Caspar Creek THP

Summary of the Proposed Timber Harvest Plan

Area
247 Acres (31 acres are in Class I and Class II WLPZ)

Location/Topography
The THP area is located approximately 6.5 miles southeast of the community of Fort Bragg, California. The legal description is Township 17 North; Range 17 West; Sections 1, 2, 10, 11, 12, and 15; Mount Diablo Base and Meridian. The elevation ranges from 160 feet to 1,080 feet above sea level. The slope and aspect of harvest units is variable throughout.

Stand History
The plan area was clearcut and burned by the Caspar Lumber Company between the 1860s and 1890s. Oxen and bull teams, followed by steam donkeys, were used for logging. Nearly a century later, between 1966 and 1973, naturally regenerated second growth was harvested using single tree and small group selection silvicultures in the Middle Fork Caspar. The third entry in this area included shelterwood removal and clear cut units that were harvested during the late 1980s, and selection units (including the THP area) harvested in 1995.

Vegetation and Stand Conditions
The harvest area is Site Class II and III timberland. The overstory is dominated by redwood, Douglas-fir, grand fir, and tanoak. Western hemlock and Bishop pine are minor overstory species. The understory is generally well stocked Douglas-fir, redwood, grand fir and tanoak poles and saplings. Snags and cull trees are increasing, yet relatively rare, and large woody debris is scarce. Tanoak sprouts, ceanothus, huckleberry, sword ferns, rhododendron, and salal are the dominant understory species. French broom and jubata grass are found along some of the access roads and landings.

Hardwoods are present as both trees and shrubs throughout the harvest area. In some areas they will not have a significant impact on the stand. In other locations hardwood trees will need to be removed to maintain the site occupancy of conifers. Hardwood brush may also need to be manually treated to encourage regeneration in areas lacking redwood stocking and the potential for occupancy from stump sprouts.

Watershed and Stream Conditions
The Caspar Creek THP lies in the Caspar Creek Planning Watershed. Logging began in the watershed in the mid-1860s and was mostly completed by the late 1890s. During this era logs were hauled by teams of oxen, and later steam donkeys, and dumped into the creeks. Caspar Creek and its tributaries were dammed and then used to transport logs to the mill at the mouth of Caspar Creek during seasonal high flows. Tractor operations during the 1960s and 1970s created extensive skid trail systems which were placed in and across watercourses. The watercourses bear evidence of these early activities which left the channels in a highly modified condition.

Coho and Steelhead are present in Caspar Creek. The main stem and middle forks of Caspar Creek lay adjacent to the THP units. Numerous non-fish bearing streams are found throughout the harvest area.

Silviculture
The targeted residual conifer basal area, as averaged throughout the stand, is approximately 160 sq. ft. per acre. Trees will be selected individually with the focus on reducing competition to promote increased growth rates on understory conifers, particularly redwood stump sprouts, as well as reducing competition between residual trees. Tanoaks will be felled where they are directly competing with residual conifers.

Preharvest Basal Area		Post Harvest Basal Area	
Conifer:	220 ft^2	Conifer:	150-160 ft^2
Hardwood:	10 ft^2	Hardwood:	8 ft^2

The following estimates are based on mark tally volume:

Harvest Volume:	1.34 Mmbf
Volume per acre:	7.4 mbf/ac (3.5 - 9.9 mbf/ac variation per unit)
Species Mix:	61% RW, 34% DF, 5% WW

Throughout the harvest area, management will focus on reducing competition between co-dominant crown classes. Spacing, live crown ratios, and vigor of trees will be the primary factors in choosing trees for retention. Trees with unique structural characteristics will be retained when feasible.

Slower growing or diseased Douglas-fir, grand fir, hemlock, tanoak, and an occasional dominant redwood will be harvested to release existing conifer regeneration and to encourage redwood stump sprouts. Areas adjacent to roads will be left with more canopy cover to reduce the spread of invasive species. Larger, decadent native trees will be retained for snag recruitment in areas with less than one 30"+ dbh snag per acre. Tanoaks larger than 22" will not be harvested.

Harvesting System and Roads

The THP will utilize existing road systems. Roads within the harvest area and appurtenant State Forest Roads 500, 600, 630, and 640 are currently being assessed for potential watercourse crossing structure and road drainage mitigations. This will include multiple culvert replacements and upgrades, possibly including a Class I culvert replacement project. Several culvert crossings on Road 640 are already scheduled for upgrading next year through a grant project.

Approximately 56 acres will be harvested with tractors. The remainder of the plan will use cable yarding systems.

Watercourse Protection

Class I Watercourses

- Class I Watercourse and Lake Protection Zone (WLPZ) is 150 feet, 0 to 30 feet no-cut* from the watercourse transition line, 30 to 100 feet 80% canopy retention, 100-150 feet 70% canopy retention.
- Minimum 240 sq. ft. conifer basal area/acre retention and the 13 largest conifers per 330 feet of stream channel

Class IIs, Springs, and Wet Areas

- Class II Watercourse and Lake Protection Zone (WLPZ) is 100 feet; 0 to 30 feet no-cut* from the watercourse transition line.
- Minimum 240 sq. ft. conifer basal area/acre retention and the ten largest conifers per 330 feet (13 for Class II-Large streams) of stream channel.

Class III Watercourses

- Class III watercourses have 30 to 50 foot Equipment Limitation Zones where ground based equipment will be utilized. Except for the necessary removal of trees for safe cable yarding operations, no harvest shall occur within the channel area.

**No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed.*

Demonstration and Research Values

- Encouraging the development of late seral stand characteristics in older second growth stands in Class I and Class II-L WLPZ.
- Harvesting to promote multiple age classes without shifting the species mix toward hardwoods and more tolerant conifer species or depending on herbicides.
- 3.5 miles of Road 630 were decommissioned in 2005. The decommission project for Road 630 was monitored over the winter of 2006. Julie Bawcom will be conducting a 3rd monitoring effort and analysis of this road decommissioning during THP preparation.
- Controlling the spread of invasive species by maintaining more canopy cover adjacent to roads.

Aesthetic and Recreational Considerations

The Caspar Creek THP is not located within any known special recreation area. Bicyclists, hikers, and mushroom gatherers utilize the area. The general public views the portion adjacent to County Roads 408 and State Forest Road 500. The proposed silviculture should provide a spatial arrangement of retained trees that will mitigate the visual impacts of harvesting and overtime may improve the visual aesthetics of the area. Harvesting adjacent to county and state forest roads will retain aesthetic values and significant shade canopy. A feathered approach will be employed with even greater care taken where visual impacts could be viewed from these roads. Portions of the plan area are located within the Road and Trail Corridor management area adjacent to Road 408.

Marbled Murrelet
No known potential Marbled Murrelet habitat is known to occur within 0.25 miles of the THP boundary.
Northern Spotted Owl
The plan contains habitat suitable for the Northern Spotted Owl (NSO) (*Strix occidentalis caurina*). Activity center (AC) MEN 585 is located to the northeast of the project boundary. Surveys indicate that this site has not been occupied since 2004. A 100 acre no-cut core area will be retained for this AC. There is no other valid NSO AC within the 0.7 mile assessment area of the plan. Northern Spotted Owls surveys will be conducted as required by protocol and appropriate buffers will be provided if NSO are found.

Botany
A full botanical survey will be conducted and included/amended into the harvest plan along with any necessary mitigation. *Usnea longissima* source trees were retained during tree marking.

Additional Projects Associated with the THP
The log purchaser will be required to upgrade and maintain the existing appurtenant roads with multiple culvert replacements and other improvements.

Caspar Creek THP

Preliminary Map

Sec 1, 10, 11, 12, 15
T17N R17W MDB&M
USGS 7.5 min 1991 Quadrangles:
Mendocino, Mathison Peak
Entire THP:
Selection Silviculture
Site Class II/III

Map Point
Spring / Seep
Gate
NSO Activity Center
THP Boundary
Tractor Yarding
(all other areas Cable Yarding)

NOTE: cable yarding in tractor areas are an option

JACKSON DEMONSTRATION STATE FOREST
4/18/2013 Headley

Contour Interval = 40'

1:12,000 1 in=1,000 ft

0 500 1,000 2,000 Feet

DRAFT VERSION: Not all symbology included in map detail.
Legend & map elements are subject to additions & removals.

Unit A
Unit B
Unit C
Unit D
Unit E

Caspar Creek
South Fork Caspar

▲ Watercourse Class Transition
Class II L 1,000' Transition
Class I Watercourse
(salmonoid spawning & rearing habitat)
Class II L Watercourse
Class II S Watercourse
Class III Watercourse

Proposed Seasonal Road
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Road > 200' & >15% Grade
(Permanent and seasonal roads considered "public")

Frolic #2 THP

Area: 324 Acres

Silvicultural Prescription: Selection

Harvesting System:
The harvesting system design for this timber harvest plan has not yet been finalized. The majority of the road system has already been constructed and it appears that upwards of 80% of the area will be designated for cable systems with the remainder being ground based.

Location/Topography
The THP area is located approximately 9 miles southeast of the community of Fort Bragg, California. The legal description is Township 18 North, Range 16 West, Sections 25, 26, 27, 34, 35 and 36, Mount Diablo Base and Meridian. The elevation ranges from 360 feet to 1,280 feet above sea level. The slope aspect of harvest units is variable throughout with southern aspects dominating the harvest area.

