Forest Management Plan

for the

Almquist Family Revocable Trust Property
Kneeland, California

CFIP Project Number: 08-NCR-HUM-01
State Contract Number: 8CA08316

EQIP Contract Number: 749104094Q9
Farm/Tract Number: 1672/ 71068

Prepared: December 15, 2009

Author:
Jared M. Gerstein, RPF #2826
Baldwin, Blomstrom, Wilkinson and Associates, Inc.
P.O. Box 702
Arcata, CA 95518

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): _____

Signature: _____

Organization/Company: _____

Address: _____

_____

Phone: _____ **RPF:** _____

Contents

1. LANDOWNER'S NAME, ADDRESS, COUNTY AND PHONE NUMBER. 1
2. LEGAL DESCRIPTION OF SITE. 1
3. LAND USE HISTORY 5
4. MANAGEMENT OBJECTIVES. 5
5. TRANSPORTATION SYSTEM. 7

Existing Road Network 7
Proposed Road Network 11

6. DESCRIPTION OF SOILS AND SITE POTENTIAL. 11

Site Productivity 12

7. GROWING STOCK 12
8. GROWTH/POTENTIAL YIELDS 19
9. REGENERATION NEEDS 19
10. SOCIO-CULTURAL CONSIDERATIONS: MARKETS, LIMITATIONS. 20
11. CURRENT SILVICULTURAL SYSTEM(S)—ROTATION, CUTTING, CYCLE, ETC. 21
12. LAND CONSERVATION PRACTICE NEEDS. 23

General Guidelines for Land Conservation Practices 23
Land Conservation Practice Projects on the Almquist Property 23

13. FISH AND WILDLIFE IMPROVEMENT NEEDS. 24

General Guidelines for Fish and Wildlife Habitat Improvement 24
Fish and Wildlife Conditions on the Almquist Property 26
Known Occurrences of Sensitive Species 26
Known and Potential Habitat Occurrences for Sensitive Species 27

14. FIRE PROTECTION NEEDS. 31

General Guidelines for Fire Protection 31
Fire Protection Needs on Almquist Property 32
Shaded Fuel Breaks 32
Water Supply 32
Information to Local Emergency Personnel 32

15. INSECT AND DISEASE PROBLEMS. 34

Sudden Oak Death 35

16. PROPOSED ALTERNATIVES; COST/BENEFIT ANALYSIS OF INVESTMENTS. 36
17. MANAGEMENT RECOMMENDATIONS. 36

Access 36

Erosion Control 36
Forest Improvement 36
Fire and Fuels Management 36
Recreation 37
Management 37
18. PROPERTY SECURITY/IMPROVEMENTS 37
19. COMMUNITY/AGENCY COOPERATION MECHANISMS 37
20. RECREATION POTENTIAL 37
21. AESTHETIC CONSIDERATIONS 38
22. ARCHAEOLOGICAL, HISTORICAL, CULTURAL CONSIDERATIONS 38
23. CLIMATE CHANGE AND CARBON SEQUESTRATION 38
REFERENCES 40

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

Almquist Family Revocable Trust
Eric R. Almquist and Mary H. Almquist
467 Essex Lane
McKinleyville, CA 95519

Humboldt County

Telephone number for Almquist Lumber Co. (707) 825-8880

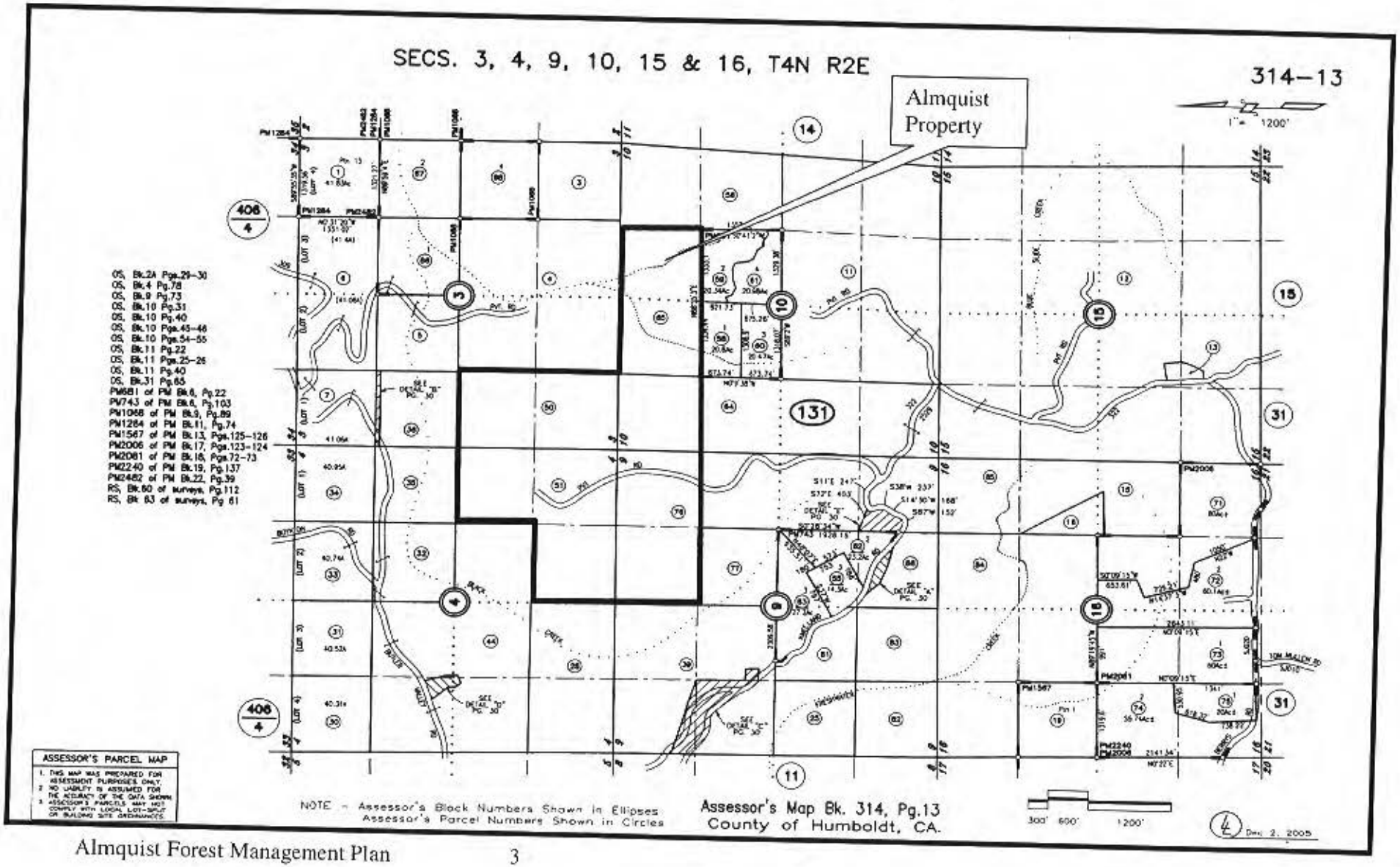
2. Legal Description of site.

The property is composed of 4 Patent Parcels (described below), all in Humboldt County (Maps 1 and 2).

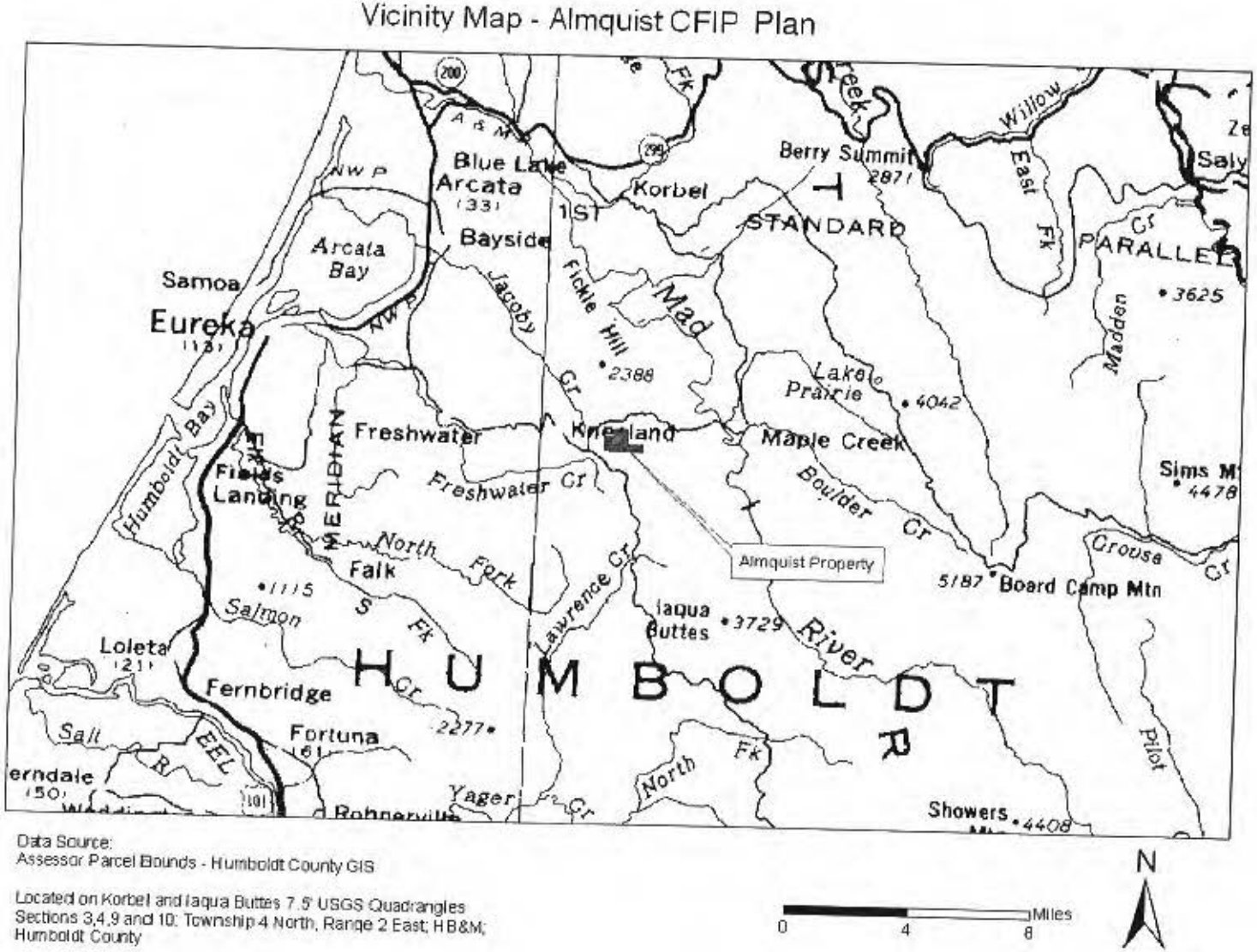
Patent Parcel 1- The west half of the southwest quarter of Section 3, and the northeast quarter of the southeast quarter of Section 4, all being in Township 4 North, Range 2 East Humboldt Base and Meridian
Patent Parcel 2- The south half of the southeast quarter of Section 4, and the north half of the northeast quarter of Section 9, and the northeast quarter of the southeast quarter of Section 4, all being in Township 4 North, Range 2 East Humboldt Base and Meridian.
Patent Parcel 8- The northwest quarter of the northwest quarter of Section 10, all being in Township 4 North, Range 2 East Humboldt Base and Meridian.
Patent Parcel 9- The northeast quarter of the northwest quarter, and the northwest quarter of the northeast quarter of Section 10, all being in Township 4 North, Range 2 East Humboldt Base and Meridian.

