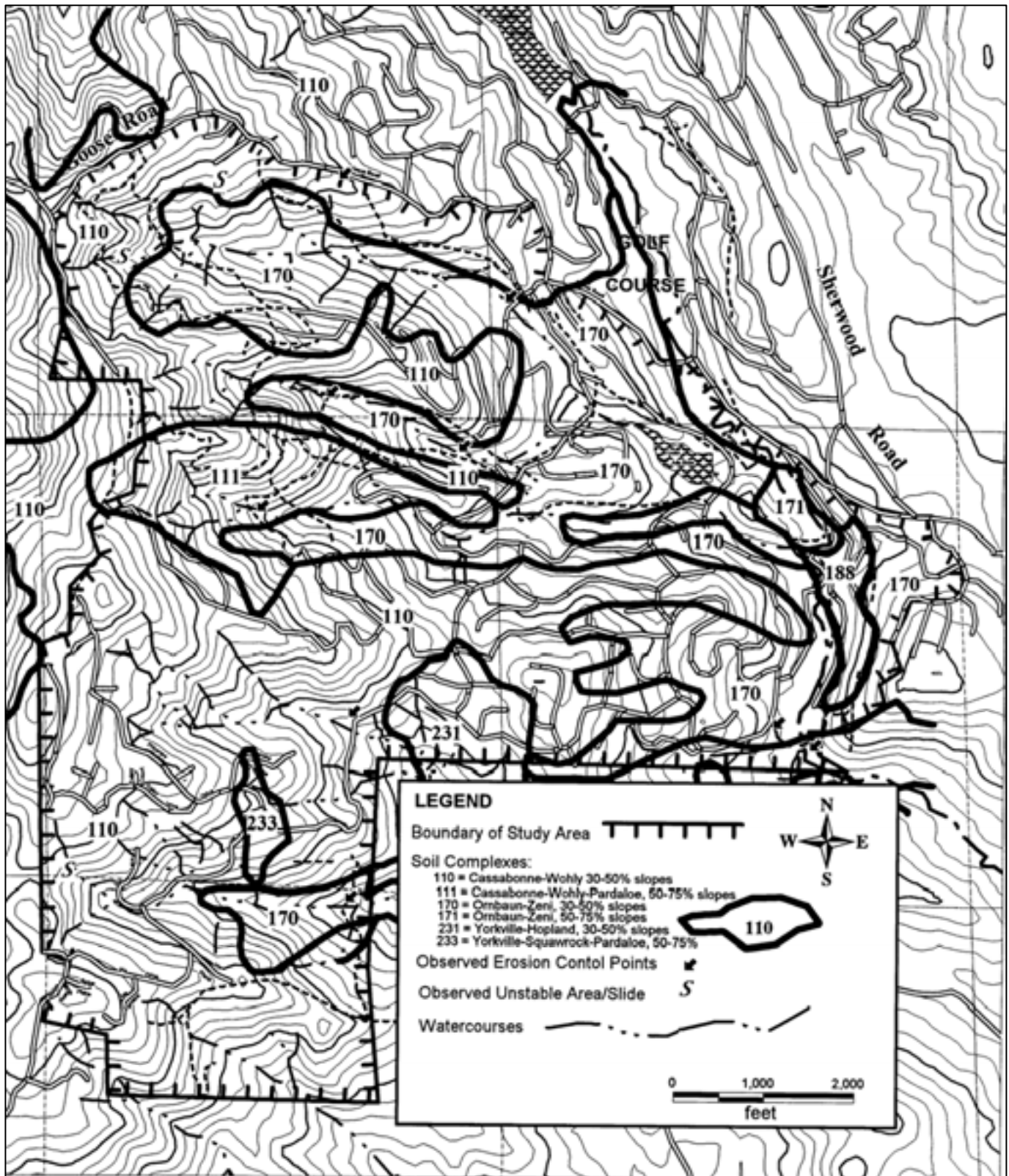
USGS Quadrangle Map with Topography and Physical Features

Scale: 1" = 1500'



Map of Soils, Geology and Erosion Control Points

Scale: 1" = 1500'



Map of Public Roads and Trails

Scale: 1" = 1500'



**Inventory Results for the Riparian
and
Nonriparian Areas

Summer 2004**

Stand Tables: South District Inventory of Non-Riparian Areas

Page 1 of 5

Prepared for
Sternberg - Brooktrails Cruise
 by
 Natural Resources Management Corp.

Stand Attribute Report

Stand Number: TIMBER
 Stand Type:
 Acres: 608
 Plots: 152

Stand Age (DBH): Yrs.
 Date: 09-29-2004
 Time: 12:26AM
 File: TIMBER.r08

	Mean	Minimum	Maximum
Overstory Crown	75%	0 - 5%	85 - 99%
Understory Crown	37%	0 - 5%	85 - 99%
Ground Slope	40%	0 - 15%	86 - 95%

Quadratic Mean DBH
 All Trees Over 5"
 = 12.2 inches

Volume Summary

Species	% Vol Gross	Vol/Acre (MBF)		---DBH---		Per Acre Count	
		Gross	Net	Max	Mean	Snags	GreenCull
Douglas-fir	45%	8.89	8.16	74	20	0.8	-
Redwood	24%	4.69	4.65	50	17	0.4	-
Alder	<1%	0.01	0.01	20	20	-	-
Tanoak	24%	4.78	4.77	30	13	0.3	-
Madrone	7%	1.35	1.35	40	15	0.9	-
Chinkapin	<1%	0.04	0.04	26	17	-	-
Maple	<1%	0.00	0.00	18	18	0.1	-
Laurel	<1%	0.05	0.05	40	14	-	-
Live Oak	<1%	0.02	0.02	26	13	-	-
Black Oak	<1%	0.05	0.05	58	18	-	-
White Oak	<1%	0.01	0.01	16	16	-	-
Total	100%	19.88	19.10	--	15	2.5	-