Stand History
Prior to the 1920's the operations of the Caspar Lumber Company had extended up the Parlin Creek drainage and into the western portions of the Frolic Timber Sale area. By the end of the 1920's the entire Parlin Creek drainage had been harvested. First the area adjacent to Parlin Creek was river logged which occurred sometime between 1870 and 1900. Steam donkey and railroad logging soon followed, extending operations further up the slope and smaller watercourses. JDSF last entered the sale area under the Frolic Timber Sale in 1996-97. Silviculture identified in the Timber Harvest Plan was seed tree seed step which the State Forest staff implemented as a structure tree retention harvest. The harvest areas closely represent the modern day variable retention silviculture. Retention elements were primarily dispersed with small clumps of trees. The area proposed for harvest under this Timber Sale is the second growth timber that lies in-between the 1996 structure tree cuts.

Vegetation and Stand Conditions
The current forest is an evenaged second growth stand comprised of redwood, Douglas-fir, grand fir and western hemlock with a hardwood component consisting of primarily tanoak. Other tree species such as pacific madrone, golden chinquapin, wax myrtle and California nutmeg are also found within the harvest area. Major constituents in the understory are tanoak, sword fern and evergreen huckleberry. The Douglas-fir component found in these stands is very similar to that which was encountered in the North Fork Spur Timber Sale. The trees are mature and show signs of poor vigor and disease. Preliminary inventory data indicates that Douglas-fir comprises approximately 27% of the stand.

Hardwoods are present throughout the harvest area. In some areas they will not have a significant impact on the stand. In other locations hardwood trees will need to be removed to maintain the site occupancy of conifers. Larger areas with high percentages of hardwood have been removed from the sale area.

Watershed and Stream Conditions
The Frolic #2 THP lies in the Parlin Creek Planning Watershed which drains to the Noyo River. Early harvesting activities in this drainage began with river logging activities and evolved to railcar transportation systems supplied with logs yarded with stream donkeys. The watercourses bear evidence of these early activities which left the channels in a highly modified condition. Much of Parlin Creek is a fish bearing watercourse with tributary streams that also contain fish. Portions of the THP lie adjacent to watercourse reaches which are known to contain fisheries habitat. Numerous non-fish bearing streams are found throughout the harvest area

Silviculture

Throughout the harvest area management will focus on reducing competition between co-dominant crown classes. Spacing, live crown ratios and vigor of trees will be the primary factors in choosing trees for retention. Smaller, well growing intermediate trees will be retained to contribute to vertical diversity and overtime, when combined with regeneration, a more diverse stand structure. Some harvesting will occur in these intermediate classes but will likely be limited to trees of poor form. Hardwood trees will be harvested where necessary to maintain conifer occupancy. Trees with unique structural characteristics will be retained when feasible. Redwood trees will be favored for retention as much of the Douglas-fir in the area is mature and shows signs of decline. Consequently as much merchantable Douglas-fir will be harvested as feasible while still considering the need to provide revenue to the State Forest System.

Inventory data has been used for preliminary evaluation of the stand. A more intensive cruise will be implemented to further stratify the area for more accurate estimation of actual current basal area. The proposed harvest will be approximately 40% or less of the conifer basal.

Stand composition as represented by inventory data is approximately 25% Douglas-fir, 63% redwood, 3% grand fir and 9% hardwoods. The inventory data presented below is for the entire harvest area. Defect and non-merchantable material is expected to be high based on recent timber sales in the area and net volumes will likely be well below gross volumes.

Frolic #2

Conifer Pre-harvest Basal Area	Conifer Post-harvest Basal Area	Conifer Pre-harvest Volume (Gross Vol / acre)	Conifer Post-harvest Volume (Gross Vol / acre)
380	230	84,363	51,461

** Above data is based on 2005 FRI data. Actual basal area may change as more recent and accurate data is developed. Target retention will remain at 61% or greater.*

Watercourse Protection

Class I

- Class I Water Lake Protection Zone (WLPZ) is 150 feet, 0 to 30 feet no-cut* from the watercourse transition line, 30 to 100 feet 80% canopy retention, 100-150 feet 70% canopy retention.
- Minimum 240 sq. ft. conifer basal area/acre retention and the 13 largest conifers per 330 feet of stream channel

Class II

- Class II Water Lake Protection Zone (WLPZ) is 100 feet; no-cut core zone* from the watercourse transition line.
- Minimum 240 sq. ft. conifer basal area/acre retention and the ten largest conifers per 330 feet (13 for large class II streams) of stream channel.

Class III

- Class III watercourses have 30 to 50 foot Equipment Limitation Zones where ground based equipment will be utilized.

**No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed.*

Roads

Only minor repairs and short road spurs are anticipated to facilitate operations in this area.

Demonstration and Research Values

JDSF is evaluating the potential for an Anadromous Salmonid Protection (ASP) Rule Section V Technical Advisory Committee (VTAC) study within the Frolic #2 timber sale area.

Aesthetic and Recreational Considerations

The Frolic #2 area is located in part along Forest Road 330 which is used by equestrians, hunters and mountain bikers. The road is a travel route to the Bob Woods meadow which is visited by recreationist annually. Due to the elevated use of the road by various users a 50 foot aesthetic buffer will be retained. Only trees that are a hazard or need to be harvested to facilitate operations will be cut. Skid trails will travel through the aesthetic buffer but will be largely covered with slash after operations.

Indian Springs Campground is located near the east end of the proposed sale area. The campground will be buffered and the only impacts from this sale would be short term increase in noise and traffic. The camp is rarely occupied and no impacts would persist beyond the actual harvesting operations.

Marbled Murrelet

No known potential marbled murrelet habitat is known to occur within 0.25 miles of the THP boundary.

Northern Spotted Owl

The plan contains habitat suitable for the Northern Spotted Owl (NSO) (*Strix occidentalis caurina*). One recorded NSO activity center is located adjacent to and slightly within the plan boundary. Three NSO activity centers are known to be located within .7 miles of the plan boundary. Northern Spotted Owl surveys will be conducted as required by protocol.

Botany

Humboldt Milk Vetch is known to occur within the harvest area. A full botanical survey will be conducted and included/amended into the harvest plan along with any necessary mitigation.

Frolic #2 THP

Preliminary Map

Sec 25, 26, 27, 34, 35, 36
T18N R16W MDB&M
USGS 7.5 min 1991 Quads:
Noyo Hill, Northspur

Entire THP:
Selection Silviculture
Site Class II/III

- Map Point
- Spring / Seep
- Gate
- NSO Activity Center
- THP Boundary
- Tractor Yarding (all other areas Cable Yarding)

NOTE: cable yarding in tractor areas are an option

- Watercourse Class Transition
- Class II L 1,000' Transition
- Class I Watercourse (salmonoid spawning & rearing habitat)
- Class II L Watercourse
- Class II S Watercourse
- Class III Watercourse

- Proposed Seasonal Road
- Existing Permanent Road
- Existing Seasonal Road
- Existing Temporary Road
- Road > 200' & >15% Grade

NOTE: Permanent and seasonal roads considered "public"

JACKSON DEMONSTRATION STATE FOREST
4/18/2013 Headley

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0 500 1,000 2,000 Feet

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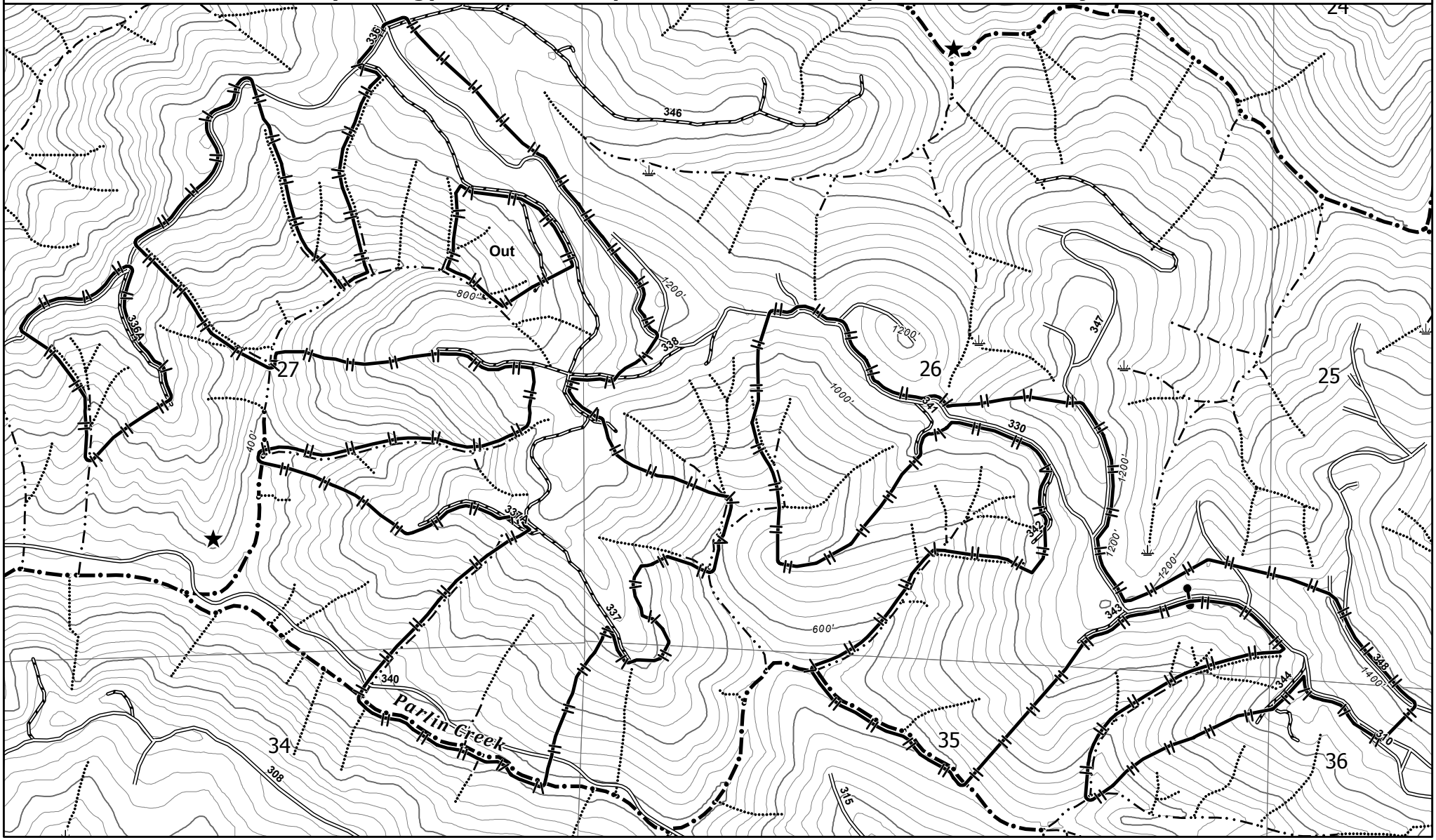

