TIMBER HARVESTING PLAN

FOR ADMIN. USE ONLY

1._____ 8._____
2._____ 9._____
3._____ 10._____
4._____ 11._____
5._____ 12._____
6._____ 13._____
7._____ 14._____

STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY AND FIRE PROTECTION
RM-63 (06-2018)

FEB 05 2020

FOR ADMIN. USE ONLY
THP No. 1-20-00006 MEN
Date Rec'd: JAN 10 2020
Date Filed FEB 13 2020
Date Approved MAY 05, 2020
Date Expires May 04, 2025

THP Name: *Caspar 500 THP*

- **If this is a MODIFIED THP** [☐]
- **Is this a MODIFIED THP for FUEL HAZARD REDUCTION** [☐]

If THP is any one of the modified types above complete appropriate modified checklists at end of general section

Extension: [ ] Am #_____

This Timber Harvesting Plan (THP) form, when properly completed, is designed to comply with the Forest Practice Act (FPA) and Board of Forestry and Fire Protection rules. All rule references are from Title 14 CCR; when cited, the form text will only make reference to the rule number itself. The THP is divided into six sections. See separate instructions for information on completing this form. **NOTE: The form must be printed legibly in ink or typewritten, an online version is available at _____.** Additional space may be inserted, as needed, to provide required information. Please distinguish answers from questions by *font change*, **bold** or underline.

SECTION I - GENERAL INFORMATION

This THP conforms to my/our plan and upon approval, I/we agree to conduct harvesting in accordance therewith. Consent is hereby given to the Director of Forestry and Fire Protection, and his or her agents and employees, to enter the premises to inspect timber operations for compliance with the Forest Practice Act and Forest Practice Rules.

1. REGISTERED PROFESSIONAL FORESTER:

RPF Signature: **Signature on file with CAL FIRE, refer to page 1.1** Lic. No. **2779** Date _____

RPF Printed Name: **Jason Serna** Phone **707-964-5674**

Address **802 N. Main Street** City **Fort Bragg** State **CA** Zip **95437**

Email: **jason.serna@fire.ca.gov**

2. LICENSED TIMBER OPERATOR(S): Name **Unknown, LTO will be named prior to operation** Lic. No. _____
(If unknown, so state. You must notify CAL FIRE, by amendment, of LTO prior to start of operations)

Address _____

City _____ State _____ Zip _____ Phone _____

Email: _____

Signature: _____

3. TIMBERLAND OWNER(S) OF RECORD: Name **State of California, Jackson Demonstration State Forest**

Address **802 N. Main Street**

City **Fort Bragg** State **CA** Zip **95437** Phone **(707) 964-5674**

Email: **mike.powers@fire.ca.gov**

Signature: **Signature on file with CAL FIRE, refer to page 1.1**
Michael Powers, Forest Manager

RECEIVED
FEB 05 2020
COAST AREA OFFICE
RESOURCE MANAGEMENT

RECEIVED
JAN 10 2020
COAST AREA OFFICE
RESOURCE MANAGEMENT

THP Signature Page

TIMBER HARVESTING PLAN

STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY
AND FIRE PROTECTION
RM-63 (03-15)

1-20-00006-MEN
January 10, 2020

THP Name: Caspar 500 THP

SECTION I - GENERAL INFORMATION

This THP conforms to my/our plan and upon approval, I/we agree to conduct harvesting in accordance therewith. Consent is hereby given to the Director of Forestry and Fire Protection, and his or her agents and employees, to enter the premises to inspect timber operations for compliance with the Forest Practice Act and Forest Practice Rules.

3., 4. and 5. TIMBERLAND OWNER(S) OF RECORD, TIMBER OWNER(S) OF RECORD, and PLAN SUBMITTER

Name **State of California, Jackson Demonstration State Forest**

Address **802 North Main Street** City **Fort Bragg** State **CA** Zip **95437** Phone **(707) 964-5674**

Signature _____ Date 1/8/20

Michael Powers, JDSF Forest Manager

NOTE: The timber owner is responsible for payment of a yield tax. Timber Yield Tax information may be obtained at the TimberTax Section, MIC: 60, State Board of Equalization, P.O. Box 942879, Sacramento, California 94279-0060; phone 1-800-400-7115; BOE Web Page at: www.boe.ca.gov/proptaxes/timbertax.htm.

2. and 6. LICENSED TIMBER OPERATOR(S) and ON-SITE CONTACT:

Name **Unknown, LTO and On-Site Contact will be named prior to operations.** Lic. No._____
(If unknown, so state. You must notify CDF of LTO prior to start of operations)

1. REGISTERED PROFESSIONAL FORESTER AND Statement of Environmental Impact: After considering the rules of the Board of Forestry and Fire Protection and the mitigation measures incorporated in this THP, I (the Registered Professional Forester) have determined that the timber operation:

[X] will not have a significant adverse impact on the environment.

[X] I certify that I, or my supervised designee, personally inspected the THP area, and this plan complies with the Forest Practice Act, the Forest Practice Rules and the Professional Foresters Law.

Signature _____ Date 01/08/2020

Jason Serna, RPF #2779

4. TIMBER OWNER(S) OF RECORD: Name **Same as Timberland Owner of Record above**

Address

City _____ State _____ Zip _____ Phone _____

Email: _____

Signature: **Signature on file with CAL FIRE, refer to page 1.1**
Michael Powers, Forest Manager

NOTE: The Timber Owner is responsible for payment of a yield tax. Per State of California Revenue and Taxation Code sections 38104 and 38115. Timber Yield Tax information may be obtained at: Timber Tax Section, MIC: 60, California Department of Tax and Fee Administration, P.O. Box 942879, Sacramento, California 94279-0060. Phone 1-800-400-7115 OR 1-916-274-3330. For Timber Tax information, please see our website at: www.boe.ca.gov/proptaxes/timbertax.htm.

5. PLAN SUBMITTER(S): Name **Same as Timber Owner of Record above**
The submitter is the person who owns, leases, contracts, or operates on timberland. If the submitter is not identified in (2), (3), or (4), above, an explanation of his/her authority to submit the plan should be provided in Section III. [1032.7(a) and 1034(e)].

Address _____

City _____ State _____ Zip _____ Phone _____

Email: _____

Signature: **Signature on file with CAL FIRE, refer to page 1.1**
Michael Powers, Forest Manager

6. ON-SITE CONTACT: Name: **The LTO shall be the person to contact on-site who is responsible for the conduct of operations. The LTO is unknown at this time. An LTO Responsibility Acknowledgement Form will be amended to the THP prior to the start of operations.**
List person to contact on-site who is responsible for the conduct of the operations. If unknown, so state; name must be provided for inclusion in the THP prior to start of timber operations.

Address _____

City _____ State _____ Zip _____ Phone _____

Email: _____

CalTREES THP GENERAL INFORMATION

ITEM #7 LOCATION OF TIMBER OPERATIONS

a. Legal Description						
Meridian	Township	Range	Section	Acreage	Assessor's Parcel Number	County
Mount Diablo	**17 N**	**17 W**	**3**	**25.79**	**11854001**	**Mendocino**
			5	**0.07**	**11843030**	
			8	**111.92**	**11848001**	
			9	**59.36**	**11848002**	
			9	**201.02**	**11848003**	
			10	**135.16**	**11854004**	
			TOTAL AC	**533.32**		

NOTE: Total Acreage only includes the logging area

FOREST DISTRICT

b. Forest District			
[X]	COAST FOREST DISTRICT	[☐]	Tahoe Regional Planning Authority Jurisdiction
[☐]	Southern Sub District of the Coast Forest District	[☐]	A County with Special Regulations
[☐]	SOUTHERN FOREST DISTRICT	[☐]	Coastal Zone, no Special Treatment Area (STA)
[☐]	High use Sub District of the Southern Forest District	[☐]	STA(s): Type: Identify:
[☐]	NORTHERN FOREST DISTRICT	[☐]	Other:

c. CALWATER PLANNING WATERSHED		
Name	Watershed identification Number	CALWATER Version
Caspar Creek	**1113.300404**	**2**

d. WATERSHED (ASP, 303D)			
[X]	ASP Watersheds	[☐]	Non ASP Watersheds
[☐]	Upstream of ASP Watersheds	[☐]	303d Watersheds
[☐]	Exempt from ASP Watershed Rules • Reason Exempt:		• Reason listed:

e. USGS QUADRANGLE	
Name	Date
Mendocino	**1991**
Mathison Peak	**1991**

ITEM #8 MODIFIED THP REQUIRED CONDITIONS AND MITIGATIONS

a. Modified THP	
1.[☐]Yes [X] No	Is this THP submitted as a modified THP per 14 CCR § 1051

CalTREES THP GENERAL INFORMATION

2.[☐]Yes [X] No	Is this THP submitted as a modified THP for Fuel Hazard reduction per 14 CCR § 1051.3
b.	**Timberland Conversion**
1.[☐]Yes [X] No	Has a Timberland Conversion been submitted?
	• Permit Number: _____ (if known) or
	• Expected approval date:
2.[☐]Yes [X] No	Has a Timberland Conversion been approved?
	• Permit Number:
	• Approval date:
	• Expiration date:

c.	**Demonstration of Maximum Sustained Production (MSP) per 14 CCR § 913.11 (93.11, 953.11).**
MSP OPTION	
[X] (a)	THP Number Option (a) is approved under: **01-14-122 MEN (Peterson Gulch THP)**
	Date Approved: **February 12, 2015**
[☐] (b)	Has a Sustained Yield Plan been approved?
	• SYP number:
	• Date Approved:
	Has a Sustained Yield Plan been submitted but not approved?
	• SYP number:
	• Date Submitted:
☐] (c)	

d.	**Conservation Easements / Landowner Assistant programs**
1. [☐]Yes [X] No	Is there a conservation easement, existing, for any of the plan area?
	If "YES" provide • Conservation Easement Name: _____ • Who is the easement grantee: (Who holds the easement) _____
2. [☐]Yes [X] No	Is a Conservation Easement proposed or waiting approval for any portion of the plan area?
3. [☐]Yes [X] No	Are there any land owner assistance programs associated for any portion of the propose plan area? If "YES" indicate what land assistance program it is and associated identifying document number and/or name of project.

e.	**Habitat Conservation Plans (HCP) / Natural Communities Conservation Plans (NCCP)**
1.[☐]Yes [X] No	Is any portion of the ownership covered by a Habitat Conservation Plan?
[☐] [☐]	Aquatic Terrestrial
2.[☐]Yes [☐] No	
3.[☐]Yes [☐] No	

ITEM #9	Prescribed Maintenance Period
a. [X]Yes [☐] No	Will the Licensed Timber Operator be employed for the construction and maintenance of roads and landings during the conduct of timber operations? If "NO" identify who will be responsible and provide a contact phone number.
	Contact name: **Unknown at this time**
	Phone number:
b. [X]Yes [☐] No	Will the Licensed Timber Operator be responsible for erosion control maintenance after timber operations have ceased and until a work completion report has been certified by the department? If "NO" include a written agreement per 14 CCR 1050(c). Timberland Owner acknowledgement form contains the necessary information and can be included as the written agreement NOTE: Prescribed maintenance periods: • Outside ASP watersheds maintenance period is one year but can be extended 3 years at the Departments discretion. • ASP watersheds the maintenance period is three years Other activities such as stocking, that require the use of roads, crossings, or other features requiring erosion control shall be maintained during that activity even after the prescribed maintenance period has ended. **The timberland owner shall be responsible for erosion control maintenance upon certification of the Work Completion Report.** **Per 14CCR 923.7(j), the prescribed maintenance period for logging roads and associated landings, including appurtenant roads, shall be three years.**
c. [X]Yes [☐] No	Is it anticipated timber operations will commence on the date of THP conformance as approved by the Department? If "NO" provide an expected date of commencement of timber operations:_____
d. [X]Yes [☐] No	Is it anticipated timber operations will be completed within 5 years from the date of THP conformance? If "NO" provide the expected date timber operations will be completed: DATE_____

ITEM #10	Stocking Adjacent Plans
a. [☐]Yes [X] No	Is there a **THP** on file with CAL FIRE for any portion of the plan area for which a Report of Satisfactory Stocking has not been issued by CAL FIRE? If "YES" provide THP Number: _____
b. [☐]Yes [X] No	Is there a contiguous even aged unit with regeneration less than five years old or less than five feet tall? If "YES" provide explanation per 14 CCR 913.1 (933., 953.1)(a)(4)

CalTREES THP GENERAL INFORMATION

ITEM #11	Responsibilities / Notifications
a. [X]Yes [☐] No	RPF has notified the Plan Submitter, in writing, of their responsibilities pursuant to 14 CCR 1035 of the Forest Practice Act and Rules. **Jackson Demonstration State Forest (JDSF) staff has many years of experience with timber harvesting plans. Copies of plans involving JDSF are filed at the Fort Bragg office. The Plan Submitter and signatory for the Timber/Timberland Owner is an RPF and is knowledgeable about the requirements listed under this item.**
b. [☐]Yes [X] No	RPF has notified the timber owner and the timberland owner of their responsibilities for compliance with the Forest Practice Act and Rules and the prescribed maintenance periods and maintenance of erosion control structures. **See Item 11a above.**
c. [X]Yes [☐] No	RPF will provide the timber operator with a copy of the portions of the approved THP as listed in 14 CCR 1035(f).
	Who will meet with the LTO prior to commencement of operations to advise of sensitive conditions and provisions of the THP per 14 CCR 1035.2. [X] RPF [X] Supervised Designee [☐] Both [☐] Other Additional information: **I or my supervised designee will meet with the LTO prior to commencement of operations to advise of sensitive conditions and provisions of the plan pursuant to 1035.2**
d. [X]Yes [☐] No	Are Archaeological or historical sites within or near the plan area that require protection? NOTE: Archaeological information is CONFIDENTAIL **See Confidential Archaeological Addendum** **Per 14 CCR 929.6, no persons, except as permitted by law, who is involved in timber operations shall excavate, collect artifacts from, vandalize or loot archaeological or historical sites located within the THP area.** **If new archaeological or historical materials or potential sites are found during operations on the THP, operations shall cease within 100 feet of the potential site and CAL FIRE shall be notified immediately. Operations other than standard road use shall not resume within 100 feet of the potential site until CAL FIRE has evaluated the area and protective measures, if necessary, have been specified by CAL FIRE.**
e. [X]Yes [☐] No	RPF has the following authority and responsibilities for the preparation and administration for the THP and timber operations. (Including both work completed and work remaining to be done. Additional information: **The listed RPF will be the agent for the plan submitter during the initial THP preparation and approval process. The RPF has been retained by the plan submitter to provide professional advice throughout the timber operations. Additional work for which the RPF has authority and responsibility is all requirements under 1035.2, LTO pre-operational meeting, in addition to THP preparation activities: marking of timber, flagging, watercourse classification, flagging of protection zones, design of road systems, design of logging systems, assessment of cumulative impacts,**

	archaeological assessment and the accuracy and completeness of the plan.
f. [**X**]Yes [☐] No	RPF has been retained by the plan Submitter to provide professional advice to the LTO and timberland owner upon request throughout the active timber operations regarding the THP, the Forest Practice Rules, and other associated regulations pertaining to timber operations per 14 CCR 1035(d)(1)
	Describe additional required work requiring an RPF, which the RPF submitting this proposed THP does not have the authority or responsibility to perform. **None.**

ITEM #12	**Notice of Intent (NOI)**
Per 14 CCR 1032.7(c)(1-5) The RPF preparing the THP shall submit to the Director, with the THP, a Notice of Intent (NOI) to harvest timber if: (1) Any proposed boundary lies within 300 feet of any property not owned by the timberland owner, or (2) Plan amendments that change plan boundary so that new boundaries are within 300 feet of property not owned by the timberland owner. (3) Plan amendments change the silvicultural method if a notice was required for the Plan by condition (1) or (2) above. (4) Any overhead electrical power line, except a line from a transformer to a service panel, is present within the plan area or within 200 feet outside the Plan boundary, or (5) Plan amendments change a plan boundary so that the overhead electrical power line, except a line from a transformer to a service panel, is within the new boundary area or within 200 feet outside the Plan Boundary.	
a. [☐]Yes [**X**] No	Is a Notice of Intent necessary for this THP? If "YES" include the NOI with the THP as a separate form with the THP
b. [**X**]Yes [☐] No	I understand the NOI is to be posted prior to submitting the THP and I will post the NOI at the conspicuous location near the project location prior to submitting this proposed THP.

ITEM #13	**Statement of Environmental Impact**
After considering the rules of the Board of Forestry and Fire Protection and the mitigation measures incorporated in this THP, I the Registered Professional Forester, have determined that the timber operations (mark all that apply).	
a. [☐]	**WILL HAVE** A SIGNIFICANT adverse effect on the environment. Provide a statement of reasons for overriding considerations in SECTION III.
b. [X]	**WILL NOT** HAVE A SIGNIFICANT adverse impact on the environment.
[X]	I certify that I, or my supervised designee, personally inspected the THP area, and this plan complies with the Forest Practice Act, the Forest Practice Rules and the Professional Foresters Law.

Modified THP	
[☐]	I certify that this Modified THP meets: 1. The conditions or facts stated in 14 CCR 1051(a)(1)-(16) exist on the MTHP area at the time of submission, preparation, mitigation, and analysis of the MTHP and no identified potential significant effects remain undisclosed. 2. I, or my supervised designee, will meet with the LTO on the MTHP site, before timber operations commence, to review and discuss the contents and implementations of the Modified THP

CalTREES THP ITEM #14 - Silviculture

ITEM #14 – SILVICULTURE

- Check the Silvicultural methods or treatments allowed by the Forest Practice Rules to be applied under this THP.
- If more than one method or treatment will be used identify the boundaries on a map per 14 CCR § 1034(x)(2)
- List the approximate acreage for each method identified.

a.	Evenaged	ACRES	
[☐]	Clearcutting		**EVENAGED REGENERATION METHODS (14 CCR § 913.1 [933.1, 953.1]) (All Districts)** **NOTE: variation by District in (a)(4)(A) and (d)(3) Shelterwood Removal Step**
[☐]	Seed Tree Seed Step		
[☐]	Seed Tree Removal Step		
[☐]	Shelterwood Preparatory Step		
[☐]	Shelterwood Seed Step		
[☐]	Shelterwood Removal Step		
	Un-evenaged		**UNEVENAGED REGENERATION METHODS (14 CCR § 913.2 [933.2, 953.2]) (All Districts)** **NOTE: variation by District in (a)(2)(A)(1)**
[X]	Selection	352.1	
[X]	Group Selection	124.2	
[☐]	Transition		
	Intermediate Treatments		**INTERMEDIATE TREATMENTS (14 CCR § 913.3 [933.3, 953.3])**
[☐]	Commercial Thinning		
[☐]	Sanitation Salvage		
	Alternative		**ALTERNATIVE PRESCRIPTIONS (ALL DISTRICTS) (14 CCR § 913.6 [933.6, 953.6])**
[☐]	Alternative Prescription		
	Special Prescriptions		**SPECIAL PRESCRIPTIONS (14 CCR § 913.4 [933.4, 953.4])** RPF is required to include specific information when Restoration or Oak woodland management is selected. The FPR element forms are provided at the end. Indicate the specific acreage for each type of restoration or oak area on these forms.
[☐]	Special Treatment Area Prescription		
[☐]	Rehabilitation of Understocked Area Prescription		
[X]	Fuel Break / Defensible Space	25.28	
[☐]	Variable Retention		
[☐]	Restoration – Aspen, Meadow, & Wet Area		
[☐]	Ca. Black and Oregon White Oak Woodland Management		
	Non-regeneration		**NON REGENERATION HARVESTING**
[☐]	Conversion		
[☐]	Road Right-of-way		
[X]	No Harvest	31.74	

TOTAL ACREAGE:	533.32	If acreage is different than acreage listed in the legal description provide explanation:

If Selection, Group Selection, Commercial Thinning, Sanitation Salvage or Alternative methods are selected the post-harvest stocking levels must be stated. If Site class varies then state the post-harvest stocking standard to be meet by each applicable Site Class.

NOTE: Location of boundaries of timber-site classes needed for the determination of stocking standards to be applied, down to 20-acres minimum or as specified in district rules shall be mapped per 14 CCR § 1034(x)(12)

b.	POST-HARVEST STOCKING TO BE MET AT THE COMPLETION OF OPERATIONS	
Silvicultural Prescription	Site Class (I, II, III, IV, V)	Post-harvest stocking standard
Selection	**II and III**	• **At least 150 square feet per acre of basal area shall be retained.** • **The residual stand shall contain sufficient trees to meet at least the basal area, size and phenotypic quality of the tree requirements specified under the seed tree method.** • **A minimum of 15 square feet per basal area shall consist of trees with a D.B.H. of 18" or greater [14 CCR 913(a)(2)(A)(4) and 14 CCR 913.2 (a)(2)(B)(4)].**
Group Selection	**II and III**	**The goal is to retain an average of 180-200 square feet per acre (between created group openings) of conifer basal area per acre for all group selection harvest units. Due to pre-harvest variability in stocking levels, individual plots shall be considered stocked if they meet the stocking standard in 14 CCR 913.2 (B).** • **At least 80% of the stocked plots must meet the basal area stocking standard of at least 75 square feet per acre of basal area retained.** • **Not more than 20% of the stocked plots may meet stocking standards utilizing the 300-point count standard with trees that are at least 10 years old.**
Shaded Fuel Brake	**II and III**	**The intent of the fuel break is to treat small fuels. Treatments shall be done after timber harvest and prior to completion of operations.** • **At least 150 square feet per acre of basal area shall be retained. Refer to Section III.** • **Fuels to be removed include brush and small trees less than 11" excluding most redwoods.** • **Masticate fuels where topography allows.** • **Supplement by lopping and scattering and/or chipping using hand crews.** • **Prune residual trees up to 8-12' above ground level.** • **Slash and/or chipped materials will be piled and burned or broadcast and left on site at the direction of the RPF.** • **Fuel treatments shall be completed after timber harvest and before completion of operations.**

c.	EVENAGED REGENERATION SIZE
[☐]Yes [**X**] No	Will evenaged regeneration step Units be larger than those specified in the rules? [☐] 20 acres TRACTOR [☐] 30 acres AERIAL or CABLE If YES is the RPF proposing: [☐] An increase to evenaged TRACTOR Units to 30 acres because Erosion Hazards Rating is Low and the slopes are less than 30% [☐] An increase to any evenaged harvest unit up to 40 acres If YES provide substantial evidence that the THP contains measures to accomplish any one of the subsections per 14 CCR § 913.1 [933.1, 953.1](a)(2)(A) – (E) In SECTION III Operational Instruction to the LTO, needed to meet subsections (A) – (E) above shall be included in SECTION II

CalTREES THP ITEM #14 - Silviculture

	NOTE: Oversized Units should be designated on the THP map(s) by size.

Operational instructions to the LTO:

d. TIMBER MARKING

In the table below indicate the area requiring tree marking, the method of marking, who completed the marking and if it was an entire or sample area mark.

Marking completed in (specify Location(s))	Trees Marked (Harvest / Retained)	Completed By (RPF / Designee)	Area Marked (Entire / Sample area)	RPF Explanation if needed (Optional)
Entire plan area	**Harvest**	**Both**	**Entire**	**See below**

Selection & Fuel Break **– Marking of harvest trees shall be done by the RPF and/or his supervised designee(s) with blue paint using a breast height mark (horizontal stripe) and a stump mark (spot). Within the eucalyptus stand, the RPF and/or his supervised designee(s) shall mark trees to girdle with pink paint using a breast height mark and a stump mark. Marking of retention trees is not required; however individual trees occasionally may be marked for retention by the RPF or supervised designee with a circle at breast height and at the base of the tree in any color paint (i.e. blue or orange).**

Group Selection **–Marking of harvest trees within the groups and between the groups shall be done by the RPF and/or his supervised designee(s) with blue paint using a breast height mark and a stump mark.**

- **Eucalyptus stand groups have the following:**
  - **The groups within the eucalyptus stand are designated by red and black striped flagging with all trees within the group marked with blue paint.**
  - **Outside the groups within the eucalyptus stand, the RPF and/or his supervised designee(s) shall mark trees to girdle with pink paint using a breast height mark and a stump mark.**

Road right-of-way **– Proposed logging roads are flagged with solid orange Site-Mark® "TRUCK ROAD" in black lettering. The clearing limits are designated with two vertical orange stripes that are painted on trees to be retained and are facing the centerline. All trees between the clearing limits are proposed for harvest. If necessary to provide adequate clearance for road construction, additional trees may be harvested upon approval of the responsible RPF.**

Unmarked trees may be felled in the following situations:

1) **To provide safe operating corridors for skyline cable operations. See CABLE CLEARANCE TREES below, Item 14g.**
2) **To provide stumps for cable-rigging purposes.**
3) **Compliance with Title 8 CCR, Logging and Sawmill Safety Orders**

[**X**]Yes [☐] No	Is the RPF requesting a waiver of required marking?
	If YES, provide directions explaining how the LTO will determine what trees shall be harvested or retained: **The LTO may only fall and harvest unmarked trees subject to the provisions of Item 14(4) & (g).**
	If more than one silvicultural method or group selection is used, provide instructions to the LTO identifying how boundaries of the different methods or groups have been identified: **Silviculture boundaries are delineated on the THP map. The boundaries are not flagged in the field.**

e. FOREST PRODUCTS TO BE HARVESTED:

[**X**]	Saw Logs	[**X**]	Poles	[**X**]	Clean Chips
[**X**]	Peeler Logs	[**X**]	Split Wood Products	[**X**]	Firewood

CalTREES THP ITEM #14 - Silviculture

[X]	Fuel Wood	[X]	Fuel chips	[☐]	Other
[X]	Burl Wood				

f.	GROUP B SPECIES MANAGEMENT
1.[X]Yes [☐] No	Are group B species proposed for management?
2.[X]Yes [☐] No	Are group B or non-indigenous A species to be used to meet stocking standards?
3.[X]Yes [☐] No	Will group B species need to be reduced to maintain relative site occupancy of group A species?
If any answer is YES, list the species, describe treatment, and provide LTO felling and slash treatment guidance. See table below	

TABLE FOR LTO TREATMENT GROUP B SPECIES MANAGEMENT

Species	Treatment Method	Felling Instruction	Slash Treatment Instructions
Tanoak/other minor hardwoods	**Manual/Mechanical**	**Reduction of hardwoods by mechanical methods shall conform to the guidelines of Item 14(d). Hardwoods will be harvested to reduce competition with conifers. Any harvested hardwood may be yarded to the nearest landings. True oaks, chinquapins, madrones and tanoaks with a DBH of 24" or greater will not be harvested unless necessary for safety, yarding or road construction. Fell all hardwoods with a blue horizontal stripe of paint near DBH (cut tree mark).**	**Slash generated at landings shall be spread on landings, skid trails or spur roads, chipped, placed in a burn pile or removed in a manner which will leave previously exisiting roads passible by logging trucks.**
Monterey Pine / Bishop pines	**Manual/Mechanical**	**Reduction of Monterey/Bishop pine by mechanical methods shall conform to the guidelines of Item 14 (d). Any harvested pine may be shall be yarded to the nearest landings. Many of the pines marked are for hazard tree reduction along roads and trails. Fell all pines with a blue horizontal stripe of paint near DBH (cut tree mark).**	**Slash generated at landings shall be spread on landings, skid trails or spur roads, chipped, placed in a burn pile or removed in a manner which will leave previously exisiting roads passible by logging trucks.**

1. [☐]Yes [X] No	Are follow-up treatments expected to maintain relative site occupancy of group A species? [☐] Manual Treatments - Describe: [☐] Herbicide Treatments - Describe: [☐] Both
	If YES who will be responsible?
2.[☐]Yes [X] No	Will a Licensed Pest Control Advisor be involved in the process? If YES explain when an advisor will be needed:

g.	LTO FELLING INSTRUCTIONS PLAN AREA
	As per 14 CCR 914.1, felling shall adhere to the following: ***914.1(a) – to the fullest extent possible and with due consideration given to topography, lean of trees, landings, utility lines, local obstructions, and safety factors, trees shall be felled to lead in a direction away from watercourses.***

CalTREES THP ITEM #14 - Silviculture

914.1(b) – Desirable residual trees and tree seedlings of commercial species shall not be damaged or destroyed by felling operations, except where unavoidable due to safety factors, lean of trees, location of obstructions or roads, or lack of sufficient openings to accommodate felled trees.

914.1(c) – Trees shall be felled in conformance with watercourse and lake protection measure incorporated in the Timber Harvest Plan and consistent with Article 6 of these rules.

914.1(d) – Felling practices shall conform to requirements of 14 CCR919.2 to protect bird nesting sites.

Wedges, jacks and cable pulling methods shall be used as needed to direct the fall of trees away from watercourses, and sensitive areas, to minimize damage to regeneration and residual timber, to minimize breakage, and to fell to lead. There shall be no trading of trees without pre-approval of the plan submitter's designee.

TREES SUBSTANTIALLY DAMAGED BY LOGGING OPERATIONS: Damaged trees may not be felled if within a WLPZ, if marked for retention, or if the damaged tree has a cavity potentially used by wildlife. Otherwise, merchantable young growth trees damaged during the timber operations shall be felled and yarded as approved and directed by the plan submitter.

DOWNED TREES: There shall be no cutting or removal of existing unmarked down trees or logs. These logs may be moved if necessary for clearing truck road rights-of-way and as otherwise necessary to harvest the designated timber. If windthrow of merchantable trees occurs in the logging area prior to completion of operations, windthrown trees outside of the WLPZ may be harvested upon approval of the plan submitter.

CABLE CLEARANCE TREES: Any tree (within the THP area only) may be harvested/felled if necessary for cable clearance, except for trees located within a WLPZ. Trees located within a WLPZ shall not be felled for cable corridors unless they directly impact the safety of cable-yarding operations, these trees felled for safety may be harvested. Compliance with all other applicable Forest Practice Rules and requirements in the THP in required.

h.	REGENERATION
[☐]Yes [**X**] No	Will artificial regeneration be required to meet stocking standards? Describe:

i.	SITE PREPARATION
Definition of site preparation per 14 CCR § 895.1: Site preparation means "any activity" involving mechanical disturbance of soils or burning of vegetation which is performed during or after completion of timber harvesting and is associated with preparation of any portion of a logging area for artificial or natural regeneration.	
1[**X**]Yes [☐] No	Will site preparation be used within the logging area? If YES, provide site preparation plan per 14 CCR § 915.4 [935.4, 955.4] **At completion of operations, the plan area will be assessed to determine extent of site preparation necessary. On the tractor ground, all slash and logging debris within 100 feet of JDSF Road 500 shall be cut and chipped or masticated to create a shaded fuel break. Within the group openings within the eucalyptus area of the plan, pile burning will be utilized as a management technique for eucalyptus regeneration. Slash generated from the groups and surrounding area shall be jackpotted on eucalyptus stumps.**
2[☐]Yes [**X**] No	Will site preparation be required to meet stocking?
	• General method(s) of site preparation: **Pile burning will be utilized in a portion of the plan area to prepare for natural generation and to clear eucalyptus slash. Mechanical (loader or excavator) piling, hand pulling, and/or chipping of slash and brush may be utilized. Logging slash shall be jack-pot piled onto large cut eucalyptus stumps within the group openings of Unit 3. Burning will be conducted per CAL FIRE burn permit requirements.**

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	• Type of equipment to be used for mechanical site preparation and/or firebreak construction: **A bulldozer and possibly an excavator may reconstruct or construct firebreaks using existing skid trails and roads. Fire breaks may also be constructed with hand tools. Firebreaks will be constructed to the minimum requirements for fire containment. Exposed soil within ELZs will be treated per Item 18. Damaged drainage features shall be reinstalled.**
	• Methods to protect desirable residual trees per 14 CCR § 917.7 [937.7, 957.7]: **The stand where pile burning will be used is a predominantly redwood stand with a large component of eucalyptus that will be cut and used to fuel to the burn piles. Timing of the burn during periods of higher fuel moisture content will reduce fire intensity. No slash will be piled adjacent to residual snags, trees, or clumps. No ignition will occur in the WLPZ or ELZ. Some scorching of trees is expected.**
3.[☐]Yes [**X**] No	• Are there any exceptions or alternatives proposed to the standard rules? If YES, provide an explanation and justification for the proposed exceptions:
	• Provide a map identifying the boundaries of site preparation areas, if different from the logging area boundaries, and distinguish areas by type of site preparation activity. **The boundaries for site preparation are the same areas shown as tractor yarding method on the THP Operations Maps. Some of these areas coincide with the group selection.**
	• Prior to conducting site preparation activities provide the name of the person responsible for site preparation:
	- Name: **Jason Serna**
	- Address: **802 N. Main Street, Fort Bragg, CA 95437**
	- Phone #: **707-964-5674**
	• Estimated timing of site preparation activities: **After sufficient heavy rain fall to raise fuel moisture content, and prior to burn suspension. Fire line construction will occur under conditions stated in the WPOP.**

j.	**REGENERATION PLAN (rehabilitation of understocked areas or variable retention)**
[☐]Yes [**X**] No	Is a regeneration plan needed per 14 CCR § 913.4 [933.4, 953.4](b) or (d)? If YES, please provide a detailed description for Review Team to evaluate how the proposed management prescription will aid in restoring and enhancing the productivity of commercial timberland. The regeneration plan shall include but not be limited to: - Rehabilitation of understocked areas: site preparation, method of regeneration and other information needed to evaluate the proposal by the Review team: - Variable Retention: Trees and elements retained, objectives intended to achieved by retention, distribution and quantity of retained tress, intended time period of retention, and potential future conditions or events the RPF believes would allow harvest of retained trees.