Mean DBH, Crown Ratio, Basal Area and TPA by Crown Position

Species	Pre-Dominant Crown				Dominant Crown				Co-Dominant Crown				Intermediate Crown				Suppressed Crown			
	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA
Douglas-fir	39	47%	0.9	0.1	21	41%	35.1	12.0	16	28%	7.1	4.6	13	21%	1.3	1.2	13	10%	0.3	0.3
Redwood	35	55%	0.3	0.0	25	38%	17.8	5.0	16	33%	12.2	7.9	12	26%	3.7	4.4	11	24%	1.3	1.8
Alder	-	-	-	-	20	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Tanoak	-	-	-	-	16	-	11.1	7.5	13	-	42.9	45.0	11	-	10.3	14.6	12	-	0.8	1.0
Madrone	-	-	-	-	19	-	6.8	3.2	14	-	9.5	8.8	13	-	2.4	2.6	13	-	0.4	0.4
Chinkapin	-	-	-	-	17	-	0.3	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Maple	-	-	-	-	18	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Laurel	-	-	-	-	22	-	0.4	0.1	14	-	0.5	0.5	11	-	0.4	0.6	-	-	-	-
Live Oak	-	-	-	-	21	-	0.3	0.1	12	-	0.1	0.2	12	-	0.4	0.5	-	-	-	-
Black Oak	-	-	-	-	22	-	0.7	0.2	16	-	0.1	0.1	14	-	0.1	0.1	-	-	-	-
White Oak	-	-	-	-	-	-	-	-	-	-	-	-	16	-	0.1	0.1	-	-	-	-
Total	38	49%	1.2	0.1	20	40%	72.6	28.5	14	31%	72.5	67.2	12	24%	18.7	24.1	12	23%	2.8	3.5

Observed Tree Damage (Trees per Acre)

Damage Type	Conifer	Hardwood	Damage Type	Conifer	Hardwood
Insect.....	-	-	Multi-Stem..	-	-
Fire.....	0.1	-	Broken Top..	0.5	-
Animal.....	-	0.2	Nest.....	-	-
Disease.....	0.2	0.1	Form.....	0.2	-
Mechanical..	1.6	0.1	Other.....	0.5	-

Volumes: MBF using Scribner Rule, 16 foot logs, Bebe Hyperbola

Stand Tables: South District Inventory of Non-Riparian Areas

Page 2 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: TIMBER
Stand Type:
Acres: 608
Plots: 152

Stand Age (DBH): Yrs.
Date: 09-29-2004
Time: 12:26AM
File: TIMBER.R03

Young-Growth Conifer

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Doug-fir Trees BA		Redwood Trees BA		Other Cnf Trees BA		Totals Trees BA	
0- 1	90.8	0.0	70.4	0.0	1.3	0.0	162.5	0.0
2- 2	22.4	0.5	5.6	0.1			28.0	0.6
4- 4	13.5	1.2	7.9	0.7			21.4	1.9
6- 6	8.2	1.6	5.3	1.0			13.5	2.6
8- 8	9.5	3.3	5.6	2.0			15.1	5.3
10- 10	2.7	1.4	4.1	2.2			6.8	3.7
12- 12	3.4	2.6	3.7	2.9			7.0	5.5
14- 14	1.4	1.4	1.5	1.6			2.8	3.0
16- 16	1.4	2.0	1.7	2.4			3.1	4.3
18- 18	1.0	1.8	2.3	4.1			3.4	5.9
20- 20	1.4	3.0	1.9	4.1			3.3	7.1
22- 22	1.2	3.2	0.9	2.5			2.1	5.7
24- 24	1.4	4.5	1.0	3.2			2.4	7.6
26- 26	1.0	3.6	0.2	0.9			1.2	4.5
28- 28	1.0	4.2	0.7	3.2			1.7	7.4
30-100	2.6	17.8	1.3	8.4			3.9	26.2
Totals	162.8	52.1	114.1	39.2	1.3	0.0	278.3	91.3

Gross and Net Volumes (MBF) Per Acre

DBH Group	Doug-fir Gross Net		Redwood Gross Net		Other Cnf Gross Net		Totals Gross Net	
0- 1								
2- 2								
4- 4								
6- 6								
8- 8								
10- 10	0.1	0.1	0.1	0.1			0.1	0.1
12- 12	0.1	0.1	0.2	0.2			0.3	0.3
14- 14	0.1	0.1	0.1	0.1			0.3	0.3
16- 16	0.2	0.2	0.2	0.2			0.4	0.4
18- 18	0.2	0.2	0.4	0.4			0.6	0.6
20- 20	0.4	0.4	0.5	0.4			0.9	0.9
22- 22	0.6	0.6	0.3	0.3			0.9	0.9
24- 24	0.7	0.7	0.4	0.4			1.2	1.1
26- 26	0.7	0.7	0.1	0.1			0.8	0.8
28- 28	0.9	0.8	0.5	0.5			1.4	1.4
30-100	4.7	4.2	1.8	1.8			6.5	6.0
Totals	8.9	8.2	4.7	4.7	0.0	0.0	13.6	12.8

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Non-Riparian Areas

Page 3 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: TIMBER

Stand Age (DBH): Yrs.

Stand Type:

Date: 10-12-2004

Acres: 608

Time: 8:16AM

Plots: 152

File: TIMBER.R03

Young-Growth Conifer

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Doug-fir		Redwood		Other Cnf		Totals	
	Trees	BA	Trees	BA	Trees	BA	Trees	BA
0- 28	160.2	34.4	112.8	30.8	1.3	0.0	274.3	65.1
30- 30	0.6	2.9	0.5	2.5			1.1	5.4
32- 32	0.7	3.8	0.4	2.1			1.1	5.9
34- 34	0.4	2.2	0.0	0.1			0.4	2.4
36- 36	0.4	2.5	0.1	0.7			0.4	3.2
38- 38	0.2	1.6	0.2	1.2			0.4	2.8
40- 40	0.2	1.4	0.1	0.5			0.2	2.0
42- 42	0.1	0.8	0.0	0.4			0.1	1.2
44- 44	0.1	0.8	0.0	0.1			0.1	0.9
46- 46	0.0	0.1	0.0	0.4			0.0	0.5
48- 48	0.0	0.3	0.0	0.1			0.0	0.4
50- 50	0.0	0.3	0.0	0.3			0.0	0.5
52- 52	0.0	0.1					0.0	0.1
54- 54	0.0	0.7					0.0	0.7
56- 56	0.0	0.1					0.0	0.1
58-100	0.0	0.1					0.0	0.1
Totals	162.8	52.1	114.1	39.2	1.3	0.0	278.3	91.3

Gross and Net Volumes (MBF) Per Acre

DBH Group	Doug-fir		Redwood		Other Cnf		Totals	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net
0- 28	4.2	3.9	2.8	2.8			7.1	6.8
30- 30	0.7	0.7	0.5	0.5			1.2	1.2
32- 32	0.9	0.8	0.4	0.4			1.3	1.2
34- 34	0.5	0.5	0.0	0.0			0.6	0.6
36- 36	0.7	0.6	0.1	0.1			0.8	0.7
38- 38	0.5	0.5	0.3	0.3			0.8	0.7
40- 40	0.4	0.4	0.1	0.1			0.6	0.6
42- 42	0.2	0.2	0.1	0.1			0.3	0.3
44- 44	0.2	0.2	0.0	0.0			0.3	0.2
46- 46	0.0	0.0	0.1	0.1			0.1	0.1
48- 48	0.1	0.0	0.0	0.0			0.1	0.1
50- 50	0.1	0.0	0.1	0.1			0.1	0.1
52- 52	0.0	0.0					0.0	0.0
54- 54	0.1	0.1					0.1	0.1
56- 56	0.0	0.0					0.0	0.0
58-100	0.0	0.0					0.0	0.0
Totals	8.9	8.2	4.7	4.7	0.0	0.0	13.6	12.8