CalWater 2.2: 1109.300502 **CDF PWS:** Blue Slide Creek

Map 1. Humboldt County Assessors Parcel Map showing location of Almquist Property.



Map 2. General location of Almquist Property in northwest Humboldt County.



3. Land Use History

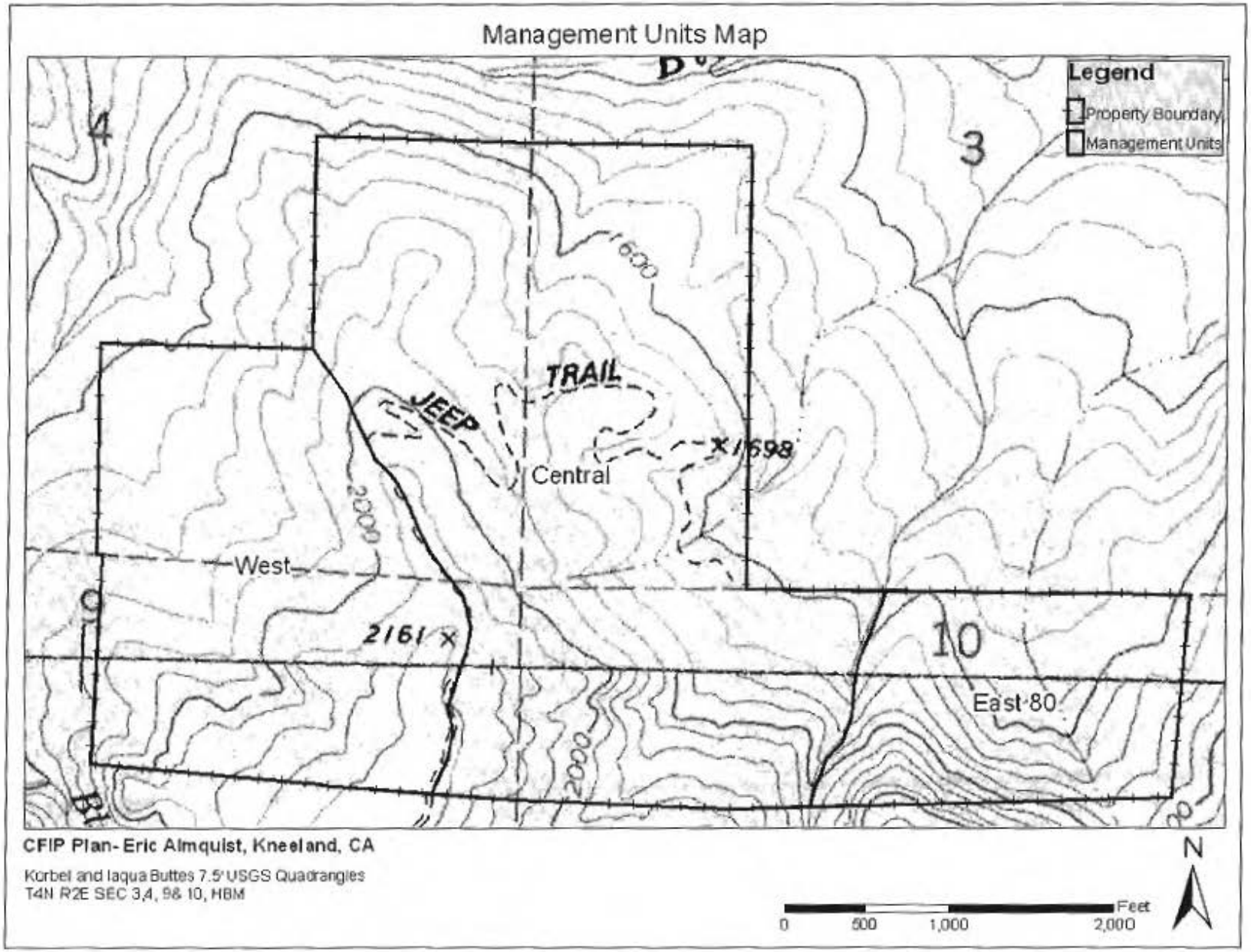
This property was originally part of the Moore Ranch and was initially harvested in the 1950's when the majority of the old growth Douglas-fir was removed. The forests naturally regenerated to even-aged forests composed of approximately half conifer and half hardwoods. Douglas-fir is the dominant conifer and tanoak is the dominant hardwood. PALCO filed three timber harvest plans on this property from 1999 through 2004 in order to harvest the second growth timber, using even-aged management regimes followed by reforestation with planted stock. Approximately 30 acres of the 400 acre property were clearcut by PALCO prior to the sale of the land, the remainder of the property is largely un-managed second growth timber.

4. Management Objectives.

In order to plan for the long-term forest management of the property, there are three management units proposed: West, Central, and East 80 (Map 3). The East 80 unit is separated from the rest of the property by a large, steep creek with no existing crossing. The landowner is interested in determining how access might be established to this unit. The Management Objectives for the property are as follows:

- Obtain CFIP, EQIP or other outside funding for forest improvement projects.
- Develop an NTMP to allow periodic commercial timber harvests in perpetuity.
- For portions of the property where hardwoods comprise 40% or more of the stand stocking, the landowner would like to improve the conifer stocking while maintaining a component of larger older hardwoods for wildlife, aesthetic and future commercial value.
- For portions of the property that are currently well stocked with conifer timber, the landowner objective is to conduct periodic selective timber harvests in order to generate revenue and increase long term growth, yield and value of the residual stand.
- Improve forest and watershed health through management activities that comply with Forest Stewardship Council certification standards.
- The landowner is interested in assessing and potentially selling carbon stocks from the property.
- The landowner has expressed interest in developing a network of mountain bike trails on the property for recreational use. Once established, these trails could be used to monitor the property or potentially host formal or informal mountain bike rides or races.

Map 3. Proposed management units for the Almquist Property.



5. Transportation System.

Existing Road Network

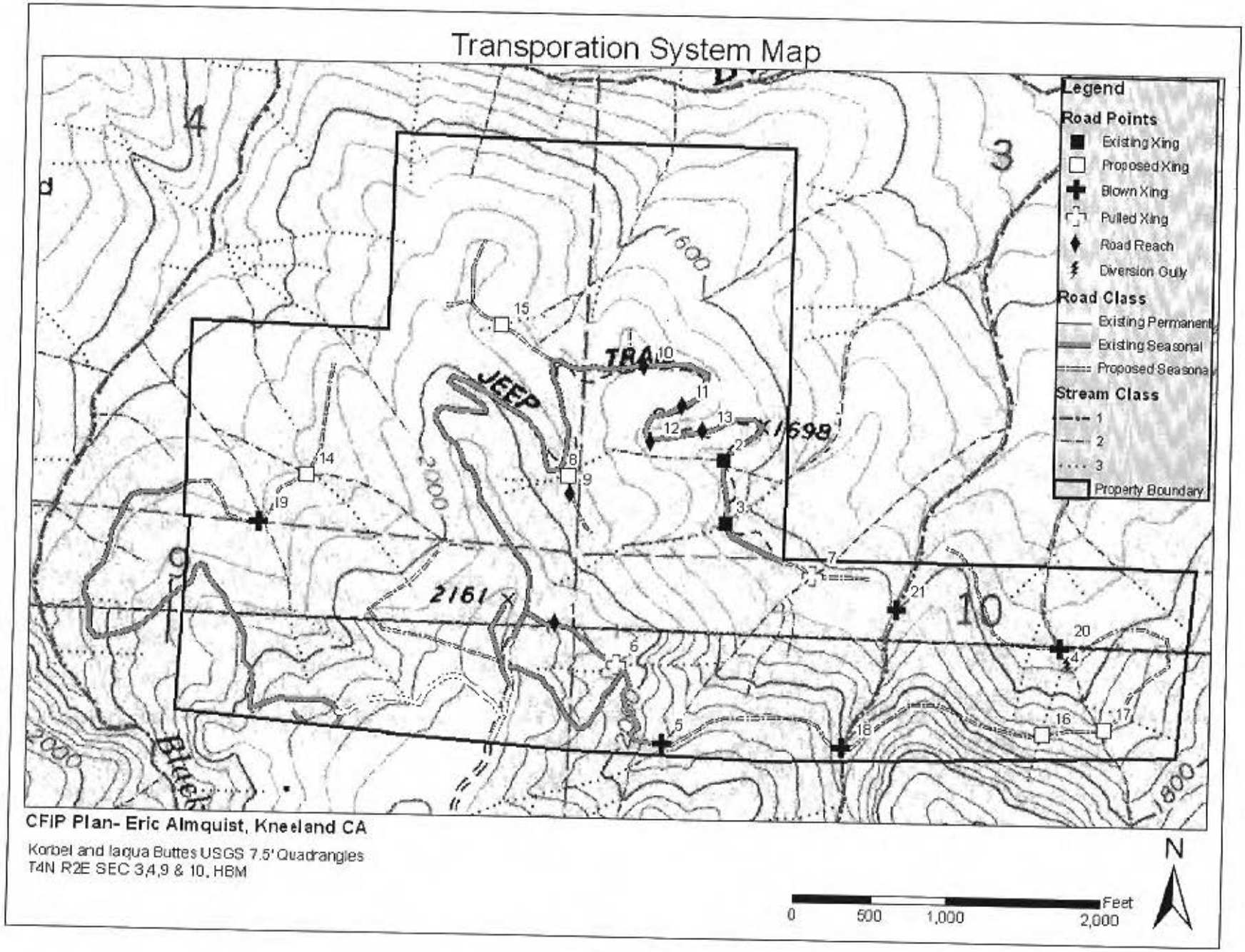
There are approximately 2.5 miles of existing seasonal truck roads and 0.4 miles of existing rocked (permanent) truck roads on the property (Map 4). These existing roads were used and upgraded in 2004 during operations on THP-1-04-225 HUM by PALCO. There are only two stream crossings on the existing road network and they were upgraded in 2004 (Site ID# 2, 3). The two existing crossings appear to be adequately designed and constructed to meet current Forest Practice Rule requirements and do not need further upgrading. Similarly the road reach surfaces along the existing road network have been upgraded to include rolling dips, outsloped surfaces and rocked drainages at existing seeps and do not need further upgrading to meet current standards for seasonal roads.