Regeneration plan:

ITEM #15 – PESTS

PESTS / FOREST DISEASES	
Timber operations shall be conducted so as to minimize the build-up of destructive insect populations or the spread of forest Diseases. 14 CCR 917.9 [937.9, 957.9](a) – (c) (All Districts)	
a. [X]Yes [☐] No	Is this THP within an area that the Board of Forestry and Fire Protection has declared a Zone of: 1.[X] Infestation 2.[☐] Infection pursuant to PRC §§ 4712 - 4718 If YES, identify feasible measures being taken to mitigate adverse infestation or infection impacts from the timber operation. 917.9 (937.9, 957.9)(a) Reference Board of Forestry Technical Rule Addendum Number 3 for RPF considerations.

Measures to mitigate adverse infestations or infections:

PINE PITCH CANKER

The plan is within the Zone of Infestation for Pine Pitch Canker. The plan does have both Bishop pine and Monterey pine which are highly susceptible to the fungus. However, there are no known pitch pine canker infestation sites within the State Forest. Pine trees that are felled as part of the logging shall be yarded to the landings and will be used for firewood sells. The wood sells are only to local residences within the Mendocino county and therefore the products will not be leaving the Zone of infestation. The slash from the pine trees shall be lopped and scattered or piled on the landing for pile burning.

SUDDEN OAK DEATH

The plan area is within a regulated county for Sudden Oak Death (SOD). There is no known infestation site within the THP area, however, there are several known SOD infestation sites within the State Forest. Plants, plant parts, unprocessed wood and wood products, and other products of SOD hosts, created as a result of timber harvest, cannot be moved within or outside of regulated counties infested with SOD without a CAL FIRE approved harvest document containing specific information that meets CDFA regulations. No host material is planned to be removed from the regulated area. If plans change, the THP will be amended to include information required in a Compliance Agreement.

A. **The following counties are within the regulated area: Alameda, Contra Costa, Humboldt, Lake, Marin, Mendocino, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Trinity and Sonoma, plus Curry County in southern Oregon.**

B. **All known SOD host species that are regulated in whole or in part:**
   1. **Plants and plant parts (except acorns or seed) of bigleaf maple (*Acer macrophyllum*), western maidenhair fern (*Adiantum aleuticum*), California maidenhair fern (*Adiantum jordanii*), California buckeye (*Aesculus californica*), madrone (*Arbutus menziesii*), manzanita (*Arctostaphylos manzanita*), California coffeeberry (*Frangula californica*), cascara (*Frangula purshiana*), toyon (*Heteromeles arbutifolia*), tanoak (*Lithocarpus densiflorus*), California honeysuckle (*Lonicera hispidula*), bay laurel (*Laurus nobilis*), False Solomon's seal (*Maianthemum racemosum*), coast live oak (*Quercus agrifolia*), canyon live oak (*Quercus chrysolepis*), California black oak (*Quercus kelloggii*), Shreve's oak (*Quercus parvula var. shrevei*), rhododendron- including azalea (*Rhododendron spp.*), wood rose (*Rosa gymnocarpa*), goat willow (*Salix caprea*), western starflower (*Trientalis latifolia*), California bay laurel (*Umbellularia californica*), evergreen huckleberry (*Vaccinium ovatum*).**
   2. **Basal trunk/ burl sprouts, small branches (less than one inch in diameter), and leaves (needles) of coast redwood (*Sequoia sempervirens)* and Douglas-fir (*Pseudotsuga menziesii).***

3. Unprocessed wood and wood products (except when completely free of bark) and plant products of the plants in (1) including but not limited to bark chips, mulch, firewood, and dried or preserved wreaths.
4. Any other product, article or means of conveyance when it is determined by the secretary, based upon generally accepted scientific principles, that it presents a risk of spreading the pest because it is a host or potential carrier of the pest.

C. Host material that may be removed from the THP area include tanoak and madrone in the of saw and chip logs, firewood, and chips.

D. Host material shall not be moved outside of the regulated area unless appropriate State and Federal permits are obtained. A copy of the permit s all be amended into the plan prior to movement of any host materials authorized under the permit. (Note: A THP may not be substituted for compliance agreements or permits when material is to be moved outside of the regulated area.)

E. This THP shall serve as a Compliance Agreement for movement of host material within the regulated area. The following conditions shall apply to movement of host material within the regulated area.
   1. The destinations of the host material may include the following locations in northern CA: Fuelwood will potentially be transported to local residences and fuel wood suppliers in Mendocino County. Sawlogs may be transported to: Scotia, Weaverville, Eureka, Samoa, Arcata, Fortuna, Korbel, Ukiah, Calpella, Philo, Cloverdale, Laytonville and Willits. Although the most likely destinations are listed above, other destination for shipments may be amended into the THP.
   2. All host material less than 4" diameter, including chips, shall be moved in a closed container. Movement of host material greater than 4" in diameter does not require a closed container.
   3. The LTO shall ensure that log trucks and equipment are inspected prior to leaving the harvest area and any host plant debris (branches, limbs, leaves, etc.) is removed. The LTO shall instruct all operators of pick-up trucks, crummies, and service vehicles to inspect for and remove any host material debris from their vehicles prior to leaving the site.

F. If after one year the SOD mitigation have changed, then the THP shall be amended by the Plan Submitter to include the most current information and mitigations.

G. The RPF or Plan Submitter responsible for providing advice to the LTO shall inform the LTO regarding the current SOD hosts and what comprises the regulated area, prior to the start-up of initial operations and throughout the active periods of the life of the THP.

H. The infested area in the eastern unit shall be the last unit logged if feasible. After working in this area, remove, rinse, and sanitize with Lysol all accumulations of soil, mud, and organic debris from boots, saws, tools, vehicles, and heavy equipment prior to moving outside the infested area.

I. Basal truck/burl sprouts, small branches (less than 1 inch in diameter), and leaves (needles) of coast redwood and Douglas-fir are considered host materials. These host materials shall not be removed from the infected area. Vehicles/ equipment leaving the plan area shall be inspected for this material and any plant parts of B(1) species and debris removed prior to leaving the plan area.

b.[X]Yes [☐] No	Are there any other significant insect or forest disease problems within the THP area if outside a declared zone? 1.[☐] Insect(s) 2.[☐] Disease(s) 3.[☐] Pest problems 4.[X] Other (provide description of the forest problem) If YES, describe proposed measures to improve the health, vigor, and productivity of the stand(s).

Proposed measures:

INVASIVE PLANTS

French Broom (*Gensita monspessulana*), Scotch Broom (*Cytisus scoparius*) and Jubuta Grass (*Cortaderia Jubata*) are invasive exotic plants that are present in the plan area, most often along roads and seasonal or temporary roads and landings. Integrating JDSF's Invasive Weed Plan, the following measures may be taken to identify immediate control needs to slow the spread of invasive weeds:

- **Pull small immature plants if feasible. Consider the amount of soil disturbance associated with manual pulling of weeds. Soil disturbance can promote seed germination.**
- **Ideally treat plants when small <12" tall with selective herbicides (target broom species) or with focused spot treatments with broad spectrum herbicides to maintain native and compatible species.**
- **Encourage native and compatible species to shade out invasive plants.**

Blue Gum eucalyptus (*Eucalyptus globulus*) is another invasive exotic species present in the eastern portion of the plan area. Mechanical and cultural treatments shall be utilized to manage the species and reduce the amount of eucalyptus within the area.

- **Mechanical methods such as cutting and girdling will be utilized to reduce the amount of eucalyptus within the stand.**
- **Jack-pot piling slash on Eucalyptus stumps to be burned at a later date.**

ITEM #16 – HARVESTING PRACTICES

YARDING SYSTEM AND EQUIPMENT TO BE USED					
	GROUND BASED (Tractor, skidder, Forwarder)		**CABLE**		**OTHER (Special)**
[X]	Tractor, including end/long lining	[X]	Cable, ground lead	[☐]	Helicopter
[X]	Rubber tire skidder, forwarder	[X]	Cable, High lead	[☐]	Animal
[☐]	Feller buncher	[X]	Cable, skyline	[☐]	Other (describe below)
[☐]	Shovel yarding				

** All Tractor operations restrictions apply to ground based equipment Reference 14 CCR 914.2 [934.2, 954.2] (All Districts)

Instructions to the LTO:

- **No cable corridors shall be situated such that logs are yarded directly up or down watercourse channels.**
- **With prior approval of the Plan Submitter's designee, the LTO may cable yard any area designated for ground based yarding provided it will afford equal or greater protection to the soil and residual stand.**

- **Tailholds located outside the plan boundary shall be considered part of the logging area. Where tailholds are located outside the plan boundary, existing stumps shall be used to the extent feasible. Live trees may be used for tailholds where not suitable stumps exist.**
- **Equipment Limitation Zone (ELZ) shall be observed within 30 feet of Class III watercourses when slopes are 30% or less and 50 feet where slopes are greater than 30%.**
- **Reference Item 38 for flagging codes pertaining to yarding operations.**

ITEM #17 – EROSION HAZARD RATING

EROSION HAZARD RATING (EHR)					
		Per 14 CCR 914.6 [934.6, 954.6](c) Waterbreaks Road and/or Trail Gradients Waterbreak Spacing by trail/road gradient			
		10 or less	11-25	26-50	>50
[X]	LOW	300	200	150	100
[X]	MODERATE	200	150	100	75
[X]	HIGH	150	100	75	50
[☐]	EXTREME	100	75	50	50

NOTE:

- If more than one rating is checked, areas must be identified on a THP map down to 20 acres in size.
- COASTAL DISTRICT with a High or extreme EHR(s) must be mapped to 10 acres.
- If ratings checked do not match the EHR Worksheet clarify the discrepancy:

EHR rating discrepancy:

ITEM #18 – SOIL STABILIZATION

ITEM #18	**SOIL STABILIZATION / EROSION CONTROL**
Per 14 CCR 923.5, 943.5, 963.5 – Erosion Control for Logging Roads and Landings [All Districts] – All logging road and landing surfaces shall be adequately drained, through the use of logging road and landing surface shaping in combination with the installation of drainage structures or facilities and shall be hydrologically disconnected from watercourses and lakes to the extent feasible. Per 14 CCR 914, 934, 954 – Harvesting practice and erosion control [All Districts] – Timber operations shall be conducted to: Meet the goal... to prevent degradation of the quality and beneficial uses of water and maintain site productivity by minimizing soil loss Guidance on methods for hydrologic disconnection may be found in "Board of Forestry Technical Rule Addendum Number 5: Guidance on Hydrologic Disconnection, Road Drainage, Minimization of Diversion Potential, and High Risk Crossings" (1st Edition, revised 10/27/14) 14 CCR 923.5, 943.5, 963.5(b), (c), (d), (e), (f), (g), (h), (j), (k), (p) contain standard Forest Practice Operational rules pertaining to the timing and specifics for the installation of erosion control structures for Roads and Landings. 14 CCR 914.6, 934.6, 954.6(a) (1-2), (b), (c), (d), (e), (f), (g), additional Coast areas (h), (i) contain standard Forest Practice Operational rules pertaining to the timing and specifics for the installation of erosion control structures for harvesting practices, tractor and cable operations. **THE LTO SHALL BE FAMILIAR WITH THESE STANDARD OPERATIONAL REQUIREMENTS, PRIOR TO OPERATIONS.**	
a. [☐]Yes [**X**] No	Are there any exceptions proposed to the above listed standard operational requirements? If YES, please provide the specific operational instruction to the LTO.
	Methods of stabilization to be used: (check all that apply)
[**X**]	STRAW Mulch Depth (inches): **Average 3-4 inches at time of application** Percent coverage: **90%**
[**X**]	SLASH Mulch [**X**] Scattered Depth (inches): **Sufficient to attain 75% coverage** Percent coverage: **75%** [**X**] Packed Depth (inches): **Sufficient to attain 75% coverage** Percent coverage: **75%**
[**X**]	Grass Seeding LTO Instructions: **Use sterile varieties or short-lived non-native annuals.**
[**X**]	Rock Armoring Size: **See Item 24 Map Point Table for rock armoring instruction and details.** Installation instructions:
[☐]	Replanting LTO instructions if needed
[☐]	Installation of commercial erosion devices Describe commercial devise and provide instructions to the LTO:
[☐]	Other Describe method and provide LTO instructions:
Per 14 CCR 914.9[934.9, 954.9] the RPF may develop on a site-specific basis alternative practices that will achieve environmental protection at least equal to the standards set forth in 914.1-914.8 [934.1-934.8, 954.1-954.8]	
b. [☐]Yes [**X**] No	Are there any alternative practices to the standard harvesting or erosion control rules proposed?

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	If YES, the information as required per 914.9 [934.9, 954.9] shall be provided in SECTION III. Provide instructions to the LTO in SECTION II.

All WATERSHEDS Logging roads / Landings	N/A	Description of Treatments	Protection Measures	Timing
c. 923.5[943.5, 963.5](i): treatments to prevent significant discharge where features cannot be hydrologically disconnected.		For those short sections of ditch drain that are hydrologically connected and are significantly discharging sediment, treatment shall include, but not be limited to: • Rocking. • Building check dams within the drain. • Building filter barriers within the drain. • Directing drainage into a filter strip prior to hydrologic connections. • Creating a sediment settling basic (sump). • Realigning culverts so that its outlet is hydrologically disconnected. • Installing energy dissipaters such as slash, rock armor, flow diverters, downspouts, etc. to disperse flows and promote infiltration. The use and selection of an appropriate energy dissipater should be based on field conditions and is a function of flow, erosion characteristics of the soils, slope gradient, slope roughness and cover, and distance to receiving watercourse.	Ditch drains shall be located as close as possible to watercourses to effectively drain inside ditches, while still allowing for the greatest buffering capacity of the filter strip below the culvert below.	
d. 923.5[943.5, 963.5](l) & (m): treatments for sidecast or fill; cuts and fills associated w/ approaches to watercourse crossings; bare areas w/in WLPZ.		Soil stabilization treatments may include, but are not limited to: • Removal, armoring with rip-rap, replanting, mulching, seedling, installing commercial erosion control devices to manufacturer's specifications, or chemical stabilizers.	Bare soil on logging road or landing cuts, fills, transported spoils, or sidecast that is created or exposed by timber operations shall be stabilized to the extent necessary to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Sites to be stabilized include, but are not limited to: • Sidecast or fill exceeding 20 feet in slope distance from the outside edge of a logging road or a landing that has access to a watercourse or lake. • Cut and fills associated with approaches to logging road watercourse crossings of Class I or Class II waters or Class III waters where an ELZ, EEZ, or a WLPZ is required.	* See Timing requirements below
e. 923.5[943.5,963.5](n):	N/A			

When the natural ability of ground cover in WLPZ is inadequate to filter sediment.				
f. 923.5[943.5,963.5](o): Exceptions to soil stabilization treatment timing.		**Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of creation of the bare area(s), whichever is sooner.**		
Watercourse crossings on logging roads				
g. 923.9[943.9,963.9] (t)(1)-(3): Bare soil on fills, sidecast, timing of treatment.		**See treatment descriptions above.**		

Forest Practice Rules (FPR) require Specific Erosion Control / Soil Stabilization measures to be addressed within the proposed THP addressing. WLPZ & Protected ELZ & EEZs within a Non ASP and exempt ASP watersheds. Please address the following table and the specific rule. If not applicable, so state.

Non ASP & Exempt ASP watersheds WLPZ & Protected ELZ & EEZ	**N/A**	**Description of Treatments**	**Protection Measures**	**Timing**
h. 916.7[936.7,956.7] Stabilization measures for WLPZ of Cl & C II.	**N/A**			

Forest Practice Rules (FPR) require Specific Erosion Control / Soil Stabilization measures to be addressed within the proposed THP addressing WLPZ & Protected ELZ & EEZ, Roads and Landings and Watercourse Crossings, within an ASP Watershed or Immediately upstream of an ASP Watershed. Please address the following table and the specific rule. If not applicable, so state.

ASP WATERSHEDS Logging roads / Landings	**N/A**	**Description of Treatments**	**Protection Measures**	**Timing**
i. 916.9[936.9,956.9](n)(1)-(7): WLPZ, & protected ELZ & EEZs.		• **Soil stabilization treatment measures may include, but need not be limited to: removal, armoring with rip-rap, replanting, mulching, seedling, installing commercial erosion control**	**Soil stabilization is required for the following areas:** • **Areas exceeding 100 contiguous square feet**	**For areas disturbed from May 1 to October 15, treatment shall be completed prior to the start of any rain that causes overland flow across or**

		devices to manufacturer's specifications, or chemical soil stabilizers. • Where straw or slash mulch is used, the minimum straw coverage shall be 90 percent, and any treated area that has been reused or has less than 90 percent surface cover shall be treated again by the end of the timber operations. • Where slash mulch is packed into the ground surface using a tractor or equivalent piece of heavy equipment the minimum slash coverage shall be 75 percent.	where timber operations have exposed bare soil. • Approaches to tractor road watercourse crossings between the drainage facilities closest to the crossing. • Any other area of disturbed soil that threatens to discharge sediment into waters in amounts that would result in a significant sediment discharge.	along the disturbed surface that could deliver sediment into a watercourse. For areas disturbed during the extended wet weather period (October 15 to November 15 & April 1 to May 1), treatment shall be completed prior to any day for which a chance of rain of 30 percent or greater is forecast by the National Weather Service or within 10 days, whichever is earlier. General Timing: Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of the creation of the bare areas, whichever is sooner.
j. 923.5[943.5,963.5](q)(3): as it pertains to roads, landings, etc.		See above		
k. 923.9[943.9,963.9](t)(4): as it pertains to watercourse crossings.		See above		

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WATERBREAK REQUIREMENTS

914.6 Waterbreaks

The following standards are applicable to the construction of waterbreaks:

(a) except as otherwise provided for in the rules:

(1) all waterbreaks shall be installed no later than the beginning of the winter period of the current year of timber operations.

(2) Installation of drainage facilities and structures is required from October 15 to November 15 and from April 1 to May 1 on all constructed skid trails and tractor roads prior to sunset if the National Weather Service forecast is a "chance" (30% or more) of rain within the next 24 hours.

(b) Waterbreaks shall be constructed concurrently with the construction of firebreaks and immediately upon conclusion of use of tractor roads, roads, layouts, and landings which do not have permanent and adequate drainage facilities, or drainage structures.

The appropriate waterbreak spacing shall be based upon the erosion hazard rating and road or trail gradient not to exceed the following standards:

14 CCR § 914.6(c) MAXIMUM DISTANCE BETWEEN WATERBREAKS (in feet)				
Erosion Hazard Rating (for surface Erosion) (See THP Section II, Item 17)	Road or Trail Gradient (%)			
	10%, or less	11 - 25%	26 - 50%	Over 50%
Extreme	100'	75'	50'	50'
High	150'	100'	75'	50'
Moderate	200'	150'	100'	75'
Low	300'	200'	150'	100'

Cable roads that are so deeply cut as to divert and carry water away from natural drainage patterns for more than 100 feet shall have waterbreaks installed on them at 100 foot intervals.

Waterbreaks shall be located to allow water to be discharged into some form of vegetative cover, duff, slash, rocks, or less erodible material wherever possible and shall be constructed to provide for unrestricted discharge at the lower end of the waterbreak so that water will be discharged and spread in such a manner that erosion shall be minimized.

Waterbreaks shall be cut diagonally a minimum of 15.2 cm (6 inches) into the firm roadbed, cable road, skid trail or firebreak surface and shall have a continuous firm embankment of at least 15.2 cm (6 inches) in height immediately adjacent to the lower edge of the waterbreak cut.

TRACTOR OPERATIONS & LOGGING ROAD USE

Equipment Limitation Zones shall be observed within 30 feet of Class III watercourses when slopes are 30% or less and 50 feet when slopes are greater than 30%. This regulation shall be observed for all tractor yarding portions of this Timber Harvest Plan.

916.9(m) – All tractor roads shall have drainage and/or drainage collection and storage facilities installed as soon as practical following yarding and prior to either (1) the start of any rain which causes overland flow across or along the disturbed surface within a WLPZ or within an ELZ or EEZ designated for watercourse protection, or (2) any day with a National Weather Service forecast of a chance of rain of 30% or more, a flash flood warning, or a flash flood watch.

Tractor yarding or the use of tractors for construction logging roads, landings, watercourse crossings, layouts, firebreaks and other tractor roads shall be done only during dry, rainless periods where soils are not saturated. Operation of trucks and heavy equipment on roads and landings shall be limited to those with a stable operating surface. See Item 23 for Year-Round Wet Weather Restrictions and Winter Operations Plan.

CalTREES THP ITEM #18 – SOIL STABILIZATION

923.1 (e) As part of the planning and use of logging roads, landings, and watercourse crossings in the logging area, the RPF or supervised designee shall: (i) locate and map significant existing and potential erosion sites and (ii) specify feasible treatments to mitigate significant adverse impacts from the road or landing.

No significant existing or potential erosion sites that pose a significant risk to the beneficial uses of water were found in the THP area. Erosion sites related to roads and the respective corrective actions are described in Item 25, in the Map Point Summary Table in Section II Attachments, and in the Erosion Control Plan (ECP) in Section V.

GEOLOGIC ASSESSMENT & RECOMMENDATIONS

A geologic assessment was conducted by a Certified Engineering Geologist in conjunction with the RPF's assessment. Geological features were identified during the field preparation and joint visits by the geologist and RPF. The Engineering Geologic Report is included in Section V. A copy of the Geology Map from this report is included in Section II. Specific recommendations for geologic feature described in the Engineering Geologic Report are described below, and mapped on the Timber Harvest Map in Section II.

Deep-Seated Landslides

Map Point D16: Section II of the THP shall describe that proposed road construction and road fill shall not extend into the flagged landslide area. The THP shall also describe that waterbar spacing along the entire road segment shall be upgraded to Extreme EHR spacing. For clarity to the LTO and reviewers, this road segment shall be identified on the THP Operations Map.

Shallow-Seated Landslides

Map Point S1: Section II of the THP shall specify that an Equipment Exclusion Zone shall be established around this feature to avoid tractor operations on the unstable area. No harvest shall occur within 10 feet of the unstable area. The EEZ shall be flagged prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

Map Point S5: Section II of the THP shall describe that harvesting will be avoided on and within 15 feet of the slide. The boundaries of this area shall be flagged for avoidance prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

Map Point S20: Section II of the THP shall describe that harvesting will be avoided on the slide complex. The unstable area shall be flagged for avoidance prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

PART OF PLAN

RECEIVED
MAR 30 2020
COAST AREA
RESOURCE MANAGEMENT

ITEM #19 – 22: GROUND BASED EQUIPMENT

GROUND BASED EQUIPMENT	
a. [☐]Yes [X] No	Per 14 CCR 895.1 a layout is a prepared bed in which a tree is felled, generally constructed by a tractor or other ground based equipment. Are tractor or skidder constructed layouts to be constructed? If YES, specify the location (consider mapping) and the extent of use. NOTE: winter operations and soil stabilization measures apply to tractor or skidder constructed layouts.
Per 14 CCR 914.3 [943.3, 954.3](e)Tractors shall not be used in areas designated for cable yarding except: • To pull trees away from streams • To yard logs in areas where deflection is low • Where swing yarding is advantageous • To construct firebreaks and/or layouts • To provide tail-holds Such exception(s) shall be explained and justified in the THP, and require Director's approved	
b. [X]Yes [☐] No	Will ground based equipment be used within area(s) designated for cable yarding: (CHECK all that apply)
[☐]	Pulling trees away from watercourses
[☐]	Yarding logs from areas with low deflection
[☐]	Swing yarding
[☐]	Construct fire breaks
[☐]	Construct layouts
[☐]	Providing tail-holds
[X]	Other Describe: **Tractors may be used on slopes up to 20 percent to construct fire lines around concentrations of slash at cable landings provided there are no other limitations on the tractor use.** **Ground based equipment may be used within the area designated for cable yarding to long-line trees from cable areas with tracks/tires resting in the area designated for ground based equipment including roads.**
	If YES, specify the location (consider mapping) and provide LTO instructions
c. [☐]Yes [X] No	Are any exceptions proposed for ground based operations within cable areas outside of the exceptions listed above? If YES, provide the required explanation and justification in SECTION III of the THP and provide operations instructions for the LTO in SECTION II below.

Per 14 CCR § 914.9 [934.9, 954.9](a) Alternatives to Standard Rules:

(a) Alternative practices may be developed by the RPF on a site-specific basis provided the following conditions are complied with and the alternative practices will achieve environmental protection at least equal to that which would result from using measures stated in 14 CCR §§ 914.1-914.8 ,934.1-934.8, 954.1-954.8.

(1) Environmental impacts with potential for significant adverse effects on the beneficial uses of water, on the residual timber, and on the soil productivity are identified and measures proposed to mitigate such impacts are included in an approved THP. The THP shall also contain a clear statement as to why alternative harvesting and erosion control measures are needed.

(2) The alternative practice(s) must be explained in sufficient detail and standards provided in the THP so that they can be

adequately evaluated and enforced by the Director and implemented by the licensed timber operator.

(3) On a THP in which alternatives covering harvesting and erosion control measures have been incorporated, the timber operator shall agree to the alternative specifications by signing and filing with the Director a copy of the plan, the amended plan or a facsimile thereof, prior to beginning or continuing operations on the portion of the plan to which the alternatives apply.

(b) The Director shall not accept for inclusion in a THP alternative harvesting and erosion control measures proposed under this section which do not meet the standard of subsection (a) of this section. In the event that there is more than one written negative position showing that the alternative practice(s) does (do) not meet the standard of subsection (a) received from among the agencies listed in 14 CCR 1037.3 and the Department which participated in the review of the plan including on-the-ground inspection, the Director shall reject the proposed alternative.

(c) Alternative practices stated in an approved THP shall have the same force and authority as those practices required by the standard rule.

d. [☐]Yes [**X**] No	Is the RPF proposing any Alternative Practices to the standard rule on a site-specific basis? If "YES" provide clear instruction to the LTO in Section II advising LTO how the Alternative is to be implemented to maintain equal protection of the standard rule. In Section III explain how the alternative practice proposed achieves environmental protection at least equal to that what which would result from using measures stated in 14 CCR §§ 914.1-914.8 ,934.1-934.8, 954.1-954.8.

LTO Instructions:

14 CCR 914.2 [934.2, 954.2](a-k) Identifies the Forest Practice Rule requirements for the use of ground based equipment within the harvesting area.

- (b) Tractor, or other heavy equipment equipped with a blade, SHALL NOT operate on skid roads or slopes that are so step as to require the blade to be used for breaking.
- (c) Tractor roads SHALL be limited in number and width to the minimum necessary for removal of logs.
  - When less damage to the resources specified in 14 CCR 914[934, 945] will result, existing tractor roads shall be used instead of constructing new tractor roads.
  - [NORTHERN only] RPF may propose exceptions for silvicultural reasons when explained and justified within the plan.
- (e) Slash and debris from timber operations SHALL not be bunched adjacent to residual trees required for silvicultural or wildlife purposes, or placed in a location where they could discharge into a Class I or II watercourse, or Lake.
- (g) where tractor roads are constructed only those roads shall be used for the skidding of logs to landings
- (h) Desirable residual trees and seedlings will not be damaged or destroyed by tractor operations.
- (i) where water breaks cannot effectively disperse surface runoff, other erosion controls shall be installed as needed.
- Slope restriction are identified in subsection (d), (f) [Coastal, Northern], (j) [Southern]

The LTO shall be aware of these rule requirements prior to operations

e. [**X**]Yes [☐] No	Will new tractor roads be constructed?
f. [☐]Yes [**X**] No	Will tractor road use be limited to existing tractor roads?

ASP NOTE: per 14 CCR 916.9 (k)(1) – Year-around tractor road limitations, Tractor roads shall not be used when operations may result in significant sediment discharge and (m) Tractor Road Drainage Facility Installation - All tractor roads shall have drainage and/or drainage collection and storage facilities installed as soon as practical following yarding and prior to either (1) the start of any rain which causes overland flow across or along the disturbed surface within a WLPZ or within any ELZ or EEZ designated for

watercourse or lake protection, or (2) any day with a National Weather Service forecast of a chance of rain of 30 percent or more, a flash flood warning, or a flash flood watch.

Will ground based equipment be used on:

g. [☐]Yes [**X**] No	Unstable areas? (only allowed if unavoidable) If YES, the RPF SHALL develop specific measures to minimize the effect of operations on slope stability. Provide the required justification and explanation in SECTION III and operational instructions to the LTO in SECTION II.
h. [☐]Yes [**X**] No	Slopes steeper than 65% If YES, provide site specific instructions to the LTO in SECTION II and provide the required explanation and justification in SECTION III.
i. [☐]Yes [**X**] No	Slopes steeper than 50% where the erosion hazard rating (EHR) is HIGH or EXTREME. If YES, provide site specific instructions to the LTO in SECTION II and provide the required explanation and justification in SECTION III.
j. [☐]Yes [**X**] No [☐] [☐] [☐]	Slopes between 50% and 65% with a MODERATE EHR at: (percentage based on average slope on sample areas of 20 acres) Existing tractor roads that do not require reconstruction. [NORTHERN and SOUTHERN only] New tractor roads that have been flagged by an RPF or supervised designee prior to use. [COASTAL only] New tractor roads at a location that has been shown on the THP map, flagged by an RPF or supervised designee prior to the pre-harvest inspection, or prior to the start of timber operations if a PHI was not required. if YES, provide site specific instructions to the LTO in SECTION II.
k. [☐]Yes [**X**] No	Slopes over 50% which lead without flattening to sufficiently dissipate water flow and trap sediment before it reaches a watercourse or lake? If YES, provide site specific instructions to the LTO in SECTION II and provide the required explanation and justification in SECTION III.

NOTE:
- Per 14 CCR 1034(x)(15) all exceptions must be located on a map.
- If any question above is answered YES then tractor road locations must be flagged on the ground prior to the PHI or the start of timber operations if a PHI is not required.

ITEM # 23 – WINTER OPERATIONS

Per 14 CCR 895.1:

- "Winter period" means the period between November 15 and April 1, Except under special County Rules per 14 CCR:
  - 925.1 (Santa Clara)
  - 926.18 (Santa Cruz)
  - 927.1 (Marin)
  - 965.5 (Monterey)

- "Extended wet weather period" means the period from October 15 to May 1.

- Tractor roads (except as otherwise provided in the rules):
  - All waterbreaks shall be installed no later than the beginning of the winter period of the current year of timber operations.
  - Installation of drainage facilities and structures is required from October 15 to November 15 and April 1 to May 1 on all constructed skid trails and tractor roads prior to sunset if the National Weather Service forecast is a "chance" (30% or more) of rain within the next 24 hours per 14 CCR 914.6[934.6, 954.6](a).
- Logging roads and landings used for timber operations shall have adequate drainage:
  - Upon completion of use for the year or by October 15, whichever is earlier.
  - An exception is that drainage facilities and drainage structures do not need to be constructed on logging roads and landings in use during the extended wet weather period provided that all such drainage facilities and drainage structures are installed prior to the start of rain that generates overland flow. 923.5[943.5, 963.5](j).

- When the term "WPOP" (Winter Period Operating Plan) is used below, all the requirements per 14 CCR 914.7[934.7, 954.7] (b) must be addressed.