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Non-Riparian Areas

Page 4 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: TIMBER
Stand Type:
Acres: 608
Plots: 152

Stand Age (DBH): Yrs.
Date: 09-29-2004
Time: 12:26AM
File: TIMBER.R03

Young-Growth Hardwood

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Alder Trees	Alder BA	Tanoak Trees	Tanoak BA	Madrone Trees	Madrone BA	Chinkapin Trees	Chinkapin BA	Maple Trees	Maple BA	Laurel Trees	Laurel BA	Live Oak Trees	Live Oak BA	Black Oak Trees	Black Oak BA	Totals Trees	Totals BA
0- 1			602.0	0.0	1.3	0.0			5.9	0.0	22.4	0.0	6.6	0.0	2.6	0.0		640.8 0.0
2- 2			55.3	1.2	3.3	0.1					1.0	0.0	0.3	0.0			59.9 1.3	
4- 4			47.7	4.2	2.0	0.2							1.3	0.1			51.0 4.4	
6- 6			39.5	7.8	4.9	1.0					2.0	0.4	0.3	0.1			46.7 9.2	
8- 8			45.1	15.7	4.6	1.6			0.7	0.2	2.0	0.7	1.3	0.5	0.3	0.1	53.9 18.8	
10- 10			24.6	13.4	3.6	2.0					0.2	0.1	0.2	0.1			28.7 15.7	
12- 12			18.8	14.7	3.4	2.6					0.5	0.4	0.3	0.3			23.0 18.0	
14- 14			8.7	9.3	2.7	2.9	0.1	0.1			0.1	0.1			0.1	0.1	11.8 12.6	
16- 16			9.0	12.6	2.0	2.8					0.2	0.3			0.2	0.3	11.4 15.9	
18- 18			4.0	7.1	1.2	2.1			0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	5.6 9.9	
20- 20	0.1	0.1	1.7	3.8	1.0	2.1											2.8 6.1	
22- 22			0.8	2.1	0.5	1.3											1.3 3.4	
24- 24			0.3	1.1	0.3	0.9					0.0	0.1					0.7 2.1	
26- 26			0.2	0.7	0.4	1.4	0.0	0.1					0.0	0.1			0.6 2.4	
28- 28			0.0	0.1	0.1	0.3											0.1 0.4	
30-100			0.1	0.3	0.1	0.8					0.0	0.1			0.0	0.4	0.2 1.6	
Totals	0.1	0.1	857.8	94.1	31.3	22.0	0.2	0.3	6.7	0.4	28.5	2.4	10.6	1.4	3.4	1.0	938.5	121.8

Gross and Net Volumes (MBF) Per Acre

DBH Group	Alder Gross	Alder Net	Tanoak Gross	Tanoak Net	Madrone Gross	Madrone Net	Chinkapin Gross	Chinkapin Net	Maple Gross	Maple Net	Laurel Gross	Laurel Net	Live Oak Gross	Live Oak Net	Black Oak Gross	Black Oak Net	Totals Gross	Totals Net
0- 1																		
2- 2																		
4- 4																		
6- 6																		
8- 8																		
10- 10			0.6	0.6	0.1	0.1											0.7	0.7
12- 12			0.8	0.8	0.1	0.1					0.0	0.0	0.0	0.0			1.0	1.0
14- 14			0.7	0.7	0.2	0.2	0.0	0.0			0.0	0.0					0.9	0.9
16- 16			1.1	1.1	0.2	0.2									0.0	0.0	1.3	1.3
18- 18			0.7	0.6	0.1	0.1							0.0	0.0			0.8	0.8
20- 20	0.0	0.0	0.4	0.4	0.1	0.1											0.6	0.6
22- 22			0.2	0.2	0.1	0.1											0.3	0.3
24- 24			0.1	0.1	0.1	0.1					0.0	0.0					0.2	0.2
26- 26			0.1	0.1	0.1	0.1	0.0	0.0					0.0	0.0			0.3	0.3
28- 28			0.0	0.0	0.0	0.0											0.0	0.0
30-100			0.0	0.0	0.1	0.1					0.0	0.0			0.0	0.0	0.2	0.2
Totals	0.0	0.0	4.8	4.8	1.3	1.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	6.3	6.3

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Non-Riparian Areas

Page 5 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: TIMBER

Stand Type:

Acres: 608

Plots: 152

Stand Age (DBH): Yrs.

Date: 10-12-2004

Time: 8:16AM

File: TIMBER.R03

Young-Growth Hardwood

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Alder Trees BA	Tanoak Trees BA	Madrone Trees BA	Chinkapin Trees BA	Maple Trees BA	Laurel Trees BA	Live Oak Trees BA	Black Oak Trees BA	Totals Trees BA
0- 28	0.1 0.1	857.7 93.8	31.2 21.2	0.2 0.3	6.7 0.4	28.5 2.3	10.6 1.4	3.3 0.6	938.2 120.2
30- 30		0.1 0.3	0.0 0.1						0.1 0.4
32- 32									
34- 34			0.0 0.3					0.0 0.1	0.1 0.4
36- 36									
38- 38			0.0 0.1						0.0 0.1
40- 40			0.0 0.3			0.0 0.1			0.0 0.4
42- 42								0.0 0.1	0.0 0.1
44- 44									
46- 46									
48- 48									
50- 50									
52- 52									
54- 54									
56- 56									
58-100								0.0 0.1	0.0 0.1
Totals	0.1 0.1	857.8 94.1	31.3 22.0	0.2 0.3	6.7 0.4	28.5 2.4	10.6 1.4	3.4 1.0	938.5 121.8

Gross and Net Volumes (MBF) Per Acre

DBH Group	Alder Gross Net	Tanoak Gross Net	Madrone Gross Net	Chinkapin Gross Net	Maple Gross Net	Laurel Gross Net	Live Oak Gross Net	Black Oak Gross Net	Totals Gross Net
0- 28	0.0 0.0	4.7 4.7	1.2 1.2	0.0 0.0		0.0 0.0	0.0 0.0	0.0 0.0	6.1 6.1
30- 30		0.0 0.0	0.0 0.0						0.1 0.1
32- 32									
34- 34			0.0 0.0					0.0 0.0	0.0 0.0
36- 36									
38- 38			0.0 0.0						0.0 0.0
40- 40			0.0 0.0			0.0 0.0			0.0 0.0
42- 42								0.0 0.0	0.0 0.0
44- 44									
46- 46									
48- 48									
50- 50									
52- 52									
54- 54									
56- 56									
58-100								0.0 0.0	0.0 0.0
Totals	0.0 0.0	4.8 4.8	1.3 1.3	0.0 0.0	0.0 0.0	0.1 0.1	0.0 0.0	0.1 0.1	6.3 6.3