In addition to upgrading the existing road network, PALCO removed the fill from two failing crossings at sites 6 and 7 (Table 1). This proactive treatment of potential sediment sources is a benefit to the current landowner, as no further treatment is required at these sites. Approximately 205 cubic yards of sediment was removed from these two crossings, according to PALCO's estimates.

Site ID #	Site Type	Identified by	Original Site ID# in THP	Site Description
1	Road Reach	BBW 2009		Skid trail needs waterbars re-installed
2	Existing Crossing	THP-1-04-225 HUM	11197	24"x40' ABS culvert, upgraded in 2004, has Critical Dip
3	Existing Crossing	THP-1-04-225 HUM	11552	24"x50' ABS culvert, upgraded in 2004, has Critical Dip
4	Diversion Gully	BBW 2009		Existing diversion, no access to site
5	Blown Crossing	BBW 2009		Incised fill, remove fill or install 36"+ CMP
6	Pulled Crossing	THP-1-04-225 HUM	C	Small Humboldt xing pulled in '04, sed save 24 yards
7	Pulled Crossing	THP-1-04-225 HUM	4	Class II Xing pulled in '04, sed save 181 yards
8	Proposed Crossing	THP-1-04-225 HUM	45	Install 36"+ CMP for proposed road
9	Road Reach	THP-1-04-225 HUM	155	Rocked rolling dip installed '04
10	Road Reach	THP-1-04-225 HUM	8492	Rocked dip, outsloped road in '04
11	Road Reach	THP-1-04-225 HUM	9747	Drained seep in 2004
12	Road Reach	THP-1-04-225 HUM	10007	Rolling dip installed 2004
13	Road Reach	THP-1-04-225 HUM	10092	Drained seep in 2004
14	Proposed Crossing	BBW 2009		Install 36"+ CMP for proposed road
15	Proposed Crossing	BBW 2009		Unchannelized wet area, Install rocked ford for proposed road
16	Proposed Crossing	BBW 2009		Install 24" CMP for proposed road
17	Proposed Crossing	BBW 2009		Install 48"+ CMP for proposed road
18	Blown Crossing	BBW 2009		Blown Xing, no fill left, Install bridge
19	Blown Crossing	BBW 2009		Blown Xing, Install 48"+ CMP for proposed road
20	Blown Crossing	BBW 2009		Blown Xing, Install 60"+ CMP for proposed road
21	Blown Crossing	BBW 2009		Blown Xing, Not feasible to reconstruct

Table 1. Description of road points on existing and proposed transportation network.

Map 4. Map of current and proposed roads along with construction and maintenance points.



Proposed Road Network

In order to access the entire property the road network will need to be expanded. The East 80 management unit is currently inaccessible. Historically, there was a road along the northern border of the East 80 with a stream crossing at Road Point 21, which has since blown out (Map 4). The landowner obtained cost estimates for replacing the crossing at approximately $200,000. The proposed road alignment along the southern border of the East 80 requires re-constructing 5 stream crossings, fixing an existing stream diversion (site 4), re-grading portions of an existing alignment and establishing a new road bed from near site 16 to the east and back around to site 20. Building the southern access road to the East 80 is expected to cost approximately $80,000 - 100,000. This estimate is based on the expectation that the required bridge, approach and abutment work at site 18 will cost approximately $50,000, geologic consultation will be required for the eastern portion of the road which crosses steep slopes and unstable ground, and it is anticipated that full-bench road construction techniques will be required on the steep ground, all of which are expensive.

Construction of roads into the East 80 can be done in two stages. The first stage includes installing a stream crossing culvert at site 5 and constructing a road along and existing alignment out to the ridge, west of the Class 1 stream at site 18. The first stage is likely to cost <$10,000. The second stage requires construction and reconstruction of the rest of the road because the bulk of the Douglas-fir timber is on the north and east side of the unit and needs a haul road to remove it.

In contrast, re-opening the additional roads necessary to access the Central and West management units should be relatively inexpensive and could be done in stages as necessary. All of the proposed roads follow existing road alignments and should only need grubbing and clearing of the road beds, road surface drainage and installation of stream crossings. The stream crossings are on Class II streams that do not appear to be very large or complicated. The additional road construction could likely be completed for <$30,000 and need not be done all at once.

6. Description of Soils and Site Potential.

The principal soils on the property are 812 Hugo, 814 Melbourne, 823 Atwell and 855 Kinman. These soil types were established in the 1950's soil survey as the updated soil survey is not available for this area as of December 2009.

The Hugo series is composed of grayish brown loam surface soil. The subsoil is comprised of pale brown clay loam originating from a parent material of sandstone and shale. The soil has moderate to rapid permeability with good to excessive drainage. The soil is suitable for timber production.

The Melbourne series is composed of brown loam surface soil. The subsoil is comprised of strong brown clay loam originating from a parent material of sandstone and shale. The soil has moderate permeability with good drainage. The soil is suitable for timber production.

The Atwell series is composed of dark grayish brown clay loam surface soil. The subsoil is comprised of pale brown gravelly clay loam originating from a sheared sedimentary rock. The soil has slow permeability with imperfect drainage. The soil is suitable for timber production.

The Kinman series is composed of dark grayish brown clay loam surface soil. The subsoil is comprised of pale brown clay originating from sandstone and shale. The soil has slow permeability with imperfect drainage. The soil is unsuitable for timber production.

Site Productivity

When considering the appropriateness of forest management on a piece of land, one of the most important limiting factors is site quality. That is how fast, how dense, and how tall a site is able to grow trees. Sites are commonly rated using roman numerals I through V with I being the highest. Site IV and better have potential for timber production. The Soil-Vegetation Maps of Humboldt County classify the forested parts of the property as Site III.

A more precise method used by foresters is to measure site index in numerous stands around the property. Site Index is the height potential of a 50 year old conifer (Douglas-fir in this case) grown relatively free of competition. Nine tree heights and increment cores were taken on appropriate trees around the property resulting in **indices from 95 to 140** (Krumland and Eng 2005) and an average of **121** with the higher values being found in the pure Douglas-fir areas. Site indices from 100 to 120 would be considered Site class III and 120 to 140 Site class II (McArdle & Meyer, 1961).

7. Growing Stock

Stocking is a timber term which subjectively describes the quantity of a commercial tree species growing on a site compared to the quantity that is desirable for achieving the best results. Best results means maximum volume growth as a result of optimum spacing and tree density. The term is only meaningful when referring to stands that will be managed for timber production. A stand is considered fully stocked if all growing space is occupied and competition induced mortality is at a minimum.

Prior to the current work on this Forest Management Plan, a Joint Timber Management Plan (JTMP) was completed for the Moore Ranch to facilitate the subdivision and sale in 2006 (Timberland Resource Consultants 2006). A total of 469 acres of timberland were assessed in the JTMP, of which 400 acres are owned by Almquist. The inventory installed for the JTMP did not stratify stands by species composition and could not be adapted for long-term planning since the plot locations were not known.

For the purposes of assessing timber volume and management potential in this Forest Management Plan, the forest was stratified into 5 vegetation types using aerial photographs and field reconnaissance (Map 5). One of these, Coastal Oak Woodland (COW) does not have

potential for commercial forest management, while the remaining acres will be included in the planning for long-term forest management (Table 2).

LAND CLASSIFICATION by Management Unit (acres)

Stand Type	East 80	Central	West	Total
DFR - 2nd growth DF	28	120	67	**216**
MHC - Older Mixed Hdwd & DF	10	10	14	**34**
MHW – tanoak dominated	20	80	6	**106**
MCH - Recent Clearcuts		12	20	**32**
COW – oak woodland		1	11	**12**
Total	**58**	**223**	**118**	**400**

Table 2. Acreage of each vegetation type on the Almquist Property in each of the Management Units.