ITEM #23	WINTER OPERATIONS
If timber operations are proposed within the winter period the RPF may propose to operate under a: • **Winter Period Operating Plan (WPOP) per 14 CCR 914.7, 934.7, 954.7(b)** • **In-lieu winter operating plan per 14 CCR 914.7 [934.7, 954.7](c)**	
a. [X]Yes [☐] No	Will timber operations occur during the winter period?
WINTER PERIOD OPERTING PLAN (WPOP)	
A Winter Period Operating Plan (WPOP) is required when winter operations will occur under the following conditions: • **Site preparation** • **Road and landing construction** • **Temporary logging road watercourse crossings will not be removed** • **At tractor watercourse crossings** • **Temporary logging roads or landings** • **Roads to be abandoned or deactivated** • **Operations are proposed in an ASP watershed or immediately upstream**	
b. [X]Yes [☐] No	Will mechanical site preparation be conducted during the winter period? If YES, then a WPOP is required per 14 CCR 914.7 [934.7, 954.7](b)
c. [☐]Yes [X] No	Will roads be constructed during the winter period? If YES, a WPOP is required per 14 CCR 914.7 [934.7, 954.7] addressing logging road and landing construction and reconstruction per 14 CCR 923.4 [943.4, 963.4](l). Provide operational instructions to the LTO in SECTION II
d. [☐]Yes [X] No	Will landings be constructed during the winter period? If YES, a WPOP is required per 14 CCR 914.7 [934.7, 954.7] addressing logging road and landing construction and reconstruction per 14 CCR 923.4 [943.4, 963.4](l).). Provide operational instructions to the LTO in SECTION II

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e. [☐]Yes [**X**] No	Will temporary logging road watercourse crossings be left in place during the winter period? If YES, a WPOP is required per 14 CCR 923.9 [943.9, 963.9](r). Provide specific measures to be taken during operations by the LTO in SECTION II
f. [☐]Yes [**X**] No	Will tractor watercourse crossings be used during the winter period? If YES, a WPOP is required per 14 CCR 914.8 [934.8, 954.8](d). Provide operational instructions and stabilization measures in SECTION II. If an exception is proposed provide an explanation and justification in SECTION III.
g. [**X**]Yes [☐] No	Will temporary logging roads be used during the winter period? If YES, a WPOP is required per 14 CCR 923.6 [943.6, 963.6](f) and 923.8 [943.8, 963.8](d). Provide specific measures to be taken during operations for the LTO in SECTION II. **LTO Instructions:** **See Winter Period Operating Plan Below. If "dry road" conditions as described below are met, temporary roads may be used for activities as described in the WPOP.**
h. [**X**]Yes [☐] No	Will temporary landings be used during the winter period? If YES, a WPOP is required per 14 CCR 923.6 [943.6, 963.6](f) and 923.8 [943.8, 963.8](d). Provide specific measures to be taken during operations for the LTO in SECTION II. **LTO Instructions:** **See Winter Period Operating Plan Below. If "dry road" conditions as described below are met, temporary roads may be used for activities as described in the WPOP.**
i. [**X**]Yes [☐] No	Will logging roads to be abandoned or deactivated, be open (not blocked) during the winter period? If YES, a WPOP is required per 14 CCR 923.6 [943.6, 963.6](f) and 923.8 [943.8, 963.8](d). Provide specific measures to be taken during operations for the LTO in SECTION II. **LTO Instructions:** **Temporary logging roads and landings to remain a part of the permanent road network shall be deactivated annually prior to the winter period or upon completion of timber operations.** **Logging roads to be abandoned or deactivated shall be blocked prior to the winter period, or upon completion of timber operations.**
	ASP WATERSHEDS OR IMMEDIATELY UPSTREAM
	Extended Wet Weather Period:
j. [**X**]Yes [☐] No	Are timber operations proposed during the extended wet weather period – October to May 1? If YES, then a WPOP is required per 14 CCR 916.9 [936.9, 963.9](l) and (l)(1)
k. [**X**]Yes [☐] No	Will logging roads construction or reconstruction occur within the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.6 [943.6, 963.6] (h)(6) and 923.4 [943.4, 963.4](s)(2) In SECTION II
l. [**X**]Yes [☐] No	Will logging road use occur within the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.6 [943.6, 963.6] (h)(6) and 923.4 [943.4, 963.4](s)(2) In SECTION II
m. [**X**]Yes [☐] No	Will landing construction or reconstruction occur within the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.6 [943.6, 963.6] (h)(6) and 923.4 [943.4, 963.4](s)(2) In SECTION II
n. [**X**]Yes [☐] No	Will landing use occur within the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.6 [943.6, 963.6] (h)(6) and 923.4 [943.4, 963.4](s)(2) In SECTION II

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o. [☐]Yes [**X**] No	Will any watercourse crossing drainage structures be CONSTRUCTED during the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.9 [943.9, 963.9](s) in SECTION II
p. [☐]Yes [**X**] No	Will any watercourse crossing drainage structures be RECONSTRUCTED during the extended wet weather period? If YES, provide specific measures to be taken during operations per 14 CCR 923.9 [943.9, 963.9](s) in SECTION II
q. [**X**]	If any of the questions above are answered YES then WPOP is required: RPF chooses to prepare a WPOP per 14 CCR 914.7 [934.7, 954.7](b)(1-12)

IF A WINTER OPERATING PLAN (WPOP) IS NOT BEING PROPOSED THEN THIS PAGE MAY BE REMOVED

ITEM FF

WINTER PERIOD OPERATING PLAN (WPOP)	
Per 14 CCR 914.7 [934.7, 954.7](b) the WPOP shall include the specific measures to be taken during the winter period to avoid or substantially lessen erosion, soil movement into watercourses and soil compaction from timber operations. The winter period operating plan shall address the following subjects:	
1) Erosion Hazard Rating:	**Low, Moderate, and High**
2) Mechanical Site preparation methods:	**N/A**
3) Yarding system: *(Constructed skid trails and tractor road watercourse crossings)*	**No tractor yarding within the Winter Period. Cable yarding and mastication in the fuel break is permitted during extended dry periods where "dry road" conditions are exhibited.**
4) Operating Period:	**November 15 – April 1**
5) Erosion Control facilities timing:	**Facilities will be installed as per 14 CCR 914.6 (a)**
6) Consideration of form of precipitation: *(rain or snow)*	**Rain**
7) Ground conditions: *(soil moisture conditions, frozen)*	**Access has been limited as described below during saturated soil conditions**
8) Silvicultural system ground cover:	**All areas of the plan area expected to retain a vegetative cover in the form of overstory/understory vegetation, slash, and associated logging debris.**
9) Operations within the WLPZ:	**Falling is permitted**
10) Equipment limitations:	**See Winter Period below**
11) Known Unstable Areas:	**No equipment operations within known unstable areas**
12) Logging roads and landings:	**No construction. Log hauling will be permitted during extended dry periods. No turbid runoff permitted**

PART OF PLAN

YEAR-ROUND WET WEATHER PLAN

1. **Logging roads, landings or tractor roads shall not be used by heavy equipment or logging trucks when:**
   - **visibly turbid water from the road, landing nor tractor road (skid trail) or an inside ditch associated with the logging road, landing or tractor road may reach a watercourse or lake in amounts sufficient to cause a turbidity increase in Class I, II, III, or IV waters.**
   - **a stable operating surface* does not exist**
   - **saturated soil conditions* exist**

   ***Refer to the definitions of *saturated soil conditions* and *stable operating surface* under 14 CCR 895.1 that are reproduced at the end of the Winter Period Operating Plan.**
   Use of roads under such conditions shall be limited to light vehicles (defined as ≤ 1-ton pick-up trucks or smaller vehicles such as quadra-tracks motorcycles). However, access will be limited to ATVs wherever rutting of the logging roads occurs.

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and/or waterbars would be breached (such that they cannot function as designed). If any permitted use results in damage to the road surface, drainage facilities, or stream crossings, the damage shall be repaired by the LTO immediately after the initial damage has occurred.

2. Grading to obtain a drier running surface more than one time before reincorporation of any resulting berms back into the road surface is prohibited.
3. Grading to obtain a drier running surface is discouraged and will be evaluated on a site-specific basis. Such grading will only be allowed for short distances with permission from the Plan Submitter's designee and is prohibited for roads located within the WLPZ of a watercourse. Material developed will be deposited in safe locations with no access to watercourses, and situated so it can be incorporated into the road's running surface as soon as feasible.
4. Concurrent with use for log hauling, approaches to logging road watercourse crossings and all traveled surfaces of logging roads in a WLPZ or within any ELZ or EEZ designated for watercourse or lake protection shall be treated for erosion control as needed to minimize soil erosion and sediment transport and to prevent the discharge of sediment into watercourses and lakes in quantities deleterious to the beneficial uses of water.
5. During and following periods of significant rain while timber operations are ongoing, the LTO shall inspect logging roads for proper functioning of drainage facilities and structures, and shall take appropriate action to ensure proper functioning.
6. Drainage facilities (i.e. waterbreaks) shall be in place and functional by October 15, except on roads in use after October 15 provided that all such waterbreaks are installed prior to the start of rain that generates overland flow.
   Log hauling on logging roads and landings shall be limited to those which are hydrologically disconnected from watercourses to the extent feasible, and exhibit a stable operating surface in conformance with (1) above.

WINTER PERIOD OPERATION PLAN

The Winter Period Operating Plan is divided into the *Extended Wet Weather Period* and the *Winter Period* per 14 CCR 895.1.

Extended Wet Weather Period: October 15 to May 1
Winer Period: November 15-April 1

During the *Extended Wet Weather Period* in the fall (October 15-November 14) and spring (April 2 to May 1) the following protection measures shall apply:

1. Tractor yarding or the use of tractors for construction of fire breaks or the construction of tractor roads shall be done only during extended dry, rainless periods with low antecedent soil wetness (no more than one-quarter inch of rain in the previous 24-hour period measured at the McGuire's RAWS Station) and where soils are not saturated. (Refer to the definition of *saturated soils* under 14 CCR 895.1). No such construction shall occur when visibly turbid water from the road, landing or skid trail surface may reach a watercourse or lake.
2. No more than one main skid trail and one spur skid trail per piece of operational yarding equipment shall be open during this period. Immediately upon completion of use any temporary crossings shall be removed and stabilized and waterbreaks shall be installed on the skid trail as required by the Forest Practice Rules.
3. Berms shall be removed or breached. Except where required for erosion control, prior to the Winter Period.
4. Construction or Reconstruction of logging roads, tractor roads, landings or watercourse crossings shall take place during the Extended Wet Weather Period only during dry rainless periods when saturated soil conditions do not exist. No such construction shall occur when visibly turbid water from a road, landing or skid trail surface may reach a watercourse or lake. No such construction shall occur during the winter period.
5. Use of logging roads, landings, tractor roads as well as log hauling shall not occur when saturated soil conditions exist on the road/landing or during periods when precipitation is sufficient to generate overland flow off the road or when it is capable of leaving the road or when sediment from the logging road, landing or tractor road surface is transported to a watercourse or drainage facility that discharges into a watercourse in amounts sufficient to cause a visible increase in turbidity in Class I, II or III waters.
   Once road use has ceased due to the foregoing conditions, use shall not resume until and unless the road surface is dry. This provision shall be applied according to a rule of reasonableness, and it shall not prohibit, for example, use of a small segment of wet road on an otherwise dry road (refer to the *dry road* definition at the end of the Winter Period Operating Plan). If any permitted use results in damage to the road surface, drainage facilities, or stream crossings, the damage shall be repaired by the LTO immediately after the initial damage has occurred to eliminate the likelihood of related sediment reaching Class I, II or III waters.
6. Light vehicles (defined as ≤ 1-ton pickup trucks, or smaller vehicles such as quad-tracks or motorcycles) may be used during periods of wet weather, however access will be limited to ATVs whenever rutting of the logging roads will occur (such that

runoff is carried along the ruts) and/or waterbars would be breached (such that they no longer would functions as intended) as a result of use by light vehicles (pickups, etc.). If any permitted use results in damage to the road surface, drainage facilities, or stream crossings, the damage shall be repaired by the LTO immediately after the initial damage has occurred to eliminate the likelihood of related sediment reaching Class I, II, or III waters.

7. Accidental depositions of debris within a Class III watercourse during the winter period will be stabilized by the LTO (such that the debris does not create the potential for diversion of the watercourse or the potential buildup of excess sediment in amounts greater than found in the watercourse where there is no logging associated debris), within 24 hours.
8. Treatments to comply with 916.9 (n)5&6 described in Item 18, soil stabilization, shall be applied when necessary for operations within the WLPZ.
9. Before the beginning of the winter period, remove and stabilize tractor road crossing facilities by excavating fills to form a channel close as feasible to the natural watercourse grade and orientation and wider that the natural channel as observed upstream and downstream of the crossing. The excavated material and cut bank shall be no greater than 65% (1.5:1) from outside edge of constructed channel. Exposed soil between the excavated watercourse and nearest adjacent drainage facility shall be stabilized by seeding, mulching, rock armoring, replanting or other treatment to prevent soil erosion and significant sediment discharge.
10. Year-Round Wet Weather Restrictions 1-6, stated above.

During the *Winter Period* (November 15 to April 1) the following protection measures shall apply:

1. Operations shall be limited to timber falling, tree planting, slash pile burning, maintenance of erosion control structures and other vegetation or slash treatments not requiring the use of heavy equipment. Additionally, if extended dry periods occur, such that, "dry road" conditions are exhibited – cable yarding, fuel treatments, and log hauling activities will be permitted.
2. On seasonal roads, light vehicles (defined as ≤ 1-ton pickup truck, or smaller vehicles such as quad-tracks or motorcycles) may be used for access during periods of wet weather, however access will be limited to ATVs whenever rutting of the logging roads would occur (such that they no longer would function as intended) as a result of road use by light vehicles (pickups, etc.). If any permitted use results in damage to the road surface, drainage facilities, or stream crossings, the damage will be repaired immediately during a time which drainage facilities are required to be in place.
3. Other than as described above under Item 1 (during extended dry periods where "dry road" conditions are exhibited), all fallers, tree planters and other project personnel will access the harvest area using existing roads by light vehicles and/or ATVs. The LTO will be responsible for maintaining erosion control structures.
4. Timber falling is proposed within the Units, including Class III ELZs.
5. The following additional provisions shall also apply:
   - The LTO shall be responsible for the maintenance of all erosion control structures.
   - Consistent with federal and state law and regulations, in order to prevent or minimize significant adverse effects to aquatic resources, emergency access is allowed during periods of wet weather in order to correct emergency, road-related problems in the form of imminent road fill failures or other erosion problems and emergency human safety situations.
   - Accidental deposition of debris within a Class III watercourse during the Winter period shall be removed or stabilized immediately by the LTO (such that the debris does not create the potential for diversion of the watercourse of the potential buildup of excess sediment in amounts than found in the watercourse where there is no logging associated debris).
   - See Item #18 regarding waterbar spacing and timing of installation.

DEFINITIONS

"Dry road" where moisture is less than or equal to that found during normal watering (dust abatement) treatments or light rainfall, and soil is not rutting or pumping fines causing a visible increase in turbidity in any drainage facility, construction/reconstruction site or road surface, any of which drains directly to Class I, II or III waters.

"Proper functioning of drainage facilities and structures" occurs when:

- Rolling dips and waterbreaks are capturing runoff from road surfaces and discharging it to locations so that sediment is no delivered to watercourses.
- Inside ditches are carrying runoff to culverts or ditch drains.
- Culverts are not occluded by debris

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"Saturated soil conditions" means that soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur. Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing material during timber operations, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials.

"Significant rain" means ¼" or more of rain within a 24-hour period, as measured at the McGuire's RAWS station located in Section 12; T17N; R16W; MDBM. This information can be accessed at the following website:
http://www.wrh.noaa.gov/mesowest/getobext.php?sid=MCGC1&table=1&banner=off

"Stable operating surface" means a road or landing surface that can support vehicular traffic and has a structurally sound road base appropriate for the type, intensity and timing of intended use.

IN-LIEU WINTER PERIOD OPERATION PLAN	
r. [☐]	RPF chooses the in-lieu winter operating plan option as allowed per 14 CCR 914.7 [934.7, 954.7](c)(1-3) Specify the procedures listed in subsections (1) and (2), and list the site specific measures for operations in the WLPZ and unstable areas as required by subsection (3).
s. [☐]Yes [☒] No	Will the in-lieu winter operating plan include operations within WLPZ(s) or unstable area(s) during the winter period? If YES, provide site specific measures per 14 CCR 914 [934, 954] to protect the beneficial uses of water in SECTION II as instructions to the LTO.
Hauling and heavy equipment use roads and landings	
t. [☐]Yes [**X**] No	Will ROADS be used for log hauling and heavy equipment use during the winter period where there will not be a stable operating surface or surfaced with rock to a depth and quantity sufficient to maintain a stable operating surface? If YES, the required explanation and justification should be provided in SECTION III per 14 CCR 923.6 [943.6, 963.6](g) and 914.7[934.7,954.7].
u. [☐]Yes [**X**] No	Will LANDINGS be used for log hauling and heavy equipment use during the winter period where there will not be a stable operating surface or surfaced with rock to a depth and quantity sufficient to maintain a stable operating surface? If YES, the required explanation and justification should be provided in SECTION III per 14 CCR 923.6 [943.6, 963.6](g) and 914.7[934.7,954.7].
Hauling and heavy equipment use on hydrologically disconnected or saturated soils.	
v. [☐]Yes [**X**] No	Will ROADS be used for log hauling and heavy equipment use during the winter period on roads that are NOT hydrologically disconnected and exhibit saturated soil conditions? If YES, provide a required explanation and justification in SECTION III. per 14 CCR 923.6 [943.6, 963.6](g) and 914.7[934.7,954.7].
w. [☐]Yes [**X**] No	Will LANDINGS be used for log hauling and heavy equipment use during the winter period on roads that are NOT hydrologically disconnected and exhibit saturated soil conditions? If YES, provide a required explanation and justification in SECTION III. per 14 CCR 923.6 [943.6, 963.6](g) and 914.7[934.7,954.7].
Watercourse crossing removal	
x. [**X**]Yes [☐] No	Will any logging road watercourse crossing proposed for removal and/or stabilization be left in place during the winter period? If YES, provide operational instructions to the LTO addressing the specifics of the applicable CDFW 1600 agreement, Lake and Streambed alteration agreement or otherwise specify in the plan. Per 14 CCR 923.9[943.9, 963.9](p)(4) In SECTION II

CalTREES THP ITEM #23 – WINTER OPERATIONS

	LTO INSTRUCTIONS **Utilize the Implementation Priority column on the Map Point Table in section II Item 24 to plan for map points and associated road maintenance completion date requirements. See Section II Attachments for 1611 and diagrams.** **Temporary logging roads and landings to remain a part of the permanent road network shall be deactivated annually prior to the winter period or upon completion of timber operations.** **Logging roads to be abandoned or deactivated shall be blocked prior to the winter period, or upon completion of timber operations.**

ITEM # 24 – ROADS AND LANDINGS

ITEM #24	ROAD CONSTRUCTION
a. [X]Yes [☐] No	**Will any road(s) be CONSTRUCTED?**
	PROVIDE: The classification and approximate length of each of the following logging road segment categories: 1034(o) Road classification: Approximate length Feet: ☐ Permanent _____ ☐ Seasonal _____ ☒ Temporary **11,296.324**
b. [☐]Yes [X] No	Will new road construction be wider than single lane with turnouts? If YES, address pursuant to 14 CCR 923 [943, 963](c) & 923.2 [943.2, 963.2](d)(1)
c.[X]Yes [☐] No	Will any new Logging road(s) cross? ☒ Unstable areas ☐ Connected headwall swales (14 CCR 895.1 "Connected Headwall Swale") ☐ Both If YES, address pursuant to 14 CCR 923.1 [943.1, 963.1](d) **The proposed road segment is to extend Road 523 further on the ridge in order to cable yard the steeper slopes. A failed alternative route outside of the unstable was scouted, but was rejected as the grade became too steep to accommodate log trucks.** **The existing portion of the road currently ends in the unstable area and the proposed road segment follows an existing skid trail that is still intact and is being constructed on "relatively gently sloping ground" (Geology Report). The unstable area in question is a deep seated slide that is moving very slowly if at all, therefore, the Geological Engineer feels that the proposed road will not have significant impacts. See Section V; Engineering Geologic Report for more information.**
d. [X]Yes [☐] No	Will any new roads? ☒ Exceed a grade of 15% ☐ Have grades greater than 15% for distances greater than 500 feet ☐ Both NOTE: per 14 CCR 1034(x)(5)(A) new road construction or reconstruction segments exceeding 15% for 200 feet shall be mapped. If YES, address pursuant to 14 CCR 923.2 [943.2, 963.2](d)(2). See 923 [943. 963](c). **The proposed road R1 exceeds 15% for a short distance of ~300 feet, slacks to 10-12% and then exceeds 15% for ~200 feet before becoming 0-3% grade. This proposed road is hydrologically disconnected from the Class II watercourses within the area per 14 CCR 923.2 (a)(5). The proposed placement of the road protects the trail network that is important to the local community, but still allows for the proper placement of a landing to facilitate tractor operations.**
e. [☐]Yes [X] No	Will any logging roads be constructed within? ☐ 150 feet of a Class I Watercourse and Lake Transition Line (WLTL) ☐ 100 feet of a class II WLTL on slopes greater than 30% ☐ Class I Watercourse or Lake ☐ Class II Watercourse or Lake ☐ Class III Watercourse or Lake ☐ Class IV Watercourse or Lake ☐ A Watercourse and Lake Production Zone (WLPZ) ☐ Other (Examples; marshes, wet meadows, wet areas)

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

	If "OTHER" is selected describe the type of feature referenced below. NOTE: Exceptions are permitted per 14 CCR 923.1 [943.1, 963.1](b)(1) – (3) at: - Existing logging road crossing(s) - Logging road watercourse crossing(s) to be constructed that are approved as part of a Fish and Game Code process (F&GC 1600 et seq.) - Logging road watercourse crossings of class III watercourses that are dry at the time of use. If YES, address per 14 CCR 923 [943, 963](c)
f. [☐]Yes [**X**] No	Will any constructed road be located across 100 feet or more lineal distance on? ☐ Slopes over 65% ☐ Slopes over 50% which are within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake If YES, address per 14 CCR 923.2 [943.2, 963.2](a)(7) and 923.4 [943.4, 963.4](n)
g. **1.**[**X**]Yes [☐] No	Will any road(s) be deactivated? **All proposed and existing temporary roads shall be deactivated prior to THP completion per 14 CCR § 895.1. This amounts to 17, 543.24 feet total (11,296.324 feet – proposed; 6,246.92 feet - existing).**
2.[**X**]Yes [☐] No	Will any road(s) be abandoned? Road classification: Approximate length Feet: ☐ Permanent _____ ☒ Seasonal **4,689 Feet** ☒ Temporary **985 Feet** **Road 669 (~ 4,659 feet) and Road 668A (~ 985 feet) are to be abandoned. Road 669 will be converted into a trail and maintained in perpetuity. Road 668A is redundant due to the lower spur on Road 668. See Section III for the specifications of the abandonments.**
3.[**X**]Yes [☐] No	Will any watercourse crossing(s) be deactivated? **At the bottom of Road 669, a failed Class III crossing will be deactivated. See MAP POINTS Table below for:** • **Description of current condition of site.** • **Specific mitigations for the site.** PART OF PLAN
4.[☐]Yes [**X**] No	Will any watercourse crossing(s) be abandoned? If YES, describe specific measures to prevent significant sediment discharge. per 14 CCR 923.8 [943.8, 963.8] et seq. and 923.9 [943.9, 963.9](e) and (p) If Logging road(s) are to be abandoned provide the blockage design Per 14 CCR 923.8 [943.8, 963.8](d)
h. [☐]Yes [**X**] No	Is there any exception to flagging or otherwise identifying the location of any road(s) to be constructed? If YES, address per 14 CCR 923.3 [943.3, 963.3](c)

ROAD RECONSTRUCTION	
i. [☐]Yes [**X**] No	**Will any roads be RECONSTRUCTED?**
	PROVIDE: The classification and approximate length of each of the following logging road segment categories: 1034(o) Road classification: Approximate length Feet: ☐ Permanent _____ ☐ Seasonal _____

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	☐ Temporary _____
j. [☐]Yes [**X**] No	Will new road reconstruction be wider than single lane with turnouts? If YES, address pursuant to 14 CCR 923 [943, 963](c) & 923.2 [943.2, 963.2](d)(1)
k. [☐]Yes [**X**] No	Will any logging roads be reconstructed within? ☐ Class I Watercourse or Lake ☐ Class II Watercourse or Lake ☐ Class III Watercourse or Lake ☐ Class IV Watercourse or Lake ☐ A Watercourse and Lake Zone (WLPZ) ☐ Other (Examples; marshes, wet meadows, wet areas) If "OTHER" is selected describe the type of feature referenced below. NOTE: Exceptions are permitted per 14 CCR 923.1 [943.1, 963.1](b)(1) – (3) at: - Existing logging road crossing(s) - Logging road watercourse crossing(s) to be constructed that are approved as part of a Fish and Game Code process (F&GC 1600 et seq.) - Logging road watercourse crossings of class III watercourses that are dry at the time of use. If YES, address per 14 CCR 923 [943, 963](c)
l. [☐]Yes [**X**] No	Will any reconstructed road be located across 100 feet or more lineal distance on? ☐ slopes over 65% ☐ Slopes over 50% which are within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake. If YES, address per 14 CCR 923.2 [943.2, 963.2](a)(7) and 923.4 [943.4, 963.4](n)
m. [☐]Yes [**X**] No	Is there any exception to flagging or otherwise identifying the location of any road(s) to be reconstructed? If YES, address per 14 CCR 923.3 [943.3, 963.3](c)
	LANDING CONSTRUCTION
n. [**X**]Yes [☐] No	Will any Landing(s) be CONSTRUCTED?
o. [☐]Yes [**X**] No	Will any landing(s) be constructed within? ☐ 150 feet of a Class I Watercourse and Lake Transition Line (WLTL) ☐ 100 feet of a class II WLTL on slopes greater than 30% ☐ Class I Watercourse or Lake ☐ Class II Watercourse or Lake ☐ Class III Watercourse or Lake ☐ Class IV Watercourse or Lake ☐ A Watercourse and Lake Protection Zone (WLPZ) ☐ Other (Examples; marshes, wet meadows, wet areas) If "OTHER" is selected describe the type of feature referenced below. NOTE: Exceptions are permitted per 14 CCR 923.1 [943.1, 963.1](b)(1) – (3) at: - Existing crossing(s) - Logging road watercourse crossing(s) to be constructed that are approved as part of a Fish and Game Code process (F&GC 1600 et seq.) - Logging road watercourse crossings of class III watercourses that are dry at the time of use. If YES, address per 14 CCR 923 [943, 963](c)
p. [☐]Yes [**X**] No	Will any landing(s) exceed one half acre in size?

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	NOTE: per 14 CCR 1034(x)(5)(D) if any landing exceeds ¼ acre in size or requires substantial excavation, the location shall be mapped. If YES, address per 14 CCR 923 [943, 963](c) and 923.2 [943.2, 963.2](e)(2)
q. [☐]Yes [**X**] No	Will any Landing(s) be located on? ☐ Unstable areas ☐ Connected headwall swales (14 CCR 895.1 "Connected Headwall Swale" ☐ Both If YES, address pursuant to 14 CCR 923.1 [943.1, 963.1](d)
r. [☐]Yes [**X**] No	Will any landing construction be located across 100 feet or more lineal distance on? ☐ Slopes over 65% ☐ Slopes over 50% which are within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake. If YES, address per 14 CCR 923.2 [943.2, 963.2](a)(7) and 923.4 [943.4, 963.4](n)
s. [☐]Yes [**X**] No [**X**]Yes [☐] No	Will any Landing(s) be deactivated? Will any Landing(s) be abandoned? If YES, describe specific measures to prevent significant sediment discharge. per 14 CCR 923.8 [943.8, 963.8] et seq. and 923.9 [943.9, 963.9](e) and (p) **The landing that the end of Road 668A is an existing WLPZ landings. See MAP POINT table for specific measures to prevent significant sediment discharge.**

LANDING RECONSTRUCTION	
t. [☐]Yes [**X**] No	Will any Landing(s) be RECONSTRUCTED?
u. [☐]Yes [**X**] No	Will any landing(s) be reconstructed within? ☐ Class I Watercourse or Lake ☐ Class II Watercourse or Lake ☐ Class III Watercourse or Lake ☐ Class IV Watercourse or Lake ☒ A Watercourse and Lake Protection Zone (WLPZ) ☐ Other (Examples; marshes, wet meadows, wet areas) If "OTHER" is selected describe the type of feature referenced below. NOTE: Exceptions are permitted per 14 CCR 923.1 [943.1, 963.1](b)(1) – (3) at: - Existing logging roads crossing(s) - Logging road watercourse crossing(s) to be constructed that are approved as part of a Fish and Game Code process (F&GC 1600 et seq.) - Logging road watercourse crossings of class III watercourses that are dry at the time of use. If YES, address per 14 CCR 923 [943, 963](c)
u.1. [☐]Yes [**X**] No	Will any landing reconstruction be located across 100 feet or more lineal distance on? ☐ Slopes over 65% ☐ Slopes over 50% which are within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake. If YES, address per 14 CCR 923.2 [943.2, 963.2](a)(7) and 923.4 [943.4, 963.4](n)

SIGNIFICANT EROSION SITE(S)	
w. [**X**]Yes [☐] No	Are there any significant erosion sites? ☐ Existing ☒ Potential ☐ Both Associated within the logging area at? ☒ Logging road(s) ☐ Landing(s) ☒ Watercourse crossing(s) in the logging area? Per 14 CCR 923.1 [943.1, 963.1](e)(1) – (5). Also see 923.9 [943.9, 963.9](a) If YES, for each significant existing or potential erosion site, provide the following: ➢ Describe current condition of the site. ➢ Identify which sites can be feasibly treated, and which sites cannot. ➢ Specify mitigations for those sites that can be feasibly treated. ➢ Indicate logical order of treatment for those which have feasible treatments NOTE: Consider providing a MAP POINT TABLE which identifies the erosion site by mapped referenced identifier consistent with mapped locations. **Map Points 3, 4, and 5 are Potential Significant Erosion Sites, all will be treated. See MAP POINTS Table below for:** • **Description of current condition of the site.** • **Specific mitigations for each site.** • **Implementation Priority Code for each site.** **See Item 25 for LTO Instructions.**

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

MAP POINT (MP) Identifier	SITE DESCRIPTION (SD) (See Key)	Watercourse CLASS (WC) or feature	EXISTING Culvert Diameter Size (EC)	PROPOSED Culvert Diameter Size (PC)	Geologist used? Yes or No	1600? Yes or No	Potential Sediment Discharge (PSD) in cu. yds. (See Key)	Implementation Priority (IP) (See Key)
	MITIGATION AND/OR MANAGEMENT MEASURES: If needed, provide additional details of site; and/or describe proposed treatment							

*NOTE: Write "NA" or "—" if a box is not applicable to the map point.

MP:1	SD: CR	WC: Class II	EC: B	PC: F	Geo Used? No	1600? Yes	PSD: 5 cu yards	IP: Low
	Description: Undrained minor Class II watercourse with existing trail along inboard of road. The outside 2/3 of road prism below the trail has slumped approximately 4-feet. The watercourse along the trail is composed of 2 channels, both approximately 1-foot wide and 9-10' apart. Each channel has a 5-6' low lying "user built bridge" composed of local wood material. The abutments of these bridges are within or near the stream channel. The bridges have potential to wash out during high flows. Down the road ~ 100 feet from the crossings, there is fill erosion from the road. It appears that in past large storm events, the Class II watercourse breached its banks, flowed down the road and eroded the fill in two separate places. The current Class II watercourse has a substantial bank and these sites do not appear to be eroding currently. However, a large storm event has the potential to repeat past events. **Mitigation/Management Measures:** Replace bridges with armored ford. Utilizing hand tools, lay back stream banks to the extent feasible and install armored rocked rolling dip trail crossings for each channel. Armor dip crossings with 4-12-inch rock. Smaller rock maybe used for trail surface through crossings. Each crossing shall be wide and deep enough to pass 100-year flows. Spoils removed shall be deposited in a stable location within the road surface and away from the watercourse.							

MP:2	SD: CR	WC: Class II	EC: B	PC: F	Geo Used? No	1600? Yes	PSD: 5-10 cu yards	IP: Low
	Description: Undrained minor Class II watercourse with existing trail along inboard of road. The watercourse is composed of a perineal channel 4-5' wide. Another channel lies just east and appears to receive drainage only during very high flows. Both channels have a low lying "user built bridge" composed of local wood material. The abutments of these bridges are within or near the stream channel. The bridges have potential to wash out during high flows. **Mitigation/Management Measures:** Replace bridges with armored ford. Utilizing hand tools and being careful not the over excavate, lay back stream banks to the extent feasible and install armored rocked rolling dip trail crossing for each channel. Armor dip crossing with 4-12-inch rock. Smaller rock maybe used for trail surface through crossings. Each crossing shall be wide and deep enough to pass 100-year flows. Spoils removed shall be deposited in a stable location within the traveled road surface and away from the watercourse.							

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MP:3	SD: CR, WCD	WC: Class III	EC: NA	PC: F	Geo Used? Yes	1600? Yes	PSD: 5-10 cu yards	IP: Low

Description: The Class III watercourse has been diverted, traveling down the road and delivering sediment to the Class III described in Map Point 4.

Mitigation/Management Measures: Design criteria shall be consistent with the diagram at the end of Section II. Install a rocked in-stream crossing excavation with a trail located along the inboard of road. Fill shall be excavated through the crossing, establishing the stream channel to the natural grade and alignment to the extent feasible. Class III centerline flagging indicates the location of original watercourse orientation. Excavate channel approximately 4-feet wide and lay back banks no steeper than a 1:5/1 (horizontal to vertical) ratio. Excavated material shall be stock piled along the road cutbank, each side of the work site and outsloped to allow for immediate drainage.

Rock armor the excavated stream channel and side slopes with ¼ ton rip-rap. 4-12" cobble will be used through the trail crossing. The trail surface shall be capped with smaller rock. Install oversized waterbar above approach to crossing at orange/black stripe flagging.

MP:4	SD: CR, CF	WC: Class III	EC: 12"	PC: F	Geo Used? Yes	1600? Yes	PSD: 5-10 cu yards	IP: Low

Description: Map Point 4 is part of road abandonment activities, while maintaining a trail surface through a minor Class III crossing. The Class III watercourse is drained by a rusted 12-inch culvert. Immediately above the crossing, the fill slope had eroded, likely due to diversion of Class III described in Map Point 3. The eroded fill slope is not delivering sediment, appears stable and is well vegetated with ferns.

Mitigation/Management Measures: Design criteria shall be consistent with the diagram at the end of Section II. Remove culvert and install a rocked in-stream crossing excavation with a trail located along the inboard of road. Fill shall be excavated through the crossing, establishing the stream channel to the natural grade and alignment to the extent feasible. Class III centerline flagging indicates the location of original watercourse orientation. Excavate channel approximately 4-feet wide and lay back banks no steeper than a 1:5/1 (horizontal to vertical) ratio. Avoid placement of spoils within eroded fill slope. Excavated material shall be stock piled along the road cutbank below/south of the work site and outsloped to allow for immediate drainage.

Rock armor the excavated stream channel and side slopes with ¼ ton rip-rap. 4-12" cobble will be used through the trail crossing. The trail surface shall be capped with smaller rock. Install oversized waterbar above approach to crossing at orange/black striped flagging.