Frolic #2 THP

Preliminary Map

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USGS 7.5 min 1991 Quads:
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Entire THP:
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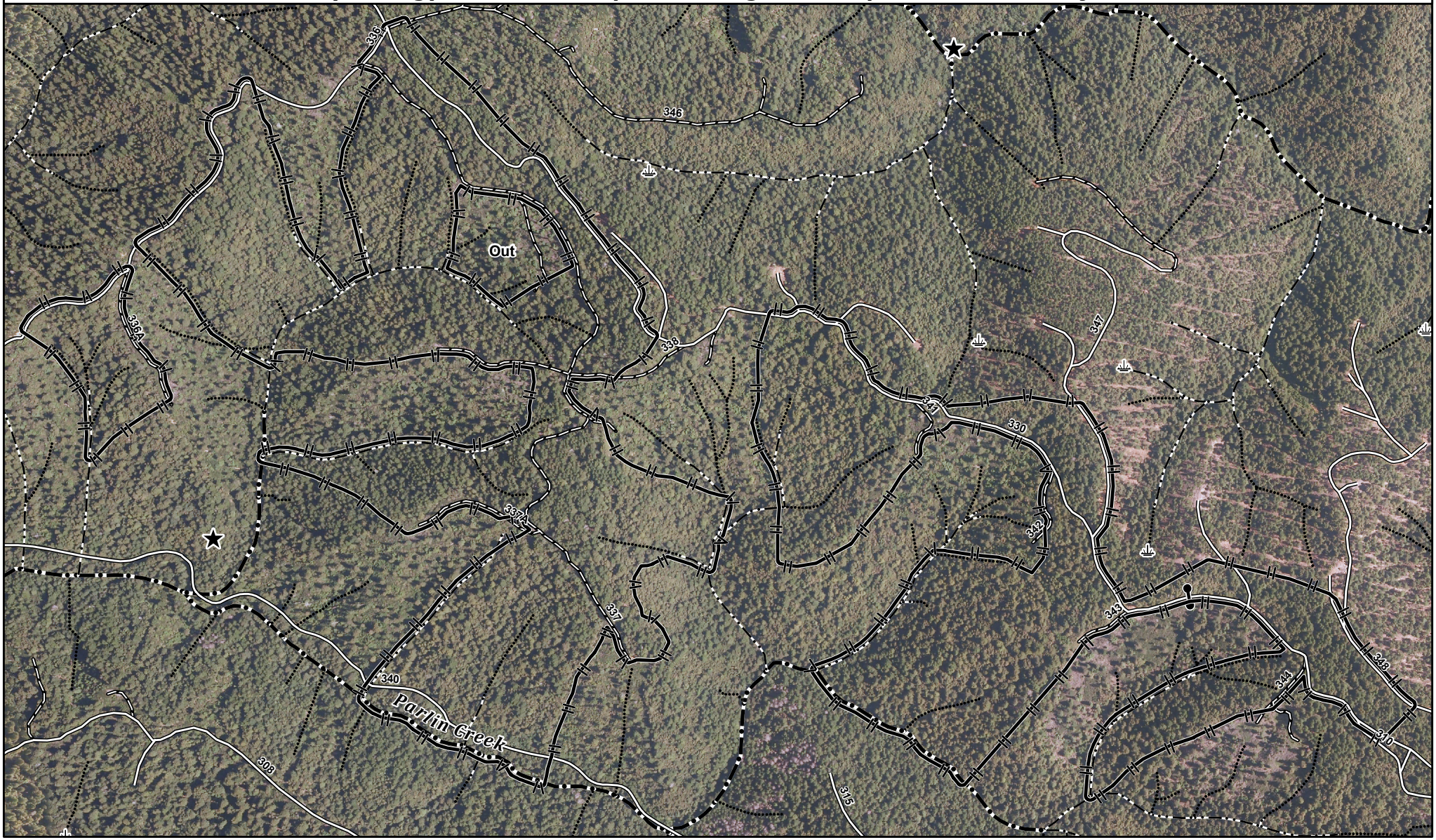

PARK GULCH THP

Location
The estimated 790 acre Park Gulch THP is located approximately 13 miles east and southeast of the community of Fort Bragg, California. The legal description is portions of Sections 3, 4, 5, 8, 9 and 10, T17N, R15W, Mount Diablo Base and Meridian.

Timber Harvest Preparation
To date, most of the watercourses have been classified and the majority of the road locations, including new roads, have been identified. By estimate, 60-65% of the THP area will be cable-yarded and 35-40% will be tractor-yarded. Final timber harvest and silviculture boundaries are not complete. Some areas may be removed from the harvest area illustrated on the attached Preliminary THP Map, given that some areas may not be suitable for harvest due to either the lack of conifer harvest volumes, poor site conditions or limitations of logging equipment.

Harvest History
Most of the proposed THP area was harvested by the Caspar Lumber Company in the 1940's, and the majority of the old growth trees were harvested during this time. The entire logging area utilized tractors to yard logs downhill to streamside roads and then hauled to Camp 20. The harvest area was re-entered in the 1970's to remove the remaining old growth trees. Very few old growth trees were observed during sale preparation.

Topography
Elevation ranges from approximately 400 feet at the lowest far west and southern THP boundary to approximately 1200 feet at the ridgetop near the east boundary. Approximately one-third of the slopes within plan area are north facing, one-third south facing with the remaining areas roughly equally divided between east and west facing slopes. A prominent ridge runs east-west along Road 231. Stream channels are altered, largely due to disturbances created from historic logging. The majority of the harvest area for both young-growth redwood and Douglas-fir is Site Class III. A small area located in the northeast corner is composed of Site Class IV.

Watershed and Stream Conditions
Park Gulch is a marginal Class I watercourse, supporting steelhead and Coho salmon. The Class I break is an approximate 10 foot bedrock waterfall, located 2,000 feet upstream from Chamberlain Creek. The stream channel is narrow with an abundance of large woody debris, mostly contributed from historic logging activity.

The Chamberlain Creek Watershed, including Park Gulch, was highly impacted by the logging of the old growth forest. Most of the watershed was tractor logged, resulting in a high density of skid trails and roads, many located near the watercourse channels. Tractor equipment yarded logs across the slope and along stream banks, displacing soil and depositing material into watercourses.

There are several main Class II channels within the plan area, many of them downcutting through material that was deposited during the early logging. Many new channels were developed as a result of historic logging, creating braided channels and introducing large woody debris into watercourses. The Class II gradient typically varies between 5% and 15% in lower reaches and 25% to 50% in upper reaches. Watercourses are well shaded throughout their lengths.

Vegetation and Stand Conditions

The current conifer stand is mostly comprised of 70 year old unmanaged second growth redwood, Douglas-fir and a minor component of grand fir. A few 40-45 year third growth trees were observed. The hardwood component consists primarily of tanoak. Other tree species include pacific madrone, golden chinquapin and wax myrtle. Major constituents in the understory are tanoak, evergreen huckleberry and some manzanita. Understory vegetation is denser in areas dominated by hardwoods. Conifer regeneration is mostly absent throughout, with the exception of highly suppressed conifers that had regenerated from historic logging disturbance.

Both poor and moderately stocked areas were observed throughout the sale area. Some isolated pockets of larger diameter conifers are located near watercourses, draws and along ridgetops. Overall, conifer stem diameters are generally small, with few trees exceeding 30 inches DBH. Tanoak is relatively abundant throughout the sale area, overall composing approximately 42% of the total basal area and exceeding the total conifer stems per acre by approximately 125%. In some areas, tanoak is the dominant tree species.