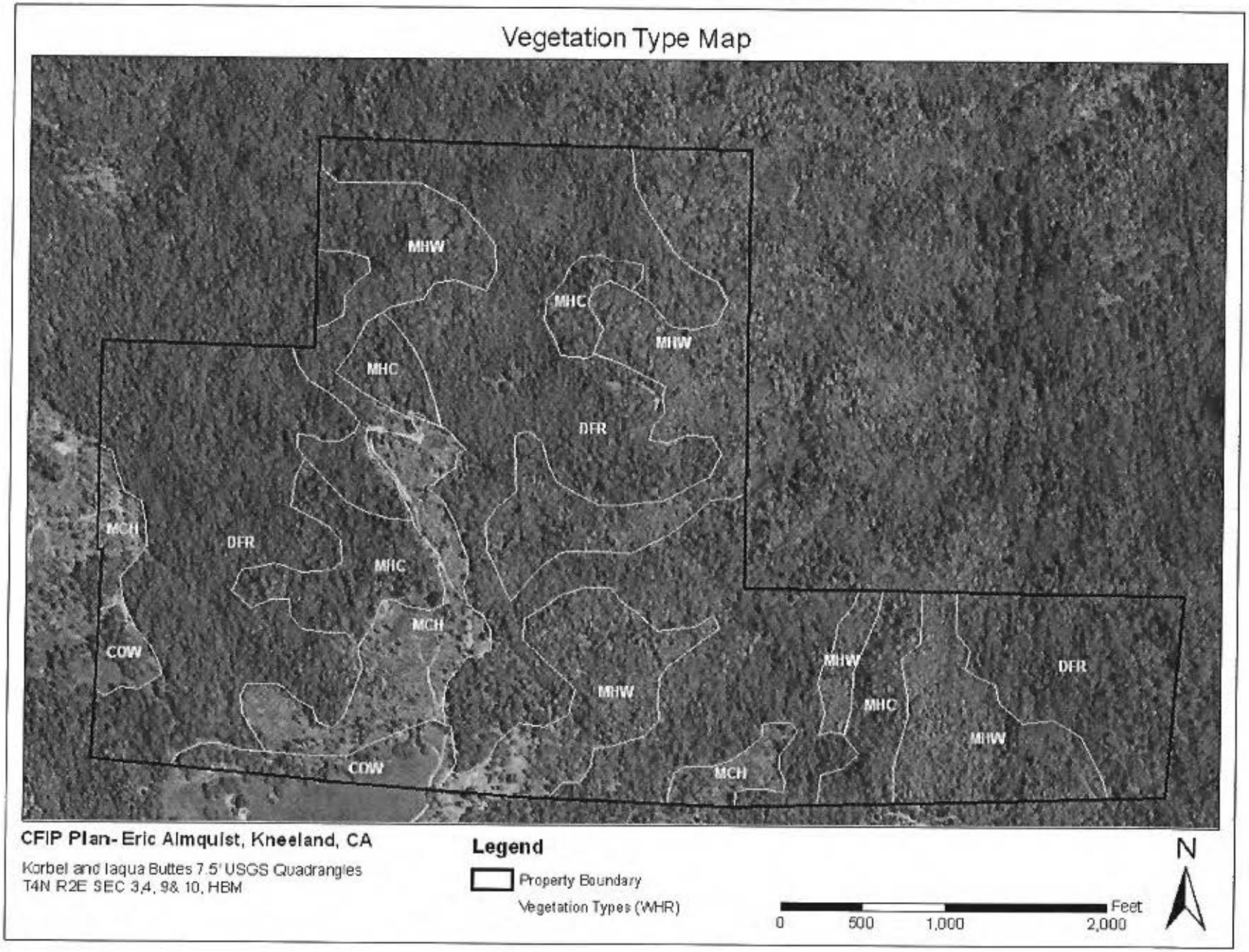
The DFR type is essentially an even-aged 2nd growth stand of 50-55 year old Douglas-fir that has grown up since the initial logging. It also contains a minor amount of western hemlock along with a significant hardwood component that often dominates the understory and intermediate crown positions. The understory of the stand is composed of Douglas-fir seedlings, saplings, hardwoods, evergreen huckleberry and sword fern.

The MHC type is a mature hardwood forest with scattered residual Douglas-fir (~3 per acre). It is found in a few small stands around the property (see Vegetation Type Map) and appears to have escaped logging for the most part since it contains few stumps. Approximately 75-80% of the basal area is comprised of young and old hardwoods in all canopy positions, which is likely is the reason the stands were not cut. The residual Douglas-fir trees are typically 30-50 inches in diameter, <200 years old, have minimal defect and are growing fairly well.

The MHW type is a young hardwood forest dominated by tanoak with lesser components of pacific madrone and California Bay. Conifer stocking in this type is minimal.

In order to estimate stocking, a comprehensive grid of plots was laid out across the property, but not all of them could be measured within the Forest Management Plan budget. A subset of these (41 plots total) was measured in the 3 stand types on the property with measurable volume in order to quantify stand characteristics (DFR, MHC and MHW). The results provide a fairly useful picture of the stands especially, in terms of conifer to hardwood basal area stocking. However, for a long-term timber management plan (NTMP) or a carbon project assessment, the remainder of plots would need to be completed to improve the precision of the inventory.

Map 5. Vegetation types on the Almquist Property delineated from 2005 NAIP aerial photos and field verification.



The following tables show the inventory results by stand type for the most commonly used descriptive variables – trees per acre, basal area per acre, and net board foot volume per acre (Tables 3,4 and 5). Most of the hardwood volume is non-merchantable as sawlogs due to its poor form and numerous low branches and is not represented in the board foot volume figures. Cubic foot volumes are included because they can be converted to cords of firewood or tons of pulp logs in case markets become available. The hardwood data is summarized in Table 6 where 20% of the total volume is assumed to have the potential for sawlog utilization with the remainder represented in cords of firewood.

The figures presented show total volumes for the whole property. However, the portion found in the East 80 management unit is currently inaccessible and will remain so without substantial investment in developing road access. A note below each table indicates the proportion that should be considered unavailable.

Table 3. Montane Hardwood Conifer (MHC) Type

Sample = 6 variable radius plots

Total Acres 34

Visible Conifer Defect = 9.2%

SPECIES	Avg DBH trees>5"	Trees/Acre	Basal Area/Acre (square feet)	Cubic Ft/acre	Net Volume/acre (Merch Bd. Ft.)	Total Stand Vol. (Merch. Bd. Ft.)	Board Ft. Std Error
Douglas-fir	16.5	51	75	2,532	16,858	573,172	
Tanoak	9.2	280	180	3,519		0	
Madrone	26.3	3.5	13	404		0	
Other Hardwood	8.4	27	13	141		0	
TOTAL	10.1	361.5	281	6,596	16,858	573,172	+/- 47%

NOTE: 29% of this type is found in the East 80 unit and is currently unavailable for management.

Table 4. Montane Hardwood (MHW) Type

Sample = 9 variable radius plots

Total Acres 106

Visible Conifer Defect = 0%

SPECIES	Avg DBH trees>5"	Trees/Acre	Basal Area/Acre (square feet)	Cubic Ft/acre	Net Volume/acre (Merch Bd. Ft.)	Total Stand Vol. (Merch. Bd. Ft.)	Cubic Ft. Std Error
Douglas-fir	9.5	40	10	210	1,092	115,752	
Tanoak	11.2	584	201	3,244		0	
Madrone	14.6	11	13	378		0	
Other Hardwood	14.4	7	9	257		0	
TOTAL	11.3	642	233	4,089	1,092	115,752	+/- 10.5%

NOTE: 19% of this type is found in the East 80 unit and is currently unavailable for management.

Table 5. Douglas-Fir (DFR) Type

Sample = 26 variable radius plots

Total Acres 216

Visible Conifer Defect = 1.9%

SPECIES	Avg DBH trees>5"	Trees/Acre	Basal Area/Acre (square feet)	Cubic Ft/acre	Net Volume/acre (Merch Bd. Ft.)	Total Stand Vol. (Merch. Bd. Ft.)	Board Ft. Std Error
Douglas-fir	14.4	131	135	4,884	28,213	6,094,008	
Other Conifer	14.6	7	5	96	528	114,048	
Tanoak	8.8	221	66	526		0	
Madrone	17.6	2	3	50		0	
Other Hardwood	8.8	69	19	264		0	
TOTAL	11.7	430	228	5,820	28,741	6,208,056	+/- 14%

NOTE: 13% of this type is found in the East 80 unit and is currently unavailable for management.

Table 6. Hardwood Data-All Units

Veg Type	Green Tons	Cords (80% of total)	Board Feet (20% of total)
DFR	5,386	1,814	161,572
MHC	4,251	1,382	127,516
MHW	12,597	4,112	377,921
Total	22,234	7,308	667,009

For comparison purposes, the stand table included in the JTMP showed the average volume per acre was 15,745 board feet of conifer and 40.4 tons of hardwoods. Using these per acre data the total volume on the Almquist property would have been 6,219 MBF of conifer and 15,800 tons of hardwood as of 2006. The recent inventory shows total property volume to be **6,897 MBF of conifer and 22,234 tons of hardwood** as of 2009.

8. Growth/Potential Yields.

The assessment of a stand's management potential involves an evaluation of the likely growth of its timber volume and hence monetary value. It is most commonly described as either percent annual growth or as volume increase per acre per year. It is important to obtain a reasonably accurate measurement of growth because a fundamental tenet of sustainable forestry is to always cut less than growth to ensure a continuous supply of timber. The projected periodic volume growth is then used to calculate the Long Term Sustained Yield. For the purposes of this Forest Management Plan, the data gathered on the 41 plots which included 29 ten year growth increments collected from DF, are adequate to run through the forest growth simulation program (FVS) to get a good approximation of volume growth (Table 7).

Table 7. Projected Annual Volume Growth

Type	DF - BF/acre	Hdwd - tons/acre	% Growth
DFR	1,296	0.7	4.6
MHC	804	2.8	3.2
MHW	78	4.7	4.1

The JTMP estimated growth rates at 5% annual growth for the property, so the new (2009) cruise indicates a slightly lower growth rate.

The percent growth of young stands is high, because the standing volume is very low. As the stand matures and is carrying more volume per acre, rates drop even though the actual volume growth is still higher than volume growth of the young stand. As the stand develops further, trees can become too crowded and diameter growth decreases.

In the mixed stand type, a greater proportion of conifers to hardwoods would increase the total growth and improve future management potential. This can be achieved to some extent through selection harvests that include removal of hardwoods to favor conifer growth as well as planting conifers. In the DF type commercial thinning is a possibility. Silvicultural strategies are discussed further in that section below.

9. Regeneration Needs.

There are three areas covering 30 acres that were clearcut in 2004 and replanted with Douglas-fir and redwood seedlings, denoted as MCH on the Vegetation Type Map (Map 5). The eastern most clear cut area appears to be well stocked and free of brush competition. However, the other

two units in the Central and Western Management Units have areas with excessive brush competition and/or understocked areas.

Approximately ½ of the 22 acre clearcut in the center of the property has excessive brush competition from blue blossom ceanothus (*Ceanothus thrysiflorus*). The planted regeneration is about 3 feet tall and visible under the 12 foot tall ceanothus canopy which has about 90% canopy cover over the regeneration. Manual release of this regeneration is recommended by cutting, piling and burning the ceanothus. The cap rate for CFIP funded release projects in heavy brush cover is $400/acre. Thus the total cost of this release project is estimated to be $4,400, of which the landowner could apply for a 75% Cost Share though the CFIP program. The stocking density of planted regeneration appears to be adequate, but supplemental planting may be desired after the release operation is complete and a more accurate regeneration survey is completed.

The 4 acre clearcut on the western boundary of the property has moderate brush competition and areas of poor regeneration success. Blue blossom ceanothus and various *rubus* (berry) species are the primary competition sources in this area. It is recommended that a release from the moderate brush levels be completed on all 4 acres. The cap rate for CFIP funded projects is $300/acre for moderate brush cover, so the project total would be $1,200, with the landowner eligible for a 75% Cost Share through the CFIP program. It is estimated that approximately ½ of the clearcut area will need to be replanted after the release treatment.