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Riparian Areas

Page 1 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Stand Attribute Report

Stand Number: WLPZ
Stand Type:
Acres: 120
Plots: 31

Stand Age (DBH): Yrs.
Date: 09-29-2004
Time: 12:26AM
File: WLPZ.r08

	Mean	Minimum	Maximum	
Overstory Crown	73%	0 - 5%	85 - 99%	Quadratic Mean DBH All Trees Over 5" = 12.3 inches
Understory Crown	39%	0 - 5%	75 - 85%	
Ground Slope	39%	0 - 15%	86 - 95%	

Volume Summary

Species	% Vol Gross	Vol/Acre (MBF)		---DBH---		Per Acre Count	
		Gross	Net	Max	Mean	Snags	GreenCull
Douglas-fir	38%	7.80	7.71	72	20	0.1	-
Redwood	47%	9.71	9.61	54	17	-	-
Other Conifer	<1%	0.08	0.08	26	26	-	-
Alder	1%	0.17	0.17	24	20	-	-
Tanoak	6%	1.32	1.32	26	11	-	-
Madrone	2%	0.46	0.46	28	14	-	-
Maple	1%	0.11	0.11	14	12	-	-
Laurel	4%	0.76	0.76	48	12	0.3	-
Live Oak	1%	0.15	0.15	26	11	-	-
Black Oak	<1%	0.02	0.02	12	12	-	-
Total	100%	20.58	20.40	--	15	0.4	-

Mean DBH, Crown Ratio, Basal Area and TPA by Crown Position

Species	Pre-Dominant Crown				Dominant Crown				Co-Dominant Crown				Intermediate Crown				Suppressed Crown			
	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA	DBH	Ratio	BA	TPA
Douglas-fir	57	40%	1.3	0.1	21	41%	31.0	10.9	16	32%	3.2	2.1	-	-	-	-	-	-	-	-
Redwood	50	50%	1.9	0.1	23	39%	31.6	9.7	16	33%	31.0	18.7	13	34%	6.5	6.2	13	20%	3.2	3.4
Other Conifer	-	-	-	-	26	30%	0.6	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Alder	-	-	-	-	20	-	1.3	0.6	-	-	-	-	-	-	-	-	-	-	-	-
Tanoak	-	-	-	-	19	-	1.3	0.6	11	-	16.1	24.7	12	-	4.5	5.8	-	-	-	-
Madrone	-	-	-	-	22	-	3.9	1.5	12	-	3.9	4.8	12	-	0.6	0.8	10	-	0.6	1.2
Maple	-	-	-	-	-	-	-	-	12	-	1.9	2.6	-	-	-	-	-	-	-	-
Laurel	-	-	-	-	13	-	5.8	4.9	11	-	2.6	4.0	11	-	2.6	3.8	-	-	-	-
Live Oak	-	-	-	-	26	-	0.6	0.2	11	-	1.3	2.0	10	-	0.6	1.2	-	-	-	-
Black Oak	-	-	-	-	12	-	0.6	0.8	-	-	-	-	-	-	-	-	12	-	0.6	0.8
Total	52	46%	3.2	0.2	20	40%	76.8	29.4	13	33%	60.0	58.8	12	34%	14.8	17.8	12	20%	4.5	5.4

Observed Tree Damage (Trees per Acre)

Damage Type	Conifer	Hardwood	Damage Type	Conifer	Hardwood
Insect.....	-	-	Multi-Stem..	-	-
Fire.....	-	-	Broken Top..	0.5	-
Animal.....	-	-	Nest.....	-	-
Disease.....	-	-	Form.....	-	-
Mechanical..	0.2	-	Other.....	0.8	-

Volumes: MBF using Scribner Rule, 16 foot logs, Behre Hyperbola.
All trees under 10" DBH are excluded from this report. (Except for the Quadratic Mean DBH)

Stand Tables: South District Inventory of Riparian Areas

Page 2 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: WLPZ
Stand Type:
Acres: 120
Plots: 31

Stand Age (DBH): Yrs.
Date: 09-29-2004
Time: 12:25AM
File: WLPZ.R03

Young-Growth Conifer

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Doug-fir Trees	BA	Redwood Trees	BA	Other Cnf Trees	BA	Totals Trees	BA
0- 1	93.5	0.0	12.9	0.0	22.6	0.0	129.0	0.0
2- 2	22.6	0.5	4.8	0.1			27.4	0.6
4- 4	9.7	0.8			11.3	1.0	21.0	1.8
6- 6	6.5	1.3	1.6	0.3			8.1	1.6
8- 8	4.8	1.7	3.2	1.1			8.1	2.8
10- 10	1.2	0.6	7.1	3.9			8.3	4.5
12- 12	2.5	1.9	4.9	3.9			7.4	5.8
14- 14	1.2	1.3	6.0	6.5			7.2	7.7
16- 16	0.5	0.6	3.7	5.2			4.2	5.8
18- 18	1.1	1.9	4.4	7.7			5.5	9.7
20- 20	1.8	3.9	2.7	5.8			4.4	9.7
22- 22	1.0	2.6	1.5	3.9			2.4	6.5
24- 24	0.8	2.6	2.7	8.4			3.5	11.0
26- 26	0.9	3.2	1.2	4.5	0.2	0.6	2.3	8.4
28- 28	0.5	1.9	1.1	4.5			1.5	6.5
30-100	2.1	15.5	2.9	20.0			5.0	35.5
Totals	150.5	40.4	60.7	75.7	34.0	1.6	245.2	117.8

Gross and Net Volumes (MBF) Per Acre

DBH Group	Doug-fir Gross	Net	Redwood Gross	Net	Other Cnf Gross	Net	Totals Gross	Net
0- 1								
2- 2								
4- 4								
6- 6								
8- 8								
10- 10	0.0	0.0	0.1	0.1			0.1	0.1
12- 12	0.1	0.1	0.2	0.2			0.4	0.3
14- 14	0.1	0.1	0.5	0.5			0.6	0.6
16- 16	0.0	0.0	0.4	0.4			0.4	0.4
18- 18	0.2	0.2	0.7	0.7			0.9	0.9
20- 20	0.6	0.6	0.7	0.7			1.3	1.3
22- 22	0.4	0.4	0.5	0.5			1.0	1.0
24- 24	0.4	0.4	1.0	1.0			1.4	1.4
26- 26	0.7	0.7	0.7	0.7	0.1	0.1	1.5	1.5
28- 28	0.5	0.5	0.8	0.8			1.3	1.3
30-100	4.6	4.5	4.1	4.1			8.7	8.6
Totals	7.8	7.7	9.7	9.6	0.1	0.1	17.6	17.4