Species	Stems (per acre)	Basal Area (sq. ft./acre)	Gross Conifer Volume (bd. ft./acre)
Young Redwood	70	128	18,700
Young Douglas-fir	26	52	9,900
Whitewoods	<1	<1	100
Hardwoods	120	75	
Conifer Totals	96	180	28,700

Table 1. Stand estimates were derived from 2005 FRI plots (72 plots) within the THP boundary.

Silvicultural Prescription

Areas composed of dense tanoak canopies are a significant factor in limiting conifer growth rates and site occupancy in an area that historically had higher conifer occupancy. Developing a prescription that promotes conifer growth in a hardwood dominated stand is challenging. Without a reasonable effort to control hardwoods, reduced growth rates of residual conifers and lack of successful conifer regeneration can be expected.

In order to maximize the opportunity to manage hardwoods, a close assessment of the components of the overstory vegetation must be conducted. Thus far, a preliminary assessment is complete. These efforts focus on areas that range from moderate conifer stocking with a hardwood component, to areas dominated with tanoak. Considerations for establishing the harvest and silviculture boundaries include the balance of implementing selection silviculture, while attending to hardwood control measures and preparing an economically feasible harvest plan. The selection silvicultural prescriptions described below include a rough estimate of the percent area designated for each selection prescription.

Single Tree and Group Selection. The target harvest is approximately 25% to 35% of the pre-harvest conifer basal area (BA). Selection silviculture will be implemented to initiate the conversion of a relatively even-aged stand to an uneven-aged condition.

Conifer PreHarvest Basal Area	*Estimated Conifer PostHarvest Basal Area
180 ft^2/acre	118-135 ft^2/acre
hardwood preharvest basal area averages 85 ft^2/acre and will be reduced by ~ 15-20%	

*Table 2. *Actual basal areas may change as more accurate data is obtained. Expressed as a range due to high level of variability. Target conifer retention is estimated at 65% to 75% of the preharvest level for single tree and 75% for group selection silviculture harvest units.*

Group Selection

Generally, areas of poor conifer stocking correlate with a high hardwood component. Group selection is best suited to improve conifer stocking and reduce hardwood competition in these areas, thus, group selection will be implemented on approximately 40% to 60% of the THP area. Less than 20% of the area designated for group selection harvest (excluding WLPZ's) will be made up of group openings. The average group opening is expected to be 1.5 to 2.0 acres, with larger group openings up to 2.5 acres. Consideration is given to stand composition, topography, logging operations and location of future group openings

for determining group size. Establishing logical group opening locations (and size) will include planning for future groups and choosing areas where conifers are expected to maintain site occupancy. Single tree selection will be considered between groups if the conifer post-harvest basal area is at least 160 sq.ft. per acre. Due to the low stocking of group selection areas, single tree selection between groups is expected to be limited or will not occur.

Following the creation of groups, redwood seedlings will be planted at 10-12 foot spacing within the groups. Hardwood control measures will be implemented within groups to reduce competition with naturally regenerating and planted conifer seedlings. Hardwoods will be treated within all groups. A proportion of groups will include either "hack and squirt" of standing hardwoods or mechanical cutting of hardwoods, followed by cutting hardwood sprouts/seedlings sometime post-harvest (2-3 years). Herbicide may also be utilized for hardwood stump treatments.

Single Tree – with and without Clusters

Within the selection silviculture area, both single tree selection with small cluster openings and single tree selection without clusters will be implemented. Selection with clusters will entail creating small openings up to ¼ acres in size, making up approximately 10% to 20% of the selection area, thus targeting an equal amount of harvest conifer basal area. Trees will be individually marked between cluster openings to reach the target harvest (25% to 35% of pre-harvest BA), resulting in a light harvest. The target harvest basal area will be marked for areas of single tree selection without clusters. Tree marking will focus on reducing competition between co-dominant crown classes. Co-dominant and dominant conifers will be harvested where it will benefit the growth of residual conifers. Trees with optimal spacing, live crown ratios, form and high vigor will be considered for retention. Smaller trees will also be harvested, targeting trees with poor form and vigor. Larger Douglas-fir will be harvested to release adjacent redwood. Douglas-fir stems that show decline or poor vigor will be marked for harvest. Hardwood trees will be harvested where they are directly competing with residual conifers.

To further reduce hardwood competition and increase conifer stocking, similar hardwood control measures and tree planting proposed for group openings described above, will also be implemented within all or a proportion of up to ¼ acre cluster openings.

Old Forest Structure Zone (OFSZ)

Located in the far southeast corner of the proposed Park Gulch THP, approximately 8 acres are within the OFSZ. Management in the OFSZ will be aimed at producing structural characteristics of older forest, which include large trees, snags, down logs, multiple canopy layers and a high level of structural diversity while coincidentally growing and producing timber through thinning and periodic replacement of large trees. The entry currently under planning will focus on reducing competition in codominant trees to increase growth rates and maintain large trees overtime. Thinning levels will be adequate to recruit minor amounts of regeneration to promote vertical diversity while carrying a significant portion of the stand forward.

The criteria for choosing areas with and without clusters include the relative conifer and hardwood components. Generally, clusters will be located in areas with a moderate to high hardwood component. Areas with the highest conifer stocking will utilize single tree selection only. Of the estimated 40% to 60% of the single tree selection area, 70% to 90% of the selection area will be composed of selection with clusters.

Watercourse Protection

- Class I streams have a 150' Water/Lake Protection Zone (WLPZ). No trees will be marked for harvest in the first 100 feet of the WLPZ. Trees will be marked for harvest within the remaining 50 feet.
- Watercourses typed as Class II – (Large, ref. 14 CCR 916.9) watercourses within 1,000 feet of a Class I have a 100' WLPZ, where no trees will be marked for harvest within the entire WLPZ. The remaining Class II watercourses (standard, ref. 14 CCR 916.9) have a 100 WLPZ, where no trees will be marked for harvest in the first 25 feet of the WLPZ. Trees will be marked for harvest within the remaining 75 feet.

For all WLPZs where trees will be marked for harvest, a light harvest aimed at increasing growth on larger diameter trees will occur. Harvest of trees is allowed for the need to conduct safe cable operations in WLPZ areas where no trees are designated for harvest.

Roads

Approximately 3.5 miles of new road construction is proposed, including roads 231B, 231C and spur roads. Approximately 2.5 miles of road, including road 203 and most of road 204 is proposed for abandonment. Two short road segments located east of

Road 231A are also proposed to be abandoned. Existing roads include JDSF Forest Road 202, 231 and segments of Roads 204, 230 and 231A. All existing roads are stable and proposed roads are generally located on ridge tops. Improvements to drainage will occur on existing roads and new roads will be outsloped.

Wildlife
The plan contains habitat suitable for Northern Spotted Owl (NSO) (*Strix occidentalis caurina*). There are two historic NSO activity centers within 1,000 feet of the plan boundary, MEN 002 and MEN 516. A two year survey for the NSO will begin this year, 2013.

Marbled Murrelet
There is no potential murrelet habitat within the plan area. Potential murrelet habitat exists within ¼ mile of the THP in the Camp 20 Grove 500 feet from the southwest corner of the THP boundary. The Camp 20 Gove was surveyed in 2005/06 and 2008/09 with no murrelet detections.

Botany
A botanical survey is scheduled to be completed by fall of 2013.

Demonstration

The west half of the Park Gulch THP is roughly within the JDSF "Major Demonstration, Experiment and Education Area".

1. Document the cost effectiveness, revenues and costs, of different group, cluster and single tree selection methods.

2. Demonstrate the ability of small cluster (up to ¼ acre) openings to successfully establish conifer regeneration in redwood/Douglas-fir stands with a significant hardwood component.

3. Demonstrate the ability to conduct harvesting and road abandonment activities that maintain trail/road conditions compatible with equestrian and other recreational use.

Recreational and Aesthetic Considerations

- Use of firearms is not allowed within a portion of the sale area due to proximity of the Chamberlain Creek Conservation Camp.
- Road access to the sale area includes JDSF Forest Roads 202, 230 and 231. Road 202 and 231 are impassible year round by vehicle. Road 231 is blocked at the intersection with Road 230 and is currently inaccessible at the intersection with Road 200, where a gate will be installed. Road 202 is locked year round. Road 230 is locked during the winter period and accessible by vehicle during dry periods only.
- The sale area is available for public recreation, including hiking and bicycle riding. Portions of the plan area are located within the Road and Trail Corridor management areas adjacent to Road 200, Road 202, Road 230, Road 231 and Highway 20. In addition, existing roads and skid trails associated with the proposed Park Gulch THP are frequently utilized by equestrians.
- No specifically designated recreation facilities exist within the area.

The effort to minimize the aesthetic impacts of Road 200, Road 231 and Highway 20, operations within 200 feet will include light harvesting, maintaining canopy adjacent to roads and other vegetation acting as a visual barrier.

Road abandonment efforts will be conducted to meet the objectives of reducing sediment inputs into streams, while maintaining trail/road conditions compatible with equestrian and other recreational use.