10. Socio-Cultural considerations: Markets, limitations.

The Almquist property is surrounded by privately owned parcels that are 20-200 acres in size. Most are zoned TPZ or agricultural exclusive, however there are a couple of small rural residential zoned parcels on the southern border of the property. The property is not visible from any major roads or population centers. Eric Almquist has contacted most of the owners of the neighboring parcels and thus far none have expressed opposition to his plans to practice low-intensity forest management on the parcel.

The landowner, Eric Almquist, owns a small lumber mill which is co-located with his retail lumber yard which sells local hardwood lumber and firewood amongst other products. This unique ability of the landowner to utilize local hardwoods for sale will allow him to commercially harvest hardwoods that may not be possible for other landowners. Having a commercial outlet for hardwoods may allow the landowner to pursue his goal of increasing conifer stocking on the property even in the absence of traditional commercial markets for hardwoods such as the pulp mill or cogeneration plants.

Almquist may utilize some of the Douglas-fir timber from the property for milling and sale through his retail business. However, it is likely that the majority of the timber will be sold to local mills such as Humboldt Redwood Company in Scotia, Schmidbauer in Eureka or California Redwood Company in Korbel. Round trip haul times are likely to range from 1.5 to 3 hours depending on which mills are used.

11. Current Silvicultural system(s)—rotation, cutting, cycle, etc.

A primary management goal is to promote healthy growth of trees of all sizes by following a system of selection silviculture. Under this system, trees are selected for harvest whose removal will increase the growth of retained trees and promote regeneration and release of Douglas-fir. The system requires a balance which maintains growing stock to provide current growth, shade, wind protection, wildlife habitat, and visual appeal; while satisfying light and spacing requirements needed to stimulate regeneration and sufficient growth of smaller trees.

The future desired forest condition for this property is a mature uneven-aged forest with a high, variable canopy of large Douglas-fir, tanoak, and Pacific madrone. It will ultimately be distributed across the ownership as a mixture of different aged patches resulting from site-specific silvicultural prescriptions. The long term silvicultural objective is to increase structural diversity in the forest and to build volume by ensuring that growth is greater than harvest volume. In the process, the even-aged stands of Douglas-fir and tanoak will become an uneven-aged forest containing trees of all sizes.

Although commercial harvests on the property may occur every few years in the future, in any given stand the re-entry period or cutting cycle will be roughly 15 years. At this time 20 to 35% of the volume of the stand being entered will be removed leaving a minimum stocking of at least 75 square feet of basal area per acre but usually much more. A more precise harvest schedule will be developed in the NTMP based upon real inventory and growth information. Harvest entries will remove less than overall stand growth until the stocking level producing maximum periodic volume increment is attained. Subsequent harvests will cut volume growth since the last entry to maintain a sustained, even flow of logs in perpetuity.

The near term management emphasis will be to thin dense stands, remove low quality trees, and remove hardwoods to favor conifer growth. However, hardwoods such as tanoak and madrone are an integral component of these stands and therefore management will not exclude these species entirely. Selection across the diameter classes will be combined with a thinning from below to remove suppressed and intermediate trees that are unlikely to release following harvest. In addition, damaged, diseased, poorly formed and low vigor trees will be culled from the stands. Selection will also be applied to reduce competition among tanoak sprouts, encourage growth on the best stems, and achieve over time an inverse-J shaped diameter class distribution. The goal is to increase the conifer percentage to 50-80% by basal area depending on micro site features and current species composition. This will be a gradual transition and may not be achieved in all areas within the foreseeable planning horizon.

Ideally, thinning should open the canopy enough to allow crowns to expand unhampered for 5-10 years but not so much as to encourage the retention of lower limbs in conifers or cause forking in hardwoods. It is better to maintain a higher stem density at a younger age to encourage rapid height growth and straight, limb-free boles. When hardwoods have attained whatever height is desired to be free from forks (consider what product is desired) thinning should open the canopy for longer periods of time. For conifers, this is generally when the limbs have died on

the first eighteen feet of the bole. Closer spacing in conifers favors natural pruning and reduced taper.

When selecting conifer trees to retain, those which are straight, free from defect and disease, have small limbs and full, well-balanced crowns on at least 30% of their bole, and are in a dominant and codominant position should be favored. Hardwood crop trees should be selected using the same criteria as for conifers, but in order to prevent forking or sweep in the bole they should be in a dominant position. These trees should be kept in this position throughout their lifetimes to produce the highest quality wood. Surrounding trees may be used to train them in this position.

In addition to single tree selection across the stands, small groups of trees (<2.5 acres) will be removed to provide areas for artificial regeneration of Douglas-fir. Group selections will be primarily focused in hardwood dominated areas. Hardwood competition will be controlled in group openings using mechanical or manual methods, as herbicide use is not desired by the landowner. Large diameter trees will be retained in some group openings to function as seed sources and/or as legacy trees.

Permanent leave trees, often called "Legacy" or "Wildlife" trees, will be designated in the forest management zone and will remain to the end of their natural life as a seed source for natural regeneration, to provide diverse stand structure, and to provide for future snags and downed logs. These trees will complement the higher density of legacy trees already found in the creek zones and other inaccessible areas which will not be managed.

The 30 acres of recently clearcut area that are currently regenerating have a mixture of Douglas-fir and redwood seedlings. Redwood does not appear to have been a natural component of these stands prior to harvest, however the planted stock appears healthy and vigorous at this time. There are other scattered planted redwoods that are 10-20 years old on the East 80 management unit that also appear to be healthy and vigorous. The success of the planted redwoods will be monitored over time and additional redwoods will be planted if the existing ones continue to grow well.

These young stands will be repeatedly thinned as an even aged stand for the first 40-60 years and transitioned to an uneven aged structure after that and managed using single tree selection and/or small group selections, as described above.

While the preceding silvicultural recommendations are general guidance for the entire property, site specific prescriptions will need to account for local conditions. For example, in the Western Management unit frequent groups and individual trees were observed that appeared to have been blown down. This elevated risk of blow down in the Western unit means that post harvest retention levels may have to be somewhat higher than elsewhere on the property, selection of windfirm trees for retention will be very important and that group selection harvests will have to be carefully placed, if they are used at all. Additionally, it would be wise to close seasonal roads and skid trails in a manner that allows them to be easily re-opened if salvage operations become necessary.

12. Land Conservation Practice Needs.

General Guidelines for Land Conservation Practices

Resource protection is an integral part of any long-term management scenario because of the potential impacts that timber removal, the operation of heavy equipment, and ongoing homesteading activities can have on site productivity and the downstream beneficial uses of water. The state forest practice laws are largely intended to protect water quality. The main beneficial uses of water in the area include: domestic and agricultural water supplies, fish migration and spawning, and wildlife habitat. The crux of resource conservation is to keep soil in the forest for long term site productivity and prevent it from being transported downhill into the aquatic system. Since the primary continuing source of sediment transport is known to be roads and skid trails, they need to be properly maintained if in use or abandoned if no longer in use. Proper road design and maintenance are keys to watershed protection. Through careful planning and management, it is possible to minimize environmental risks.

The landowner will continue to improve upon and maintain existing erosion features on all roads, trails, and landings, including waterbars, culvert crossings, cross drains, and inside ditches. Monitoring and maintenance during the winter period is essential. All erosion control structures should be checked each year before the beginning of the rainy season and periodically throughout the winter, in particular before and after storm events.

General erosion control guidelines for the continued maintenance and improvement of the road system are as follows:

- Outslope roads wherever feasible in order to reduce long term maintenance and improve the quality of runoff water.
- Grade and install rocked, rolling dips on low gradient sections of main haul roads.
- Place rocked, critical dips over all existing and planned culverts whenever feasible in order to prevent channel diversions.
- Do not operate heavy equipment off of roads and trails or near springs or watercourses.
- Abandon skid roads and prohibit vehicular use after forestry operations are complete.

The previous THPs that were submitted on the Almquist Property contained extensive sections describing the geologic conditions and geomorphic hazards on the property. Any future management that includes the potential for significant site disturbance such as road construction or timber harvest will need to re-examine these reports carefully and likely contract for additional on-site geologic review of projects.

Land Conservation Practice Projects on the Almquist Property

An inventory of current and potential management related sediment sources was conducted on the Almquist property in November 2009. In general, the number of sites and scale of erosion

was low because three THPs have been filed and completed on this property in the recent past and most erosion problems were addressed at that time. However, two sites were observed that need corrective action.

The first is noted as site #1 (Table 1, Map 4- Transportation Plan Section). This is an approximately 800 foot long former skid trail in the Central Management unit that leads to a decommissioned stream crossing (Site #6). The skid road had waterbars installed after logging was complete, however there has been some off road vehicle traffic on the skid road since then and the water bars need to be rebuilt now. There is no gullying on the skid road and the waterbars have not been breached yet, but sediment has accumulated on the uphill side of the waterbars and the tops of the waterbars have been worn down. The landowner has a tractor that would be sufficient to perform the needed maintenance, and it should be done after June 1st 2010, when soils are sufficiently dry to not cause rutting of the road surface. The slope on the skid trail is approximately 25%, so water bar spacing should be 100 feet between bars, as this site has a Moderate Erosion Hazard Rating (THP-04-225).

The second site is noted as site #4 (Table 1, Map 4- Transportation Plan Section) and is located in the East 80 Management unit. This site is a diverted stream channel that was originally caused by a road crossing installed during first cycle logging 60+ years ago. A gully has formed that is approximately 100 yard long by 3 yards deep and 4 yard wide. It was estimated that approximately 1,200 cubic yards of sediment has already been delivered to the stream channel from this diversion. Although the majority of sediment has already been delivered, the gully sidewalls appear to be actively eroding- so it is possible that another 100-300 cubic yards of sediment could be delivered from this erosion source. This site could be fixed by removing the remaining 200 cubic yards of road fill with an excavator and would take approximately 1 day of time. Unfortunately it is not possible to access this site with heavy equipment at this time because the road to this area has washed out in numerous locations. It was estimated in the Transportion Plan section (above) that constructing a road to this location would cost approximately $80,000 to $100,000. This site will be addressed when/if the new access road is built to this location.

The other sites shown on Map 4 as "blown crossings" are currently stable and have already lost nearly all of the original fill volumes. No further work needs to be done to these sites at this time.

13. Fish and Wildlife Improvement Needs.

General Guidelines for Fish and Wildlife Habitat Improvement

It is an important goal of this plan to provide high quality wildlife habitat, particularly for species associated with undisturbed riparian areas and late-seral forest conditions. This is consistent with the silvicultural goals of creating a mature uneven-aged forest with a canopy of large Douglas-fir, redwood, tanoak, and Pacific madrone. The changes in forest composition that will result from implementing the selection system will favor species typical of uneven-aged, mid to late seral, mixed conifer/hardwood forests.