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MP:5	SD: CR, B,	WC: Class I	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 10-15 cu yards	IP: Low
	Description: Undrained Class I watercourse crosses road. The watercourse channel is 4-6 foot wide. An existing trail approaches the watercourse, where a 7-foot "user built" bridge spans across the watercourse. The bridge is at the same level of existing road surface with abutments located at edge of road fill, immediately above the active stream channel and within the channel migration zone. The bridge is likely to collapse as the channel continues to head cut upstream. **Mitigation/Management Measures:** Replace "user built" bridge by hand with a new pedestrian bridge. Design criteria can be found in diagram at the end of Section II. Abutments shall be placed at the same level or higher than the adjacent road surface and outside of the channel migration zone (approximately 10-feet each side of Class I channel centerline). The landowner reserves the right to utilize stronger materials and increase the width of the bridge to ensure safe passage for pedestrians if deemed necessary. No petroleum products, steel or metal material shall enter the watercourse. Note: The freeboard distance between the calculated 100-year flow level and bottom of proposed bridge is 1.5 feet.							
MP:6	SD: CR, B	WC: Class II	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 0-5 cu yards	IP: Low
	Description: Undrained minor Class II watercourse crosses road. The watercourse channel is 1.5-2 feet wide. A "user built" bridge is composed of an approximately 4-foot long redwood slab crossing the watercourse. The bridge is at the same level of existing road surface and the abutments are at or near the edge of the stream channel. **Mitigation/Management Measures:** Replace bridge. Utilizing hand tools, lay back stream banks and install an armored rocked rolling dip trail crossing. Armor dip crossing with 4-12-inch rock. Smaller rock maybe used for trail surface through crossing. The crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the traveled road surface and away from the watercourse.							
MP:7	SD: RC	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0 cu yards	IP: Low
	Description: A small swale that has a high-water table. There is potential for a soil pipe to be exposed once the road grade is built. **Mitigation/Management Measures:** When building the road, install a critical dip and outslope the road so that water does not pool.							
MP:8	SD: OK, CDR	WC: NA	EC: NA	PC: 18"	Geo Used? No	1600? Yes	PSD: 0 cu yards	IP: Low
	Description: A Class II watercourse to the west is not hydrologically disconnected and a Class I watercourse is approximately 50 below the road. The inside ditch is moderately vegetated which currently acts as a filter strip.							

	Mitigation/Management Measures: Install a 18" Ditch Relief Culvert with the outlet into the large (38 inch) redwood tree. Rock disturbed part of road after installation of culvert.							
MP:9	**SD:** C, CD	**WC:** NA	**EC:** 18"	**PC:** 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: A damaged ditch relief culvert. The outlet is crushed. **Mitigation/Management Measures:** Replace with 18" culvert. Rock disturbed portion of road after culvert installation.							
MP:10	**SD:** OK, O – downspout removal	**WC:** Class III	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated Class III watercourse crossing from a 2014 THP with a rusted through downspout approximately 50 feet from a Class I watercourse. **Mitigation/Management Measures:** ~~Remove the downspout. Install large rip rap as an energy dissipater in place of~~ the downspout. Key in the rip rap so that it is stable.							
MP:11	**SD:** C, CDR	**WC:** NA	**EC:** NA	**PC:** 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: A Class I watercourse (Blue Gum Creek) to the north is hydrologically connected to the road by a ditch. The road is approximately 60 feet above a second Class I watercourse (Caspar Creek). The ditch is heavily vegetated and has currently been acting as a filter strip. **Mitigation/Management Measures:** Install a 18" ditch relief culvert with the outlet aimed at the clump of redwoods below the road. Rock disturbed portion of road after culvert installation.							
MP:12	**SD:** OK, FP	**WC:** Class II	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** Yes	**PSD:** 1 cu yards	**IP:** Low
	Description: An updated Class II watercourse crossing from a 2014 THP with a small amount of perched fill above the culvert. Rip rap was installed as an energy dissipater during time of updated culvert, however some settling has occurred and more rip rap is needed. **Mitigation/Management Measures:** Pull the perched fill back and move to a hydrologically disconnected location designated by the RPF or his designee. Add in additional rip rap for the energy dissipater. Hay or mulch any exposed soil prior to the wet weather period.							
MP:13	**SD:** OK, O – downspout removal	**WC:** NA	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through.							

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	Mitigation/Management Measures: Remove downspout and replace with rip rap.							
MP:14	**SD:** OK, O – downspout removal	**WC:** NA	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures:** Remove downspout and replace with rip rap.							
MP:15	**SD:** C, CDR	**WC:** NA	**EC:** NA	**PC:** 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: A Class II watercourse is hydrologically connected to the road. The inside ditch is vegetated and currently acting as a filter strip. **Mitigation/Management Measures:** Install a 18" ditch relief culvert. Install rip rap as an energy dissipater. Rock the disturbed portion of road.							
MP:16	**SD:** OK, O – downspout removal	**WC:** NA	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures:** Remove downspout and replace with rip rap.							
MP:17	**SD:** OK, O – downspout removal	**WC:** Class III	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** No	**PSD:** 10 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures:** Remove downspout and replace with rip rap.							

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MP:18	**SD**: WCD	**WC**: Class II	**EC**: NA	**PC**: 24"	**Geo Used?** No	**1600?** Yes	**PSD:** 5-10 cu yards	**IP:** Low
	Description: An un-drained minor Class II watercourse is diverted by the inside ditch of Road 600. Drainage travels within the inside ditch to the culvert just down the road. The natural drainage pattern below the road was observed with the centerline identified with Class II flagging. **Mitigation/Management Measures**: Install a new 24" culvert to the natural stream gradient and align with Class II flagging. Excavate inlet slightly. Install rip rap at outlet. Rock disturbed portion of road after culvert installation.							
MP:19	**SD**: OK, C – downspout removal	**WC**: NA	**EC**: NA	**PC**: NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures**: Remove downspout and replace with rip rap.							
MP:20	**SD**: WCD	**WC**: Class II	**EC**: NA	**PC**: 24"	**Geo Used?** No	**1600?** Yes	**PSD:** 5-10 cu yards	**IP:** Low
	Description: An un-drained minor Class II watercourse is diverted by the inside ditch of Road 600. Drainage travels within the inside ditch to the culvert just down the road. The natural drainage pattern below the road was observed with the centerline identified with Class II flagging. **Mitigation/Management Measures**: Install a new 24" culvert to the natural stream gradient and align with Class II flagging. Excavate inlet slightly. Install large woody debris or rip rap at outlet. Rock disturbed portion of road after culvert installation.							
MP:21	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A Class II watercourse is hydrologically connected to the road by an inside ditch. The inside ditch is vegetated and currently acting as a filter strip. **Mitigation/Management Measures**: Install a 18" ditch relief culvert. Install large woody debris or rip rap as an energy dissipater. Rock the disturbed portion of road.							
MP:22	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: The top of a Class III watercourse is at the outlet of a ditch relief culvert on Road 500 to the west. To reduce the amount of water entering the Class III, a second ditch relief culvert is needed.							

	Mitigation/Management Measures: Install a 18" ditch relief culvert. Rock with 6" rock the disturbed portion of the road with a deep road base of at least 8-10".							
MP:23	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A ditch relief culvert was installed in 2019 and the outlet empties within 40 feet of the top of a Class III. There is a redwood stump that is used as an energy dissipater/ block to direct access to the Class III. **Mitigation/Management Measures**: Install a 18" ditch relief culvert. Rock with 6" rock the disturbed portion of the road with a deep road base of at least 8-10".							
MP:24	**SD**: C, CP	**WC**: NA	**EC**: 18"	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A ditch relief culvert with a plugged inlet. **Mitigation/Management Measures**: Replace ditch relieve culvert with an 18" culvert in same location.							
MP:25	**SD**: CR	**WC**: Class III	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 2-3 cu yards	**IP:** Low
	Description: A Class III crossing that is pulled **Mitigation/Management Measures:** Install temporary crossing with a 18" culvert. Pull crossing by October 15th of the year used in operations. Lay back fill and mulch or slash pack.							
MP:26	**SD**: C, CR, CRT	**WC**: Class II	**EC**: 18"	**PC**: NA	**Geo Used?** No	**1600?** Yes	**PSD:** 3-5 cu yards	**IP:** Low
	Description: A Class II crossing with a 18" culvert. **Mitigation/Management Measures**: Use as is. Pull crossing by October 15th of the 1st year used in operations. Lay back fill and mulch or slash pack.							

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

MP:27	SD: C, B, WCD	WC: Class II	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 5 cu yards	IP: Low

Description: Undrained minor Class II is diverted where the channel intersects inboard of road. Drainage travels along inboard of road and into the Class II watercourse described in Map Point 1. The stream channel is 1-1.5 feet wide. A low lying "user built" bridge spans across the diverted channel, just above Map Point 1. The treatment below includes installing a rocked rolling dip trail crossing where the corrected channel intersects the existing trail.

Mitigation/Management Measures: Utilizing hand tools, correct diversion by installing a channel across road into the natural drainage area. Create a berm at least 1-foot high on the downhill side of excavated channel. Place outfall of channel in line with Class II centerline/message flagging.

Where the existing trail crosses corrected channel, lay back stream banks and install an armored rocked rolling dip trail crossing. Armor dip crossing with 4-12 inch rock. Smaller rock maybe used for trail surface through crossing. The crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the traveled road surface and away from the watercourse.

PART OF PLAN

MP:28	SD: RC	WC: NA	EC: NA	PC: NA	Geo Used? Yes	1600? No	PSD: NA	IP: Low

Description: Currently a proposed temporary road that is above an unstable area.

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Mitigation/Management Measures: The geologist recommended no fill is put below the tractor/ cable break (designated by red and white striped falling) and that after completion of road use, waterbar spacing for extreme erosion hazard rating be utilized.

MP:29	SD: RA	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0-5 cu yards	IP: Low

Description: An existing road with a slope of 0-3% grade leading to an existing WLPZ landing. 985 feet of road will be abandoned temporary.

Mitigation/Management Measures: Abandon 985 feet of the existing temporary Road 668A. Install oversized waterbars to ensure drainage. The entrance shall be blocked to vehicle traffic using methods including but not limited to slash packing and logs.

MP:30	SD: C, CP	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0-5 cu yards	IP: Low

Description: An existing Ditch Relief Culvert is completely buried on the inlet side. Currently not functioning.

Mitigation/Management Measures: Pull culvert and layback fill. Rock the channel area.

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CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

INSTRUCTIONS FOR FILLING OUT MAP REFERENCE TABLE FOR PLANNED WORK AND MITIGATION

The Map Reference/Work Order Table is designed to be used in Timber Harvesting Plans (THPs), Nonindustrial Timber Management Plans (NTMPs), and Notices of Timber Operations (NTOs). It has been designed to eliminate the need to repeatedly provide the same information separately for THPs/NTMPs, Erosion Control Plans, and 1600 applications. Instead, the table can be referenced under appropriate THP/NTMP item numbers, RWQCB Erosion Control Plans (ECP)'s, and/or 1600 permit applications included in the THP/NTMP.

All map points (e.g. unstable areas, exception and in lieu points, watercourse crossings, mitigation sites, etc.) can be identified in the table. Acronyms from the "Map Key" (see below) can be utilized for the "Site Description" and "Implementation Priority" found on the table. It is suggested that you include the Map Key, Map Reference Table, and associated map together in Section II of the Plan.

To add additional rows in the Map Reference Table: copy the full row which is established for each map point (composed of two lines); and add to the bottom of your table.

If you are submitting an NTO, please update your Map Reference Table to reflect current information. If a map point has been addressed under a previous NTO, indicate that (e.g. "Addressed under previous NTO") and include any additional maintenance information, if applicable, for that map point. If you add new map points to the NTO table, they must have been amended to the NTMP first, UNLESS they are maintenance points only.

MAP POINT / WORK ORDER TABLE KEY			
SITE DESCRIPTION			
OK	Functional Site	**CROSSING TYPES**	
CSDS	Controllable Sediment Discharge Site	**B**	Bridge
UA	Unstable Area	**CR**	Crossing site
O	Other descriptions than below (describe under "Measures" on table)	**CRF**	Crossing failure
		CRP	Crossing- EXISTING permanent
ROAD / SKID TRAILS		**CRT**	Crossing- EXISTING temporary
CRN	Critical dip needed	**C**	Culvert (also see below)
CUTF	Cutbank failure	**F**	Ford
FF	Fill failure	**HCR**	Humboldt crossing
FP	Fill perched	**LSB**	Log stringer bridge
G	Gully	**RRD**	Rocked Rolling Dip
L	Landing	**SCR**	Spitler crossing
IDE	inside ditch eroding		
RA	Road abandonment	**CULVERT CONDITIONS**	
RC	Road construction	**CAM**	Culvert attachments missing (e.g. trash racks, downspouts, etc.)
RR	Road Reconstruction	**CD**	Damaged inlet or outlet
RD	Rolling dip	**CDR**	Ditch relief needed
SK	Skid trail	**CF**	Failed / failing
WB	Waterbar	**CFB**	Fish barrier
		CFD	French Drain
WLPZ and WATERCOURSES		**CNA**	Culvert not aligned
AP	Alternative practice	**CNG**	Culvert not installed to grade
FB	Fish barrier	**CE**	Outlet erosion
HE	Habitat enhancement	**CS**	Outlet shotgunned
IL	In lieu practice	**CP**	Culvert plugged
WD	Water drafting	**CU**	Culver undersized
WCD	Watercourse diversion		
WDP	Woody debris project		
IMPLEMENTATION PRIORITY (IP)			
HIGH	Mitigation applied in: 1st year after Harvest Document approval.		
MED.	Mitigation applied concurrent with operations affecting site.		
LOW	Mitigations applied prior to Harvest Document completion.		
POTENTIAL SEDIMENT DISCHARGE			
If located in the Region of the North Coast Regional Water Quality Control Board, provide the following information in the associated table for each Controllable Sediment Discharge Source (CSDS) map point			
• Potential Sediment Discharge (PSD): expressed in total cubic yards			

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

ITEM #25

NOTE: If any item listed above is checked "YES" Provide:

- **Operations Instructions to the LTO,** in accordance with the respective rule requirement(s) in **SECTION II** of the THP.
- Any required **explanation and justification** should be included in **SECTION III**

Operation instructions to the LTO:

CONSTRUCTION OF LOGGING ROADS AND LANDINGS

Logging roads to be constructed shall:

- **Be outsloped where feasible and drained with waterbreaks and/or rolling dips in conformance with other applicable Forest Practice Rules.**
- **Be hydrologically disconnected from watercourses and lakes to the extent feasible to minimize sediment delivery from road runoff to a watercourse, and reduce the potential for hydrologic changes that alter the potential for soil erosion and sediment transport, and to prevent significant sediment discharge.**
- **Be no wider than a single-land compatible with the largest type of equipment specified for use on the logging road, with adequate turnouts provided as required for safety, except where wider roads dimensions are required by existing contracts with a federal agency.**

Landings to be constructed shall:

- **Be no larger than one-quarter acre**
- **Avoid construction on slopes greater than 40 percent**

All excavated material and bare soil created from road, crossing, and landing construction within a WLPZ, unless otherwise specified, shall be stabilized as described in THP Section II, Item 18. Areas to be treated with mulch or slash shall be treated prior to the completion of operations or October 15th, whichever is earlier in the year of installation.

The following mitigation measures apply to all permanent and seasonal road segments that exceed a 15 percent grade:

- **Waterbreaks shall be installed to moderate EHR spacing placed to direct surface flow into vegetation, slash or other stable locations.**
- **The LTO shall maintain a stable operating surface at all times during operations.**

DEACTIVATED ROADS, LANDINGS, AND CROSSINGS

Abandoned and deactivated roads and crossings shall meet the following standards meeting the intent of 923.8 (a-d):

- **Crossing fills shall be excavated to form a channel that is as close as feasible to the natural watercourse grade and orientation, and that is wider than the natural channel as observed upstream and downstream of the logging road watercourse crossing to be removed.**
- **The excavated material and any resulting cut bank shall be no greater than 65 percent (1.5:1, horizontal to vertical) from the outside edge of the constructed channel to prevent slumping, to minimize soil erosion and sediment transport, and to prevent significant sediment discharge. Exposed soil located between the watercourse crossing and the nearest adjacent drainage facility or hydrologic divide, whichever is closer, including cut banks and excavated material, shall be stabilized by seeding, mulching, rock armoring, replanting, or other suitable treatment to prevent soil erosion and significant sediment discharge.**
- **Deactivated roads and landings shall be left in a condition that provides for long-term, maintenance -free function of drainage and erosion controls.**
- **Deactivated roads shall be blocked prior to the winter period or upon completion of timber operations as specified in the winter period operating plan.**

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

SIGNIFICANT EROSION SITES

A description and feasible mitigation of all significant erosion sites are provided in the MITIGATION/MANAGEMENT MEASURES above and are illustrated as map points on the Timber Harvest Map. The logical order of treatment is represented as the implementation priority.

See the THP Map Point Summary and Operations Map in the Section II Attachments for specifics of road related work. Unless specified otherwise, other road work will be completed prior to submission of completion report. Temporary watercourse crossings will be removed and stabilized prior to the winter period.

LTO INSTRUCTIONS FOR GENERAL ROAD MAINTENANCE

914.5: The following standards shall be adhered to in servicing logging equipment and disporting of refuse, litter, trash and debris:

(a) Equipment used in timber operations shall not be serviced in locations where servicing will allow grease, oil, or fuel to pass into lakes or watercourses.

(b) Non-biodegradable refuse, litter, trash, and debris resulting from timber operations, and other activity in connection with the operations shall be disposed of concurrently with the conduct of timber operations.

ASP WATERSHEDS	
a. [X]Yes [☐] No	Will hauling on roads and landings be limited to those which are Hydrologically disconnected from watercourses to the extent feasible, and exhibit a stable operating surface? If NO, address the exception pursuant to 923.6 [943.6,963.6] (h)(3).

ADDRESS THE FOLLOWING AS IT APPLIES TO ASP WATERSHEDS OR IMMEDIATELY UPSTREAM AND CONTIGUOUS TO, ANY WATERSHED WITH LISTED ANADROMOUS SALMONIDS

When logging road(s) or landing(s) construction or reconstruction is proposed identify:

1) How the proposed operations will fit into the systematic layout pattern.
Per 14 CCR 923.1 [943.1. 963.1](g)

JDSF's road use, construction and maintenance objectives are supported through a program that includes Forest wide road inventory and improvement. The program's goal is to improve water quality by reducing suspended sediment concentrations and turbidity, through developing road construction standards, use restrictions, maintenance and prioritizing roads to be properly abandoned.

The current road network for the plan reflect a history of varying transportation technologies and forest practice rules. Portions of Road 500 lies within the prism of an old Wagon Road and was later converted to a two lane permanent forest road. Within the last decade, improvements to watercourse crossing and drainage have been set to the standard of the current Forest Practice Rules, including requirements for roads within watersheds with listed anadromous salmonids. Road segments and landings are proposed off of Road 500 and 520 to facilitate favorable tractor and cable yarding.

Road 600 is a permanent road that services the Caspar Watershed research team. This road has been updated in the last decade to the current Forest Practice Rules and has many Class II and III watercourse crossings. There are some minor erosion features that constant maintenance has mitigated. A few minor spur roads off of Road 600 facilitate both tractor and cable yarding operations.

Road 669 will have a crossing pulled and abandoned. This road will be allowed to naturally abandon due to the infeasibility of getting equipment to the entire portion of the road without causing significant damage.

2) What, if any, offsetting mitigation measures (including but not limited to, abandonment of logging road(s) and landing(s) are needed to minimize potential adverse impacts to watersheds from the road system.
Per 14 CCR 923.1 [943.1. 963.1](g)

CalTREES THP ITEM #24 & 25– ROADS AND LANDINGS

Considering the stable condition of the existing road network and the need for very minor road construction, in the opinion of the RPF, road abandonment is not necessary for offsetting mitigation measures, however, deactivation is proposed for Road 669 which assists in reaching the landowner's goal of total miles of road abandonment.
• Provide specific provisions for the protection of salmonid habitat for all logging road(s) construction:
3) On slopes, greater than 50% with access to a watercourse or lake. Per 14 CCR 923.4 [943.4, 963.4](s)(1) **N/A**
• Provide specific erosion control measures for all permanent and seasonal roads:
4) With a grade of 15% or greater which extends 500 feet or more. Per 14 CCR 923.5 [943.5, 963.5](q)(2) **N/A**

CalTREES THP ITEMs 26 – WATERCOURSES

ITEM #26– WATERCOURSE LAKE PROTECTION ZONE (WLPZ) PROTECTION MEASURES

ITEM #26	WATERCOURSES

Per 14 CCR 916, 936, 956 – Intent of Watercourse and lake Protection [ALL DISTRICTS] – The purpose of this article is to ensure that timber operations do not potentially cause significant adverse site-specific and cumulative impacts to the beneficial uses of water, native aquatic and riparian-associated species, and the beneficial functions of riparian zones; or result in an unauthorized take of listed aquatic species; or threaten to cause violation of any applicable legal requirements. This article also provides protection measures for application in watersheds with listed anadromous salmonids and watersheds listed as water quality limited under Section 303(d) of the Federal Clean Water Act.

It is the intent of the Board to restore, enhance, and maintain the productivity of timberlands while providing appropriate levels of consideration for the quality and beneficial uses of water relative to that productivity.... Further, it is the intent of the Board that the evaluations that are made, and the measures that are taken or prescribed, be documented in a manner that clearly and accurately represents those existing conditions and those measures.

a. [X]Yes [☐] No	Are there any watercourses or lakes classified as a CLASS I through CLASS IV within or adjacent to the plan area? *(Check all that apply)*		
		Within plan area	Adjacent to plan area
	[X] Class I:	[X]	[X]
	[X] Class II:	[X]	[X]
	[X] Class III:	[X]	[X]
	[☐] Class IV:	[☐]	[☐]
	[☐] Lakes:	[☐]	[☐]
	[X] Other (Springs, Seeps)	[X]	[☐]

If YES, to above question list:

- Class of the water feature
- Associated WLPZ or ELZ and width
- Protection measures; determined from 14 CCR 916.5[936.5, 956.5], Table I. and/or 14 CCR 916.9[936.9, 956.9] et seq.
- Specify if Class III or IV watercourses will have a WLPZ or ELZ

b.[X]Yes [☐] No	Will Class III or IV watercourses be protected with a WLPZ or ELZ? If YES, describe below

LTO instructions:

See below.

Watercourse description and protection measures to be applied: (14 CCR 916.5)

The following measures are incorporated into the plan to stabilize soils, minimize soil erosion, and prevent discharge of sediment into waters in amounts deleterious to aquatic species or the quality and beneficial uses of water in WLPZ areas and Class III watercourses.

All Class I and Class II Watercourses

- **The WLPZ shall be clearly identified on the ground by the RPF or his supervised designee prior to the pre-harvest inspection. WLPZ boundaries are identified with blue/white striped "WLPZ" flagging and solid orange flags.**
- **Trees to be harvested within the WLPZ outside of cable corridors shall be marked prior to the pre-harvest inspection.**
- **Unmarked trees within the WLPZ may be felled/ harvested for cable clearance. Harvesting of unmarked trees shall comply with Section II, Item 14g. See Section II and III Item 27 for additional information.**
- **The WLPZ shall be considered an equipment exclusion zone except for road work.**

- Trees cut within the WLPZ as allowed per 916.6 (e) (1) may be harvested.
  - *916.9(e)(1)(C) Actions necessary for the protection of public health, safety and general welfare.*
  - *916.9(e)(1)(D) Actions to allow for full suspension cable yarding when necessary to transport logs through the channel zones.*
- At least 75% surface cover and undisturbed area shall be retained to act as a filter strip for raindrop energy dissipation and for wildlife habitat.
- Native hardwoods shall not be harvested in the WLPZ except for cable corridors, incidental damage due to falling and yarding operations and safety concerns.
- Accidental depositions of soil or other debris in lakes or below the watercourse or lake transition line in waters classed I, II, and IV shall be removed immediately after the deposition.
- Trees cut within the WLPZ shall be felled away from the watercourse by pulling or other mechanical methods if necessary, in order to protect the residual vegetation in the WLPZ.
- No salvage logging shall occur.
- Harvesting within the WLPZ will be limited to removal of codominant, intermediate, or suppressed trees to promote growth on larger diameter dominate trees and improve LWD recruitment potential.

WATERCOURSE AND LAKE PROTECTION ZONE (WLPZ) WIDTHS

Slope (%)	Class I WLPZ (ft)	Class II-L WLPZ (ft)	Class II-S WLPZ (ft)	Seep/Spring (ft)	Wet Area (ft)	Class III – ELZ (ft)
< 30	150	100	50	50	50	30
30-50	150	100	75	75	50	50
>50	150	100	100	75	50	50
Core Zone	30	30	15	15	15	-

CLASS I WATERCOURSES

On all slopes, a 150-foot watercourse and lake protection zone (WLPZ) shall be established for all Class I watercourses. The WLPZ will be at least as wide as described above as flagged from the Watercourse and Lake Transition Line (WTL). An outer zone or the are from 100 to 150 feet from the WTL is not required by the Forest Practice Rules (FPR) based on the proposed silviculture but has been incorporated to ensure the protection of the beneficial uses of water. Within the Class I WPLZ the following protection measures shall be followed:

- Between 0 and 100 feet retain the 13 largest conifer trees (live and dead) on each acre of the area that encompasses the Core and Inner Zones.

Canopy Retention Requirements:

- Between 0 and 30 feet: all trees shall be retained with the following exceptions:
  - *916.9 (e)(1)(C) Actions necessary for the protection of public health, safety and general welfare.*
  - *916.9(e)(1)(D) Actions to allow for full suspension cable yarding when necessary to transport logs through the channel zones.*
- Between 30 and 75 feet: Post-harvest overstory canopy retention shall be 85% where it exists pre-harvest. Post-harvest canopy may be composed of both conifers and hardwood species and shall have at least 25% overstory conifer canopy.
- Between 75 and 100 feet: Post-harvest overstory canopy retention shall be 80% where it exists pre-harvest. Post-harvest canopy may be composed of both conifers and hardwood species and shall have at least 25% overstory conifer canopy.
- Between 100 and 150 feet: Post-harvest overstory canopy retention shall be 70% where it exists pre-harvest. Post-harvest canopy may be composed of both conifer and hardwood species.
- Between 0 and 150 feet: At least 50% of the understory canopy covering the ground and adjacent waters shall be left in a well distributed manner composed of a diversity of species similar to that found before the start of operations.

CLASS II WATERCOURSES

A watercourse and lake protection zone (WLPZ) shall be established on Class II watercourses which shall be 50 to 100 feet in width. The WLPZ will be at least as wide as described above, as flagged in the field. Within the Class II WLPZ the following protection measure shall be followed:

Class II-L (large) watercourses within 1,000 feet of a Class I watercourse:

- The "Core Zone" shall be 30 feet from the Watercourse Transition Line (WTL) and the "Inner Zone" comprises the remainder of the 100-foot-wide buffer.

- No trees shall be harvested within the core zone except with the following exceptions:
  - Harvesting allowed under 916.9 (e)(1)(A)
    - *916.9 (e)(1)(C) Actions necessary for the protection of public health, safety and general welfare*
    - *916.9 (e)(1)(D) Actions to allow for full suspension cable yarding when necessary to transport logs through the channel zone.*
  - Harvesting for cable clearance as specified in Item 14g.
- Where it exists pre-harvest, retain at least 80% overstory canopy cover comprised of both conifers and hardwood species, with at least a 25% overstory conifer canopy.
- Retain 13 largest conifer trees (live or dead) on each acre within the WLPZ.

Class II – L greater than 1,000 feet from a Class I and Class II – S (Standard) watercourses:

- A 50 – 100' WLPZ has been established: the "Core Zone" shall be 15 feet from the WTL and the "Inner Zone" an additional 35-85 feet.
- No tree shall be harvested within the core zone with the following exceptions:
  - Harvesting allowed under 916.9 (e)(1)
    - *916.9(e)(1)(C) Actions necessary for the protection of public health, safety and general welfare*
    - *916.9(e)(1)(D) Actions to allow for full suspension cable yarding when necessary to transport logs through the channel zones*
  - Harvesting for cable clearance as specified in Item 14g.
- Where it exists pre-harvest, retain at least 70% of the total canopy covering the ground, left in a well distributed multistoried stand configuration comprised of a diversity of species similar to that found before the start of operations. The residual overstory canopy shall be comprised of at least 25% of the existing overstory conifers.
- Recruitment of large woody debris for instream habitat shall be provided by retaining at least the ten largest conifers within 50 feet of the watercourse transition line per 330 feet of stream channel.

CLASS III WATERCOURSES

Class III watercourses shall be designated with blue and white polka-dot flagging on the centerline of the watercourses.

Soil deposited in a Class III watercourse during timber operations shall be removed and debris deposited shall be removed or stabilized before the conclusion of operations or October 15, whichever is earlier.

Tractor operations shall remain 30 feet from all Class III watercourses (except at crossings and approaches to truck roads), when they are found on slopes less than 30%, and 50 feet when slopes are 30% or greater. This zone shall be termed an Equipment Limitation Zone (ELZ) and shall be flagged prior to the pre-harvest inspection. ELZ's within cable yarding areas have not been flagged as heavy ground based equipment are excluded.

- No salvage logging shall occur within Class III watercourses.
- All of the following shall be retained:
  - Pre-existing large wood within the ELZ.
  - Pre-existing down wood and debris within channel zone.
  - Hardwoods, to the highest extent feasible, within the ELZ.
  - All snags within the ELZ, unless removal is necessary for safe operations.
  - Countable trees within the ELZ needed to achieve resource conservation standards in 14 CCR 912.7.
- Only sprouting conifers that do not have boles overlapping the channel zone and any tree necessary for safe operations may be harvested within the channel zone. "Channel zone" means that area located between the watercourse transition lines.

916.9(h)(8) exceptions pursuant to 14 CCR § 916.9 [936.9, 956.9], subsections (e)(1)(A)-(F) are permitted in any ELZ and cnahhel zone.

Harvesting allowed under 916.9(e)(1)

- *916.9(e)(1)(C) Actions necessary for the protection of public health, safety and general welfare*
- *916.9(e)(1)(D) Actions to allow for full suspension cable yarding when necessary to transport logs through the channel zones*

CalTREES THP ITEMs 26 – WATERCOURSES

SPRINGS/SEEPS & WET AREAS

With the exception of WLPZ widths, protection measures previously stated above for *"Class II - S (standard) watercourse"* and *"Protection Measures for All Class II – Watercourses"* shall apply to springs/seeps and wet areas. The WLPZ width for springs shall be 50 feet on slopes 30%, and 75 feet on slopes >30%. WLPZ widths for wet areas shall be 50 feet.

916(b) The LTO shall not do either of the following during timber operations:

(1) Place, discharge or dispose of or deposit in such a manner as to permit to pass into the waters of the State, any substance or materials, including, but not limited to soil, silt, bark, slash, sawdust, or petroleum, in quantities deleterious to fish, wildlife, beneficial functions of riparian zones, or the quality and beneficial uses of water;

(2) Remove water, trees or large woody debris from a watercourse or lake, the adjacent riparian area, or the adjacent flood plain in quantities deleterious to fish, wildlife, beneficial functions of riparian zones, or the quality and beneficial uses of water.

c. [☐]Yes [**X**] No	Is there any tractor road watercourse crossings that require mapping per 14 CCR 1034(x)(7)
[☐]Yes [**X**] No	Will TRACTOR road watercourse crossings involve the use of a culvert? If YES, per 14 CCR 914.8[934.8, 954.8](e) state the minimum diameter and length for each culvert.

Map Reference Points (MRP)	Culvert Diameter	Culvert Length

d. [☐]Yes [**X**] No	Is there a Master Agreement for Timber Operations (MATO) for Streambed Alteration Agreement (SAA) approved by the Department of Fish and Wildlife for any portion of this plan? MATO or SSA Number: _____ If YES, provide a list of the crossings, water drafting sites, or other water features to be used during operations and provide the conditions to be utilized and or consider from the MATO or SAA as operational instruction to the LTO in SECTION II.

MATO or SAA INSTRUCTIONS TO LTO	
Specific water feature under MATO or SAA (crossings, drafting sites, etc.)	Conditions of MATO or SAA to be utilized at each specific feature

e. [**X**]Yes [☐] No	Is this THP Review Process to be used to meet Department of Fish and Wildlife CEQA review requirements? If YES, attach the required 1611 Addendum at the end of SECTION II and include any supporting information and analysis in SECTION III. List instructions to the LTO in SECTION II for installation, protection measures, and mitigation measures, per THP from instructions or CDF Mass Mailing (07/02/1999) "Fish and Game Code 1611 Agreements and THP Documentation."