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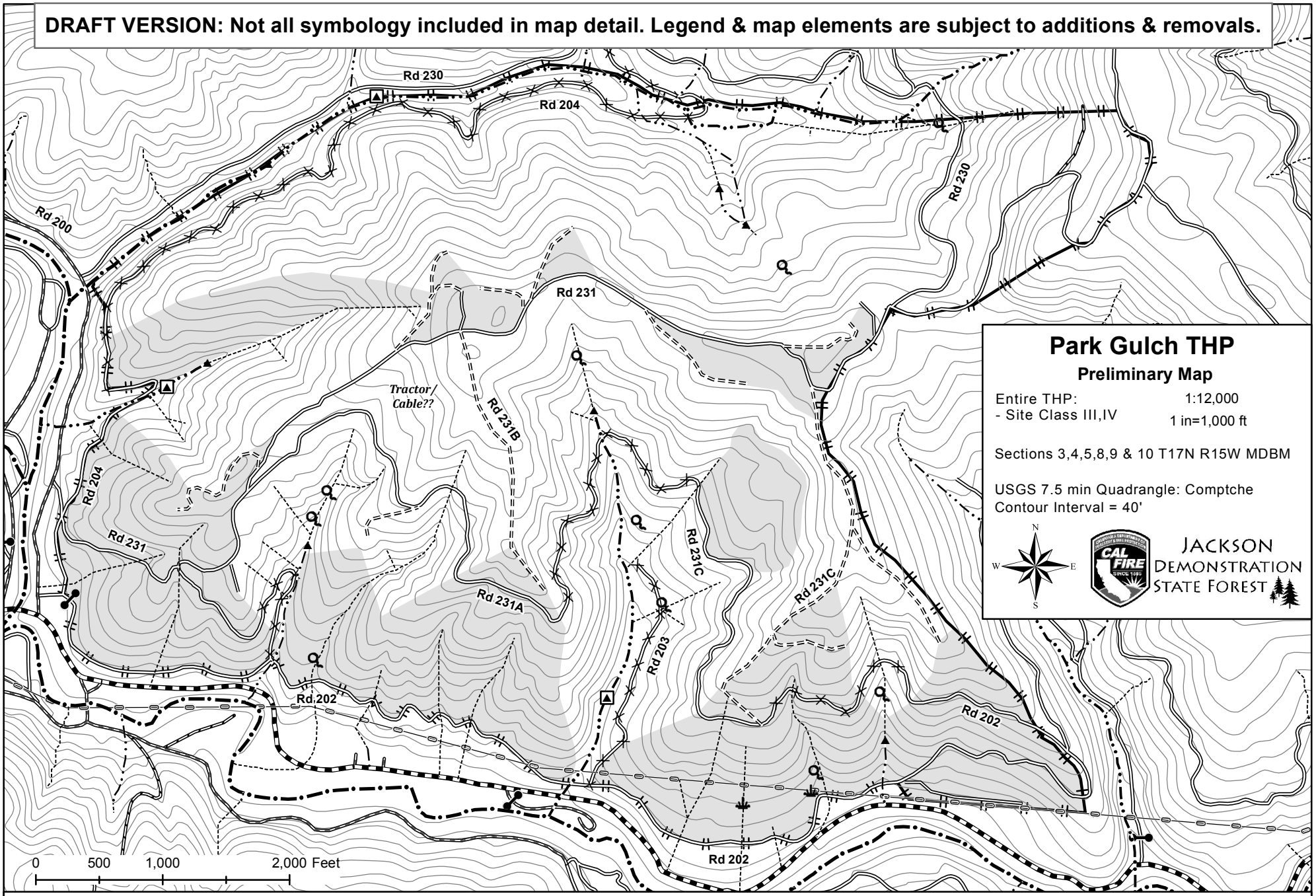

Park Gulch THP

Preliminary Map

Entire THP: 1:12,000
- Site Class III,IV 1 in=1,000 ft

Sections 3,4,5,8,9 & 10 T17N R15W MDBM

USGS 7.5 min Quadrangle: Comptche
Contour Interval = 40'

N
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CAL FIRE SINCE 1885

JACKSON DEMONSTRATION STATE FOREST

THP Boundary

Single Tree Selection Silviculture (all other areas Group Selection)

Tractor Yarding (all other areas Cable)

=R=R=R Proposed Road Reconstruction

======= Proposed Seasonal Road

X X X Proposed Road Abandonment

* * * * * Road > 200' & >15% Grade

Skid Trail

Existing Permanent Road

all displayed permanent roads in Class I WLPZ

Existing Seasonal Road

Existing Temporary Road

NOTE: Permanent and seasonal roads are considered "public"

Map Point

Gate

Wet Area

Spring / Seep

Watercourse Class Transition (mid stream)

Class II L 1,000' Transition

Class I Watercourse (salmonoid spawning & rearing habitat)

Class II L Watercourse

Class II S Watercourse

Class III Watercourse

Railroad Gulch

Area: 240 acres

Silvicultural Prescription: Single tree selection (80 acres), group selection (80 acres), & combination group/individual tree selection (80 acres)

Harvesting Systems: Approximately 42.5% (102 acres) will be cable-yarded, and 57.5% (138 acres) will be tractor-yarded.

Pre-harvest Basal Area		Post-harvest Basal Area	
Conifer:	307 ft^2/acre	Conifer:	200 ft^2/acre
Hardwood:	42 ft^2/acre	Hardwood:	30 ft^2/acre

Location

The THP area is located approximately 4 miles northeast of Mendocino, CA. The legal description is:

Section	Township	Range	Acreage	County	Base and Meridian
13	17N	17W	41	Mendocino	Mount Diablo
14	17N	17W	112	Mendocino	Mount Diablo
23	17N	17W	54	Mendocino	Mount Diablo
24	17N	17W	33	Mendocino	Mount Diablo
		TOTAL ACREAGE	240		

93.3 % (224 acres) of the THP area is located within the Railroad Gulch drainage, a tributary to Big River within the Mouth of Big River Planning watershed. 6.6% (16 acres) lies within the Berry Gulch Planning Watershed in an unnamed drainage, a tributary to Little North Fork Big River.

Topography

The elevation ranges from 80 feet to 760 feet above sea level. The slopes range from gentle to very steep. The aspect of harvest units is variable, with a general aspect that trends to the south.
Timber site class for conifer species is classified as Site II and III

Vegetation and Stand Conditions

The THP area was clear-cut in 1918 and burned repeatedly to promote rangeland-a food source for cattle utilized by the logging camps. Once the logging camps moved elsewhere, the area was planted in 1924. A harvest in 1983 removed an average of 30% of the basal area using single tree selection (80 acres), group selection (80 acres), & combination group/individual tree selection (80 acres). The resulting stand is primarily second-growth averaging around 90 years old. A 30 year-old cohort of third-growth occupies the midstory, understory and group openings. Some residual redwoods that survived the clearcut and burn era of the 1920's occupy scattered areas of the plan area. These trees are typically found on north slopes or other areas where fire intensity was minimized by environmental factors. Trees exhibiting old-growth characteristics will be retained where feasible.

Species composition based on percentage of basal area (BA) is as follows: Redwood (74%) Douglas-fir (12%) whitewoods (2%) and Tanoak (10%). Wax myrtle, Scoulers willow, red alder, Pacific madrone, California nutmeg, chinquapin, and California bay represent 2%.

Watershed and Stream Conditions

The majority of the harvest plan area (224 acres) is within the Railroad Gulch watershed. To a much lesser extent (16 acres) is located in an unnamed tributary of Little North Fork Big River. Big River, Little North Fork Big River, and Railroad Gulch are fish bearing streams containing anadromous salmonids. The watercourses within the plan area are generally well shaded, but with elevated sediment loads; likely a result of early harvesting activities which involved yarding of logs down the channels to the railroad systems located near Railroad Gulch and Little North Fork Big River. The watersheds are exhibiting signs of recovery as the shade levels increase, large woody debris becomes recruited and fine sediment is flushed from the system.

The smaller tributary channels upstream of the Class I watercourses are intermittent. Those that support non-fish aquatic life are generally low gradient with little or no surface flow during the dry period. The smallest watercourses are primarily ephemeral and appear stable.

Planned Silviculture

Single Tree Selection will be implemented on northern 1/3 of the THP area to continue the development of an uneven-aged condition. Approximately 30% of the pre-harvest basal area will be removed. Trees selected for removal will be chosen with regard to timber operation practicality, decreased competition of residual trees, and to capture expected mortality. Spacing, live crown ratios, and vigor will be the primary factors in choosing trees for retention. Smaller, well growing intermediate trees will be retained to contribute to vertical diversity and uneven-aged structure. Trees with unique structural characteristics will be retained when feasible. It is desired to maintain existing species composition levels.

Group Selection will be implemented on the middle 1/3 of the THP to continue the development of a coarse scale uneven-age condition. Of the 80 acres designated for group selection 8-12 acres will be designated for harvest this entry. Groups will be approximately .5 acres in sizes totaling between 16 to 24 groups. Given the height of the dominant trees, these openings are one tree height in diameter. The new group openings will be separated by a logical logging area and located by an RPF based on the following criteria: benefit of or to the 1983 openings, operational feasibility, areas where trees exhibit poor form, capture expected mortality, expectation of conifer regeneration, and environmental factors. Number of group openings will depend on the planned return interval, available acres for harvest, and planned rotation age.