The species which have received the most attention recently due to their declining populations are the northern spotted owl, marbled murrelet, and anadromous fish in general. There are certainly other terrestrial and aquatic species as well which have suffered more quietly from a reduction in habitat. Some of the elements to consider when assessing the habitat value for these species include: the presence of snags, dens, and nest trees; levels of large woody debris in the forest and in creek zones; the amount of sediment input to streams; the size of pools and riffles for fish spawning and rearing; and water temperature in fish bearing streams and tributaries.

The intention of management is to mitigate the impacts of past logging by rehabilitating and improving habitat opportunities for native wildlife whenever possible. Even though most of the species that utilize the land either now or in the future will never be seen or measured, that does not mean they are not there. It is not practical to carry out species specific surveys in most cases, but by implementing management which retains important habitat features and protects sensitive areas such as stream zones, it is assumed that the needs of most wildlife species will be met.

To achieve these goals the following management practices should be used:

- Retain all snags unless marked as a hazard by the RPF or his designee.
- Mark Legacy or Wildlife trees for snag recruitment and to eventually become downed woody debris.
- Existing downed logs and cull logs produced during timber operations should be left in the woods for coarse woody debris recruitment wherever possible, except when utilized for firewood or building. Some fuel modification may be necessary to reduce fire hazard.
- All logs in stream zones must be retained. Management will provide for a continuous supply of coniferous coarse woody material to improve, maintain and restore vital stream functions, including salmonid habitat structure and bank stability.
- Near-stream vegetation in tributaries should be maintained with a canopy above 80% at all times in order to safeguard against water temperature effects.
- No operation of heavy equipment within any stream zones except at prepared truck or tractor road crossings, in order to further safeguard against sediment and mass wasting effects on aquatic habitat.
- Log and rock hauling and skidding operations should cease when turbid water is flowing across the road surface or in a roadside ditch which has the ability to enter a watercourse.
- Rocked watercourse crossings whenever possible.

Northwest coastal coniferous forests can support a high abundance of wildlife species. Bird populations are particularly robust. Bird species typical of this habitat include northern spotted

owl, western flycatcher, pileated woodpecker, chestnut-backed chickadee, golden crown kinglet, Hutton's vireo, solitary vireo, hermit warbler and varied thrush. Amphibians and reptiles that show a strong association to the Douglas-fir/tanoak habitat include Pacific giant salamander, Olympic salamander, Del Norte salamander, black salamander, clouded salamander, tailed frog, ensatina and northwestern garter snake. Mammals include fisher, deer mouse, creeping vole, dusky-footed wood rat, and western red-backed vole (Mayer & Laudenslayer et. al. 1988).

When it comes to determining which wildlife species actually use the property, there is no substitute for landowner observation. Keeping records of any animal sightings along with when and where seen can prove to be invaluable in the future. Even if their identity is uncertain, a description can help with later analysis.

For more general wildlife information, there are a number of resources available to find out whether any species listed as Threatened or Endangered or as a Species of Special Concern might be found in the plan vicinity. However they are usually only as specific as the USGS 7.5' minute quadrangle. Updated plant, animal, and communities lists can be obtained from the California Department of Fish and Game (CDF&G) website. The CDF&G also maintains the California Natural Diversity Database (CNDDB) to record location specific sightings of listed species.

Further analysis of the potential impacts to significant wildlife species will be required when an NTMP is developed. This will include surveying for northern spotted owls and possibly other species as well.

Fish and Wildlife Conditions on the Almquist Property

Known Occurrences of Sensitive Species

A northern spotted owl (NSO) (*Strix occidentalis caurina*) activity center was observed and recorded for the property in 2004 (THP-04-225). The activity center is located in the Western Management Unit. Another NSO activity center is located immediately south of the property on the east side. The breeding season for spotted owls is March 1st to August 31st. It is not known if these two activity centers are still occupied by NSOs, but if they are the following restrictions apply.

- Loud or disruptive activities such as road construction, falling, logging, yarding, etc. are prohibited within a ¼ mile of the nest site during the breeding season.
- No timber harvest operations are permitted within 500' of the activity center at any time, e.g. no cut area.

The only other two listed sensitive species that have been observed on the property are two plant species: long-beard lichen (*Usnea longissima*) and coast fawn lilly (*Erythronium revolutum*). See Map 6 for locations. The coast fawn lilly is a California Native Plant Society (CNPS) list 2.2 species, which requires protection of the locations of individual plants. The long-beard lichen does not have a CNPS listing status; avoidance of this plant is recommended but not required.

Known and Potential Habitat Occurrences for Sensitive Species

Habitat and species surveys for Bald Eagles, other large raptors and other birds were performed in THP-04-225. According to that THP, there is habitat for golden eagle (*Aquila chrysaetos*) and of course northern spotted owls (*S. occidentalis*) on the property. There is potential habitat for Vaux's swift (*Chaetura vauxi*), Cooper's hawk (Accipiter cooperii) and purple martin (*Progne subis*).

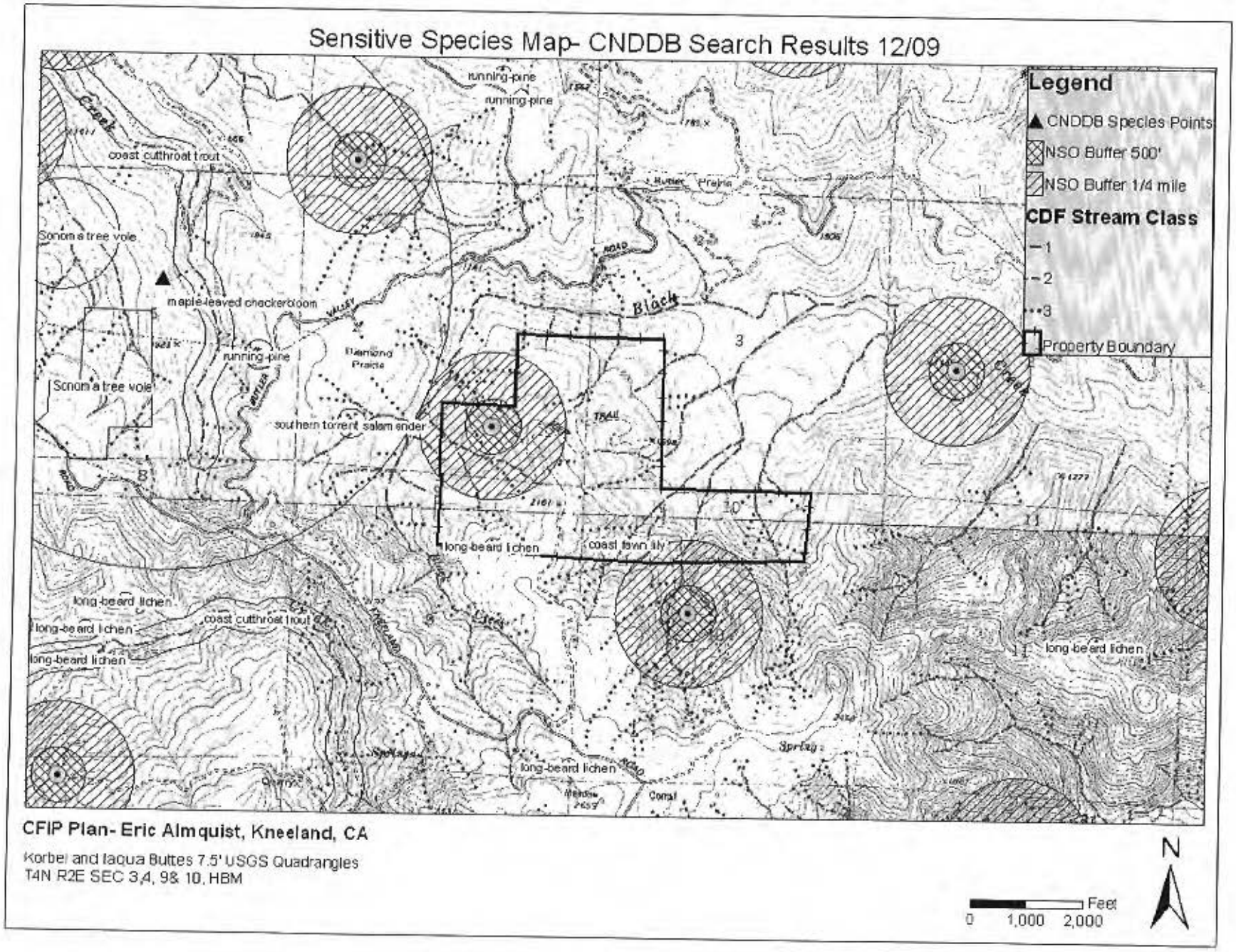
The property contains year round streams and a number of small ponds so there is potential habitat for most amphibians, though no surveys have confirmed their existence. Information in THP-04-225 indicated that the ponds were not large enough or open enough to the sunlight to be suitable habitat for Northwestern pond turtles (*Clemmys marmorata marmorata*).

Habitat for Pacific Fisher (*Martes pennanti pacifica*) does occur on the property and there is potential habitat for California red tree vole (*Arborimus pomo*) and Humboldt marten (*Martes Americana humboldtensis*).

Habitat for the following listed plant species (CNPS list 2) occurs on the property: Northern cluster sedge (Carex arcta), Coast fawn lilly (*Erythronium revolutum*), Hair-leaved rush (Juncus supinformis) and leafy stemmed mitrewort (*Mitella caulescens*). There is also potential habitat for a number of other CNPS list 1 and 2 species. (THP-04-225).

According to THP-04-225 there is potential spawning and rearing habitat for Steelhead trout (*Oncorhynchus mykiss*) and Cutthroat trout (*Oncorhynchus clarki)* on the property. However, reconnaissance of the Class I channel in 2009 revealed numerous 3-8 foot waterfalls and steep channel gradients which indicate that further review of this area as suitable habitat is necessary. It is possible that the Class I watercourse on the property could be re-classified as a Class II-L under the new Anadromous Salmonid Protection (ASP) rules.

Map 6. Locations of State and Federally listed species found on and near the Almquist Property; based on search of CNDDB 12/09.