LTO INSTRUCTIONS: **Supporting information is located in Section II Attachments. An approved Stream Alteration Agreement shall be amended into the plan prior to operations.**

f. [☐]Yes [**X**] No	Are any exceptions provided under F & G code 1600 et seq., and made an enforceable part of plan? If YES, per 14 CCR 923 [943,963](d) identify the exceptions and provide the enforceable standards as instructions to the LTO in SECTION II.

g. [**X**]Yes [☐] No	Will new drainage structures and facilities on watercourses that support fish or listed aquatic species be constructed? If YES, per 14 CCR 914.8[934.8, 954.8](c) and 923.9 [943.9, 963.9](c). Structures and facilities shall be fully described and allow unrestricted passage of all life stages of fish or listed aquatic species, and natural movement of bedload. Provide operational instructions to the LTO in SECTION II. **Please refer to MAP POINT Table in Item 24 for specifications to structures.** **Please see Section V for Cross Section & 100-year Flood Flow for Map Point 5.** **Please see Section III Item 26 (g) for culvert sizing for Map Points 5, 18, and 20.**

Per 14 CCR 923.9(e) – The location of all NEW permanent constructed and reconstructed, and temporary logging road watercourse crossings, including those crossings to be abandoned or deactivated, SHALL be shown on a map. If the structure is a culvert intended for permanent use, the minimum diameter of the culvert and the method(s) used to determine the culvert diameter SHALL be specified in the plan,	
h. [☐]Yes [**X**] No	Are there any NEW PERMANENT constructed logging road watercourse crossings requiring mapping?
[☐]Yes [**X**] No	Are there any NEW RECONSTRUCTED logging road watercourse crossings requiring mapping?
[**X**]Yes [☐] No	Are there any watercourse crossings to be ABANDONED or DEACTIVATED?
	If YES, to the above questions these crossing shall be shown on a map in section II
	Per 14 CCR 923.9(e) If any watercourse crossing has a culvert intended for permanent use, the minimum diameter of the culvert and the method(s) used to determine culvert diameter shall be stated in the plan. Per 14 CCR 923.9(f) permanent watercourse crossings that are constructed or reconstructed SHALL accommodate the estimated 100-year flood flow, including debris and sediment loads.
	Method for sizing crossing: **Culvert on Road 669 to Ford. See Attachments at the end of Item 24 for Ford specifications.**
i. [☐]Yes [**X**] No	Is there any exception to flagging or otherwise identifying the location of any constructed or reconstructed road watercourse crossing prior to the pre-harvest inspection? If YES, per 14 CCR 923.9[943.9, 963.9](j) provide the explanation and justification in SECTION III.
j. [☐]Yes [**X**] No	Will other methods for diversion of overflow at culver crossings be utilized (<u>other than critical dips</u>) in the construction or reconstruction of logging road watercourse crossings which culverts? If YES, per 14 CCR 923.9[943.9, 963.9](j) provide instructions to the LTO in SECTION II identifying the methods to be used for the diversion of overflow at watercourse crossings.
Per 14 CCR 923.9[943.9, 963.9](k) watercourse crossings and associated fills and approaches SHALL be constructed and maintained to prevent diversion of stream overflow down the road, and to minimize fill erosion should the drainage structure become obstructed.	
k. [**X**]Yes [☐] No	Are there any existing watercourse crossings that are located on logging roads within the logging area?
[**X**]Yes [☐] No	Are there any watercourse crossing proposed for construction located on logging roads within the logging area?

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	If YES, per 14 CCR 923.9[943.9, 963.9](k) identify the crossing and provide the methods to mitigate or address the diversion of stream overflow at the crossing. **Map points 18 and 20 are both crossings that will be constructed to address minor Class II watercourse diversions. Refer to the MAP POINT TABLE for specifics.**
l. [**X**]Yes [☐] No	Will rock be used to stabilize crossing outlets? If YES, per 14 CCR 923.9[943.9, 963.9](k) Rock used to stabilize outlets of crossings shall be adequately sized to resist mobilization of soil and significant sediment discharge. The range of rock size shall be described within the plan as instruction to the LTO in SECTION II indicate the range of the rock dimensions to be used. **Rock dimensions for stabilizing culvert inlets and outlets, etc. is incorporated within the Map Point Table Mitigation/Management Measures, Item 25.**

m. [☐]Yes [**X**] No	Watercourse crossing proposed to be reconstructed or removed, are there any significant volumes of sediment accumulated upstream of the watercourse crossing? If, YES per 14 CCR 923.9[943.9, 963.9](n) provide instructions to the LTO, in SECTION II, describing how the material will be stabilized, removed (the extent feasible), and in conformance with CDFW agreements, where applicable.
n. [☐]Yes [**X**] No	Do logging road watercourse crossing drainage structures and other erosion control features have a high historical fail rate within the project area?
[☐]Yes [**X**] No	Do/will existing watercourse crossings utilizing a culvert have large amounts of fill material covering the culvert making up the crossing?
	If, YES per 14 CCR 923.9[943.9,963.9](o) drainage structures and erosion control features shall be oversized, designed for low maintenance, reinforced, or removed before the completion of timber operations or as specified in the approved plan. Provide instruction to the LTO in SECTION II identifying these crossings, providing instruction of how these crossings will be treated.

Guidance on reducing the potential for failure at high risk watercourse crossings may be found in "Board of Forestry Technical Rule Addendum Number 5: Guidance on Hydrologic Disconnection, Road Drainage, Minimization of Diversion Potential, and High Risk crossings" (1st Edition, revised 10/27/14)

o. [**X**]Yes [☐] No	Will any logging road watercourse crossing be removed? If YES, provide instructions to the LTO, in SECTION II, describing the removal plan pursuant to the standards per 14 CCR 923.9[943.9, 963.9](p)(1)-(4) **Refer to Item 24 Map Point Table, Mitigation Measures and Implementation Priority Column for instructions.**

FOR PLANS LOCATED WITHIN AN ASP WATERSHED	
p. [**X**]Yes [☐] No	Will timber operations occur within a class I WLPZ? **Timber operations within the Class I watercourse WLPZs are designed and will be conducted so that the significant objective of protection, maintenance, or restoration of the beneficial uses of water or the populations and habitat of anadromous salmonids or listed aquatic or riparian-associated species will be attained. Specific practices utilized include the harvesting prescriptions within WLPZs and limiting heavy equipment use near watercourses and on steep slopes. WLPZ requirements included in this timber**

	harvest plan exceed those of the Forest Practice Rules. Proposed silviculture to be implemented in the plan area is limited to single tree selection and group selection. These applications will achieve significant upslope retention. Limiting timber operations as described above will allow for further timber production while meeting the requirements of Title 14 CCR 916.2 and 14 CCR 916.9c.
[☐]Yes [**X**] No	Will timber operations occur within a WLPZ adjacent to a restorable Class I watercourse?
	If YES, Address per 14 CCR 916.9[936.9, 956.9](f)(2)(A)-(E).

Per 14 CCR 916.9[936.9, 956.9](e)(1)(A)-(E) there shall be NO timber operations within a channel zone with the exception of those conditions listed within 916.9[936.9, 956.9](e)(1)(A)-(E)	
q. [**X**]Yes [☐] No	Will there be any timber operations within the channel zone of any watercourse? If YES, Indicted the location and type of timber operations to be conducted and provide instructions to the LTO in SECTION II. **Class I and II WLPZ protection measures incorporated into this plan in Item 26, Section II are designed to meet the goals and objectives of 916.9(c). 916(c)(1) "Core Zone", acknowledges that the exclusion of timber operations within the core (and channel migration) zone meet the objectives of having protection, maintenance and restoration of the beneficial uses of water and properly functioning salmonid habitat and listed aquatic or riparian associated species as a significant objective. Class I and II WLPZ protection measures include retention of all trees within the channel migration zone and between 0 and 30 feet from the water transition line/channel migration zone. These measures will ensure the maintenance of stream bank stability and tree growth near the watercourse, thus further increasing the level of large wood recruitment. The Class I WLPZ protection measures include a 150 foot WLPZ, exceeding the required 100 foot WLPZ. The proposed WLPZ protection measures exceed the Forest Practice Rules and will provide adequate protection measures for the beneficial uses of water, including assuring that the maintenance and any potential for further restoration of salmonid habitat will occur.** **Within the Class I watercourse and Class II tributaries of the watercourse known as "Blue Gum Creek", the RPF is proposing operations within the "core and channel migration zones" to address the eucalyptus stand by utilizing 14 CCR 916.9(v). The RPF is proposing to girdle eucalyptus that are > 22" within all zones of the Class I and II WLPZ and where feasible, cut eucalyptus <22". The RPF believes that the reduction of the eucalyptus within the Class I and II watercourse WLPZ will not lower the shade canopy below the minimum. The 14 CCR 916.9(v)(3)(A)(1-7) evaluation is located in SECTION III under ITEM 26(q)** **Timber operations will occur within the channel zone of "Blue Gum Creek" and the associated tributaries only. All other channel zones will be adhere to 14 CCR 916.9(e)(1)(A-E). If feasible, the LTO shall girdle any eucalyptus marked with a PINK horizontal strip at breast height, such that the saw blade has cut into the cambium layer of the tree.**

Per 14 CCR 923.1[943.1, 963.1](h) NO logging road(s) or landing(s) shall be planned for construction or reconstruction in the CMZ or Core Zone of a Class I watercourse or within 150 feet of a watercourse transition line. with the exception of those conditions listed within 916.9[936.9, 956.9](e)(1)(A)-(E) and 916.9[936.9, 956.9](v)	
[☐]Yes [**X**] No	Will there be any logging road(s) or landing(s) constructed in the CMZ or Core Zone of a Class I?
	If Yes, indicate the location and provide instructions to the LTO in SECTION II.

Per 14 CCR 923.9[943.9, 963.9](d) Watersheds with listed anadromous salmonids. A description of all existing permanent Class I watercourse crossings shall be provided, where fish are always or seasonally present or fish passage is restorable.	
r. [☐]Yes [**X**] No	Are there existing permanent Class I crossings where fish are always present?
[**X**]Yes [☐] No	Are there existing permanent Class I crossings where fish are seasonally present?
[☐]Yes [**X**] No	Are there existing permanent Class I crossings where fish passage is restorable?

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	If YES, provide a description of the existing permanent Class I watercourse crossings. Indicate in the description where the current crossing conditions may be adversely affecting fish passage and identify the proposed measures, if feasible, to address the conditions.
s. [**X**]Yes [☐] No	Will water drafting occur in association with the timber operations?
	If YES, timber operations shall comply with Fish and Game Code Section 1600, et seq.
t. [☐]Yes [**X**] No	Is there a Fish and Game Code Section 1600 Master Agreement for Timber Operations which addresses water drafting? If YES, provide the operational restrictions from the Master Agreement in SECTION II as instructions to the LTO. If NO, describe the water drafting site conditions and proposed water drafting activity in the plan. Per 14 CCR 923.7[943.7, 963.7](I)(2)(A)-(F) *(See Below)*

Per 14 CCR 923.7[943.7, 963.7](I)(2)(A)-(F) the description of water drafting site conditions and proposed water drafting activity shall include:
General description of proposed site: **The site is within an existing Class II watercourse drafting site WD17. It is believed that only 3 to 4 loads of water will be needed weekly during active operations occurring under this plan.**
Watercourse Classification: **Class II**
Drafting parameters including:
Month(s) of use – **April 1st to November 15th**
Estimated volume needed per day – **2,000-2,500 gallons**
Estimated maximum instantaneous drafting rate and filling time - **Instantaneous diversion rate shall remain less than 350 gallons per minute (0.78 cfs).**
Other water drafting activities in same watershed – **N/A**
Drainage area (acres) above point of diversion – **WD17 – 80.5 acres**
Estimated:
Unimpeded stream flow – **During summer months with drafting activities the average stream flow is 6.80 gpm**
Pumping rate – **Estimated diversion rate for a water truck is 270 gpm (0.60 cfs)**
Drafting duration – **15 minutes**
A discussion of the effects on aquatic habitat downstream from the drafting site(s) of single pumping operations, or multiple operations at the same location, and at other locations in the same watershed: **The quantity of water diverted for dust abatement is minimal relative to the watershed. Habitat will be protected downstream by the parameters allowed under the current 1600 permit. Drafting conditions within the permit and the JDSF Water Drafting Plan (as submitted with THP 1-13-007 MEN) included protection for salmonids. These conditions also meet protection measures recommended by CDFW for foothill yellow-legged frogs.**

CalTREES THP ITEMs 27 – WLPZ IN-LIEU OR ALTERNATIVE PRACTICES

ITEM #27– WLPZ IN-LIEU OR ALTERNATIVE PRACTICES

ITEM #27	WLPZ IN-LIEU OR ALTERNATIVES
Per 14 CCR 916.1[936.1, 956.1] (In-Lieu Practices) – In rule sections where provision is made for site specific practices to be proposed by the RPF, approved by the Director and included in the THP in lieu of a standard rule, the RPF shall: • Reference the standard rule • Explain and describe each proposed practice • Explain how it differs from the standard practice, • Explain and justify how the protection provided by the proposed practice is a t least equal to the protection provided by the standard rule. • Identify the specific location where it shall be applied. 14 CCR 1034(x)(15) and (16) Per 14 CCR 916.6[936.6, 956.6] (Alternatives) – Alternative prescription for the protection of watercourses and lakes may be developed by the RPF or proposed by the Director on a site specific basis provided the following conditions are complied with and the alternative prescription will achieve compliance with the standards set forth in 14 CCR 916.3[936.3, 956.3] and 916.4[936.4, 956.4](b) The alternative prescription shall include in the THP information per 14 CCR 916.6[936.6, 956.6]a)(1)-(3)	
a. [☐]Yes [**X**] No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the prohibition of the construction or use of tractor roads listed below? Per 14 CCR 916.3[936.3, 956.3(c) Timber operators shall not construct or use tractor roads in a Class I, II, III, IV watercourses, wet meadows and other wet areas unless explained and justified in the plan by the RPF. Except at: • Prepared tractor crossing described in 14 CCR 914.8[934.8, 954.8](b) • Class III watercourse crossings dry at the time of use • At new and existing tractor road crossings approved as part of a Fish and Game Code Process (F&GC 1600 et seq.) If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
b. [☐]Yes [**X**] No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the retention of non-commercial vegetation bordering and covering meadows and wet areas? 14 CCR 916.3[936.3, 956.3(d) If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
c. [**X**]Yes [☐] No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the Directional felling of trees within any WLPZ away from the watercourse or lake? 14 CCR 916.3[936.3, 956.3(e) If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below) **In several locations within the timber harvest plan, WLPZ-protected watercourses are in close proximity to each other, and it is not possible to fall a tree in one WLPZ which will not fall towards another watercourse or into the other WLPZ. See Section III Item 26(c) for explanation and justification.**

CalTREES THP ITEMs 27 – WLPZ IN-LIEU OR ALTERNATIVE PRACTICES

d. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the standard WLPZ(s) width(s) identified in 14 CCR 916.5[936.5, 956.5], Table I? If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
e. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the protection of Class IV watercourse(s)? 14 CCR 916.4[936.4,956.4](c) and 916.5[936.5, 956.5], Table I If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)

f. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the exclusion of heavy equipment from the WLPZ except at those locations listed below? Per 14 CCR 916.4[936.4, 956.4(d)&(f) – Heavy equipment shall not be used in timber falling, yarding, or site preparation within the WLPZ unless such use is explained and justified in the THP and approved by the Director. Except at: • Prepared tractor crossing described in 14 CCR 914.8[934.8, 954.8](b) • Class III watercourse crossings dry at the time of use • Existing road crossings • New tractor and road crossings approved as part of a Fish and Game Code Process (F&GC 1600 et seq.) If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
g. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the establishment of ELZ(s) for Class III watercourses unless side slopes are, 30% and EHR is low? 14 CCR 916.4[936.4, 956.4](c)(1) If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
h. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the Retention of at least 50% of the overstory canopy in the WLPZ? 14 CCR 916.5[936.5, 956.5](e)"G" If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
i. [☐]Yes **[X]** No	Are there any site-specific practices proposed in-lieu of, or as an alternative, to the Retention of at least 50% of the understory in the WLPZ? 14 CCR 916.5[936.5, 956.5](e)"G" If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)
j. [☐]Yes **[X]** No	Are there any additional in-lieu or alternative practices proposed for watercourse or lake protection? If YES, provide operational information to the LTO under each item selected YES, in SECTION II. Proved the explanation and justification in SECTION III, (see table below)

CalTREES THP ITEMs 27 – WLPZ IN-LIEU OR ALTERNATIVE PRACTICES

Explanation and justification table for in-lieu WLPZ practices. SECTION III This table is consistent with the table provided in the CalTREES online submission.				
Map reference point	Standard rule	Describe each proposed practice	Explain how proposed practice differs from the standard practice	How is the proposed practice equal to the standard rule?
All WLPZ's where directionally falling trees will enter another WLPZ.	***14 CCR 916.3(e)*** ***14 CCR 914.1(a)***	***14 CCR 916.6 Alternative Watercourse and Lake Protection*** ***Falling of trees towards a watercourse where two WLPZ-protected watercourses do not allow for adequate room for directional falling.***	**The standard practice requires all trees to be directionally felled way from watercourses. The proposed rule would allow trees to be felled into an adjacent WLPZ-protected watercourse where those WLPZ-protected watercourses are within close proximity to each other and it is not physically possible to fall a tree in one WLPZ which will not fall towards another nearby watercourse or into the other WLPZ.**	**The proposed practice is to acknowledge that fact that there are some close proximity WLPZ-protected watercourses that it is physically impossible to not fall a tree from one WLPZ into another. Rather than put the LTO into a difficult situation, the RPF has identified these areas and ensured they are addressed. Additionally, the RPF has marked trees in the above mentioned WLPZ-protected watercourses such that the trees to be harvests will not impact any of the watercourses, just the WLPZ buffers. All other pertinent Forest Practice Rules and requirements of the THP apply, therefore beneficial uses should not be adversely affected and no significant effects are anticipated, thus equating the proposed practice to the standard rule.**

CalTREES THP ITEMs 28-29 – DOMESTIC WATER NOTIFICATIONS

ITEM #28-29 – DOMESTIC WATER NOTIFICATIONS

ITEM #28	DOMESTIC WATER NOTIFICATIONS

Per 14 CCR 1032.10 – The THP submitter shall provide notice by letter to all other landowners within 1,000 feet downstream of the THP boundary whose ownership adjoins or includes a Class I, II, or IV watercourse(s) which receives surface drainage from the proposed timber operations.

The notice shall request that the THP submitter be advised of surface domestic water use from the watercourse, within the THP or within 1,000 feet downstream of the THP boundary.

When required to notice by letter, publication shall also be given one time by the THP submitter in a newspaper of general circulation in the area affected by the proposed project.

Such letter and publication shall notify the adjoining party:

- of the proposed timber operation
- describe its legal location
- identify the name, if any, of the watercourse it may affect
- request a response by the property owner within ten days of the post-marked date on the letter or the date of publication as appropriate

The RPF may propose, with justification and explanation, an exemption to such notification requirements, and the Director may agree.

Copies of either notice, proof of service and publication, and any responses shall be attached to the THP (SECTION V) when submitted.

If domestic use is noted, the plan shall contain mitigations necessary to protect domestic water use.

THE PLAN SHALL NOT BE SUBMITTED UNTIL TEN DAYS AFTER THE ABOVE NOTIFICATION(s) HAVE BEEN COMPLETED

a. [☐]Yes [**X**] No	Are there any landowners with 1,000 feet downstream of the THP boundary whose ownership adjoins or includes a class I, II or IV watercourse(s) which receive surface drainage from the proposed timber operations? If YES, the requirement of 1032.10. Proof of letter notification shall be included in THP SECTION V. If NO, notification exemption request below need not be answered.
b. [☐]Yes [**X**] No [☐] [☐] [☐]	Is an exemption to the notification requirements requested? (check notification requesting to be exempted) Letter Newspaper Both If YES, provide the explanation and justification for the exemption request in SECTION III of the THP.
c1. [☐]Yes [**X**] No	Was any information received in response to domestic water notifications indicating domestic water supplies may be present within or downstream of the project area?
c2. [☐]Yes [☐] No	If YES, are there any additional mitigation measures needed beyond that required by standard watercourse and lake protection rules? If YES, provide the site-specific instruction to the LTO in SECTION II.

CalTREES THP ITEMs 28-29 – DOMESTIC WATER NOTIFICATIONS

ITEM #29	SENSITIVE WATERSHEDS
[☐]Yes [**X**] No	Is any part of the THP area within a Sensitive Watershed as designated by the Board of Forestry and Fire Protection? If YES, identify the watershed and list the special rules, operating procedures or mitigation that will be used to protect the resources identified at risk.

WATERSHED	SPECIAL RULE	MITIGATION MEASURES PROTECTING RESOURCES IDENTIFIED AT RISK

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ITEM #30 – HAZARD REDUCTION

ITEM #30	HAZARD REDUCTION
Per 14 CCR 917, 937, 957 - Hazard reduction shall provide standards for the treatment of snags and logging slash in order to reduce fire and pest safety hazards in the logging area, to protect such area from potential insect and disease attack, and to prepare the area for natural or artificial reforestation while retaining wildlife habitat. Per 14 CCR 917.2, 937.2, & 957.2 – The following standards shall apply to the treatment of slash created by timber operations within the plan area and on roads adjacent to the plan area.	
a. [X]Yes [☐] No	Will slash treatment occur within 100 feet of the edge of the traveled surface of a PUBLIC road? **All permanent and seasonal roads on JDSF are considered Public Roads. Slash created and trees knocked down by timber operations within 100 feet of the edge of permanent JDSF Road 500, Road 520, and Road 600 adjacent to the plan area shall be treated for fire hazard reduction. Road 500 will have additional fuel break treatments. Slash created and trees knocked down by timber operations within 50 feet of the edge of JDSF Roads 523, 665, 666, 666A, 667, 668 and 668B (and all other spurs where classified as seasonal) shall be treated for hazard reduction. Treatment shall consists of lopping as defined in 14 CCR §895.1: *Severing and spreading of slash so that no part of it remains more than 30" above the ground (Ref. Sec. 4551.5, PRC).***
b. [☐]Yes [X] No	Will slash treatment occur within 50 feet of the edge of the traveled surface of PERMANENT private roads open for public use where permission to pass is not required?
c. [☐]Yes [☐] No	[SOUTHERN only] Will slash treatment occur within 50 feet of the edge of the traveled surface of SEASONAL private roads open for public use where permission to pass is not required?
	If YES to any of the above, slash created or trees knocked down by road construction or timber operations shall be treated by: (Select all that apply) [X] lopping for Fire hazard reduction per (14 CCR 895.1) [X] Piling and burning per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [X] chipping [☐] burying [☐] removal [X] Other (explain) **Mastication**
d. [☐]Yes [X] No	Are there any permanently located structures maintained for human habitation in the project area requiring slash treatment? If YES, identify distance slash treatment will occur and indicate the method of treatment [☐] Within 100 feet of permanent structure [☐] Removed [☐] Piled and burned per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [☐] Other (explain) [☐] Between 100-200 feet of permanent structure [☐] Lopped for fire hazard reduction (per 14 CCR 895.1) [☐] removed [☐] chipped [☐] Piled and burned per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [☐] Other (explain)

CalTREES THP ITEM #30 – HAZARD REDUCTION

e. [☐]Yes [**X**] No	Has the RPF or Director determined there is an unusual fire risk or other hazard exists within the proposed project area? If YES then lopping is required within 200-500 feet of permanent structures.

f. [☐]Yes [**X**] No	Is the RPF proposing any alternatives to treating slash along roads and within 200 feet of structures. If YES, the RPF shall explain and justify in the plan how equal fire protection will be provided. The explanation and justification shall include:
	Description of the alternative treatment(s):
	Estimated amount / distribution of slash:
	Type of remaining vegetation:
	Topography:
	Climate:
	Degree of public exposure fire history:
	Provide a description of where the alternative will be used: (mapping area(s) is suggested)

g. [**X**]Yes [☐] No	Will piling and burning be used for hazard reduction? If YES, refer to 14 CCR 917.2, 937.2, 957.2(a)(1-3). (select all that apply) [**X**] Piles created prior to September 1 shall be treated not later than April 1 of the year following its creation, or within 30 days following climatic access after April 1 of the year following its creation. [**X**] Piles created on or after September 1 shall be treated not later than April 1 of the second year following its creation, or within 30 days following climatic access after April 1 of the second year following its creation. **The LTO shall be responsible for the disposal of slash generated at landings as directed by the RPF. A combination of treatments may be utilized at the discretion of the RPF including, but not limited to: piling and burning (burning is the responsibility of the landowner), lopping, chipping and spreading of slash.** **When piling and burning is utilized, the LTO shall be responsible for the piling of slash generated at landings and construction of fire lines. Slash piles created by the LTO will be provided at least 5 feet bare mineral soil fire line and shall be kept sufficiently free of soil or other non-combustible material for effective burning.**
h. [☐]Yes [**X**] No	Is the RPF proposing any alternatives to piling and burning from those required in 14 CCR 917.2, 937.2, 957.2(a)(1-2)? If YES, the RPF shall provide and explanation and justification in the plan to be approved by the director.

ITEM #30 - 31 – HAZARD REDUCTION

ITEM #30	HAZARD REDUCTION
Per 14 CCR 917, 937, 957 - Hazard reduction shall provide standards for the treatment of snags and logging slash in order to reduce fire and pest safety hazards in the logging area, to protect such area from potential insect and disease attack, and to prepare the area for natural or artificial reforestation while retaining wildlife habitat. Per 14 CCR 917.2, 937.2, & 957.2 – The following standards shall apply to the treatment of slash created by timber operations within the plan area and on roads adjacent to the plan area.	
a. [**X**]Yes [☐] No	Will slash treatment occur within 100 feet of the edge of the traveled surface of a PUBLIC road? **All permanent and seasonal roads on JDSF are considered Public Roads. Slash created and trees knocked down by timber operations within 100 feet of the edge of permanent JDSF Road 500, Road 520, and Road 600 adjacent to the plan area shall be treated for fire hazard reduction. Road 500 will have additional fuel break treatments. Slash created and trees knocked down by timber operations within 50 feet of the edge of JDSF Roads 523, 665, 666, 666A, 667, 668 and 668B (and all other spurs where classified as seasonal) shall be treated for hazard reduction. Treatment shall consists of lopping as defined in 14 CCR §895.1: *Severing and spreading of slash so that no part of it remains more than 30" above the ground (Ref. Sec. 4551.5, PRC).***
b. [☐]Yes [**X**] No	Will slash treatment occur within 50 feet of the edge of the traveled surface of PERMANENT private roads open for public use where permission to pass is not required?
c. [☐]Yes [☐] No	[SOUTHERN only] Will slash treatment occur within 50 feet of the edge of the traveled surface of SEASONAL private roads open for public use where permission to pass is not required?
	If YES to any of the above, slash created or trees knocked down by road construction or timber operations shall be treated by: (Select all that apply) [**X**] lopping for Fire hazard reduction per (14 CCR 895.1) [**X**] Piling and burning per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [**X**] chipping [☐] burying [☐] removal [**X**] Other (explain) **Mastication**
d. [☐]Yes [**X**] No	Are there any permanently located structures maintained for human habitation in the project area requiring slash treatment? If YES, identify distance slash treatment will occur and indicate the method of treatment [☐] Within 100 feet of permanent structure [☐] Removed [☐] Piled and burned per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [☐] Other (explain) [☐] Between 100-200 feet of permanent structure [☐] Lopped for fire hazard reduction (per 14 CCR 895.1) [☐] removed [☐] chipped [☐] Piled and burned per (14 CCR 917.2, 937.2, 957.2(a)(1-3)) [☐] Other (explain)

CalTREES THP ITEM #30 - 31 – HAZARD REDUCTION

e. [☐]Yes **[X]** No	Has the RPF or Director determined there is an unusual fire risk or other hazard exists within the proposed project area? If YES then lopping is required within 200-500 feet of permanent structures.

f. [☐]Yes **[X]** No	Is the RPF proposing any alternatives to treating slash along roads and within 200 feet of structures. If YES, the RPF shall explain and justify in the plan how equal fire protection will be provided. The explanation and justification shall include:	
	Description of the alternative treatment(s):	
	Estimated amount / distribution of slash:	
	Type of remaining vegetation:	
	Topography:	
	Climate:	
	Degree of public exposure fire history:	
	Provide a description of where the alternative will be used: (mapping area(s) is suggested)	

g. **[X]**Yes [☐] No	Will piling and burning be used for hazard reduction? If YES, refer to 14 CCR 917.2, 937.2, 957.2(a)(1-3). (select all that apply) **[X]** Piles created prior to September 1 shall be treated not later than April 1 of the year following its creation, or within 30 days following climatic access after April 1 of the year following its creation. **[X]** Piles created on or after September 1 shall be treated not later than April 1 of the second year following its creation, or within 30 days following climatic access after April 1 of the second year following its creation. **The LTO shall be responsible for the disposal of slash generated at landings as directed by the RPF. A combination of treatments may be utilized at the discretion of the RPF including, but not limited to: piling and burning (burning is the responsibility of the landowner), lopping, chipping and spreading of slash.** **When piling and burning is utilized, the LTO shall be responsible for the piling of slash generated at landings and construction of fire lines. Slash piles created by the LTO will be provided at least 5 feet bare mineral soil fire line and shall be kept sufficiently free of soil or other non-combustible material for effective burning.**
h. [☐]Yes **[X]** No	Is the RPF proposing any alternatives to piling and burning from those required in 14 CCR 917.2, 937.2, 957.2(a)(1-2)? If YES, the RPF shall provide and explanation and justification in the plan to be approved by the director.

CalTREES THP ITEMs #32-35 BIOLOGICAL RESOURCES

ITEM # 32 – BIOLOGICAL RESOURCES

ITEM #32	LISTED PLANT or ANIMAL SPECIES INCLUDING HABITAT
a. [X]Yes [☐] No	Are there any ANIMAL SPECIES, including their habitat(s), which are listed as rare, threatened or endangered under Federal or state law, or a sensitive species by the Board of Forestry associated with the THP area? If YES, identify the animal species and the provisions to be taken for the protection of the species.

Listed and Sensitive Animal Species Table					
Animal Species	Species type Mammal / bird / reptile / amphibia / fish / Invertebrate	FEDERAL Threatened / endangered /	STATE Threatened / endangered / candidate	BOF Sensitive	Protection measures
Northern Spotted Owl	Bird	Threatened	Threatened	Sensitive	See below
Marbled Murrelet	Bird	Threatened	Endangered	-	See below
Foothill Yellow – Legged Frog	amphibian	-	Candidate	-	See below
Coho Salmon	Fish	Endangered	Endangered	-	Protection measures incorporated into Items 18, 23, and 26 of the plan shall protect habitat for this species
Chinook	Fish	Threatened	-	-	See above
Steelhead	Fish	Threatened	-	-	See above
Grey Wolf	Mammal	Endangered	Endangered	-	See below

NORTHERN SPOTTTED OWL

The northern spotted owl became a state candidate species as of December 27, 2013. CDFW issued a statement on 1/16/2014 that it will rely on the processes currently established under 919.10 and 939.10 of the California Forest Practice Rules and implemented by CAL FIRE as avoiding unauthorized take of NSO during the candidacy period.

1) **The THP lies within the Coast range of the Northern Spotted Owl (*Strix occidentalis caurina*, NSO) and contains habitat suitable for Northern Spotted Owls. There are two known NSO Activity centers within 0.7 miles of the plan area: MEN 659, and MEN 585. See Section V for additional information.**
2) **The plan will comply with 14 CCR 919.9(e) USFWS Programmatic Technical Assistance Scenario 4 Attachment A dated 3-15-2011.**

The plan complies with the respective Scenario in the following ways:

- **Suitable habitat exists within some or all the harvest units.**
- **NSO Surveys shall be conducted in conformance with the most current approved Northern Spotted Owl Survey Protocol; except as noted below.**
- **Habitat and operational conditions shall follow the 3-15-2011 Attachment A: Take Avoidance Analysis (Coast); except as noted below**

No timber operations shall occur until protocol surveys have been completed for the current, and/or immediately preceding survey period, the results have been provided to CAL FIRE to be evaluated for consistency with the plan and the protocol, and the results have been amended into the plan.

Year 1 (2020) survey effort will commence on or after March 1, 2020. Survey information shall be amended in once the surveys are completed.

CalTREES THP ITEMs #32-35 BIOLOGICAL RESOURCES

Habitat and operational measures for known, and/or future Activity Centers within 0.7 miles of the project or 0.25 miles of associated non-habitat altering activities (e.g. roads) are as follows (please refer to Section V, "Additional Information Regarding the Northern Spotted Owl" regarding Exceptions):

POST-HARVEST HABITAT RETENTION AND TYPING

Within the 0.7 mile radius (985 acres) of each Activity Center please use the following:

1) *Retain habitat to maximize attributes desirable for NSO*
2) *Retain at least 500 acres of suitable (Foraging/Nesting/Roosting) NSO Habitat post-harvest, as follows:*
   a) *Retain 200 acres of Nesting/Roosting habitat within the 0.7 mile radius of the Activity Center consisting of:*
      i) *100 acres of the 200 acres of Nesting/Roosting habitat retained should be contiguous, or contiguous as possible with the Activity center.*
      ii) *An additional 100 acres of Nesting/Roosting habitat within the 0.7 mile radius*
         (1) *If the second 100 acres of Nest/Roosting habitat is also contiguous with the Activity Center, or within the same drainage, operations should retain a minimum of 66% of the pre-harvest basal area per acre of trees at least 11 inches DBH.*
         (2) *If the remaining 100 acres of Nesting/Roosting is not contiguous with the Activity Center, retain at least Nesting/Roosting habitat.*
   b) *Retain at least 300 acres of Suitable NSO habitat, post-harvest, or at least Foraging quality.*
3) *Remove no more than 1/3 of the remaining Suitable habitat is excess of 500 acres within 0.7 miles of an Activity Center during the life of the timber operations.*

ROAD USE

To avoid take of NSO from noise disturbance (see U.S. Fish and Wildlife Service 2006), road use *within 0.25 mile (1,320 feet) of an NSO Activity Center during the breeding season is prohibited until July 10,* unless *:*

1) *Non-nesting, or nesting failure at the Activity Center has been determined by a Activity Center Search (2011 NSO Protocol) conducted on or after May 15th*, or
2) *The Activity Center is within 165 feet of a major highway that typically has continuous traffic year around (Hwy 1, 36, 101, 128, 299, etc), and the appurtenant road is not within 165 feet of the Activity Center.*
3) *After July 9th until the end of the breeding season road use within the 100-acre core is restricted to existing road use, maintenance and map point work.*

Exception: Road use on existing, permanent roads(s): JDSF Road 500 (See Appurtenant Road Map in Section II Attachments).