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Riparian Areas

Page 3 of 5

Prepared for
Sternberg - Brooktrails Cruise
by
Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: WLPZ
Stand Type:
Acres: 120
Plots: 31

Stand Age (DBH): Yrs.
Date: 10-12-2004
Time: 8:15AM
File: WLPZ.R03

Young-Growth Conifer

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Doug-fir		Redwood		Other Cnf		Totals	
	Trees	BA	Trees	BA	Trees	BA	Trees	BA
0- 28	148.4	24.9	57.8	55.7	34.0	1.6	240.3	82.3
30- 30	0.4	1.9	0.5	2.6			0.9	4.5
32- 32	0.3	1.9	0.9	5.2			1.3	7.1
34- 34	0.1	0.6	0.3	1.9			0.4	2.6
36- 36	0.4	2.6	0.5	3.9			0.9	6.5
38- 38	0.3	2.6	0.2	1.9			0.6	4.5
40- 40	0.3	2.6	0.1	0.6			0.4	3.2
42- 42								
44- 44	0.1	0.6	0.1	0.6			0.1	1.3
46- 46								
48- 48			0.1	0.6			0.1	0.6
50- 50	0.1	1.9	0.0	0.6			0.2	2.6
52- 52			0.0	0.6			0.0	0.6
54- 54			0.1	1.3			0.1	1.3
56- 56								
58-100	0.0	0.6					0.0	0.6
Totals	150.5	40.4	60.7	75.7	34.0	1.6	245.2	117.8

Gross and Net Volumes (MBF) Per Acre

DBH Group	Doug-fir		Redwood		Other Cnf		Totals	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net
0- 28	3.2	3.2	5.6	5.5	0.1	0.1	8.9	8.8
30- 30	0.5	0.5	0.4	0.4			0.9	0.9
32- 32	0.5	0.5	0.8	0.8			1.3	1.3
34- 34	0.2	0.2	0.4	0.4			0.5	0.5
36- 36	0.7	0.7	0.8	0.8			1.5	1.5
38- 38	0.7	0.7	0.4	0.4			1.1	1.1
40- 40	0.9	0.9	0.1	0.1			1.1	1.1
42- 42								
44- 44	0.2	0.2	0.1	0.1			0.4	0.3
46- 46								
48- 48			0.2	0.2			0.2	0.2
50- 50	0.7	0.7	0.2	0.2			0.9	0.9
52- 52			0.2	0.2			0.2	0.2
54- 54			0.4	0.4			0.4	0.4
56- 56								
58-100	0.2	0.2					0.2	0.2
Totals	7.8	7.7	9.7	9.6	0.1	0.1	17.6	17.4

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Riparian Areas

Page 4 of 5

Prepared for
Sternberg - Brooktrails Cruise
 by
 Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: WLPZ
 Stand Type:
 Acres: 120
 Plots: 31

Stand Age (DBH): Yrs.
 Date: 09-29-2004
 Time: 12:25AM
 File: WLPZ.R03

Young-Growth Hardwood

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Alder Trees	Alder BA	Tanoak Trees	Tanoak BA	Madrone Trees	Madrone BA	Maple Trees	Maple BA	Laurel Trees	Laurel BA	Live Oak Trees	Live Oak BA	Black Oak Trees	Black Oak BA	Totals Trees	Totals BA
0- 1			422.6	0.0			35.5	0.0	77.4	0.0	29.0	0.0	9.7	0.0	574.2	0.0
2- 2			37.1	0.8					12.9	0.3	3.2	0.1			53.2	1.2
4- 4			30.6	2.7	1.6	0.1	4.8	0.4	22.6	2.0					59.7	5.2
6- 6			12.9	2.5	3.2	0.6	6.5	1.3	24.2	4.8					46.8	9.2
8- 8			30.6	10.7	11.3	3.9	6.5	2.3	12.9	4.5					61.3	21.4
10- 10			21.3	11.6	3.5	1.9	1.2	0.6	7.1	3.9	2.4	1.3			35.5	19.4
12- 12			7.4	5.8	2.5	1.9	0.8	0.6	4.1	3.2	0.8	0.6	1.6	1.3	17.3	13.5
14- 14			0.6	0.6			0.6	0.6	0.6	0.6					1.8	1.9
16- 16			1.8	2.6	0.9	1.3									2.8	3.9
18- 18	0.4	0.6	0.4	0.6	0.4	0.6			0.6	1.3					1.1	1.9
20- 20					0.3	0.6									0.9	1.9
22- 22			0.2	0.6	0.7	1.9									1.0	2.6
24- 24	0.2	0.6			0.2	0.6									0.4	1.3
26- 26			0.2	0.6							0.2	0.6			0.3	1.3
28- 28					0.2	0.6			0.2	0.6					0.3	1.3
30-100									0.2	1.3					0.2	1.3
Totals	0.6	1.3	565.8	39.3	24.8	14.4	55.8	5.9	162.7	22.5	35.6	2.7	11.3	1.3	856.7	87.3

Gross and Net Volumes (MBF) Per Acre

DBH Group	Alder Gross	Alder Net	Tanoak Gross	Tanoak Net	Madrone Gross	Madrone Net	Maple Gross	Maple Net	Laurel Gross	Laurel Net	Live Oak Gross	Live Oak Net	Black Oak Gross	Black Oak Net	Totals Gross	Totals Net
0- 1																
2- 2																
4- 4																
6- 6																
8- 8																
10- 10			0.6	0.6	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0			0.9	0.9
12- 12			0.3	0.3	0.1	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.8	0.8
14- 14			0.0	0.0			0.1	0.1							0.1	0.1
16- 16			0.2	0.2	0.1	0.1									0.2	0.2
18- 18	0.1	0.1	0.1	0.1	0.0	0.0									0.1	0.1
20- 20					0.0	0.0			0.1	0.1					0.2	0.2
22- 22			0.1	0.1	0.1	0.1									0.2	0.2
24- 24	0.1	0.1			0.1	0.1									0.2	0.2
26- 26			0.1	0.1							0.1	0.1			0.2	0.2
28- 28					0.1	0.1			0.0	0.0					0.1	0.1
30-100									0.2	0.2					0.2	0.2
Totals	0.2	0.2	1.3	1.3	0.5	0.5	0.1	0.1	0.8	0.8	0.1	0.1	0.0	0.0	3.0	3.0

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Stand Tables: South District Inventory of Riparian Areas

Page 5 of 5

Prepared for
Sternberg - Brooktrails Cruise
 by
 Natural Resources Management Corp.