Single Tree/ Group Selection will be implemented on the southern 1/3 of the THP area to continue the development of an uneven-aged condition. Groups will be less than .5 acres with single tree selection applied between the groups. Group locations will be designated on an 'as needed' basis determined by stocking, regeneration of conifers, and stand improvement using similar criteria above. The stands between the groups will be selectively thinned using the criteria of Single Tree Selection above. Groups will be smaller and thinning lighter to maintain the desired residual basal area target.

The purpose of the harvest is to continue the long term study of contrasting and comparing three silvicultural prescriptions: Single Tree Selection, Group Selection, and Single Tree/Group Selection. The plan area is large enough in scale to incorporate a variety of environmental factors but small enough to provide interested groups the ability to traverse through the stands of different uneven-age silviculture systems.

Watercourse Protection

Class I and II watercourse protections zones will be managed to create late-seral forest characteristics.

- Class I Water Lake Protection Zone (WLPZ) is 150 feet, 0 to 30 feet no-cut* from the watercourse transition line, 30 to 100 feet 80% canopy retention, 100 to 150 feet 70% canopy retention. Minimum 240 sq. ft. conifer basal area/acres retention and the 13 largest conifers per 330 feet of stream channel
  **No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed*

- Class II WLPZ is 100 feet; 0 to 30 feet no-cut* from the watercourse transition line
  Minimum 240 sq. ft. conifer basal area/acre retention and the 10 largest conifers per 330 feet (13 for large class II streams) of stream channel
  **No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed*

- Class III watercourses have 30 to 50 foot Equipment Limitation Zones where ground based equipment will be utilized. Except for the necessary removal of trees for safe cable yarding operations, no harvest shall occur within the channel area

Springs and Seeps

- Natural springs and seeps that may provide habitat for non-fish aquatic species are provided the same protection as Class II watercourses.
- Wet areas located in cutbanks resulting from the 1983 road prisms will not be afforded WLPZ protection but will be issued an equipment exclusion zone of its entirety except for the maintenance of drainage systems.

Roads

This plan includes no new road construction. Road 705 is an existing road which will require minor improvements. Improvements include additional rocking on the surface, culvert abandoned or replacement, and additional rock armor and/downspouts. Three Class II watercourse culverts may be replaced as will several class III watercourse and inside ditch culverts. Skid trails will be re-used wherever feasible to reduce environmental disturbance and maintain consistent plot data within the demonstration area.

Recreational Considerations

- The Forest History trail traverses through the northeast portion of the plan area. The trail was specifically routed through the study area for education purposes. An alternate route was constructed to provide a second route that avoids the logging area. The alternate trail, the eastern portion of the Forestry History Trail Loop, will not be affected and will remain open to recreation during harvest operations.
- An additional trail was constructed in the northwest portion of the plan for visitors interested in the demonstration. The trail traverses through uncut, selection, and group silviculture practices. This trail will be restored for use following harvest and will again be available to those interested in the demonstration.
- Nearby and adjacent forest roads are available for public recreational access, including hiking, bicycle riding and equestrian use. Harvesting of trees immediately adjacent to Roads 408, 409, and 700 roads will not occur*

  **With the exception of harvesting cable corridor trees necessary for safety.*
- For public safety, area closed signs will be posted. These signs will be posted at all points where roads and trails enter the area of timber operations.
- Road 700 is a frequently used road for recreation and access to Woodlands State Park. Measures will be taken to provide either an alternative route and/or traffic control personnel when a temporary road closure is needed.

Aesthetic Considerations

The THP area is partially visible from JDSF Road 720 and potentially Road 700. No trees will be harvested within 150 feet of road 700. Road 720 is located on the ridge south of Railroad Gulch. Very few portions of the plan area are visible from Road 720. Additionally, the retention of 70% of the stand will minimally change the aesthetics of the harvest area.

Marbled Murrelet

There is Marbled Murrelet habitat within 0.25 miles of the THP boundary. Surveys have been conducted and no evidence of Marbled Murrelets has been observed.

Northern Spotted Owl

The plan contains habitat suitable for Northern Spotted Owl (NSO) (*Strix occidentalis caurina*). There is no recorded NSO activity center within the plan boundary. Northern Spotted Owl surveys will be conducted as required by protocol and appropriate buffers provided if NSO are found.

Invasive Weeds

Minimum road widths will be maintained to reduce the potential for invasive weed dispersal. No new road construction is anticipated

Additional Projects Associated with the THP

The log Purchaser will be required to upgrade the existing appurtenant road with culvert replacements and road rocking where necessary.

Research and Demonstration

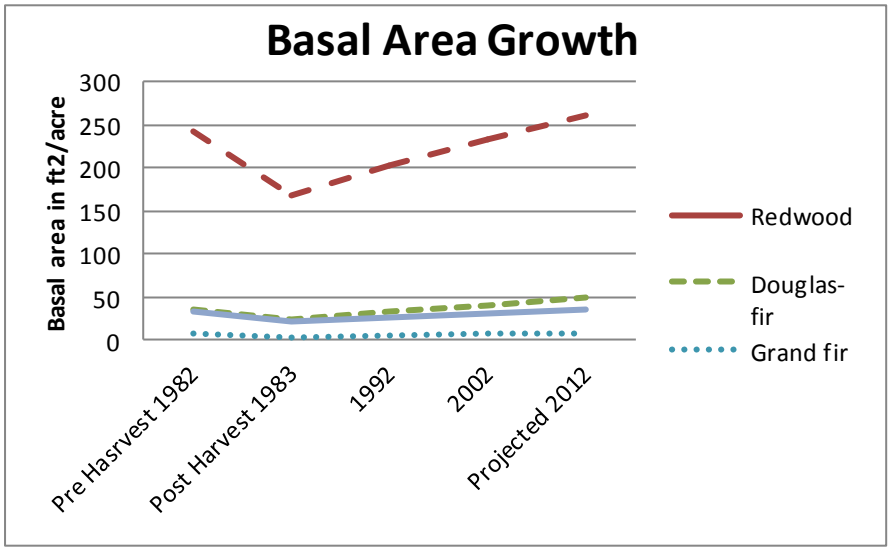
The initial purpose of the study was to demonstrate uneven-aged silvicultural methods applicable to small landownership within the coast redwood region. Originally designed by Dr. John Helms in 1982, the Railroad Gulch Study initiated variations in stand density by harvesting 20, 30, 40, and 50% of the existing basal area. It also included variations in spatial pattern by utilizing single tree, group, and combined single tree and group selection methods. The 240 acre treatment area plus 30 acres of control areas were large enough for observations of operations that can help inform small landowners. The design did not incorporate replicates of the each treatment density/ pattern combination. To monitor stand development 270 fixed radius plots were established to:

1. measure relationships between stocking levels and stand growth
2. evaluate financial costs and benefits
3. quantify the effects on understory growth and surface soil displacement.

The plots were measured a second time after the demonstration area was harvested in 1983. The initial results were summarized in a Forestry Note *Railroad Gulch: A Silvicultural Demonstration of Uneven –Aged Management Alternatives, A Progress Report* by Dana Cole and John Helms. Both pre and post-harvest stocking had considerable variability at both the treatment block level and study wide due to topography and stand history.

Other reports included: *The Effect of Silvicultural System and Stocking Level on Productivity, Costs, and Site Disturbance*, by Dr. John A. Helms (1984) , a 1983 Master's Thesis by Clifton Edwards Kennedy: *A Study of Uneven-Aged Management in Young-Growth Redwood at Jackson Demonstration State Forest*. The subsequent reports on stand response explored the growth response and site and treatment variability; *Remeasurement of Railroad Gulch Demonstration at Jackson Demonstration State Forest* by Dr. John A. Helms and Christopher Hipkins (1996) and *Summary Data for Railroad Gulch Harvest Demonstration Area* by John-Pascal Berrill and Dr. Kevin O'Hara (2007). John-Pascal Berrill 2008 dissertation: *Coast Redwood Stand Growth and Leaf Area Index: The Influence of Site Quality*, focused on one of the more intriguing aspects of the study. The latter two researchers are preparing a paper for journal publication on this topic.

First Phase Results:



On a study wide basis, the basal area stocking has exceeded the pre harvest density as shown in graph above (adapted from Berrill & O'Hara 2007). Stocking and growth by individual block is variable, but at this point even the most heavily harvested areas (50%) have reached pre harvest densities