"Road use" is defined as the use of heavy equipment (logging trucks, bulldozers, backhoes, loaders, etc).

TIMBER HARVEST OPERATIONS

A 0.25 mile seasonal restriction on timber operations (except for road use after July 9th) applies to every known NSP Activity Center from the start of the breading season on February 1st until July 31st, unless it is determined via a site monitoring visit, "Activity Center Search" (NSO 2011 Protocol), that NSO are not nesting, or nesting failure has occurred. If it cannot be determined whether NSO are nesting, or nesting failure cannot be determined, the 0.25 mile seasonal restriction stays in effect for timber operations until after July 31st.

For all known Activity Centers, timber operations should adhere to the following recommendations:

1) *Within the 100-acre Core Area of an NSO Activity Center:*
   a) *Outside the breeding season, limited timber operations (i.e., road use and maintenance, map point work, tail-hold placements, use of existing skid roads, and loading) may be conducted, provided no trees ≥11 inches DBH are cut or removed by the operations, and no logs are yarded through the Core Area.*
   b) *During the NSO breeding season, timber operations (including the use of roads before July 9th) are not allowed within the 100 acre Core Area polygon, except as allowed in subsections 4 and 5, below.*

Exception: Road use on existing, permanent roads(s): JDSF Road 500 (See Appurtenant Road Map in Section II Attachments)

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2) *Timber operations outside the 100-acre Core Area polygon, but within 0.25 miles of an NSO Activity Center:*
   a) *Outside the breeding season, timber operations may be conducted.*
   b) *During the breeding season, no timber operations should proceed unless protocol surveys do not detect nesting NSOs.*
3) *For all NSP Activity Centers, prior to May 15th, (until the required May 15 or later survey is completed):*
   a) *Timber operations (except helicopter yarding or staging) may be conducted only on those THP areas >0.25 miles from the Activity Center*
   b) *Helicopter yarding and staging may occur only on those THP areas 0.5 miles from the Activity Center.*

Exception: Road use on existing, permanent roads(s): JDSF Road 500 (See Appurtenant Road Map in Section II Attachments)

4) *For NSO Activity Centers where reproductive status has been determined to be* non-nesting *or* failed nesting:
   a) *Limited timber operations (road use and maintenance, map point work, use of existing skid roads, tail-hold placements and loading) may be conducted within the 100-acre Core Area polygon of the Activity Center provided no trees >11 inches DBH are cut or removed by the operations, and no logs are yarded through the Core Area.*
   b) *Full timber operations, including helicopter yarding and staging, may be conducted within 0.25 miles but not within the 100-acre Core Area polygon of the Activity Center. Helicopter fly-overs shall not occur within 1,000 ft. of the Activity Center.*
5) *For NSO Activity Centers where reproductive status has been determined to be* nesting:
   a) *For Activity Centers where fledging status has not been determined, timber operations may be conducted only on those THP area that are >0.25 miles from the Activity Center until the end of the breeding season.*
   b) *Helicopter yarding and staging, may only occur on those THP areas >0.5 miles from the Activity Center.*

Exception: Road use on existing, permanent roads(s): JDSF Road 500 (See Appurtenant Road Map in Section II Attachments)

6) *For NSO Activity Centers where fledgling status* has been determined *(either nest failure or fledglings have left the Core Area):*

Exception: "Fledgling success" shall be substituted for "fledglings have left the Core Area." See Section V NSP for more information.

   a) *Full timber operations, including helicopter yarding and staging, may be conducted within 0.25 miles but not within the 100-acre core polygon of the Activity Center. Helicopter fly-overs shall not occur within 1,000 feet of the Activity Center.*
   b) *Limited timber operations (road use and maintenance, map point work, use of existing skid roads, tail-hold placements and loading) may be conducted within the 100-acre core polygon of the Activity Center provided no trees >11 inches DBH are cut or removed by the operations, and no logs are yarded through the Core Area.*

Exception: Road use on existing, permanent road(s): JDSF Road 500 (See Appurtenant Road Map in Section II Attachments)

7) *For any NSO Activity Center, regardless of reproductive status*
   a. *If NSO move to a new location (>1000 feet from the historic Activity Center) and attempt to nest (reproductive behavior confirmed), request technical assistance to evaluate the status of the historical Activity Center.*

CDFW consultation shall occur upon completion of the 2-year NSO protocol survey and prior to commencement of operations with either the RPF or his designee.

MARBLED MURRELET

The THP area and the 0.25 buffer have been reviewed for the existence of potential murrelet habitat by reviewing aerial photos, previous harvesting history, and undertaking field checks. Previous adjacent THPs have scoped portions of the current plan area and no murrelet habitat was found to be within or 0.25 miles of the THP area. The rest of the plan area is currently being scoped.

FOOTHILL YELLOW-LEGGED FROG

The Foothill Yellow-Legged Frog (*Rana boylii*, FYLF) is under review for state threatened status listing. The one year candidacy period began as of June 21, 2017. The Department of Fish and Wildlife received an extension until April 2019 to make a final determination on species status. This species may inhabit perennial wetted channels of Class I and Class II watercourses. For more information, See Section III and IV.

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Take avoidance measures include the following measures:

CalTREES THP ITEMs #32-35 BIOLOGICAL RESOURCES

1) No less than 5 days prior to work in Class I or II watercourses, an inspection of the watercourse crossing area shall be made to determine if water is present within 100 feet upstream or downstream of the crossing.
2) If no water is present within 100 feet of the crossing, work at the crossing may proceed without further inspections or surveys.
3) If water is present, a person familiar with all life stages of foothill yellow-legged frog shall survey 100 feet above and 100 feet below the crossing to determine if foothill yellow-legged frogs are present.
4) If the foothill yellow-legged frogs are present, work shall not begin and the California Department of Fish and Wildlife shall be consulted.
5) If foothill yellow-legged frogs are not present work may begin without further surveys.
6) If the Fish and Game Commission at a future date makes the determination that listing the FYLF is not warranted, the protection measures described above shall not be applied.

GRAY WOLF

The gray wolf became a state listed endangered species as of June 2014. Most, but not all, populations of gray wolf are also federally listed as endangered. Any wolves entering California are protected by both the ESA and the FESA. The October 2017 CDFW Gray Wolf Activity Map displays pack activity in the Lassen Plumas County border area west of Susanville. The species is a habitat generalist and requires large areas of low human populations and good ungulate prey availability. Wolves were hunted to extinction in California in the early 1900s. The redwood region does not have any specific history of wolf presence. The species was known from the Klamath Mountains, the Cascade Range, the Sierra Nevada and the Modoc Plateau. It is unlikely that a wolf or wolf den would be seen in the plan area.

If a gray wolf den or rendezvous site is encountered during active timber operations, all tree felling and yarding or other vegetative disturbances within 200 feet of the identified den shall cease and be reported to the RPF. CDFW shall be contacted for a formal consultation. The result of the consultation shall be added to the THP as an amendment and felling and yarding may resume pursuant to the amendment. If a suspected gray wolf rendezvous site is discovered during operations, the LTO shall contact the RPF.

OTHER LISTED or BOARD OF FORESTRY SENSITIVE SPECIES

The plan area may have potential habitat for the following state or federally listed (threatened, endangered) or state candidate, or state fully protected, or state rare [plants], or Board of Forestry Sensitive species that were not observed during plan preparation: ringtail cat (FP), northern goshawk (BofF), bald eagle (SE, BofF), golden eagle (BofF), osprey (BofF), great blue heron rookery (BofF), great egret rookery (BofF), white-tailed kite (FP), Humboldt milk vetch (Astragalus agnicidus) (SE), norther coast semaphore grass(*Pleuropogon hooverianus*) (ST), Roderick's fritillary (*Fritillaria roderickii*) (SE), and Monterey clover (*Trifolium trichocalyx*) (SE).

BIRDS

When an occupied nest site of a listed bird or any raptor is discovered during timber operations the timber operator shall follow the specifications in 919.2(d):

14 CCR 919.2 (d) When an occupied nest site of a listed species is discovered during the timber operations, the timber operator shall protect the nest tree, screening trees, perch trees, and replacement trees and shall apply the provisions of subsections (b) and (C) of 919.2, and shall immediately notify the Department of Fish and Wildlife and the Department of Forestry and Fire Protection. An amendment that shall be considered a minor amendment to the timber harvesting plan shall be filed reflecting such additional protection as is agreed between the operator and the Director after consultation with the Department of Fish and Wildlife.

919.2 (b) During timber operations, nest tree(s), designated perch tree(s), screening tree(s), and replacement tree(s), shall be left standing and unharmed except as otherwise provided in these following rules.

(c) Timber operations shall be planned and operated to commence as far a possible from occupied nest trees unless explained and justified by the RPF in the THP.

RAPTORS

No raptor nests within or adjacent to the plan area were discovered during plan preparation. See Sections III and IV for more information.

SONOMA TREE VOLE

Small portions of the plan area are part of the mapped polygon area for a 1996 CNDDB Sonoma tree vole nest report. A tree vole nest survey was undertaken and avoidance measures incorporated into the plan. See Section III and IV for more information.

b. [☐]Yes [**X**] No	Are there any PLANTS, including their habitat(s), which are listed as rare threatened or endangered under Federal or state law, or a sensitive species by the Board of Forestry associated with the THP area? If YES, identify the plant species and the provisions to be taken for the protection of the species.

Plant Species Table				
Plant Species	**FEDERAL** Threatened / endangered	**STATE** Rare / Threatened / Endangered	**CRPR** (1A, 1B, 2A, 2B, 3, 4)	**Protection measures**

Seasonally appropriate botanical surveys will be conducted in 2020 for the entire plan. The botanical surveys will be submitted with proposed protection measures as a minor amendment to the plan. Surveys will be consistent with the 2009 "Protocols for Surveying and Evaluating Impacts to Special Status Native Populations and Natural Communities" by the California Natural Resources Agency, Department of Fish and Wildlife.

The following protection measures have been developed in the event that a listed (state or federal), or California Rare Plant Rank 1A, 1B, 2A, or 2B plant species is discovered during timber operations:

1) **Operations shall cease within 50 feet of the occurrence and the outside buffer shall be designated.**
2) **The responsible RPF shall be notified of the discovery.**
3) **CDFW shall be notified and specific protection measures (if any) shall be developed through consultation with CDFW and then submitted to CAL FIRE as a minor amendment.**

If the LTO observes or otherwise becomes aware of a listed species (plant or animal which is rare, threatened, or endangered, or BOF species of special concern) within or adjacent to the harvest area, he/she shall cease operations and contact JDSF representative, CAL FIRE and CDFW will be consulted on any such species found during the course of the operations. A CA Native Species Survey Form shall be submitted to the CNDDB by the RPF or his/her designee for any new occurrence. See Section III; Plan Addendum to Item 32, and THP Section IV; Biological Resources.

See the Section III, Plan Addendum to Item 32, and the THP Section IV; Biological Resources for more information.

NON-LISTED SPECIES IMPACTS	
c. [☐]Yes [**X**] No	Are there any NON-LISTED species which will be significantly impacted by the operation? If yes, identify the species and the provisions to be taken for the protection of the species.

Non-Listed Species Table		
Species	**Species type** Mammal / bird / reptile / amphibia / fish / Invertebrate	**Protection measures**

Northern red-legged frog	**Amphibia**	**The larger stream buffers (WLPZ) used on JDSF are sufficient protection for the species.**

NON-LISTED PLANTS AND ANIMALS

The plan area may have potential habitat for the following Federal candidate (FC), California species status animals (CDFW Species of Special Concern-SSC) or special plant (California Rare Plant Rank 1A, 1B, 2A, or 2B) species that were not observed in the plan area during preparation:

- **Animals: pallid bat, Humboldt marten, Pacific fisher, ringtail, tailed frog, southern torrent salamander, northwestern pond turtle, Vaux's swift, purple martin, olive-sided flycatcher, yellow warbler, and white-tailed kite;**
- **Plants: small groundcone, California sedge, swamp harebell, coast fawn lily, seacoast ragwort, Santa Cruz clover, and corn lily. The botanical survey shall be amended into the plan when it is completed.**

ITEM # 35 –OTHER WILDLIFE PROTECTION REQUIRED BY FOREST PRACTICE RULES

a. [☐]Yes [**X**] No	Are there any other provisions for wildlife protection required by the rules? If YES, describe.
Description:	

SOTHERN FOREST DISTRICT ONLY	
Per 14 CCR 959.15(a) Protection of Wildlife Habitat **(a)** Where present at time of timber harvest, 400 sq. ft. basal area of oak per 40 acres should be retained and protected, giving preference to deciduous oaks. Oaks should be retained on areas designated by CDFW as deer migration corridors, holding areas, or key ranges when consistent with good forestry practices.	
b. [☐]Yes [☐] No	Will timber operations occur where the pre-harvest stand consists of 400 square feet basal area of oak per 40 acres?
c. [☐]Yes [☐] No	Is any of the proposed harvest area within an area designated by CDFW as deer migration corridors, holding areas, or key ranges?
	If YES, to one or both questions above provide direction to the LTO identifying oak retention shall occur to comply with 14 CCR 959.15. Provide site-specific instructions to the LTO indicating how Oak tree protection will be accomplished. (if necessary provide a map of these areas for the LTO)

ITEM # 33 – SNAGS

ITEM #33	**SNAGS**
Per 14 CCR 919, 939, 959 – Timber operations shall be planned and conducted to maintain suitable habitat for wildlife species as specified by the provisions of Article 9 of the Forest Practice Rules. **Within the logging area all snags shall be retained to provide wildlife habitat with the exception of snags for safety reasons Per 14 CCR 919.1, 939.1, 959.1(a)-(f)**	
a. [**X**]Yes [☐] No	Are there any snags which must be felled for fire protection or safety reasons? **The California Logging and Sawmill Safety Orders, Title 8 CCR 6259(a), require that "all...snags which appear to be dangerous to any operation shall be felled."** **All snags within the timber harvest area shall be retained with the exception of snags that pose a fire or safety hazard. If the LTO determines a snag to be a hazard, the LTO has the option to fall the snag for safety purposes.**
b. [**X**]Yes [☐] No	Will snags over 20 feet in height and 16 inches dbh be felled within 100 feet of a main ridge that is suitable for fire suppression?

	If YES, ridge shall be delineated on a THP map. **See along Road 500 and the trail as shown on the Timber Operations Map**
c. [X]Yes [☐] No	Will snags over 20 feet in height and 16 inches dbh be felled within 100 feet of all public roads, permanent roads, landings and railroads? (select all that apply) [X] Public road(s) [X] Permanent road(s) [X] Landing(s) [☐] Railroad(s) ***919.1(f): Within the logging area all snags shall be retained to provide wildlife habitat except as follows...(f) when proposed by the RPF; where it is explained, and justified that there will not be a significant impact to wildlife habitat needs or there is a threat to human health or safety, including fire where the Director determines a high hazard exists.*** **The RPF is proposing to cut hazard trees (dead and dying) that are within a tree length from JDSF Road 500 and the trail network through the plan. In some cases, this exceeds the above 100 feet. The plan area is within a high usage recreation area. The RPF or his/her designee shall mark each snag with the safety of the public in mind. They will use metrics such as but not limited to dead tops, broken limbs, up-rooting, and sever leans to determine how hazardous a tree is.** **The main source of snags along Road 500 and the trail is Bishop pines that have reached their maturity and therefore are dying off. The RPF believes that the removal of snags and hazard trees along Road 500 and the trail will not have a significant impact to wildlife as there will be sufficient recruitment of snags deeper in the plan area.**
d. [X]Yes [☐] No	Will snags be felled where federal and state safety laws and regulations require the felling of snags?
e. [☐]Yes [X] No	Will snags be felled within 100 feet of structures maintained for human habitation?
f. [☐]Yes [X] No	Will merchantable snags be felled in any location as provided for in the plan?
g. [☐]Yes [X] No	Will snags be felled as required to control insect or disease concerns?

ITEM # 34 – LATE SUCCESSIONAL FOREST STANDS

ITEM #34	LATE SUCCESSIONAL FOREST STANDS
a. [☐]Yes [X] No	Are any Late Successional Forest stands proposed for harvest? If YES, describe measures to be implemented by the LTO to avoid long-term significant adverse effects on fish, wildlife and listed species known to be primarily associated with late successional forests.
Describe:	

CalTREES THP ITEMs #36-38 – CULTURAL RESOURCES / GROWTH AND YIELD / SPECIAL INSTRUCTIONS

ITEM # 36 – CULTURAL RESOURCES

ITEM #36	ARCHAEOLOGICAL / HISTORICAL
a. [X]Yes [☐] No	Has an archaeological / historical survey been made for the THP area?
b. [X]Yes [☐] No	Has a current archaeological / historical records check been conducted for the THP area?
c. [X]Yes [☐] No	During pre-field research and surveys were archaeological or historical sites identified within the plan area? If YES, THIS INFORMATION IS CONFIDENTIAL AND NOT AVAILABLE TO REVIEW AGENCIES, OTHER THAN CAL FIRE, AND THE GENERAL PUBLIC. RPF is advised to complete the Confidential Archaeological Addendum (CAA) and place in Section VI of the THP. **During surveys, continuations of existing pre-historic sites were completed as well as primaries for two historic sites. A pre-historic isolate was found during the survey and a primary was written. There was no need for a notice to the Native American Tribes for the isolate since the isolate is not a site as outlined in 929.1 (b) *"Provide Notification to Native Americans if a Native American Archaeological or Cultural Site is located within the plan."*** **For more information regarding the above, please see Section VI the Confidential Archaeological Addendum (CAA).**

ITEM # 37 – GROWTH AND YIELD INFORAMTION

[☐]Yes [X] No	Has any inventory or growth and yield information designated "TRADE SECRET" been submitted in a separate confidential envelope in Section VI of this THP? If YES, THIS INFORMATION IS CONFIDENTIAL AND NOT AVAILABLE TO REVIEW AGENCIES.

ITEM # 38 – SPECIAL INSTRUCTIONS OR CONSTRAINTS

ROAD MAINTENANCE

The RPF shall designate the LTO(s) responsible for road and landing maintenance in the THP area(s) and on appurtenant road(s); this action shall be in the form of a minor deviation (14 CCR § 1040) submitted in writing to the Director prior to any road and/or landing work. If multiple LTOs are listed, their responsibilities shall be defined in the minor deviation. This measure is to clarify the LTO(s) responsible for road and/or maintenance. If the RPF on the THP does not have the authority under THP Item 13(c) to submit minor deviations (commonly called minor amendments) the Plan Submitter shall be responsible for accomplishing this measure.

DUST ABATEMENT

Water from the drafting tank on Road 600 and the Pond on Road 500 on JDSF will be used for dust abatement.

LICENSED TIMBER OPERATOR RESPONSIBLITIES (14 CCR § 1035.3):

Each affected licensed Timber Operator shall:

(a) Sign the plan and major amendments to the plan, or sign and file with the Director a facsimile of such plan or amendments, agreeing to abide by the terms and specifications of the plan. This shall be accomplished prior to implementation of the following; which the affected LTO has responsibility for implementing:

(1) those operations listed under the plan and

(2) those operations listed under any amendments proposing substantial deviations from the plan.

(b) Inform the responsible RPF or plan submitter, whether in writing or orally, of any site conditions which in the LTO's opinion prevent implementation of the approved plan including amendments.

(c) Keep a copy of the applicable approved plan and amendments available for reference at the site of active timber operations. The LTO is not required to possess any confidential addenda to the plan such as the Confidential Archaeological Addendum, nor is the LTO required to keep a copy of such confidential plan addenda at the site of active timber operations.

(d) Comply with all provisions of the Act, Board rules and regulations, the applicable approved plan and any approved amendments to the plan.

(e) In the event that the LTO executing the plan was not available to attend the on-site meeting to discuss archaeological site protection with the RPF or supervised designee familiar with on-site conditions pursuant to 14 CCR § 929.2 [949.2, 969.2] subsection (b), it shall be the responsibility of the LTO executing the plan to inquire with the plan submitter, timberland owner, or their authorized agent, RPF who wrote the plan, or the supervised designee familiar with on-site conditions, in order to determine if any mitigation measures or specific operating instructions are contained in the Confidential Archaeological Addendum or any other confidential addendum to the plan.

(f) Provide the RPF responsible for professional advice throughout the timber operations an on-site contact employee authorized by the LTO to receive RPF advice.

(g) Keep the RPF responsible for professional advice throughout the timber operations advised of the status of timber operations activity.

(1) Within five days before, and not later than the day of the start-up of a timber operation, the LTO shall notify the RPF of the start of timber operations.

(2) Within five days before, and not later than the day of the shutdown of a timber operation, the LTO shall notify the RPF of the shutdown of timber operations.

(A) The notification of the shutdown of timber operations is not required if the period of the shutdown does not extend beyond a weekend, including a nationally designated legal holiday.

(h) Upon receipt of written notice of an RPF's decision to withdraw professional services from the plan, the LTO or on-site contact employee shall cease timber operations, except for emergencies and operations needed to protect water quality, until the LTO has received written notice from the plan submitter that another RPF has visited the plan site and accepts responsibility for providing advice regarding the plan as the RPF of record.

NOTIFICATION OF COMMENCEMENT OF OPERATIONS

14 CCR § 1035.4 *Each calendar year, within fifteen days before, and not later than the day of the startup of a timber operation, the Timber Harvesting Plan Submitter, unless the THP identifies another person as responsible, shall notify CAL FIRE of the start of timber operations. The notification, by telephone or by mail, shall be directed to the appropriate CAL FIRE Unit Headquarters, Forest Practice Inspector, or other designated personnel.*

Mendocino Headquarters
Telephone: (707) 459-7440
Mail (address): 17501 North Highway 101 / Willits, CA 95490

MAPPED BOUNDARY DEVIATION

When boundaries (Timber Harvest Boundary, Yarding Method, Silviculture) are mapped immediately adjacent to a watercourse, road or property line, the boundary is the watercourse, road, or property line.

NCRWQCB ENFORCEMENT

Conditions stated in Section V of the THP which pertain to NCRWQCB General Waste discharge requirements will not be enforced by the Department of Forestry and Fire Protection unless those same conditions are subject to the Forest Practice Act/Rules and included as enforceable provisions in Section II of the THP.

TIMBER MARKING

As described in Item 14 D, old blue paint and orange paint may be present throughout the plan area and within any WLPZ. Tree removal guidelines apply on to trees with clearly identifiable new blue paint. The JDSF Timber Sale Administrator shall be contacted if the harvest mark is not obvious to field personnel.

CalTREES THP ITEMs #36-38 – CULTURAL RESOURCES / GROWTH AND YIELD / SPECIAL INSTRUCTIONS

There is a large amount of old flagging of various colorations throughout the plan area. Disregard any flagging that is not part of the below table. The following table describes the flagging (ribbon) designations used during THP development.

DESIGNATED ACTIVITY	FLAGGING COLOR
Timber harvesting boundary	Pink-glo Site-Mark® "TIMBER HARVEST BOUNDARY" in black lettering
Class I, II, and Springs WLPZ	Blue/white stripe Site-Mark® "LAKE AND WATERCOURSE PROTECTION ZONE" in black lettering & solid orange
Class I watercourse	Solid blue
Class II watercourse	Blue/white stripe
Class III watercourse	Blue/white polka-dot
Tractor road (skid trail)	Yellow Site-Mark® "SKID TRAIL" in black lettering
Tractor ground/Cable ground break	Red/white stripe
Road grade centerline	Orange Site-Mark® "TRUCK ROAD" in black lettering
Landing at end of road	Three solid orange flags
Equipment Exclusion Zone (EEZ) Equipment Limitation Zone (ELZ)	Orange/white stripe Site-Mark® "SPECIAL TREATMENT AREA" in black lettering & solid orange OR Solid red & solid white
Map Points & Messages/notes	Pink/black stripe & lime green
Unstable areas, protection zones	Orange/white stripe Site-Mark® "SPECIAL TREATMENT AREA" in black lettering & solid orange
Waterbars	Orange/black stripe double flag

Cal Fire Signature Page
Plan Number 1-20-0006 MEN

DIRECTOR OF FORESTRY AND FIRE PROTECTION

This Timber Harvest Plan conforms to the rules and regulations of the Board of Forestry and fire Protection and the Forest Practice Act:

By: Shawn Headley
(Signature)

5/5/2020
(Date)

Shawn Headley
(Printed Name)

Forester II
(Title)

PROFESSIONAL FORESTER
Shawn Headley
No. 2970
STATE OF CALIFORNIA

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Caspar 500 THP

Section II Attachments

Attachments

1. Timber Harvest Operations Maps
2. 1611 Permit Notification
3. Geology Maps
4. Appurtenant Roads Map
5. Erosion Hazard Rating and Site Class Map
6. Map Point Sketches

Caspar 500 Map 31

Caspar 500 THP

Operations Map - Master

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

Contour Interval = 40'

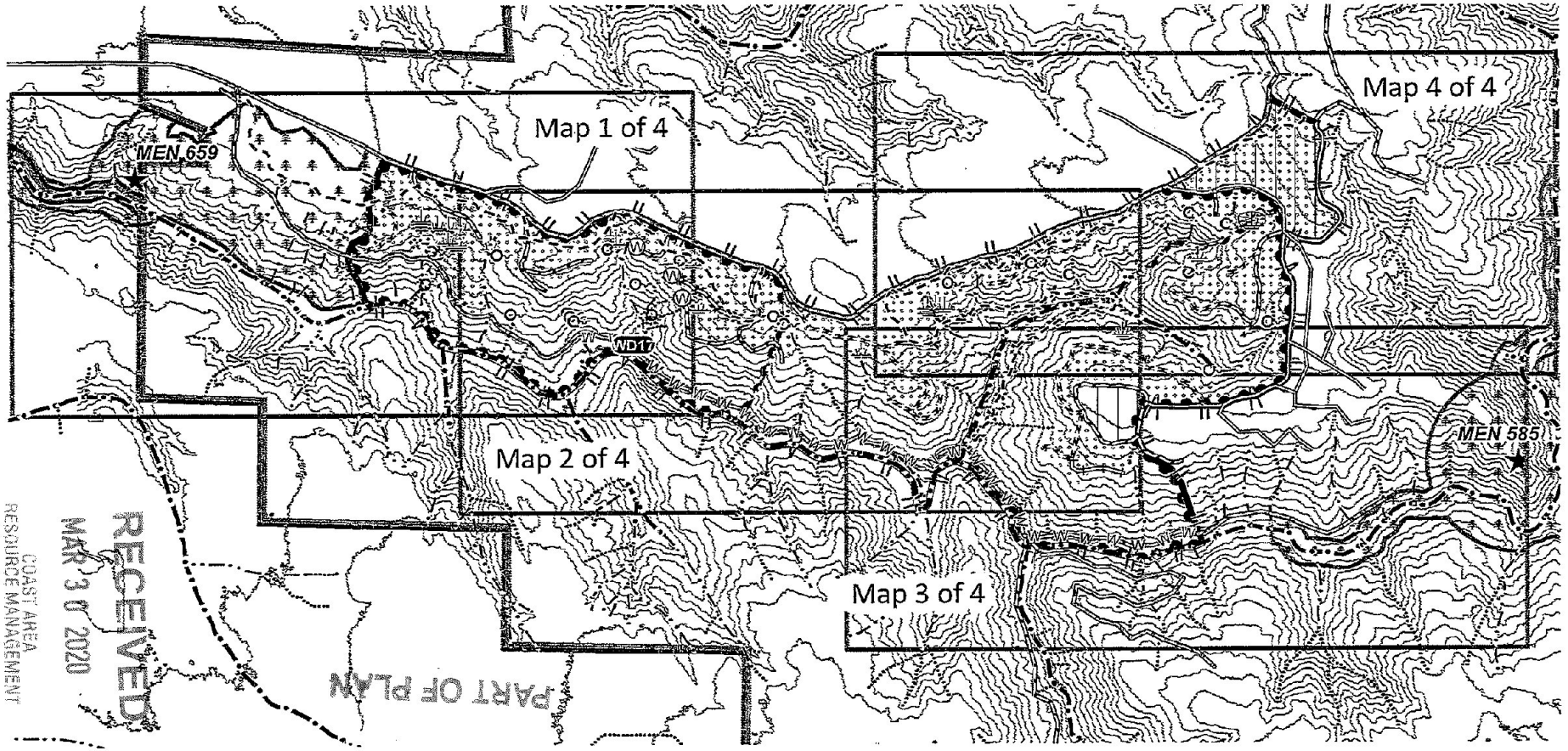
1 inch = 1,708.33 feet

0 950 1,900 3,800 5,700 Feet

Map Outlines

JACKSON DEMONSTRATION STATE FOREST

3/30/2020 TN



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Existing WLPZ
Trail
Water Drafting Site
Shaded Fuel Break

Road Classification
(permanent and seasonal roads considered "public")
Existing Permanent Road
Existing Seasonal Road
Proposed Temporary Road
Proposed Road Abandonment
WLPZ Road

Watercourse Classification
Class I
(salmonid spawning & rearing habitat)
Class II-S
Class III
Spring
Wet Area
Pond

NSO Core Area
MEN 659 Activity Center
THP Boundary
JDSF Property Line
Tractor Yarding/Cable Option
(all other THP areas cable yarding)
Unit 1 and Unit 3 Tractor Ground is Group Selection
Single Tree Selection is everywhere else

Unit Boundaries
No Cut Areas

Caspar 500 THP

Caspar 500 THP

Operations Map Page 1 of 4

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

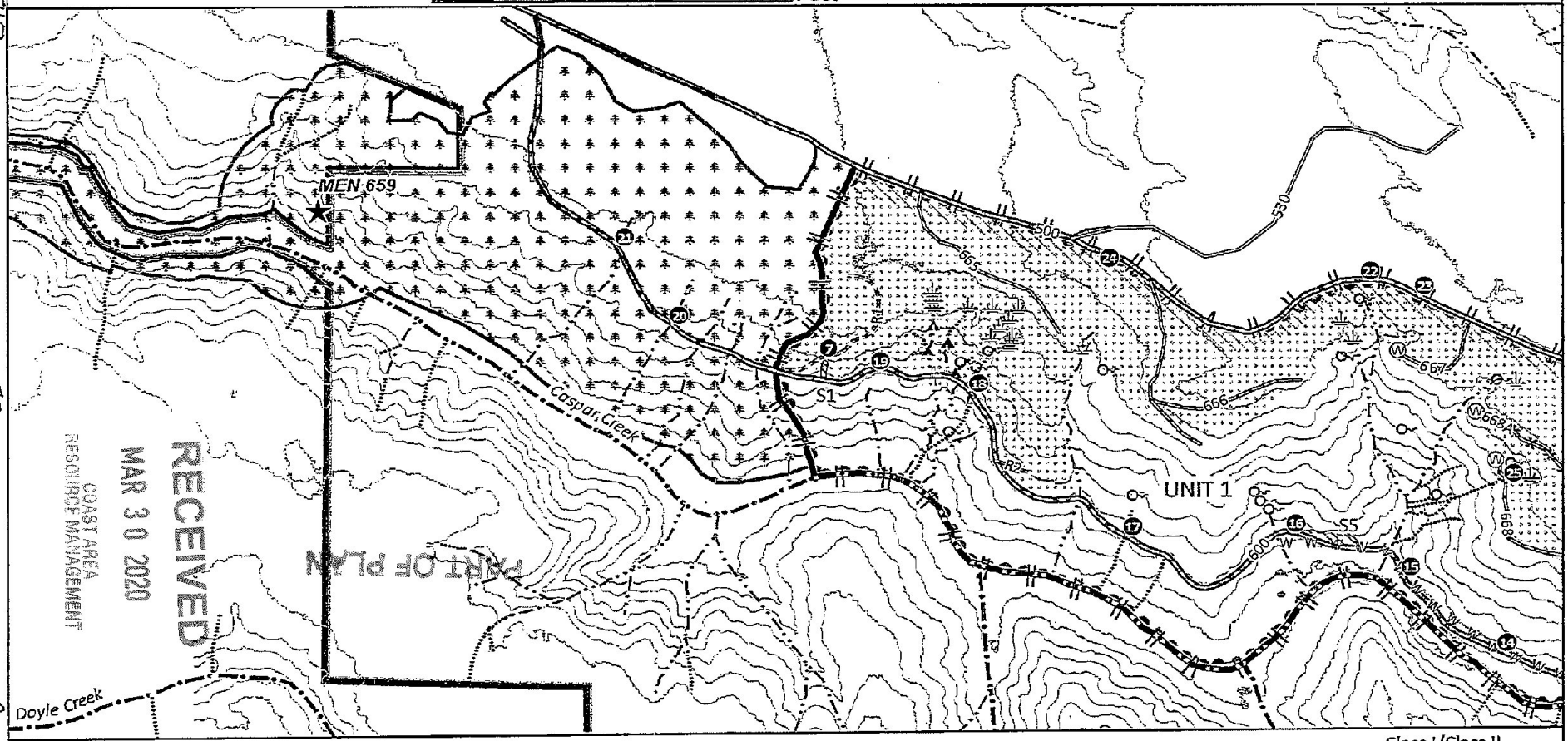
Contour Interval = 40'
1 inch = 750 feet