Basal Area and Volume per Acre

Stand Number: WLPZ
 Stand Type:
 Acres: 120
 Plots: 31

Stand Age (DBH): Yrs.
 Date: 10-12-2004
 Time: 8:15AM
 File: WLPZ.R03

Young-Growth Hardwood

Trees Per Acre and Basal Area (Sq. Ft. Per Acre)

DBH Group	Alder Trees	Alder BA	Tanoak Trees	Tanoak BA	Madrone Trees	Madrone BA	Maple Trees	Maple BA	Laurel Trees	Laurel BA	Live Oak Trees	Live Oak BA	Black Oak Trees	Black Oak BA	Totals Trees	Totals BA
0- 28	0.6	1.3	565.8	39.3	24.8	14.4	55.8	5.9	162.6	21.2	35.6	2.7	11.3	1.3	856.5	86.0
30- 30																
32- 32																
34- 34									0.1	0.6					0.1	0.6
36- 36																
38- 38																
40- 40																
42- 42																
44- 44																
46- 46																
48- 48									0.1	0.6					0.1	0.6
50- 50																
52- 52																
54- 54																
56- 56																
58-100																
Totals	0.6	1.3	565.8	39.3	24.8	14.4	55.8	5.9	162.7	22.5	35.6	2.7	11.3	1.3	856.7	87.3

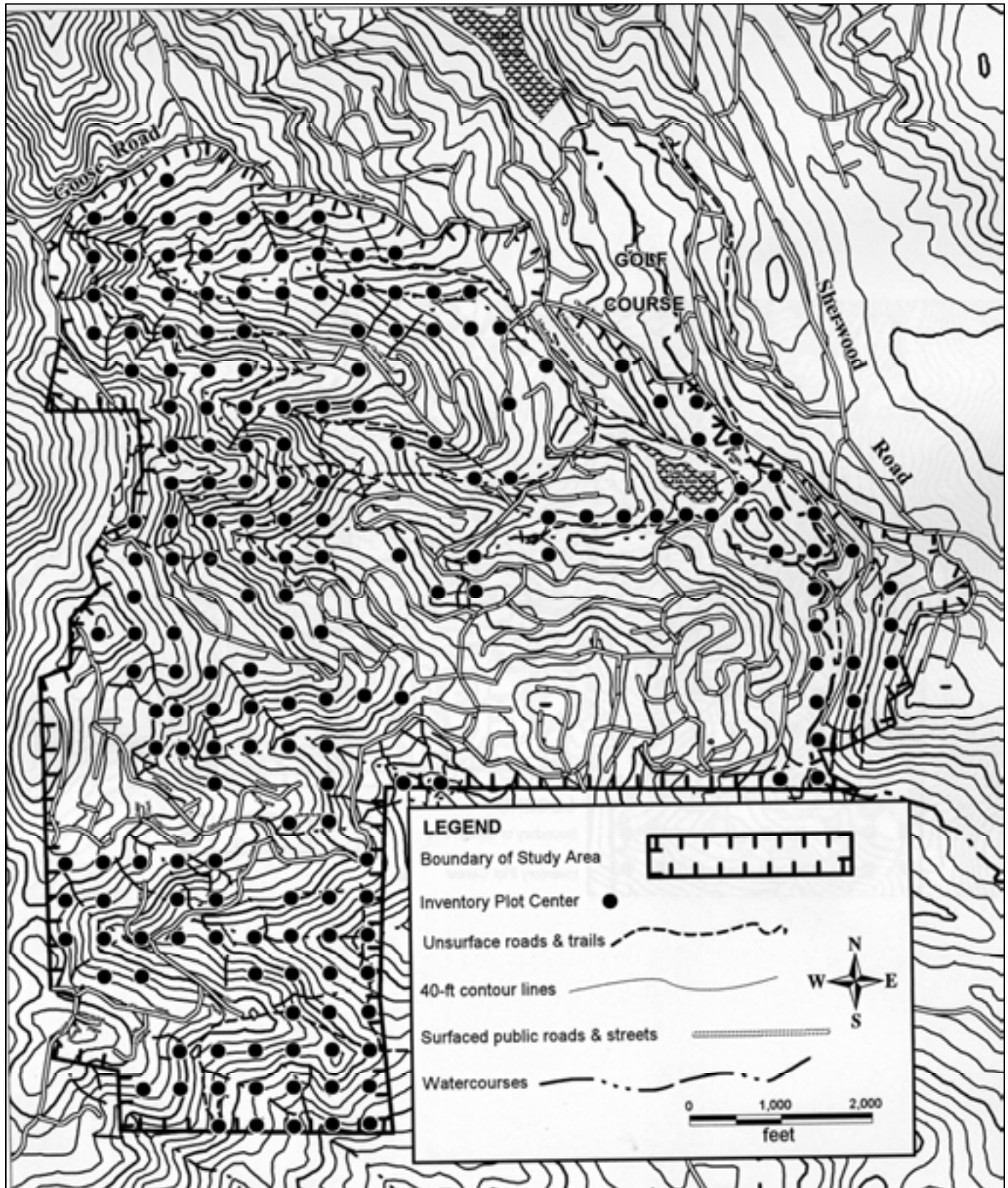
Gross and Net Volumes (MBF) Per Acre

DBH Group	Alder Gross	Alder Net	Tanoak Gross	Tanoak Net	Madrone Gross	Madrone Net	Maple Gross	Maple Net	Laurel Gross	Laurel Net	Live Oak Gross	Live Oak Net	Black Oak Gross	Black Oak Net	Totals Gross	Totals Net
0- 28	0.2	0.2	1.3	1.3	0.5	0.5	0.1	0.1	0.6	0.6	0.1	0.1	0.0	0.0	2.8	2.8
30- 30																
32- 32																
34- 34									0.1	0.1					0.1	0.1
36- 36																
38- 38																
40- 40																
42- 42																
44- 44																
46- 46																
48- 48									0.1	0.1					0.1	0.1
50- 50																
52- 52																
54- 54																
56- 56																
58-100																
Totals	0.2	0.2	1.3	1.3	0.5	0.5	0.1	0.1	0.8	0.8	0.1	0.1	0.0	0.0	3.0	3.0

Volumes: Scribner Log Rule; 16 Foot Logs; Behre Hyperbola

Map of Inventory Plots

Scale: 1" = 1500'



Brooktrails Community Services District
Greenbelt Areas to be Included in Management Plan, Phase 1
(Total forest area ≈ 800 acres across 990 acres)