14. Fire Protection Needs.

General Guidelines for Fire Protection

Decades of fire suppression and logging have created a situation where the forests of the region are not able to withstand the effects of wildfires. Fire is an integral part of this forest ecosystem, but heavy concentrations of suppressed trees that would have been cleared by repeated light ground fires have now become dangerous accumulations of ladder fuels capable of carrying a ground fire into the crowns of healthy trees. Forest conditions are at a point where high fuel loads and ladder fuels make it impossible to allow natural fire to be returned to most of this forest for the foreseeable future.

Therefore, it is very important to institute a thorough and workable program for reducing the threat of catastrophic wildfire. Since the long term reduction of the wildfire threat will require the prudent reintroduction of prescribed fire, a fuels management regime should initially focus on breaking up the fire ladder and properly treating excessive fuels buildup associated with any commercial harvests or stand improvement projects. This work will focus on the ridgetops and currently used roads first where traffic makes the likelihood of ignition high and the fire hazard is most severe. Shaded fuel breaks should be created for at least 100 ft. along either side of the road, which may be done as part of a pre-commercial thinning project.

All slash from harvesting and pruning should be lopped within 24" of the ground, and locally heavy accumulations of slash in logging areas must be piled and burned during wet fall or winter weather. Within shaded fuel break areas, slash must be completely removed or piled and burned within 100 feet of either side of the road and up to 150 ft. where possible.

General fire safety recommendations are:

- ✓ Do not operate machinery or chainsaws when conditions such as wind, humidity and air temperature combine to make for "extreme" hazard.
- ✓ Ensure that in any type of logging operation during the fire season all workers conform to regulations pertaining to smoking, fire tool requirements, lunch and warming fires, posting of fire rules, care in welding, prohibiting uncovered glass containers, caution in using chainsaws and other spark emitting equipment, and daily inspections prior to shutting down operations.
- ✓ Keep a water truck or other water source on site when burning large piles of slash.
- ✓ Maintain a cache of fire tools such as shovels, axes, McLeods, portable backpack water tank, etc.. on site and accessible.
- ✓ Keep a list of emergency phone numbers that identifies local fire response agencies, both public and volunteer.
- ✓ Create defensible fuel breaks around structures by clearing all brush and small trees.
- ✓ Develop extra water storage facilities from springs or other sources.
- ✓ Fit all storage containers with appropriate size valves for fire fighting.

Fire Protection Needs on Almquist Property

Shaded Fuel Breaks

The ridge that runs North-South in approximately the middle of the property is an ideal location for a shaded fuel break. An existing seasonal road runs down about two thirds of the length of this ridge currently. The effectiveness of this potential fuel break could be enhanced by extending its length to the northwest edge of the property along the ridge (see Wildfire and Recreation Map 7). If the entire length of this ridge is maintained as a shaded fuel break by thinning on either side of the existing road and proposed fire break out to 100' this would make an effective 1 mile long shaded fuel break. This would be a total area of approximately 24 acres.

A second ridge top shaded fuel break of approximately 0.4 mile length could be constructed in the northeast corner of the Central Management unit as well (Map 7). This shaded fuel break would occupy approximately 10 acres.

There is an additional ½ mile of existing seasonal road that connects these two potential shaded fuel break areas which could also be thinned on either side of the road to provide safe access for emergency personnel. This area would occupy an additional 10 acres.

Water Supply

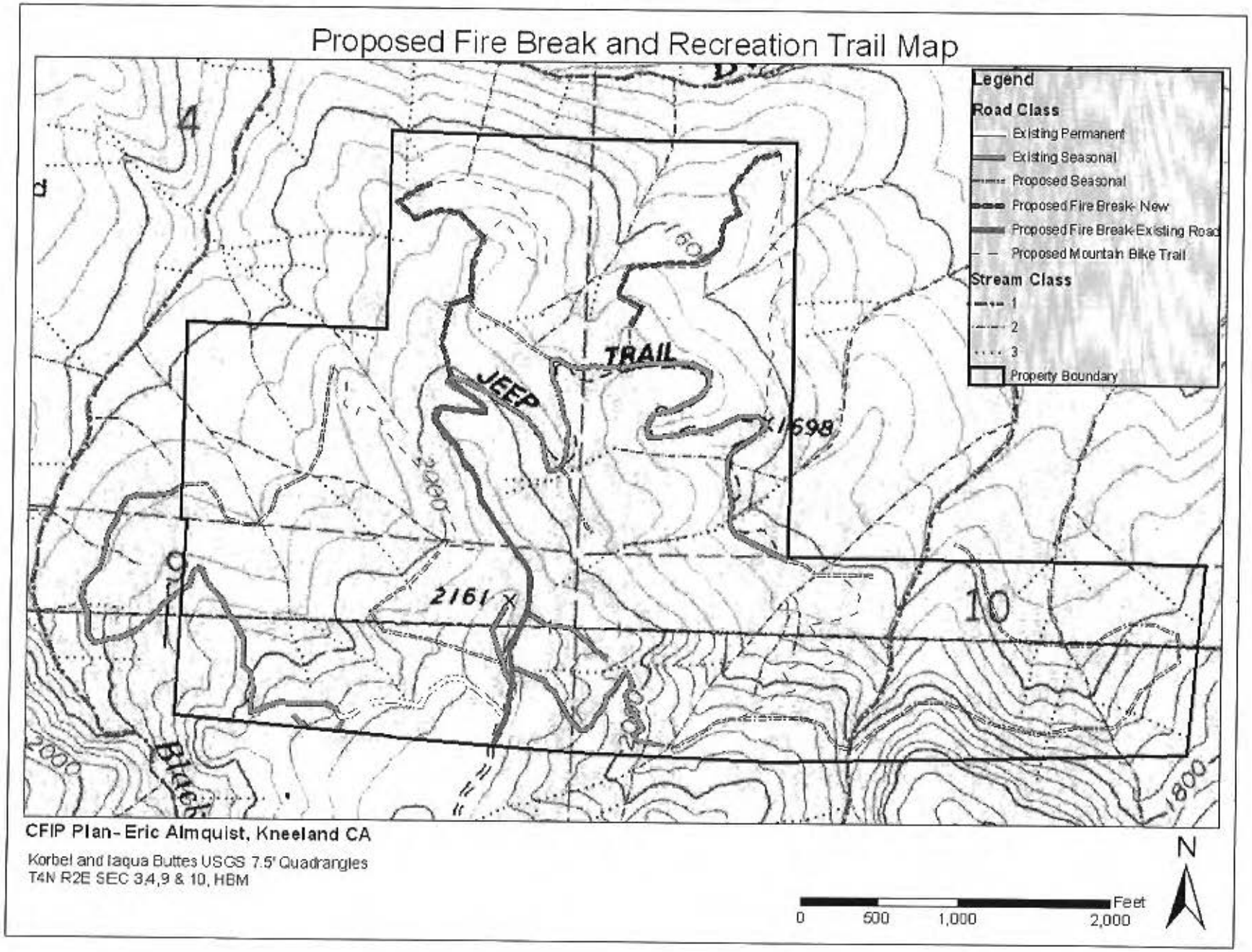
Another piece of infrastructure that would be very important for fire suppression efforts is a large water storage facility (pond or tank fitted with appropriate hardware for re-supplying water tanks on fire trucks). This facility should be located on the existing road near the south edge of the property, which is the only access point to the property.

Information to Local Emergency Personnel

Once management activities begin, the following should be provided to the Kneeland Volunteer Fire Department each year before April 1st:

- A copy of the property map with access routes delineated.
- The name, address, and emergency 24-hour phone number(s) of an individual and an alternate who has authority to respond to CDF requests for resources to suppress fires.
- The number of individuals available for fire fighting duty and their skills.
- A list of available fire fighting equipment.
- Keys or combinations to any locked gates along emergency access routes.

Map 7. Locations of proposed fire/fuel breaks on Almquist property that could be part of a recreational trail network.



15. Insect and Disease Problems.

Every forest ecosystem has biological agents (animals, insects, and diseases) and physical forces (fire, wind, snow, and ice) which are destructive to living vegetation but which are integral to the functioning of that ecosystem. These agents become a "problem" only when they adversely affect vegetation which is of particular value to the landowner or society. While an endemic level of insects and disease in a forest is natural, if these levels becomes epidemic, loss of timber value and fire hazard may result. In a forest being managed to meet landowner's goals, human intervention is often called for to improve productivity or protect the investment.

The subject property presently does not exhibit any serious pest problems, but there are a few local and regional concerns that should be noted. Conk rot (*Phellinus pini*) is a commonly found pathogen in many large residual Douglas-fir. Care should be taken when operating equipment around Douglas-fir trees as they can be sensitive to compaction, which may decrease tree vigor making them more susceptible to pests. Conk rot, or Red Ring Rot, can infect the heartwood of most conifers but is primarily found in Douglas-fir. It favors cooler, moister environments and is spread by airborne spores produced by sporophores (conks) on infected trees, which enter healthy trees through dead branch stubs or open wounds. It can seriously degrade the quality and/or merchantability of a tree over its lifetime, especially if the tree is infected when young. The only practical cure for this problem is to remove infected trees from the stand to reduce spore production.

In addition, there has been a widespread increase in madrone canker (*Fusicocum sp.*) in the past decade in Humboldt county. Although this disease was not noticed on the madrones on the property, no specific search was carried out for it. The landowners should be aware of its occurrence in other areas very close by. It forms cankers on trunks and limbs and kills a pie shaped portion of the trunk, causing leaves to discolor and die. Many madrones have been observed to survive several seasons of leaf dieback, but eventually death usually results. It is believed to be triggered by warm, humid weather. Cutting out infected trees and burning affected parts, and thinning and limbing trees to increase air circulation are control methods for this disease.

If insects or disease do become a significant problem, specific measures will be taken. Infestation zones may be cut to remove epidemic levels of pathogens. Chemical insecticides and herbicides will not be used in conformance with the desires of the landowner and RPF. Broadly accepted biological controls may be utilized depending on the intensity and threat of any outbreak.

The best preventative treatment for the aforementioned insect and disease problems is to maintain a healthy, vigorous stand through timely thinning and harvesting. A healthy tree is less likely to be infested with insects or disease, or to succumb to these destructive agents if infested, than an unhealthy tree. It is expected that through the management actions prescribed in this plan, a healthier, more vigorous forest will develop, and hence be more resistant to pest outbreaks.

It is also beneficial to encourage species of birds which prey on insects which are destructive to conifers, especially bark beetles. For example, many of the birds desired for insect control require cavities in snags for nesting. This habitat need will be supplied by designating Legacy Trees for continued snag recruitment throughout the plan area and especially near riparian areas.