0 300 600 1,200 1,800 Feet

All Tractor Ground in Unit 1 and 3 is Group Selection. Single Tree Selection everywhere else

JACKSON DEMONSTRATION STATE FOREST

3/27/2020 TN



Ⓦ Existing WLPZ Landing
Map Point
WDF Water Drafting Site
--- Trail
S# Unstable Area
R# Road
Shaded Fuel Break

Road Classification
(permanent and seasonal roads considered "public")
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Proposed Temporary Road
x x x Proposed Road Abandonment
w w WLPZ Road

Watercourse Classification
Class I
(salmonid spawning & rearing habitat)
Class II-S
Class III
Spring
Wet Area
Pond

NSO Core Area
MEN 659 Activity Center
THP Boundary
JDSF Property Line
Tractor Yarding/Cable Option
(all other THP areas cable yarding)

Class I/Class II Transition
Class II/Class III Transition
Unit Boundaries
Proposed Temporary Road - Special Instructions (MP28)
No Cut Area

Caspar 500 THP
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Section 11

Caspar 500 THP

Caspar 500 THP

Operations Map Page 2 of 4

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

USGS 7.5 min Quadrangle:

Mendocino and Mathison Peak

Contour Interval = 40'

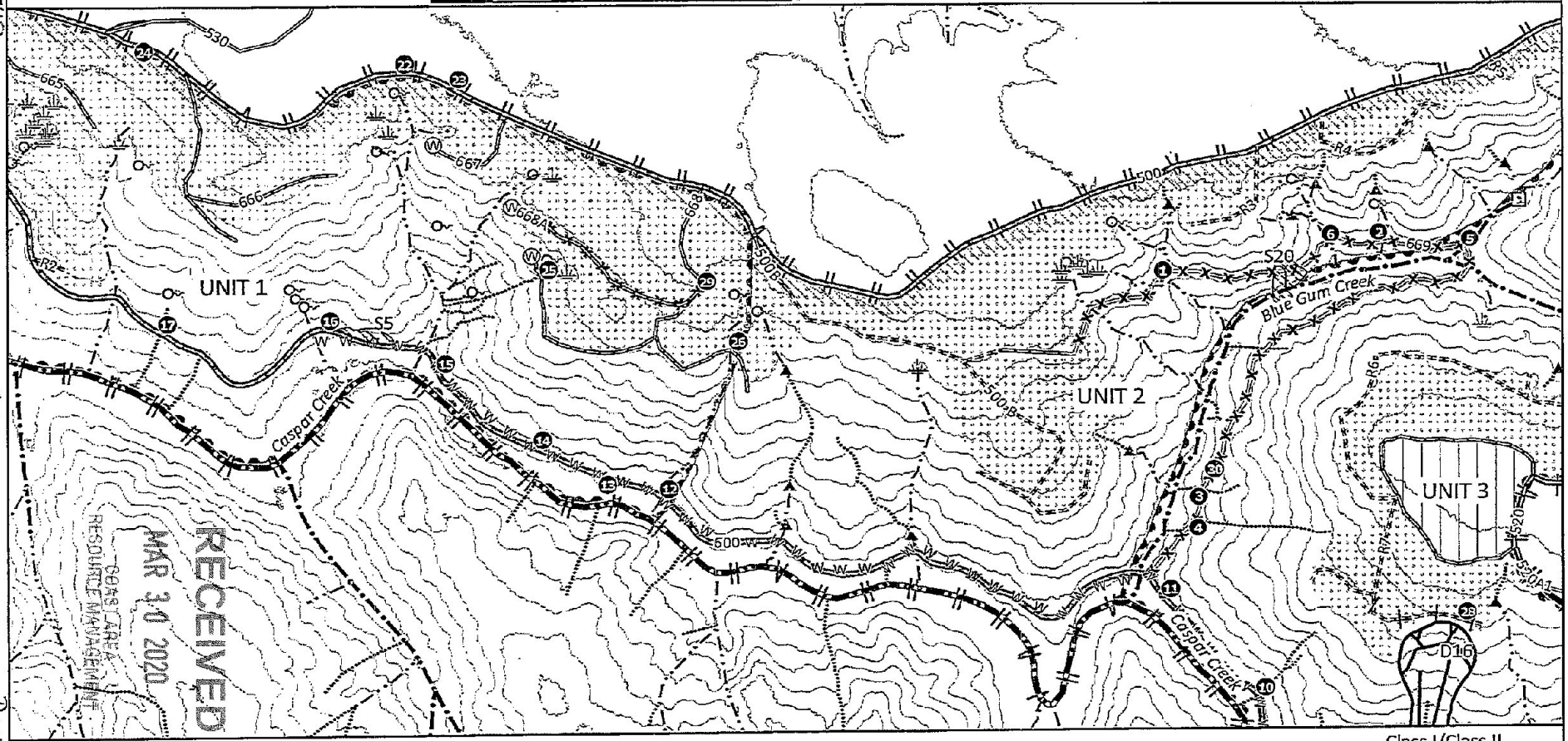
1 inch = 750 feet

0 300 600 1,200 1,800 Feet

All Tractor Ground in Unit 1 and 3 is Group Selection. Single Tree Selection everywhere else

JACKSON DEMONSTRATION STATE FOREST

3/27/2020 TN



Existing WLPZ Landing

Map Point

Water Drafting Site

Trail

Unstable Area

Road

Shaded Fuel Break

Road Classification
(permanent and seasonal roads considered "public")

Existing Permanent Road

Existing Seasonal Road

Existing Temporary Road

Proposed Temporary Road

x x x Proposed Road Abandonment

w w WLPZ Road

Watercourse Classification

Class I
(salmonid spawning & rearing habitat)

Class II-S

Class III

Spring

Wet Area

Pond

NSO Core Area

MEN 659 Activity Center

THP Boundary

JDSF Property Line

Tractor Yarding/Cable Option
(all other THP areas cable yarding)

Class I/Class II Transition

Class II/Class III Transition

Unit Boundaries

Proposed Temporary Road - Special Instructions (MP28)

No Cut Area

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Caspar 500 THP

Operations Map Page 3 of 4

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

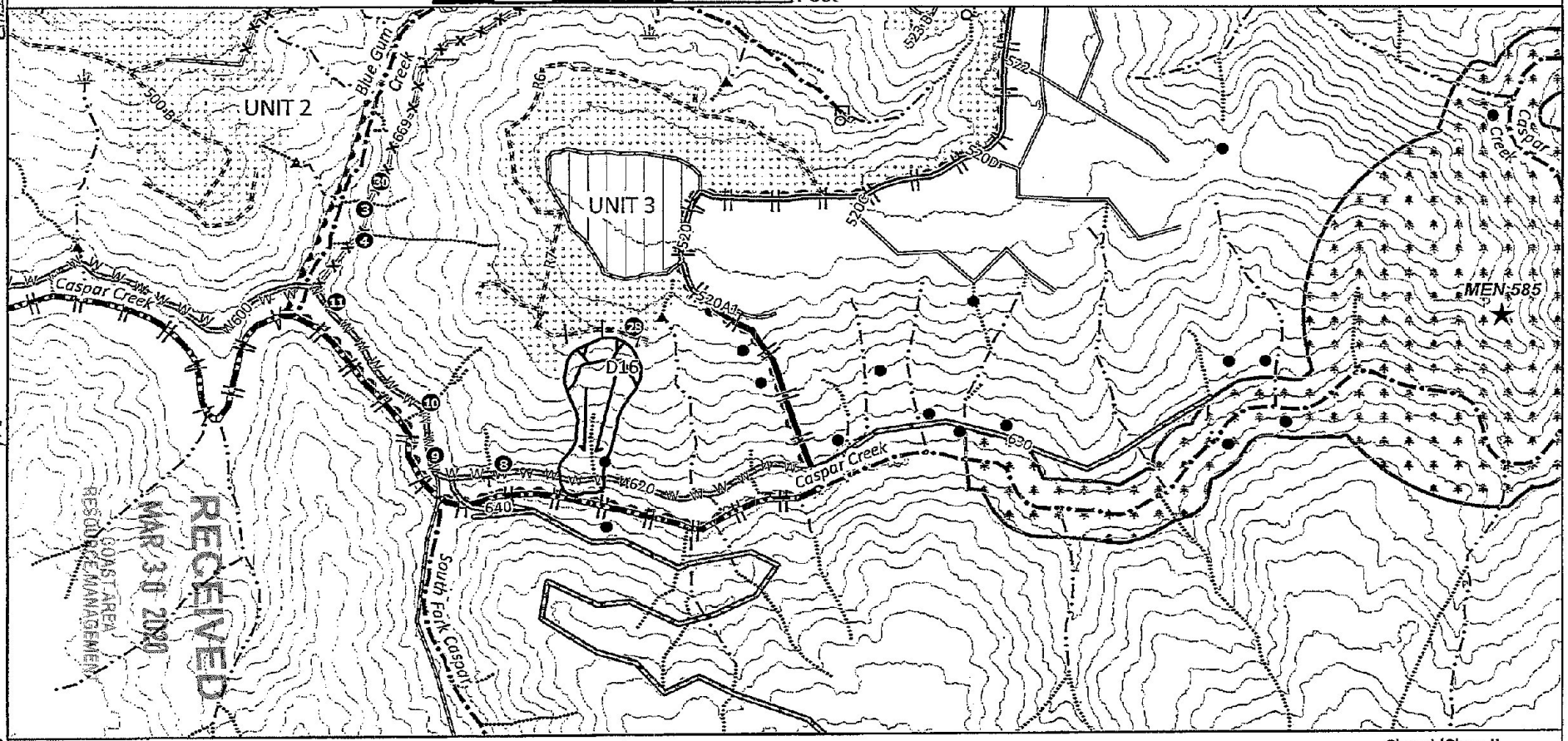
Contour Interval = 40'
1 inch = 750 feet

0 300 600 1,200 1,800 Feet

All Tractor Ground in Unit 1 and 3 is Group Selection. Single Tree Selection everywhere else

JACKSON DEMONSTRATION STATE FOREST

3/27/2020 TN



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Road Classification
(permanent and seasonal roads considered "public")

- Existing Permanent Road
- Existing Seasonal Road
- Existing Temporary Road
- Proposed Temporary Road
- x x x Proposed Road Abandonment
- w w WLPZ Road

Watercourse Classification

- Class I (salmonid spawning & rearing habitat)
- Class II-S
- Class III
- Spring
- Wet Area
- Pond

- Ⓦ Existing WLPZ Landing
- # Map Point
- WDP Water Drafting Site
- Trail
- S# Unstable Area
- R# Road
- Shaded Fuel Break
- NSO Core Area
- ★ MEN 659 Activity Center
- THP Boundary
- JDSF Property Line
- Tractor Yarding/Cable Option (all other THP areas cable yarding)
- Class I/Class II Transition
- ▲ Class II/Class III Transition
- Unit Boundaries
- Proposed Temporary Road - Special Instructions (MP28)
- No Cut Area

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Caspar 500 THP 84 Revised 3/30/2020 Section 11

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Caspar 500 THP

Operations Map Page 4 of 4

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

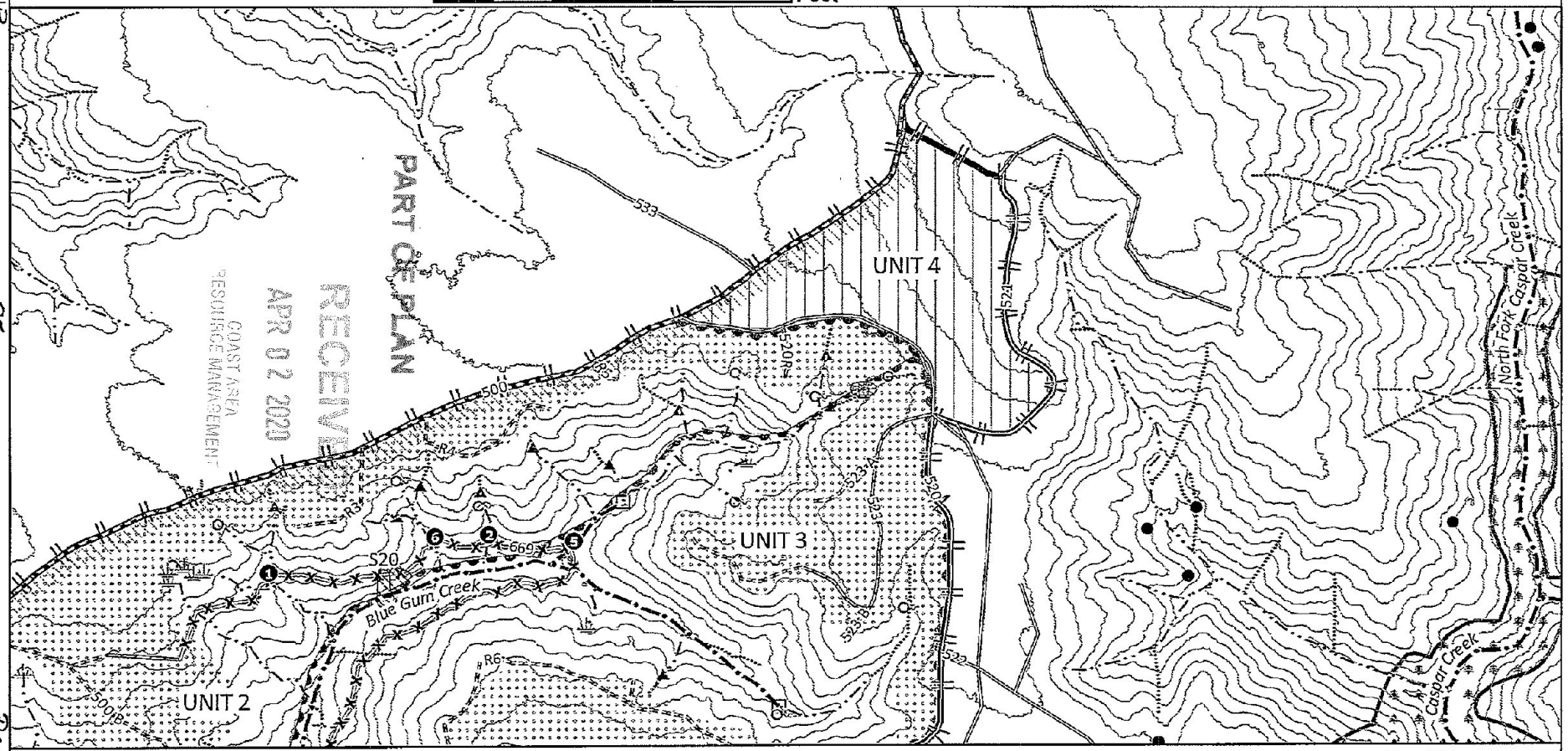
Contour Interval = 40'
1 inch = 750 feet

0 300 600 1,200 1,800 Feet

All Tractor Ground in Unit 1 and 3 is Group Selection. Single Tree Selection everywhere else

JACKSON DEMONSTRATION STATE FOREST

4/2/2020 TN



Road Classification
(permanent and seasonal roads considered "public")

- Existing Permanent Road
- Existing Seasonal Road
- Existing Temporary Road
- Proposed Temporary Road
- x x x Proposed Road Abandonment
- w w WLPZ Road

Watercourse Classification

- Class I (salmonid spawning & rearing habitat)
- Class II-S
- Class III
- Spring
- Wet Area
- Pond

- Existing WLPZ Landing
- Map Point
- Water Drafting Site
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- S# Unstable Area
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- THP Boundary
- JDSF Property Line
- Tractor Yarding/Cable Option (all other THP areas cable yarding)
- Class I/Class II Transition
- Class II/Class III Transition
- Unit Boundaries
- Proposed Temporary Road - Special Instructions (MP28)
- No Cut Area

Revised 4/2/2020 Section II

NOTIFICATION INFORMATION LIST PURSUANT TO FISH AND GAME CODE SECTION 1611

1. Basic data

a.

Applicant:	**Jackson Demonstration State Forest** **802 North Main Street / Fort Bragg, CA 95437** **Business: (707) 964-5674 Fax: (707) 964-0941**
Operator:	**Unknown at this time**
Contractor:	**Unknown at this time**
Contact Person:	**Jason Serna** **802 North Main Street / Fort Bragg, CA 95437** **(707) 964-5674**
Property Owner:	**Jackson Demonstration State Forest**

b. The name of each lake and the name and watercourse classification of each stream the lake or streambed alteration activities will affect, including the nearest downstream watercourse or water body.
The THP includes unnamed Class II and Class III tributaries to Caspar Creek and Blue Gum Creek. Caspar Creek is the THP's southern boundary. Watercourse classifications for each encroachment are included in the table below, Item 1.c

c. Road sites; township, range and section numbers; watercourse classification; present condition; proposed work of each lake and stream encroachment; and project description measures.
The project is located in Sections 3, 5, 8, 9, and 10; T17N; R17W; MDB&M.

Map Points	Road	Watercourse Classification	Encroachment Type
MP 1	669	Class II	Replace bridge with rocked ford
MP 2	669	Class II	Replace bridge with rocked ford
MP 3	669	Class III	Fix diversion, Install rocked ford
MP 4	669	Class III	Remove culvert replace with rocked ford
MP 5	669	Class I	Replace bridge
MP 6	669	Class II	Replace bridge with rocked ford
MP 8	620	Class I and II	Install Ditch Relief Culvert
MP 9	600	Class I	Install Ditch Relief Culvert
MP 10	600	Class I	Install rip rap as energy dissipater
MP 11	600	Class I (x2)	Install Ditch Relief Culvert
MP 12	600	Class I and II	Pull back perch fill, install rip rap
MP 15	600	Class II	Install Ditch Relief Culvert
MP 18 and 20	600	Class II	Fix diversion, Install culvert
MP 25	668	Class III	Install temporary culvert, remove before completion
MP 26	668	Class II	Remove culvert before completion
MP 27	669	Class II	Fix diversion, Install rocked rolling dip
WD 17	600	Class II	Water drafting from existing tank

d. A single map or diagram clearly showing all of the following:
   i. All lake and stream encroachments, with a number or other appropriate identifying label.
   ii. All roads, with a number or other appropriate identifying label
   iii. All watercourse classifications (i.e., Class I, II, or III).
   iv. Access from a named public road.
   v. A north arrow and scale.
The Timber Harvest Map illustrates the location of Map Points.

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e. Description of the encroachment sites, existing and proposed culvert diameters, area to be disturbed, proposed conditions upon completion, estimated volumes to be removed and/or added to crossing, description of fill materials and disturbed vegetation.
See Item 24 of this THP (page 40-46) for site descriptions and culvert sizing. Section II Attachments for treatment diagrams for MP 3, 4, and 5.

f. A description of the fish and wildlife and botanical resources the work could adversely affect, including riparian resources and special status species (i.e., species listed under the California Endangered Species Act ("CESA") and/or the federal Endangered Species Act ("ESA"), species fully protected under state law, and/or species of special concern). If the work could adversely affect any listed species, the applicant should indicate whether consultation under CESA or ESA has commenced and if so, the current status of the consultation. Applicant should also provide the Biological Opinion, as applicable.
Coho, chinook, and steelhead are present within the Class I watercourse on the projects sites. Foothill yellow-legged frogs may be present within the project areas. See Section II, Item 32; Section IV, Cumulative Impacts Assessment in Section V attachments.

g. Indicate if the work takes place in, adjacent to, or near a river that has been designated as "wild and scenic" under state or federal law.
The project does not take place in, adjacent to, or near a river that has been designated as "wild and scenic" under state or federal law.

2. Information about each lake and stream encroachment, including the following:

a. Construction plans, including specific details, cross sections, and dimensions.
See Item 24 Table in Section II and Work Order descriptions in Section II attachments.

b. If water will be present and diversion of flow around the work site is necessary, the volume of water to be diverted and the method of diversion.
If water is present at any site when work is proposed, water will be diverted around or through the site with pipes or a portable pump and returned to the channel downstream of the work site.

c. If water drafting is proposed, provide drafting site information (i.e. estimated volume, drafting rate, timing, etc.). Indicate if the activity will be done pursuant to a water right application or permit.
Water drafting is proposed within an existing Class II watercourse that has been tapped and diverts water to a tank. The drafting tank was set up under Orchard THP 1-13-007MEN. The location of the drafting site is illustrated on the Operations Map of this THP. A 1600 permit for drafting site WD17 shall be amended into the plan prior to drafting from this site.

Water drafting activities are proposed from April 1 to November 15th. It is expected that two to three loads of water (5,000 to 10,000 gallons) would be needed for this THP each weed active operations are occurring under this plan. The total estimated volume of water to be drafted for this THP is expected to be approximately 620,000 gallons.

d. The materials (e.g., soil, sand, gravel, ¼- to ½-ton rip-rap, large wood, etc.) and volumes that will be used for and/or removed from the lake or stream encroachment, the dimensions of the area to be excavated and the dimensions of the area to be filled.
Slash, grass seed and straw mulch will be used as needed to minimize erosion.

e. Specify the type of equipment to be used.
Hand tools, Tractors, backhoes, excavators, graders, bulldozers, or dump trucks may be used for crossing removals. A crane and loader may be used for the bridge superstructure replacement.

f. Proposed work periods including the date or condition requiring temporary crossing removal.
Work operations for crossing removal are proposed outside of the Winter Period (November 15 to April 1) when soils are not saturated.

g. The species composition and density of vegetation to be removed or disturbed as a result of lake or streambed alteration activities. Indicate if sensitive plant surveys have been completed within areas which will be affected by lake or stream encroachments. Include any plans to restore the affected riparian or hydrophytic vegetation.
Grasses, forbs, and a few small conifers and hardwoods will be removed at the crossing locations. The site was or will be surveyed for rare plants prior to operations. A botanical survey will start in Spring of 2020 and the report shall be amended in to Section V. A second survey will be amended into the plan prior to the start of operations.

h. Mode of impact to fish, wildlife and botanical resources (i.e., changes in sediment and/or flow delivery rates, dewatered or impounded watercourses, destabilized stream banks, erosion causing sediment deposition, changes to or elimination of riparian vegetation, reduced canopy effects on microclimate and/or water temperature, etc.)
The restricted timing of the project coupled with mitigations associated with this permit will ensure that no significant impacts will occur to fish and wildlife species. Other potential impacts have been mitigated by the Forest Practice Rules and other provisions proposed in the THP. See Section II, Item 32; Section IV, Cumulative Impacts Assessment.

i. Measures included to protect fish, wildlife and botanical resources (i.e., avoidance measures, sediment control measures, construction time periods, methods to divert water around or away from the work site, special measures necessary to protect special-status species, a post-work action plan including measures to minimize soil erosion, revegetation, etc.).
See Items 18, 24, 26, 32 and 38 in Section II of the THP for details and special measures needed for protection of resources during encroachment work, and see Project Description Measures, below.

j. Calculations or other data used to size culverts.

Location: *Caspar 500 THP*

Rational Method for 100-year flood flow (A < 200 acres)

	** $T_c = 1.2 \times A^{0.5}$			$Q_{100} = CIA$				.67 hwd projecting inlet
Crossing	Area (km2) A	Elevation difference (ft) H	Concentration time (min) Tc	Runoff coefficient C	100-year Return-Period Precipitation (in/hr) I *	Area (acres) A	100-yr flood flow (cfs) Q_{100}	Culvert Size for Q100 inches
Map Point 18	0.016	120	9	0.35	4.06	4.0	*5.7*	24
Map Point 20	0.020	60	10	0.35	4.06	5.0	*7.1*	36

Use 100-yr precipitation of duration similar to Tc or for 10 min, whichever is larger; convert to in/hr for input as "I"
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca

Bridge Flow Capacity (cubic feet per second)

Crossing	Sectional Area (A)	Stream Gradient (%)	Wetted Perimeter (ft)	(cfs)
MP 5	14.2	2	44.8	28

Average Channel Water Velocity

Crossing	Wetted Cross Sectional Area (A) (sq.ft)	Channel Slope (S) (ft/ft)	Wetted Perimeter (WP) (ft)	Manning's Roughness coeff. (n)	Average Flow Velocity (v) (ft/s)
MP 5	14.2	0.08	9.9	0.06	9

Bridge Hydraulic Capacity (cfs)

Crossing	Average Velocity (v) (cfs)	Wetted Cross Section (A)	Flow Capacity (Q) (cfs)
MP 5	9	14.2	127

Capacity/100-Flood Flow (cfs/cfs)
0.1

Wetted Cross Section Area - 100 Year Flood Flow

Crossing	Average Velocity (v) (cfs)	Wetted Cross Section (A)	100-yr Flood Flow (cfs)
MP 5	9	9.3	83.0

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Rational Method for 100-year flood flow (A < 200 acres)

Crossing	** $T_c = 1.2 \times A^{0.5}$ Area (km2) A	Elevation difference (ft) H	Concentration time (min) Tc	$Q_{100} = CIA$ Runoff coefficient C	100-year Return-Period Precipitation (in/hr) I *	Area (acres) A	100-yr flood flow (cfs) Q_{100}	.67 hw/d projecting inlet Culvert Size for Q100 inches
MP 5	0.352		43	0.3	3.18	87	***83.0***	*NA*

* *Use 100-yr precipitation of duration similar to Tc or for 10 min, whichever is larger; convert to in/hr for input as "I"*
http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca
** *BCMOE method*

See Section III, Item 26(g) of this THP for more information concerning the sizing of the culverts and MP 5 100-year flow calculations. See the Section V for Class I Stream Cross Section & 100-year flood Flow pre- and post- work.

k. For bridge installations: indicate if the abutments or road approaches will encroach into the floodplain or channel; provide the calculations or data used to determine bridge height and flow capacity; describe the type of abutments and scour protections with dimensions; provide any engineering reports or plans; etc.
See Section II Attachments for engineering design and calculations. Removal of the current bridge should not impact the stream channel.

l. Describe any torrent, debris or landslide conditions at each encroachment.
There are no torrents, debris or landslides at any of the encroachment sites.

WORK ORDER DESCRIPTION MEASURES

PERMANENT CULVERT CROSSINGS

Culvert shall be placed at stream gradient, or have downspouts, or have energy dissipaters at outfall.

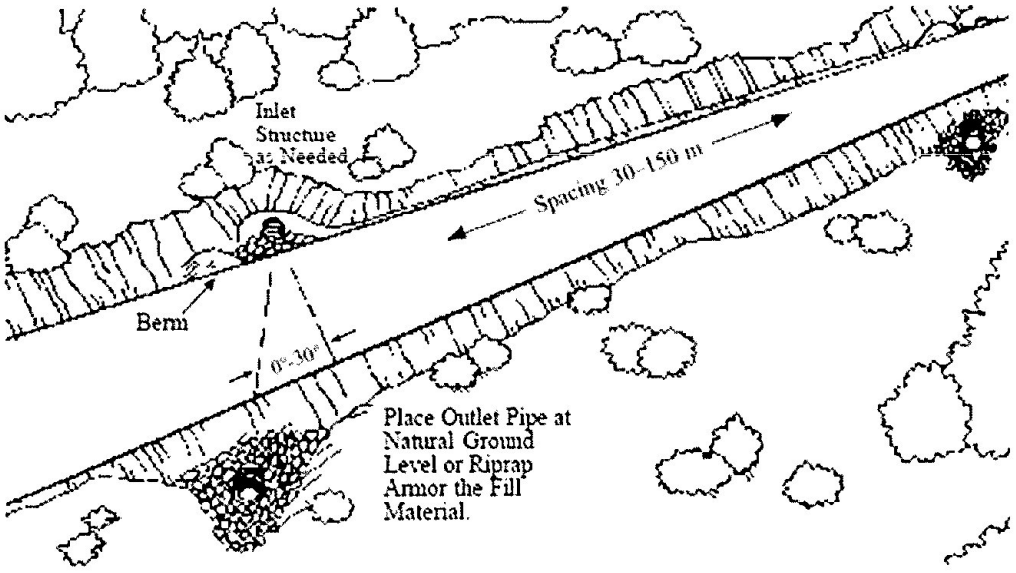
- If downspouts are used they shall be secured to the culvert outlet and shall be secure on fill slopes. If half round downspouts are used they shall be a size larger than the culvert.
- Culverts shall be long enough so that roadfill does not extend or slough past the culvert ends.
- Inlet of culverts and associate fill shall be protected with appropriate measures that extend at least as high as the top of the culvert.
- Outlet of culvert shall be riprapped if roadfill sloughing into channel can occur.
- Where debris loads could endanger the crossing a trash/debris catchment structure shall be constructed upstream of the culvert inlet.
- Bank and channel armoring may be utilized, where appropriate, to provide channel and bank stabilization.
- If operations require moving equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing.
- During construction in flowing water, which can transport sediment downstream, the flow shall be diverted around the work area by pipe, pumping, temporary diversion channel or other suitable means. When any dam or artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain fish life below the dam. Equipment may be operated in the channel of flowing live streams only as necessary to construct the described construction.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. The disturbed portion of any stream channel shall be restored to as near their original condition as possible. Restoration shall include the mulching of stripped or exposed dirt areas at crossing sites prior to the end of the work period.
- Structures and associated materials not designed to withstand high seasonal flow shall be removed to areas above the high water mark before such flows occur.
- No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washing, oil or petroleum products, or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream.

For all culvert crossings where a rock apron is proposed as an energy dissipater, the following standards will apply:

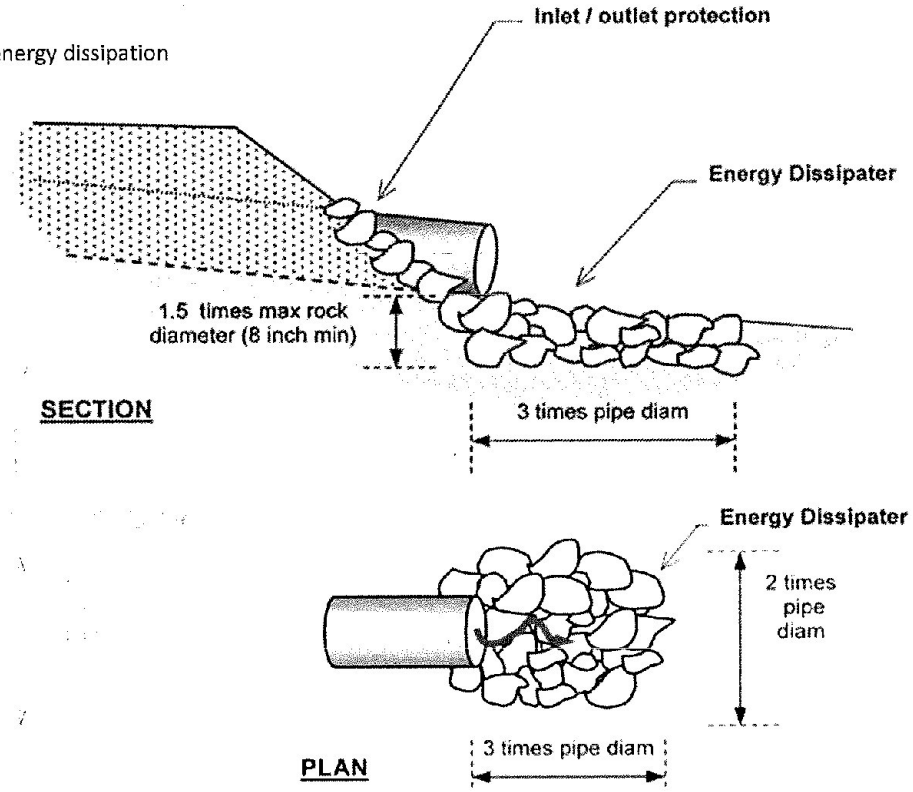
The rock apron will:

- be composed of cobble and/or riprap
- have a minimum thickness equal to about 2 times the median stone size;
- be constructed in a keyway excavated into the channel bottom;
- extend across the full width of the channel and up the channel banks to an elevation above the anticipated high-water level; and
- Extend downslope from the culvert outlet to either below the toe of the fillslope or to a distance about 4 times the culvert diameter (whichever is longer).
- If fabric is used it will be a non-woven geotextile fabric with a minimum grade of 6 oz per square yard intended to provide separation of soil/fill and rock.

*A mix of rock sizes is preferred to allow smaller stones to fill voids between larger stones to limit movement of the underlying soil into and through the rock armor. If a mix of rock sizes in unavailable, then the rock will be placed on top of a layer of geotextile filter fabric.