Management Area	Section	Township	Range	County	AP #
1	35	19N	14W	MEN	097/330/02
1	35	19N	14W	MEN	097/321/09
1	35	19N	14W	MEN	097/330/01
1	35	19N	14W	MEN	097/340/01
1	35	19N	14W	MEN	097/350/01
1	35	19N	14W	MEN	097/296/05
1	35	19N	14W	MEN	097/304/18
1	35	19N	14W	MEN	097/305/10
1	35	19N	14W	MEN	097/306/10
1	35	19N	14W	MEN	097/305/09
2	10 & 11	18N	14W	MEN	100/282/04
2	10 & 11	18N	14W	MEN	100/294/14
2	10 & 11	18N	14W	MEN	100/291/16
2	10 & 11	18N	14W	MEN	100/302/07
2	10 & 11	18N	14W	MEN	100/302/06
2	10 & 11	18N	14W	MEN	100/332/05
2	10 & 15	18N	14W	MEN	100/342/08
2	10 & 15	18N	14W	MEN	100/352/18
2	10 & 15	18N	14W	MEN	096/342/08
2	10 & 15	18N	14W	MEN	096/350/01
2	10 & 15	18N	14W	MEN	096/360/01
2	10 & 15	18N	14W	MEN	096/360/01
2	10 & 15	18N	14W	MEN	096/370/01
2	10 & 15	18N	14W	MEN	096/370/02
2	10 & 15	18N	14W	MEN	096/330/01
3	10 & 11	18N	14W	MEN	100/090/02
3	10 & 11	18N	14W	MEN	099/170/04
3	10 & 11	18N	14W	MEN	099/180/03
3	10 & 11	18N	14W	MEN	100/090/13
3	10 & 11	18N	14W	MEN	100/145/12
3	10 & 11	18N	14W	MEN	100/145/13
3	10 & 11	18N	14W	MEN	100/240/19
3	10 & 11	18N	14W	MEN	100/240/18
3	10 & 11	18N	14W	MEN	100/260/09
3	10 & 11	18N	14W	MEN	100/274/13
3	10 & 11	18N	14W	MEN	100/131/10
3	10 & 11	18N	14W	MEN	100/240/20
3	10 & 11	18N	14W	MEN	100/251/03
3	10 & 11	18N	14W	MEN	100/260/10
3	10 & 11	18N	14W	MEN	100/251/02
3	10 & 11	18N	14W	MEN	100/251/04
3	10 & 11	18N	14W	MEN	100/102/05
3	10 & 11	18N	14W	MEN	100/132/07

Brooktrails Community Services District
Greenbelt Areas to be Included in Management Plan, Phase 1
(Total forest area ≈ 800 acres across 990 acres)

Management Area	Section	Township	Range	County	AP #
3	10 & 11	18N	14W	MEN	100/132/08
3	10 & 11	18N	14W	MEN	100/090/14
3	10 & 11	18N	14W	MEN	100/102/01
3	10 & 11	18N	14W	MEN	100/131/09
3	10 & 11	18N	14W	MEN	099/180/04
3	10 & 11	18N	14W	MEN	100/260/11
3	10 & 11	18N	14W	MEN	095/350/02
3	10 & 11	18N	14W	MEN	100/143/13
3	10 & 11	18N	14W	MEN	100/143/14
3	10 & 11	18N	14W	MEN	100/082/19
3	10 & 11	18N	14W	MEN	100/090/01
3	10 & 11	18N	14W	MEN	100/081/15
4	3 & 10	18N	14W	MEN	100/022/13
4	3 & 10	18N	14W	MEN	100/071/03
4	3 & 10	18N	14W	MEN	099/142/06
4	3 & 10	18N	14W	MEN	100/023/01
4	3 & 10	18N	14W	MEN	099/142/18
4	3 & 10	18N	14W	MEN	100/023/02
4	3 & 10	18N	14W	MEN	100/021/07
4	3 & 10	18N	14W	MEN	099/143/17
4	3 & 10	18N	14W	MEN	099/142/02
4	3 & 10	18N	14W	MEN	099/143/03
4	3 & 10	18N	14W	MEN	099/092/10
4	3 & 10	18N	14W	MEN	099/092/11
4	3 & 10	18N	14W	MEN	099/041/12
4	3 & 10	18N	14W	MEN	099/091/07
4	3 & 10	18N	14W	MEN	099/030/08
4	3 & 10	18N	14W	MEN	099/041/11
4	3 & 10	18N	14W	MEN	099/091/08
4	3 & 10	18N	14W	MEN	099/101/05
4	3 & 10	18N	14W	MEN	099/091/14
4	3 & 10	18N	14W	MEN	099/101/06
4	3 & 10	18N	14W	MEN	099/141/01
4	3 & 10	18N	14W	MEN	098/342/06
4	3 & 10	18N	14W	MEN	099/030/07
4	3 & 10	18N	14W	MEN	099/101/04
4	3 & 10	18N	14W	MEN	099/101/03
4	3 & 10	18N	14W	MEN	099/111/01
4	3 & 10	18N	14W	MEN	099/120/10
4	3 & 10	18N	14W	MEN	099/131/02
4	3 & 10	18N	14W	MEN	098/342/16
4	3 & 10	18N	14W	MEN	096/182/14
4	3 & 10	18N	14W	MEN	096/190/18
4	3 & 10	18N	14W	MEN	096/200/01

Brooktrails Community Services District
Greenbelt Areas to be Included in Management Plan, Phase 1
(Total forest area ≈ 800 acres across 990 acres)