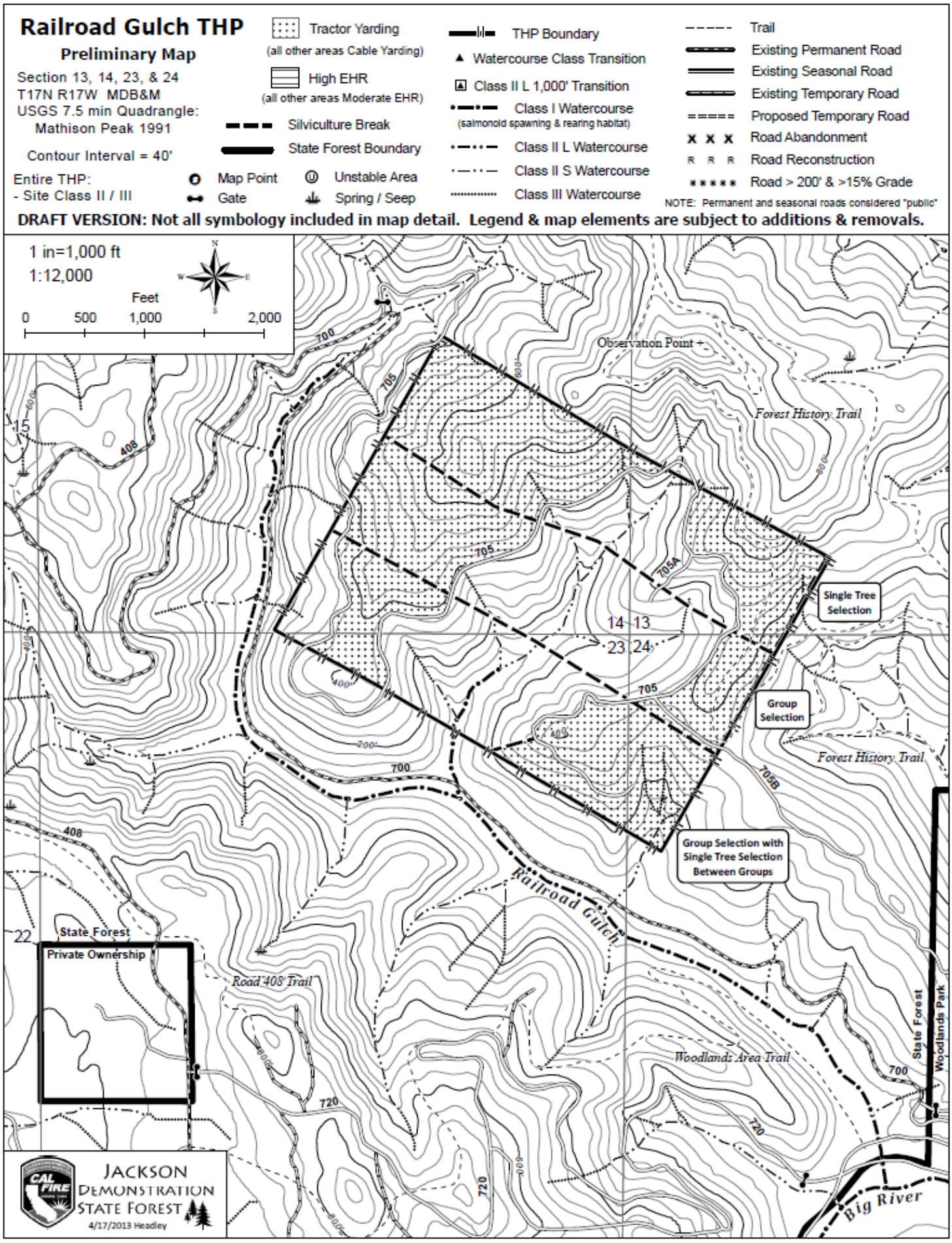
Because this study was designed as a demonstration and the real world range in site conditions confounded the non-replicated treatments, direct findings regarding the first question are not obtainable. The table below modified from Berrill and O'Hara (2007) illustrates the variability. Individual tree selection had higher growth as measured by basal area increment; the area also had higher site quality, lower proportion of hardwoods and highest initial stocking. Each of those pre-treatment factors could be influencing the growth more than the actual experimental treatment. Altering the study design will result in a continuum of density changes by spatial pattern that will help address the questions in relation to the variables that confounded the first phase results.

Treatment	Uncut Control	Group selection	Individual tree selection	Individual tree & Group selection	All plots
Site index (ft)	93.4	95.0	100.8	94.0	96.4
Pre-harvest conditions					
Percent hardwood BA (%)	17.1	12.6	11.5	24.4	16.1
Stand basal area (ft^2/ac)	318.6	345.5	376.0	294.4	337.4
Post-harvest conditions					
Stand BA 1982 (ft^2/ac)	318.6	276.2	229.4	171.9	236.4
20 year BA increment (ft^2/ac/yr)	4.1	4.7	5.5	4.3	4.7

The JDSF goal for this area continues to be demonstration of uneven-aged silviculture relevant to small landowners. The existing conditions that demonstrate long-term pattern of group and individual tree openings are valuable and could not be replaced without a 30 year time span. The modified plan was developed with feedback from Drs Helms, O'Hara, Berrill and Mr. Hipkins. The second JDSF harvest will provide for future research and demonstration opportunity focusing on the effect of site variability, pattern, and density on conifer recruitment and regeneration. Pre-harvest plot remeasurement for regeneration and diameter distribution will be completed in 2013. Optimally, a Request for Proposals would result in a thorough analysis of existing and 2013 data to characterize regeneration and recruitment trends given variables described above.

Specific Proposed THP Prescription:

- Maintain the same pattern; individual tree, group and combined in the existing areas.
- Mark to result in more consistent stand density within study. Recognize that individual plot density changes will be variable.
- Mark to address stand vigor and stocking issues including excess hardwoods and diseased whitewoods.
- Balance short and long term economic concerns by removing a range of diameter classes.
- Select an overall density target that is similar to that used by small landowners.
- Plan a 15 year harvest reentry period.


Railroad Gulch THP
Preliminary Map
Section 13, 14, 23, & 24
T17N R17W MDB&M
USGS 7.5 min Quadrangle:
Mathison Peak 1991
Contour Interval = 40'
Entire THP:
- Site Class II / III
Tractor Yarding
(all other areas Cable Yarding)
High EHR
(all other areas Moderate EHR)
Silviculture Break
State Forest Boundary
Map Point
Gate
Unstable Area
Spring / Seep
THP Boundary
Watercourse Class Transition
Class II L 1,000' Transition
Class I Watercourse
(salmonoid spawning & rearing habitat)
Class II L Watercourse
Class II S Watercourse
Class III Watercourse
Trail
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Proposed Temporary Road
Road Abandonment
Road Reconstruction
Road > 200' & >15% Grade
NOTE: Permanent and seasonal roads considered "public"
DRAFT VERSION: Not all symbology included in map detail. Legend & map elements are subject to additions & removals.
1 in=1,000 ft
1:12,000
Feet
0 500 1,000 2,000
Observation Point
Forest History Trail
Single Tree Selection
Group Selection
Group Selection with Single Tree Selection Between Groups
Railroad Gulch
Road 408 Trail
Woodlands Area Trail
State Forest
Private Ownership
Woodlands Park
Big River
JACKSON DEMONSTRATION STATE FOREST
4/17/2013 Headley

THOMPSON GULCH 2014 THP

Area: Approximately 320 acres

Silvicultural Prescription: Selection

Harvesting Systems: Approximately 60% (190 acres) of the THP will be cable-yarded, and 40% (130 acres) will be tractor-yarded.

Pre-harvest Basal Area	Post-harvest Basal Area
Conifer: 290 ft^2	Conifer: 185 ft^2
Harwood: 40 ft^2	Hardwood: 30 ft^2

Stand Description

Topography

The THP is located within the Berry Gulch Planning Watershed. The THP is located approximately 7.5 miles southeast of Fort Bragg, CA. The legal description is Sections 1 and 12, T17N, R17W, MDBM. The elevation ranges from 200 feet to 1000 feet above sea level. The slopes range from gentle to very steep. Steeper slopes, up to approximately 80%, will be cable yarded. The aspect of harvest units is variable, with a general aspect that trends to the east.

Vegetation and Stand Conditions

Most of the THP area consists of a dense, managed second-growth stand of conifer and hardwood trees approximately 85-95 years old with an understory that is generally open except for a thick huckleberry shrub cover that occupies sites dominated by hardwoods. Sword fern, redwood sorrel and bracken fern are common on upland sites.

Timber site for conifer species is classified as Site II throughout the plan area.

Watershed and Stream Conditions

The harvest plan is adjacent to Thompson Gulch which drains into the Little North Fork Big River and is a fish bearing stream containing anadromous salmonids. Early harvesting activities in the drainage utilized tractors to yard the logs downslope to a railroad system located near the river. The stream is generally well shaded, but with elevated sediment loads. The watershed is exhibiting signs of recovery as the shade levels increase, large woody debris is recruited, and fine sediment is flushed from the system. Temperature monitoring sites reveal temperatures slightly above those ideal for most salmonid species, but canopy levels are increasing. The smaller tributary channels upstream of the Class I watercourse are intermittent. Those that support non-fish aquatic life are generally low gradient with little or no surface flow during the dry period. Numerous large soil pipes have been observed in these channel bottoms. These are likely the result of early steam donkey yarding which utilized streams as yarding corridors. The smallest watercourses are primarily ephemeral and appear stable. Substantial evidence of active downcutting was not observed in the higher gradient streams that occur on steeper slopes.

Planned Silviculture

Approximately 75% of the harvest area has been designated as Older Forest Structure Zone (OFSZ) while the remaining 25% is Late Seral Development (LSD). Management in the OFSZ will be aimed at producing structural characteristics of older forest, which include large trees, snags, down logs, multiple canopy layers and a high level of structural diversity while coincidentally growing and producing timber through thinning and periodic replacement of large trees. The entry currently under planning will focus on reducing competition in codominant trees to increase growth rates and maintain large trees overtime. Thinning levels will be adequate to recruit minor amounts of regeneration to promote vertical diversity while carrying a significant portion of the stand forward. The goal for the area designated as LSD is to manage for structural

characteristics of older, mature forest, which include large old trees, large snags, large down logs, deformed trees, multiple canopy layers, and a high level of within-stand variability and both vertical and horizontal structural diversity.