Sudden Oak Death

S.O.D., as it is commonly known, is known to occur in Humboldt County, and this epidemic is serious enough to warrant a special section of this plan. An extensive amount of information is available and updated regularly on the CDF website, which is the source of the bulk of the information presented here.

There is currently a dramatic and sudden dieback of tanoaks, coast live oak, and black oak trees in several areas of coastal California with tanoak being the most affected. Since 1995, trees from these species have been reported dying in large numbers in several coastal Counties. The extent of the problem is not fully known, and the problem is expected to become more extensive in upcoming years, affecting urban and wildland tanoak, coast live, black oak, as well as numerous shrub species. Such a massive dieback of tanoaks and other oaks has never been reported in California and, if it continues, there are going to be several environmental changes: (a) the loss of these highly valued trees from gardens and forests, (b) alterations to forest ecology, with unknown and possibly dramatic implications for wildlife habitat and food chain provision, and (c) serious fire hazard risk from the resulting buildup of dry fuel.

Tanoak is a very resilient tree, and yet trees of all ages are developing symptoms quickly, and dying rapidly. From a distance, the first prominent symptoms in tanoak are drooped (wilted) shoots. Shoot wilting is spontaneous and occurs throughout the crown. Older leaves become pale green. Approximately two to three weeks later the foliage turns brown but remains clinging to branches, visibly announcing the death of tanoak. Chisel cuts into the inner bark and sapwood at breast height of affected trees, reveal saturated tissue that drops burgundy-red sap. In the summer, the bark splits and breaks as a result of drying. Gum often exudes from these splits, which may develop prominent clusters of black fruiting bodies. Long striations of a different tan to pinkish discoloration become visible on the bark surface. Roots of tanoaks exhibiting above ground symptoms often have a pungent alcoholic odor, but appear sound. The following year after the tree dies, suckers sprout near the base. Soon their tips bend, become chlorotic and die. A very noticeable feature of the dead tanoaks is massive infestation of the whole stem with ambrosia beetles in mid-summer.

Pathologists have isolated an important causal agent - a new species of Phytophthora - and beetles, other fungi, and weather may be additional factors. *P. ramorum* is a fungus that appears to enter through the bark on tree trunks and limbs, possibly after they are splashed there by raindrops. Once the trees have gone through the progressive stages of the symptoms, their vigor rapidly declines and they become vulnerable to secondary insect pests such as bark and ambrosia beetles.

The confirmed extent of Sudden Oak Death (as of December 2009) is Alameda, Contra Costa, Marin, Monterey, Napa, Santa Clara, Santa Cruz, Solano, Sonoma, Mendocino, Lake and Humboldt. No evidence of SOD has been found on the property. The closest confirmed location of SOD to the Almquist property is the Miranda area of Southern Humboldt.

16. Proposed alternatives; cost/benefit analysis of investments.

1. Sell property for rural residential development. Neighboring parcels have recently sold for this purpose, as Kneeland is a highly desirable area and real estate prices are commensurate. The landowner currently has no plans to either develop a personal residence or sell it for that purpose.
2. Practice intensive silviculture using rehabilitation on understocked areas and even-aged silvicultural treatments in conifer dominated areas. The former landowner, PALCO, had plans to carry out this type of treatment, but failed to follow through with plans outlined in their THPs. PALCO carried out the clearcut treatments, but did not implement the rehabilitation treatments. Presumably, PALCO realized it was more economical to remove the easily accessible timber and sell the property rather than commit to improving conifer stocking over time.

17. Management Recommendations.

Generally, the property is in good condition- the forest is healthy and growing rapidly, the roads are in good shape and were recently upgraded, there are no significant liabilities such as erosion problems or contaminated sites and the neighbors do not appear to present any significant problems at this point. The following recommendations are intended to improve the value of the property.

Access

1. Determine whether the currently existing loop road at the western edge of the property on former Scotia Pacific owned lands is available for use as a temporary haul road to access the lower portion of the Western Management unit.

Erosion Control

1. Upgrade the water bars on the skid road as described for Site 1 in the Transportation section above.

Forest Improvement

1. Implement regeneration release treatments on 15 acres of recently clearcut areas (as described in the Regeneration section). This work is eligible for CFIP and/or EQIP funding.
2. Replant approximately 2 acres of the recently clear cut areas (as described in the Regeneration section).

Fire and Fuels Management

1. Install shaded fuel breaks along approximately 4 miles of existing roads and proposed fire roads, occupying approximately 44 acres (as described in the Fire and Fuels section). This type of work is eligible for CFIP funding as pre-"commercial thinning" and under the EQIP program as "Firebreak" or "Fuel Break" project types.
2. Install a pond or large capacity water storage tank near the entrance to the property.

Recreation

1. Construct a network of mountain bike trails that connect up with existing and proposed seasonal roads and fire break alignments as depicted on the Proposed Fire break and Recreation Trails Map.

Management

1. Develop a Non-Industrial Timber Management Plan (NTMP) in order to continue property improvements (as described in this Plan) and harvest timber commercially, as decribed in Sections 7-11 above.

18. Property Security/improvements.

Thus far there have been no incidences of trespassing, vandalism or illegal dumping on the property. This may be because there are two neighboring houses that have a view of the access road or the fact that the landowner frequently visits the property. A gate could be installed at the southern property boundary if illegal activities become a problem. There are signs at the entrance to the property identifying the landowner and the fact that it is private property.

19. Community/Agency cooperation mechanisms.

The landowner is committed to supporting and practicing sustainable forestry in his lumber business as well as his forest lands. The landowner has entered into cooperative agreements in support of his goals of forest and wildlife habitat improvement with the local offices of the US Fish and Wildlife Service, Natural Resource Conservation Service and California Department of Forestry and Fire Protection.

20. Recreation potential.

There is an opportunity to develop a network of mountain bike trails that access the Western and Central Management units on the property. The 3 miles of existing roads provides one component of the trail system. Construction of ¾ of a mile of fuel break roads could provide an additional component of the trail network. The last component of the trail network would be construction of 1.3 miles of dedicated mountain bike trails and 0.9 miles of temporary mountain bike trails on proposed seasonal road alignments (Map 7). This compilation of road and trail segments would add up to almost 6 miles of high quality mountain bike roads/trails on the Almquist property, configured in numerous loops. Fire break trails could be constructed with frequent water bars, berms and outslopes to provide for good water drainage and high fun factor for mountain bikes, as could seasonal roads and skid trails after operations are complete.

The proposed mountain bike trails were located primarily in the hardwood (MHW) forest type where timber harvest activity is less likely to be extensive, thus minimizing potential use conflicts.

Access to the East 80 is possible at a later date, but the current lack of a crossing for the Class I stream and lack of any existing roads makes it more difficult and expensive than the opportunities that exist on the other Management units.

21. Aesthetic considerations.

The light thinning and small group selection openings proposed in this plan are unlikely to be noticeable to the general public. The west facing slopes may be visible to the lightly travelled Butler Valley road, but the majority of the property faces north and east is not visible from any public locations. The neighbors to the south do not have clear views of the property due to the dense tree cover along the property boundary and there are no plans to remove this tree cover.

22. Archaeological, Historical, Cultural considerations.

An archaeological survey was conducted during each of the three previous THPs conducted on the Almquist property. Three significant sites were documented in the confidential archaeological addendum for the most recent THP (THP 1-04-225). However, the portion of the THP area where the sites were discovered was not acquired by the current owner, Eric Almquist, and is not part of the property that is the subject of this Forest Management Plan. No other sites were discovered in the area owned by Almquist during the previous THPs.

No archaeological sites were discovered during the recent timber inventory and reconnaissance effort of 2009 for this Forest Management Plan. There are no other historical or cultural issues known at this time for the Almquist property.

23. Climate Change and Carbon Sequestration

Current climate models for forests and rangelands predict that California will soon be experiencing many changes as a result of climate change. These include increased wildfire frequency and intensity; longer fire seasons; declines in distribution, productivity and health of conifers and some range species; changes in ecosystems, wildlife habitat and populations; potential increases in drought, insects and disease in Southern California; and increased spread of invasive species.

Healthy forests have an important role to play in addressing climate change. Trees remove carbon dioxide, the primary greenhouse gas of concern, from the air and store it as carbon in as they grow. When trees die, they release CO2 back into the atmosphere. Forest damage and loss to wildfires, insects and disease, or development can result in large CO2 emissions.
CAL FIRE has identified five forestry strategies for reducing or mitigating greenhouse gas emissions. They are:

- Reforestation to sequester more carbon
- Forestland conservation to avoid forest loss to development
- Fuels reduction to reduce wildfire emissions and utilization of those materials for renewable energy
- Urban forestry to reduce energy demand through shading, increase sequestration, and contribute biomass for energy generation
- Improved management to increase carbon sequestration benefits and protect forest health

The proposed management activities on the Almquist Property address 4 of the 5 management strategies identified by CAL FIRE. The release and regeneration projects identified above will speed the reforestation of currently cutover portions of the property. The landowner is interested in forest management as an alternative to development, which is occurring on adjacent properties. We have identified 44 acres of forestland that can be thinned to serve as a fuel break, which can decrease the spread rate and intensity of wildland fire on the property. During the course of fuel reduction treatments and traditional commercial forest management the landowner intends to recover as much material as possible for re-sale as cordwood for home-heating. Finally, the landowner intends to grow bigger, older trees on the property than would be done under short rotation even-aged forestry practices- which will lead to greater sequestration of carbon on the property.

The landowner is interested in selling carbon credits from the property and the feasibility of this will be investigated in the future during the course of further inventory analysis work that will take place during development of the NTMP for the property.

References

Krumland, B., and H. Eng. 2005. Site Index Systems for Major Young-Growth Forest and Woodland Species in Northern California. California Forestry Report No. 4. State of California, The Resources Agency, Department of Forestry and Fire Protection. Sacramento, California.

Mayer, Kenneth E. and William F. Laudenslayer Jr. et. al., 1988. A Guide to Wildlife Habitats of California.

McArdle, R.E. and W.H. Meyer. 1961. The yield of Douglas-fir in the Pacific Northwest. Washington, DC. USDA Forest Service Tech. Bul. No. 201. 64 p.

Timberland Resource Consultants. 2006. Joint Timber Management Plan for RLF Redwood Properties Moore Ranch. Fortuna, CA.

Appendix A- Schedule of Operations

Planned Conservation Treatment	Estimated Amounts	2010	2011	2012	2013	
Regeneration Release	15 acres					
Planting Seedlings	2 acres					
Shaded Fuel Break	44 acres					
Install Fire Suppression Reservoir	1 tank					
Bridge and Road Engineering						