Management Area	Section	Township	Range	County	AP #
4	3 & 10	18N	14W	MEN	096/230/02
4	3 & 10	18N	14W	MEN	096/182/15
4	3 & 10	18N	14W	MEN	096/190/17
4	3 & 10	18N	14W	MEN	096/175/01
4	3 & 10	18N	14W	MEN	096/175/05
4	3 & 10	18N	14W	MEN	096/212/13
4	3 & 10	18N	14W	MEN	096/182/13
4	3 & 10	18N	14W	MEN	096/222/13
4	3 & 10	18N	14W	MEN	096/222/14
4	3 & 10	18N	14W	MEN	096/240/08
4	3 & 10	18N	14W	MEN	096/240/18
4	3 & 10	18N	14W	MEN	100/050/01
4	3 & 10	18N	14W	MEN	100/182/01
4	3 & 10	18N	14W	MEN	100/182/02
4	3 & 10	18N	14W	MEN	100/182/03
4	3 & 10	18N	14W	MEN	100/174/18
4	3 & 10	18N	14W	MEN	100/050/02
4	3 & 10	18N	14W	MEN	100/061/12
4	3 & 10	18N	14W	MEN	100/173/03
4	3 & 10	18N	14W	MEN	100/162/03
4	3 & 10	18N	14W	MEN	099/120/09
4	3 & 10	18N	14W	MEN	099/131/01
4	3 & 10	18N	14W	MEN	100/032/14
4	3 & 10	18N	14W	MEN	100/031/15
4	3 & 10	18N	14W	MEN	100/041/10
4	3 & 10	18N	14W	MEN	100/032/13
4	3 & 10	18N	14W	MEN	099/134/01
4	3 & 10	18N	14W	MEN	100/022/16
6	35	19N	14W	MEN	098/023/16
6	35	19N	14W	MEN	098/123/05
6	35	19N	14W	MEN	098/135/09
6	35	19N	14W	MEN	098/125/17
6	35	19N	14W	MEN	098/125/18
6	35	19N	14W	MEN	098/125/13
6	2	18N	14W	MEN	098/154/02
6	2	18N	14W	MEN	098/246/13
6	2	18N	14W	MEN	098/251/16
6	2	18N	14W	MEN	098/261/07
6	2	18N	14W	MEN	098/146/15
6	2	18N	14W	MEN	098/146/16
6	2	18N	14W	MEN	098/254/06
6	2	18N	14W	MEN	098/146/17
6	2	18N	14W	MEN	098/254/05
6	2	18N	14W	MEN	098/254/01

Brooktrails Community Services District
Greenbelt Areas to be Included in Management Plan, Phase 1
(Total forest area ≈ 800 acres across 990 acres)

Management Area	Section	Township	Range	County	AP #
6	2	18N	14W	MEN	098/255/12
6	2	18N	14W	MEN	098/147/09
6	2	18N	14W	MEN	098/272/01
6	2	18N	14W	MEN	098/272/02
6	2	18N	14W	MEN	098/282/02
6	2	18N	14W	MEN	098/243/12
6	2	18N	14W	MEN	098/312/12
6	3	18N	14W	MEN	098/214/10
6	2	18N	14W	MEN	098/223/02
6	3	18N	14W	MEN	098/214/09
6	2	18N	14W	MEN	098/174/02
6	3	18N	14W	MEN	098/183/05
6	2	18N	14W	MEN	098/223/01
6	3	18N	14W	MEN	098/214/01
6	3	18N	14W	MEN	098/182/11
6	3	18N	14W	MEN	098/182/04
6	3	18N	14W	MEN	098/190/09
6	34 & 35	19N	14W	MEN	098/174/01
6	34 & 35	19N	14W	MEN	098/101/16
6	34 & 35	19N	14W	MEN	098/050/09
6	34 & 35	19N	14W	MEN	098/101/06
6	34 & 35	19N	14W	MEN	098/050/08
6	2	18N	14W	MEN	097/160/13
6	2	18N	14W	MEN	097/172/01
6	2	18N	14W	MEN	097/191/09
6	34	19N	14W	MEN	097/132/01
6	34	19N	14W	MEN	097/124/15
6	34	19N	14W	MEN	097/053/15
6	34	19N	14W	MEN	097/092/01
6	34	19N	14W	MEN	097/102/08
6	34	19N	14W	MEN	097/082/15
6	34	19N	14W	MEN	097/111/13
6	34	19N	14W	MEN	097/020/01
6	34	19N	14W	MEN	097/101/07
6	34	19N	14W	MEN	097/043/18
6	34	19N	14W	MEN	097/033/14
6	34	19N	14W	MEN	097/042/08

Greenbelt Forest Management
Glossary

BA	Basal area is the area in square feet of all stems in an acre.
board foot	Measure of wood volume 1"x12"x12". Example: an 18" diameter tree with 4 merchantable 16-foot logs contains 240 board feet.
class I	a.) watercourse with fish present. b.) a domestic water supply.
class II	Watercourse providing aquatic habitat for non-fish species (e.g. frogs, etc.).
class III	Watercourse with no aquatic life present, but capable of sediment transport.
conifer	Softwood, cone-bearing tree species suitable for commercial timber production (e.g. redwood, Douglas-fir).
cord	Measure of fuel-wood volume; a stacked cord occupies 128 cubic feet (4'x4'x8'), and contains about 85 cubic feet of solid wood. One cord approximates 500 board feet.
DBH	"Diameter at breast height" - tree diameter in inches, measured outside bark 4 1/2' above ground level
group selection	Method of regeneration in an uneven-aged silvicultural system, which creates gaps within which all the trees are cut. Aimed at providing enough light for regeneration, particularly for species like Douglas-fir that establish better with some light on the forest floor.
hardwood	Non-conifer trees (e.g. tanoak, madrone, maple, live oak, black and white oak).
lop	To cut branches and trunks of cut trees so resulting slash will lie close to the ground.
MBF	Thousand board feet.
merchantable	Sound conifer trees at least 10" in diameter.
net volume	Tree volume remaining after deducting unmerchantable and cull material.
NTMP	Non-industrial Timber Management Plan.
old-growth	Trees older than 150 years (definition varies considerably)
Pre-commercial thinning	Cutting in a pre-merchantable conifer stand (2"-8" DBH) to reduce unwanted trees and improve growth on remaining trees
poles	Trees 4"-8" dbh..

rehabilitation cut	Former conifer forest that is predominated by hardwoods, diseased trees, or blowdowns, and lacking adequate conifer stocking. Most of the trees and brush are cut and the site is replanted with conifer.
release	Freeing a tree (usually a conifer) from competition by cutting growth (usually a hardwood) surrounding or overtopping it.
regeneration	Renewal of a tree crop, either by planting or natural seeding.
riparian	Stream bank and flood plain area along a watercourse.
RPF	Registered Professional Forester.
saplings	trees 1"-4" dbh.
second growth	trees established as seedlings after original old-growth logging; also called young-growth.
seedlings	trees less than 1" dbh.
site class	productive capacity of an area to grow trees expressed as a numeral from I (good site) to V (poor site).
site index	an additional measure of productivity based on the height of dominant trees at a given age; a tree that is 150 feet tall at age 100 has a site index of 150.
snag	dead standing tree.
stand table	graph which shows the number of trees of each diameter class per acre.
stocking	number, or density, of trees in a given area.
stumpage	net value of standing timber to owner, exclusive of logging or trucking costs.
sustained-yield	yield that a forest can continually produce at a given intensity of management.
TPA	trees per acre
Watersheds with Threatened & impaired values	that are listed as threatened, endangered, or candidate under the State or Federal Endangered Species Acts with their implementing regulations, are currently present or can be restored.
WLPZ	Watercourse & Lake Protection Zone.

**Summary and minutes from meetings with the Brooktrails
Community District Board of Directors, Greenbelt and
Recreation Committee and residents**