Single Tree Selection will be implemented within both management areas. However due to separate management objectives, prescriptions for each management zone will vary. In the OFSZ area approximately 35% of the preharvest conifer basal area (BA) will be removed and about 10-15% of the preharvest hardwood BA less than 20 inches DBH will be removed. This will help reduce competition from hardwoods while retaining the largest hardwoods for ecological values.

Throughout the OFSZ area management will focus on reducing competition between codominant crown classes. Spacing, live crown ratios and tree vigor will be the primary factors considered in identifying retention trees. Additionally, trees with unique structural characteristics will be retained when feasible.

Smaller, well growing intermediate trees will be retained to contribute to vertical diversity and when combined with regeneration, a multilayered stand will result. Some harvesting will occur in these intermediate classes but will likely be limited to trees of poor form.

Within the LSD area approximately 30% of the preharvest conifer basal area (BA) will be removed and about 10-15% of the preharvest hardwood BA less than 20 inches DBH will be removed. This will help reduce competition from hardwoods while retaining the largest hardwoods for ecological values.

Throughout the LSD area management will focus on accelerating the growth of dominant and codominant trees into larger size classes. Trees with unique structural characteristics will be retained when feasible. When thinning clumps of redwood, thinning will be done to variable levels to promote random stem distribution and variable growth responses. Generally avoid harvest of isolated redwoods.

About 10% of the clumps should remain un-thinned to promote slow tree growth, high quality trees, and enhance heterogeneity in stand structure. About 10% of the clumps should be heavily thinned to create patchy diversity.

<u>Demonstration and Research Values</u>
Individual tree selection in a stand comprised of 85-95 year old second growth. Harvesting to promote growth and structure development and maintain growth of understory conifers.

<u>Watercourse Protection</u>
Class I and II watercourse protections zones will be managed to create late-seral forest characteristics.

- *Class I Water Lake Protection Zone (WLPZ)* is 150 feet, 0 to 30 feet no-cut* from the watercourse transition line, 30 to 100 feet 80% canopy retention, 100 to 150 feet 70% canopy retention. Minimum 240 sq. ft. conifer basal area/acres retention and the 13 largest conifers per 330 feet of stream channel
  **No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed*

- *Class II WLPZ* is 100 feet; 0 to 30 feet no-cut* from the watercourse transition line
  Minimum 240 sq. ft. conifer basal area/acre retention and the ten largest conifers per 330 feet (13 for large class II streams) of stream channel
  **No-cut WLPZ allows for the exception of harvesting cable corridor trees where needed*

- *Class III* watercourses have 30 to 50 foot Equipment Limitation Zones where ground based equipment will be utilized. Except for the necessary removal of trees for safe cable yarding operations, no harvest shall occur within the channel area

Springs and Seeps

- Natural springs and seeps that may provide habitat for non-fish aquatic species are provided the same protection as Class II watercourses

Roads

Road layout is ongoing; however, it is anticipated that approximately three miles of new seasonal road construction primarily on the ridgetop will be necessary to provide access for cable logging on steeper slopes as well as ground-based operations on more gentle ground. At least six road segments will have an average gradient of approximately 15-20%. Any road segment on slopes over 50% will use full bench construction.

Recreational Considerations

- No campgrounds or official hiking trails are located in the area
- Nearby and adjacent forest roads are available for public recreational access, including hiking, bicycle riding and equestrian use
    - Harvesting of trees immediately adjacent to existing roads will be limited
- For public safety, area closed signs will be posted. These signs will be posted at all points where roads enter the area of timber operations.

Aesthetic Considerations

The THP area is visible from County Road 408 and JDSF Roads 730 and 740. Any harvesting proposed near the road is designed to retain and/or improve aesthetic values (near and/or long-term) and maintain shade canopy where it currently exists. Portions of the plan area are located within the Road and Trail Corridor management area adjacent to Road 408.

Marbled Murrelet

There is no known Marbled Murrelet habitat within 0.25 miles of the THP boundary.

Northern Spotted Owl

The plan contains habitat suitable for Northern Spotted Owl (NSO) (*Strix occidentalis caurina*). There is no recorded NSO activity center within the plan boundary or within 0.25 miles of the plan boundary. Northern Spotted Owl surveys will be conducted as required by protocol and appropriate buffers provided if NSO are found.

Invasive Weeds

Minimum road widths will be maintained to reduce the potential for invasive weed dispersal. Some of the proposed roads will be slash compacted post-harvest which should reduce the potential of invasive weeds.

Thompson Gulch THP

Preliminary Map

Section 1 & 12
T17N R17W MDB&M
USGS 7.5 min Quadrangle:
Mathison Peak 1991
Contour Interval = 40'

Entire THP:
- Site Class II / III
- Single Tree Selection

Tractor Yarding
(all other areas Cable Yarding)

High EHR
(all other areas Moderate EHR)

THP Boundary

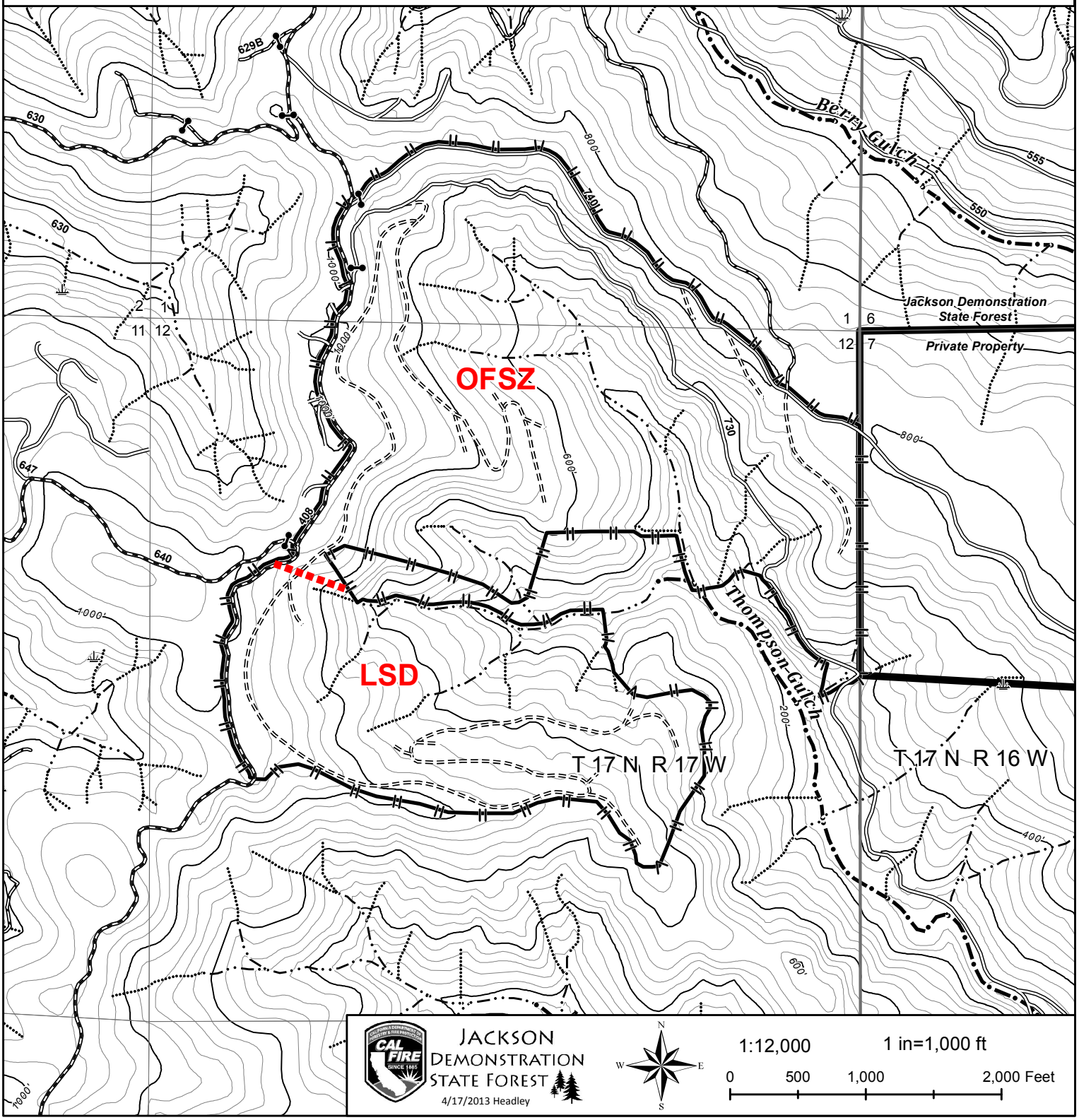
Map Point
Gate
Unstable Area
Spring / Seep

JDSF Boundary
Watercourse Class Transition
Class II L 1,000' Transition
Class I Watercourse
(salmonoid spawning & rearing habitat)
Class II L Watercourse
Class II S Watercourse
Class III Watercourse

Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Proposed Seasonal Road
Proposed Road Abandonment
Proposed Road Reconstruction
Road > 200' & >15% Grade

NOTE: Permanent and seasonal roads considered "public"

DRAFT VERSION: Not all symbology included in map detail. Legend & map elements are subject to additions & removals.



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1:12,000 1 in=1,000 ft

0 500 1,000 2,000 Feet