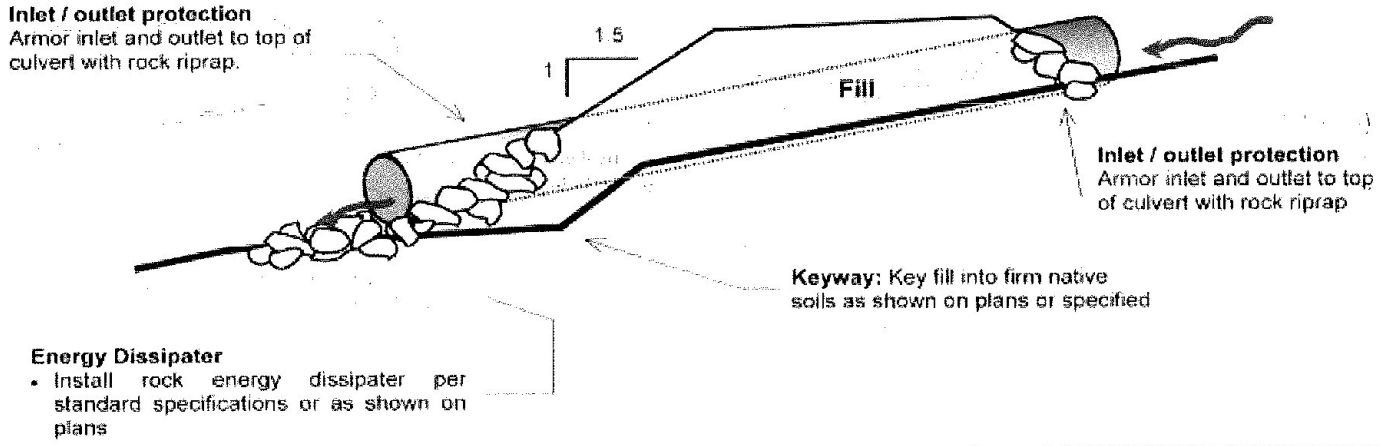


Riprap as outlet energy dissipation

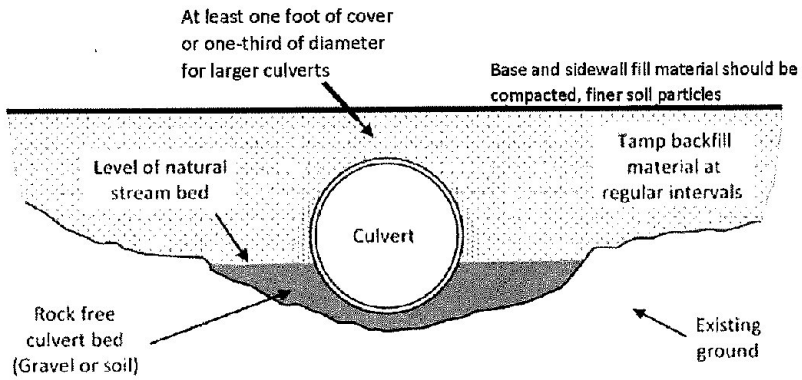


Text and diagrams from Weaver, Weppner, & Hagans, *Handbook for Forest and Ranch Roads*, MCRCD, June 2015, pp. 117 & 188.

Riprap as inlet protection and outlet energy dissipation



Rock-free fill is backfilled over the culvert in layers and compacted under the pipe and around the sidewall. Soil compaction along the haunches (lower corners) of the culvert provided confining strength to the pipe and reduce deformation, especially for non-round culvert shapes.

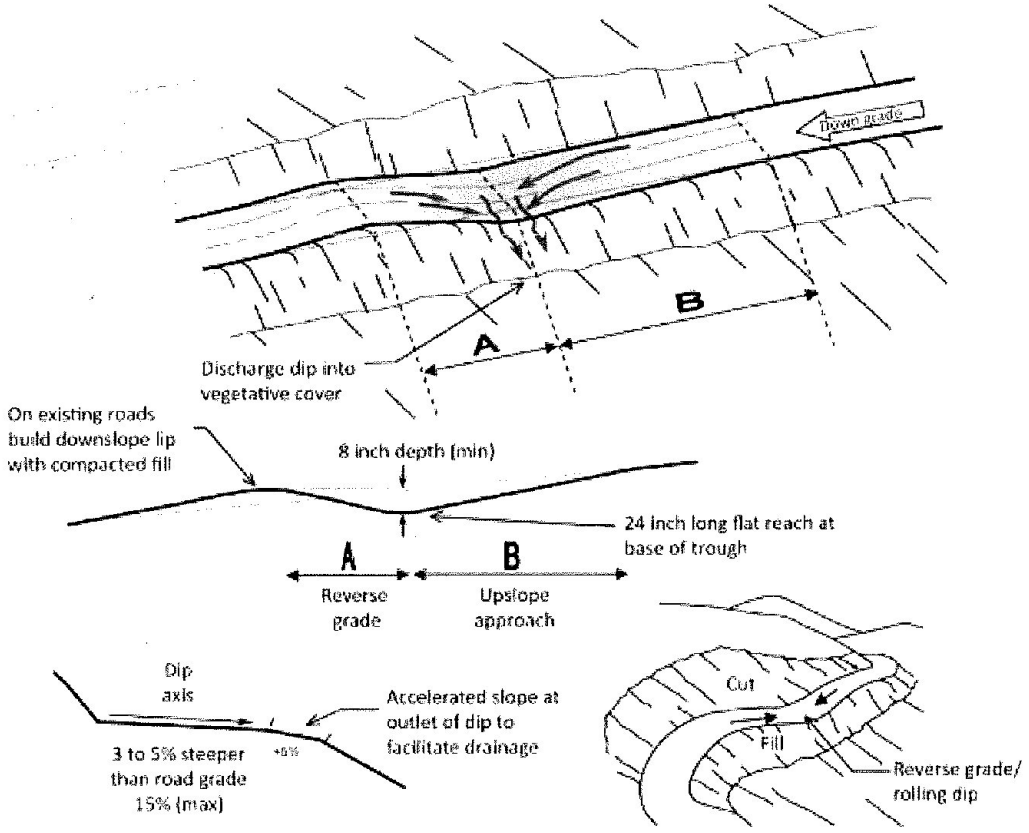


ROLLING DIP

A rolling dip is a smooth shallow ditch or depression that is at least 6" in depth and should be constructed at an angle of 45 to 60 degrees from the centerline of the road (can be nearly perpendicular). The cross grade should be at least 1 percent greater than the grade of the road. Rock riprap or down-drain flumes may be needed to prevent erosion on outsloped roads (see diagrams below).

Dips should be constructed deep enough into the road subgrade so that traffic and subsequent road grading will not obliterate them. Their length and depth should provide the needed drainage, but not be a driving hazard.

ROLLING DIP DIMENSIONS				
Road Grade (%)	**Upslope approach** (distance from up-road start of rolling dip to trough in feet) A	**Reverse Grade** (distance from trough to crest in feet) B	**Depth below average road grade at discharge end of trough** (ft) C	**Depth below average road grade at upslope end of trough** (ft) D
< 6	55	15-20	0.9	0.3
8	65	15-20	1.0	0.2
10	75	15-20	1.1	0.1
12	85	20-25	1.2	0.1
>12	100	20-25	1.3	0.1



Text and diagrams from Weaver, Weppner, & Hagans, *Handbook for Forest and Ranch Roads*, MCRCD, June 2015, pp. 65 & 66.

STREAM CROSSING EXCAVATIONS

On roads that are to be closed (deactivated or abandoned), all stream crossing culverts and fills should be removed. Stream crossing excavations are best performed using an excavator. The original channel should be excavated and exhumed down to the former streambed, with a channel width equal or greater than the natural channel above and below the crossing. Sideslopes should be laid back to a stable angle, typically a 1.5:1 gradient, or less. Spoil can be endhauled off-site or stored on the road bench adjacent the crossing, provided it is placed and stabilized where it will not erode or fail and enter the stream. The bare soils should then be mulched and seeded to minimize erosion until vegetation can protect the surface, and the approaching road segments should be cross-road drained to prevent road runoff from discharging across the freshly excavated channel sideslopes.

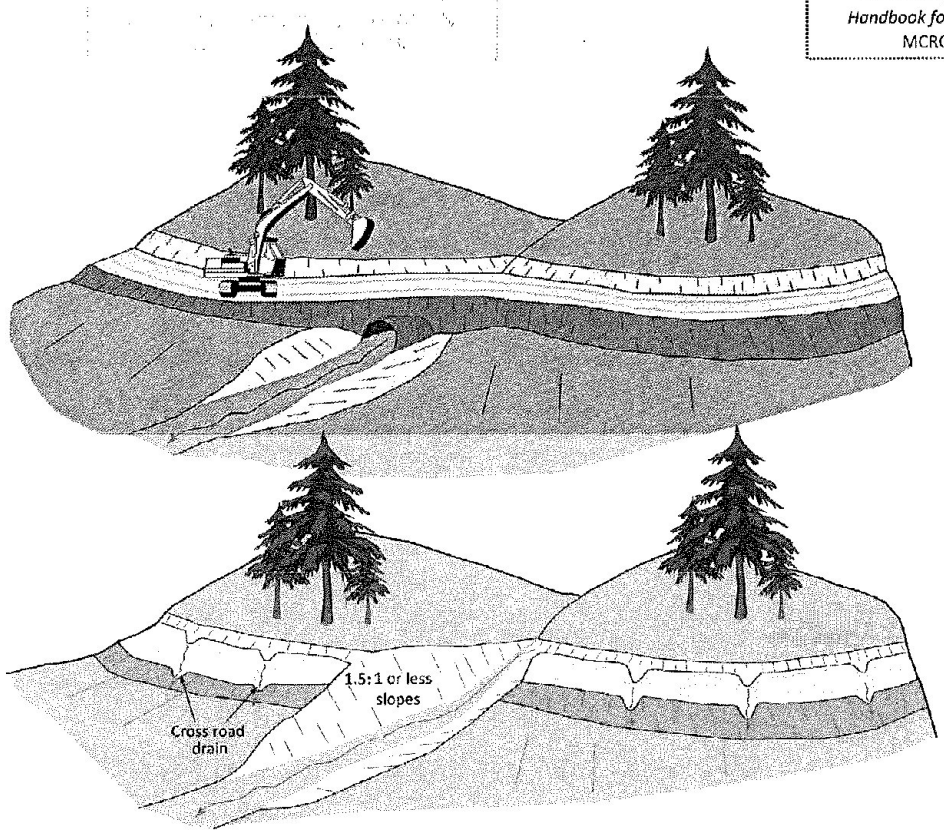
TEMPORARY CROSSING INSTALLATION

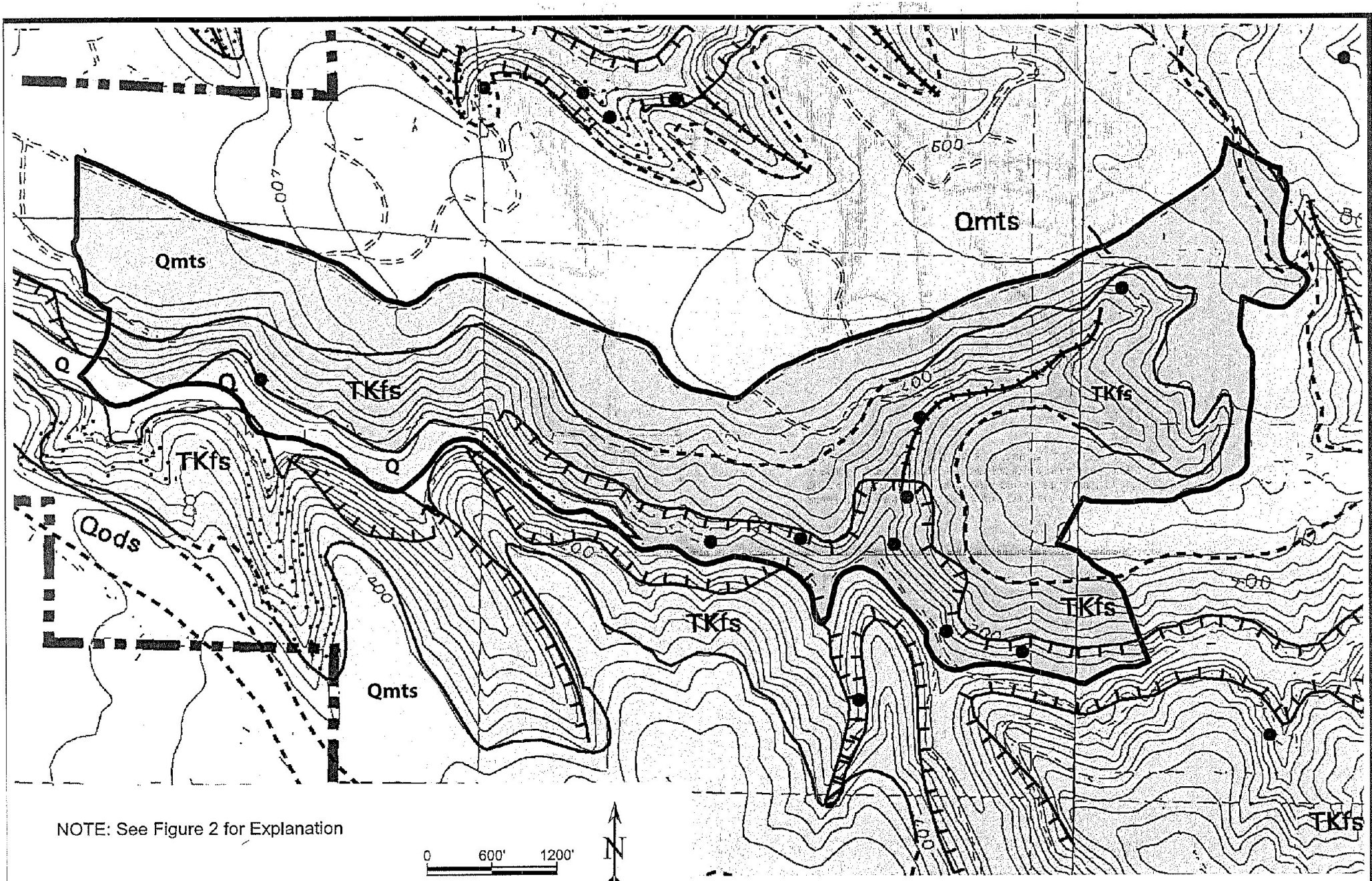
- During construction in flowing water, which can transport sediment downstream, the flow shall be diverted around the work area by an adequate sized pipe (min. 6" diameter) to handle the flow.
- If a "Spittler" type crossing is installed the operator shall place at least a 6-inch straw barrier between the "Spittler" log bundles and the fill. If straw bales are used instead of log bundles, then a straw barrier shall also be placed between the bales and the fill. If fill only is to be installed in the channels, a straw barrier greater than 6 inches in depth shall be placed in the channel below any fill.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.
- No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washing, oil or petroleum products, or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State.

TEMPORARY CROSSING REMOVALS

- Stream crossing excavations are best performed using an excavator.
- Fills shall be excavated to form a channel that is as close as feasible to the natural watercourse grade and orientation, and that is wider than the natural channel as observed upstream and downstream of the logging road watercourse crossing.
- The excavated material and any resulting cut bank shall be no greater than 65 percent (1.5:1, horizontal to vertical) from the outside edge of the constructed channel to prevent slumping, to minimize soil erosion and sediment transport, and to prevent significant sediment discharge.
- Spoils can be endhauled off-site or stored on the road bench adjacent the crossing, provided it is placed and stabilized where it will not erode or fail and enter the stream.
- The bare soils shall be stabilized by seeding, mulching, rock armoring, replanting, or other suitable treatment to prevent soil erosion and significant sediment discharge.
- The approaching road segments shall be cross-road drained (waterbarred) to prevent road runoff from discharging across the freshly excavated channel sideslopes or into the watercourse.
- Crossings shall be removed upon completion of use, prior to the winter period.

Text and diagrams modified from
W. Weaver, E. Weppner, and D. Hagans,
Handbook for Forest, Ranch,& Rural Roads,
MCRCD.January 2014. p. 283.



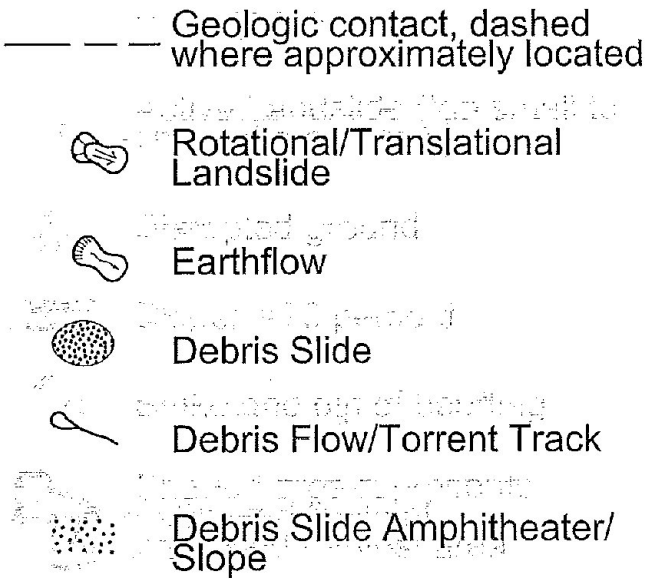


Date: 12/2019 Scale: 1" = 1200'	Regional Geologic Map To Accompany Engineering Geologic Review of South Fork Caspar Timber Harvesting Plan	Figure: 1

Base Map: Modified from Short, W.R., and Spittler, T.E., 2002, Preliminary Map of Geologic and Geomorphic Features Related to Landsliding, Jackson Demonstration State Forest, Mendocino County, California: California Geological Survey, Watershed Mapping Series, Map Set 2, Scale 1:24,000.

Section 11 96 Caspar 500 THP

Explanation



Q	Recent Alluvium
Qods	Older Dunes
Qmts	Marine Terrace Deposits Undifferentiated
TKfs	Franciscan Formation, Coastal Belt

Short, W.R., and Spittler, T.E., 2002, Preliminary Map of Geologic and Geomorphic Features Related to Landsliding, Jackson Demonstration State Forest, Mendocino County, California: California Geological Survey, Watershed Mapping Series, Map Set 2, Scale 1:24,000.

Date: 12/2019	Explanation to Regional Geologic Map To Accompany Engineering Geologic Review of Caspar 500 Timber Harvesting Plan	Figure: 2

Caspar 500
Geology Map

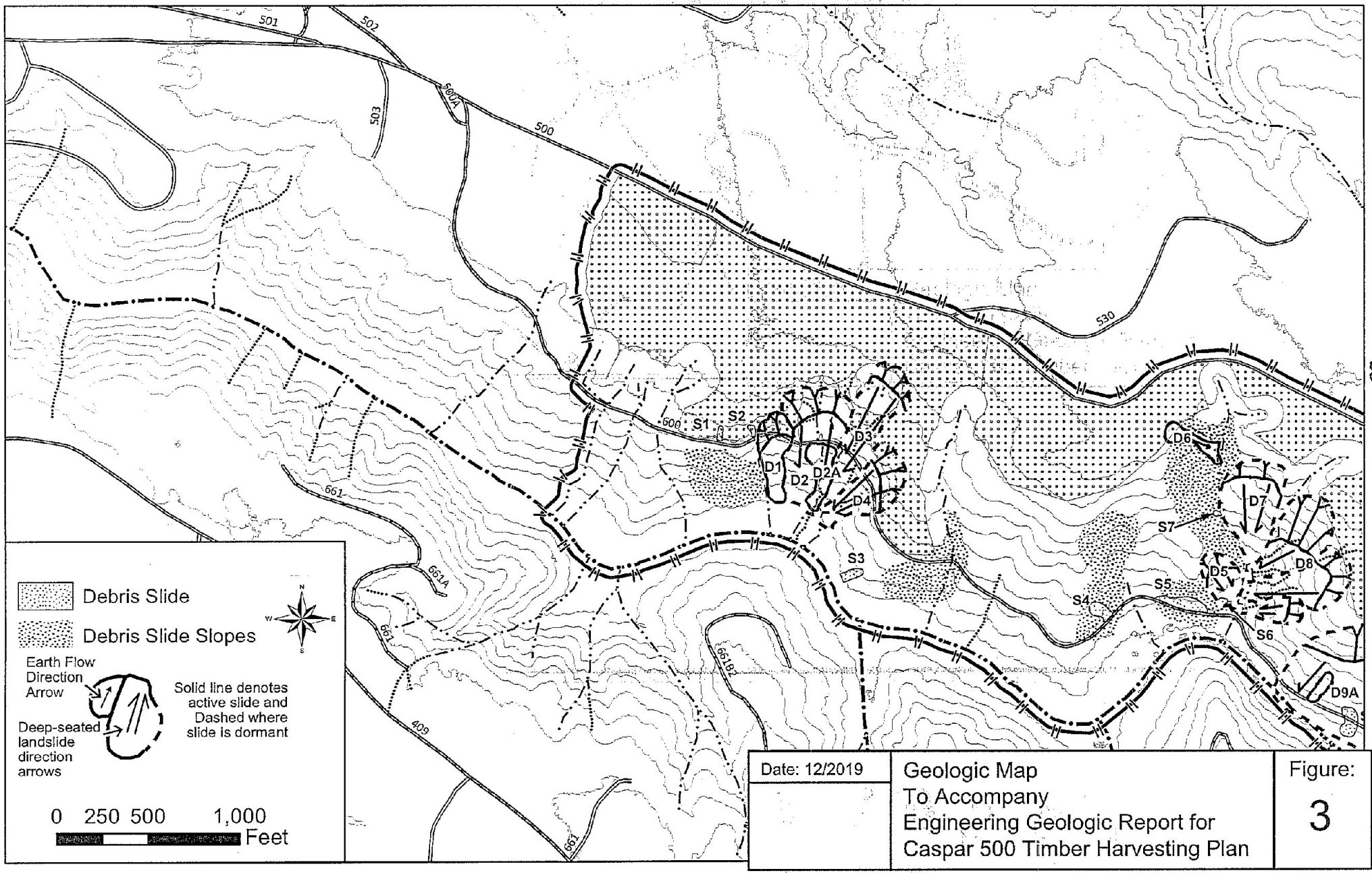
Basemap from JDSF Data
Date: 12/23/2019 P Rowland

Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding
*All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 3

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

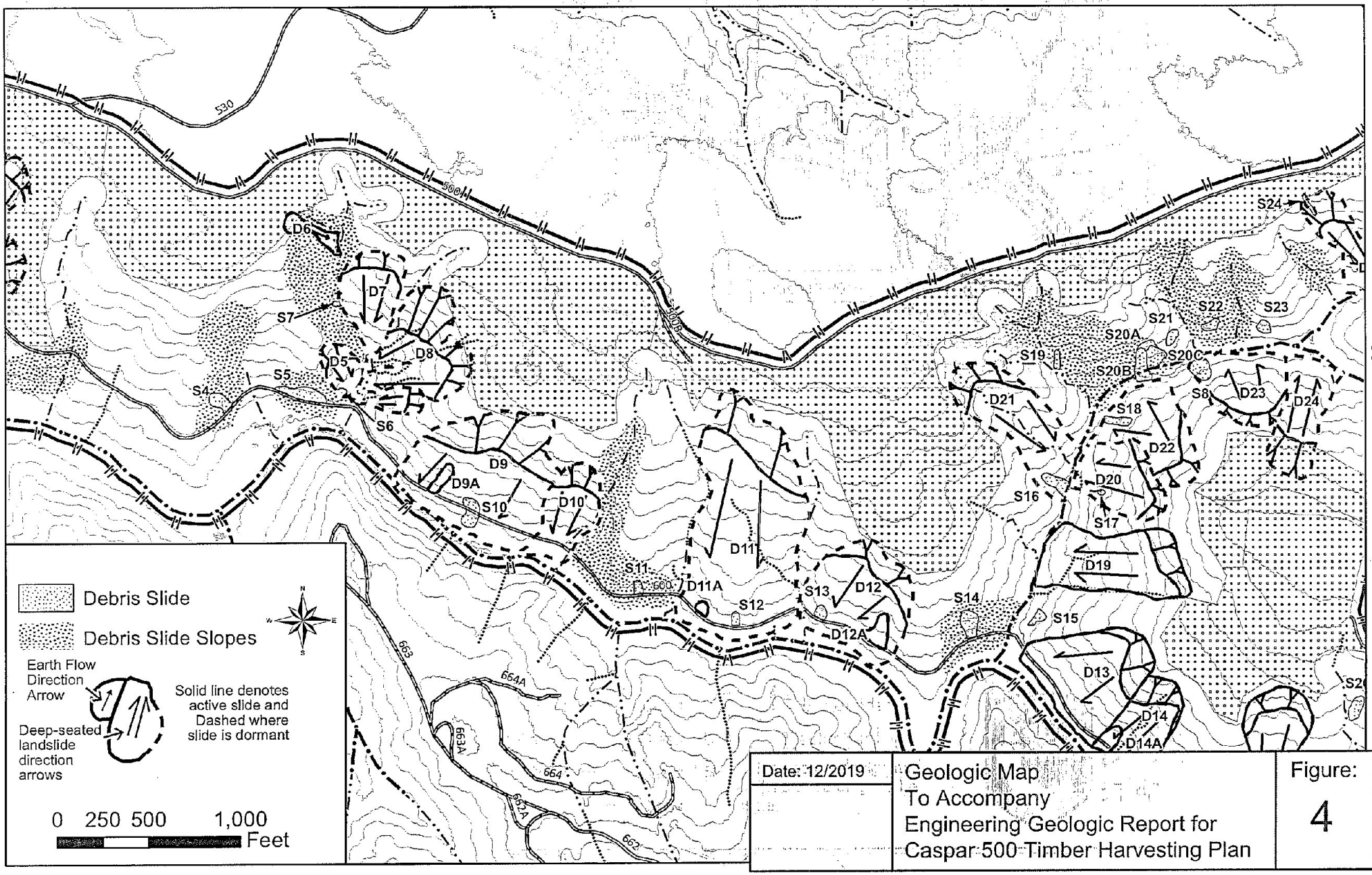
Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding

* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST

Section 11



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 4

Caspar 500 THP

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Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

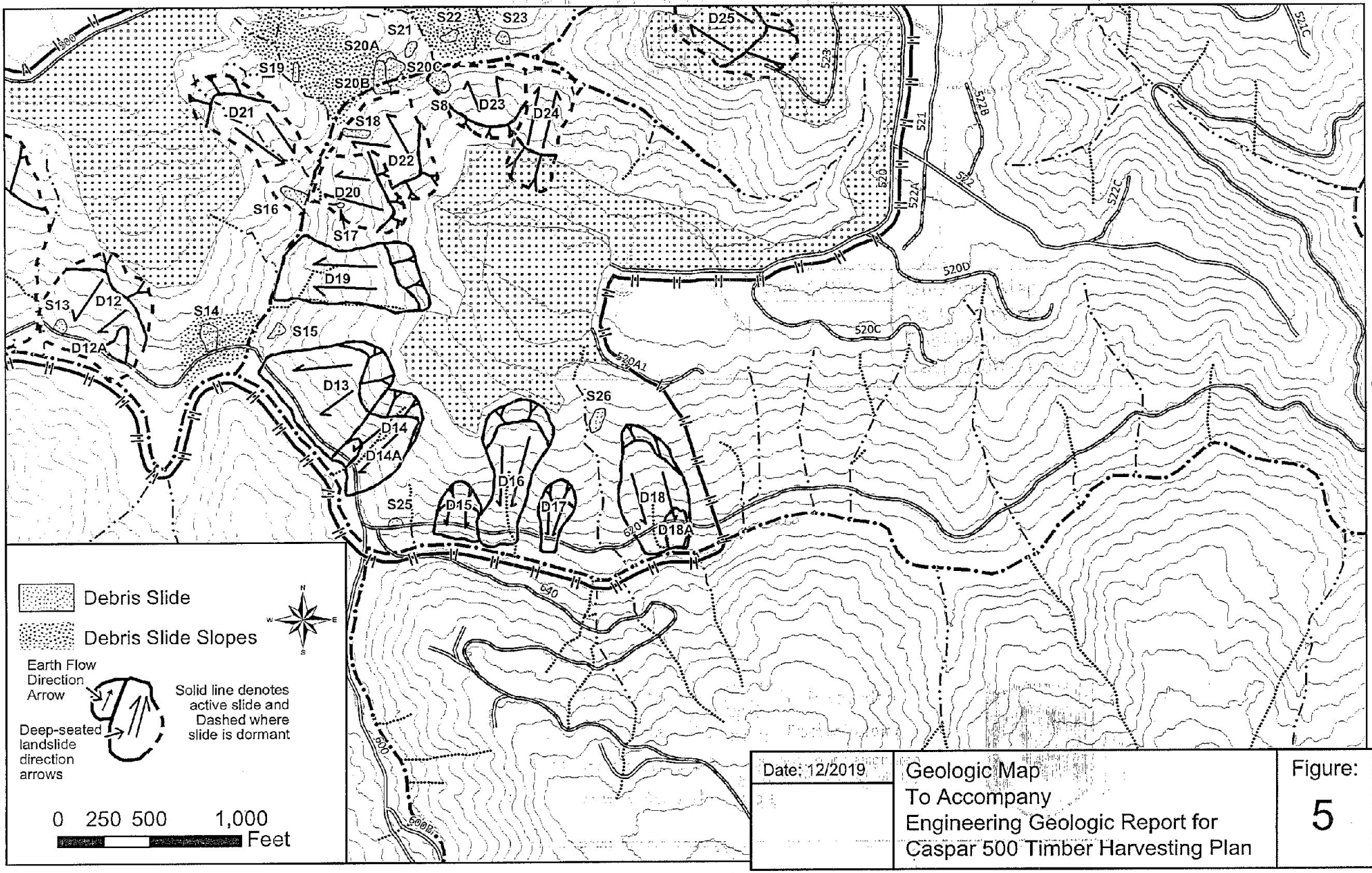
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding
* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST

Section 11



Debris Slide
Debris Slide Slopes

Earth Flow Direction Arrow
Deep-seated landslide direction arrows

Solid line denotes active slide and Dashed where slide is dormant

0 250 500 1,000 Feet

Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 5

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Caspar 500 THP

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

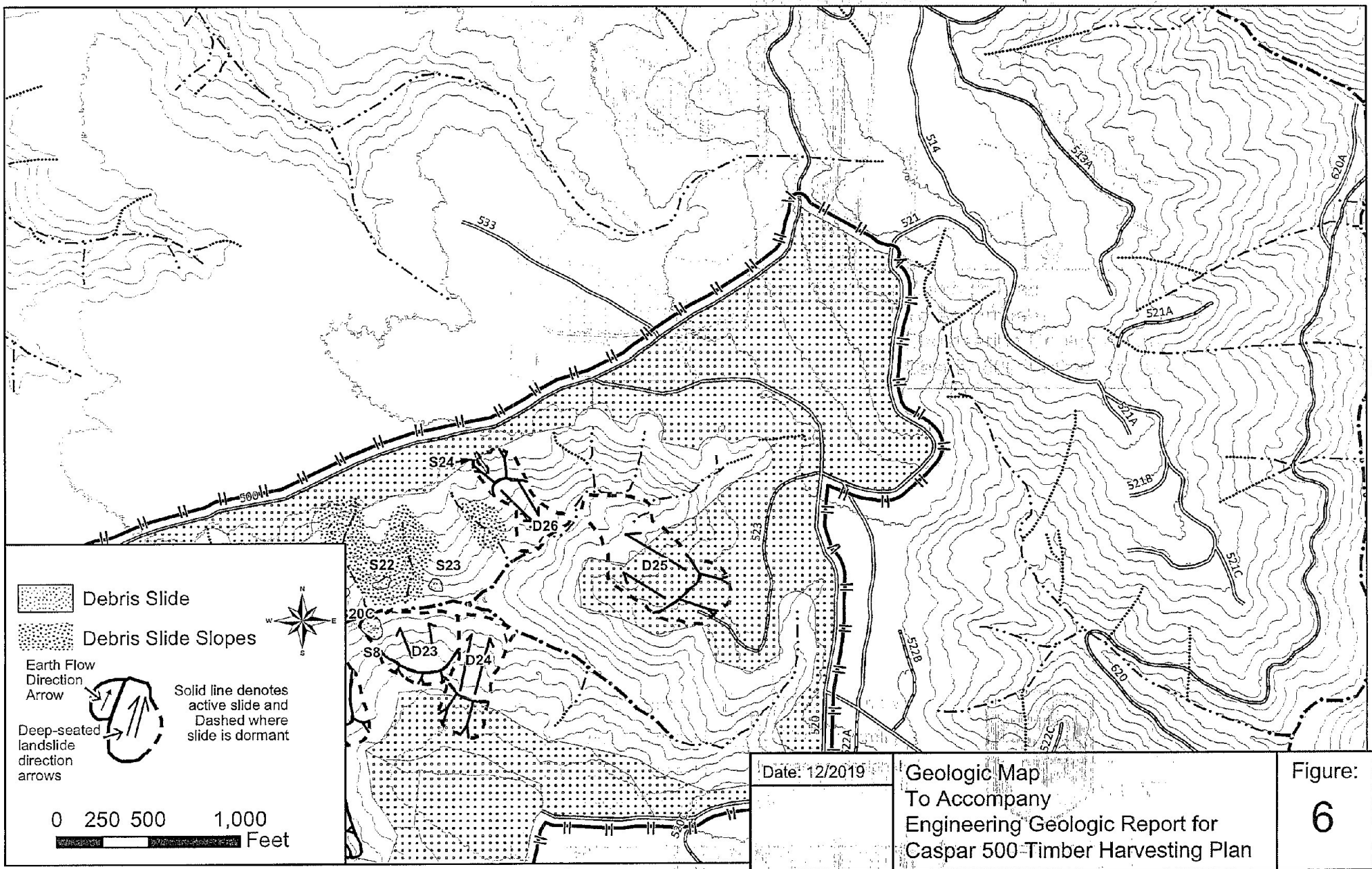
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding

*All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 6

Caspar 500 THP

Appurtenant Roads Map

1 inch = 2,000 feet

0 800 1,600 3,200 4,800 Feet

THP Boundary

JDSF Property Line

Appurtenant Roads

Haul Roads

WLPZ Road

Highway

County

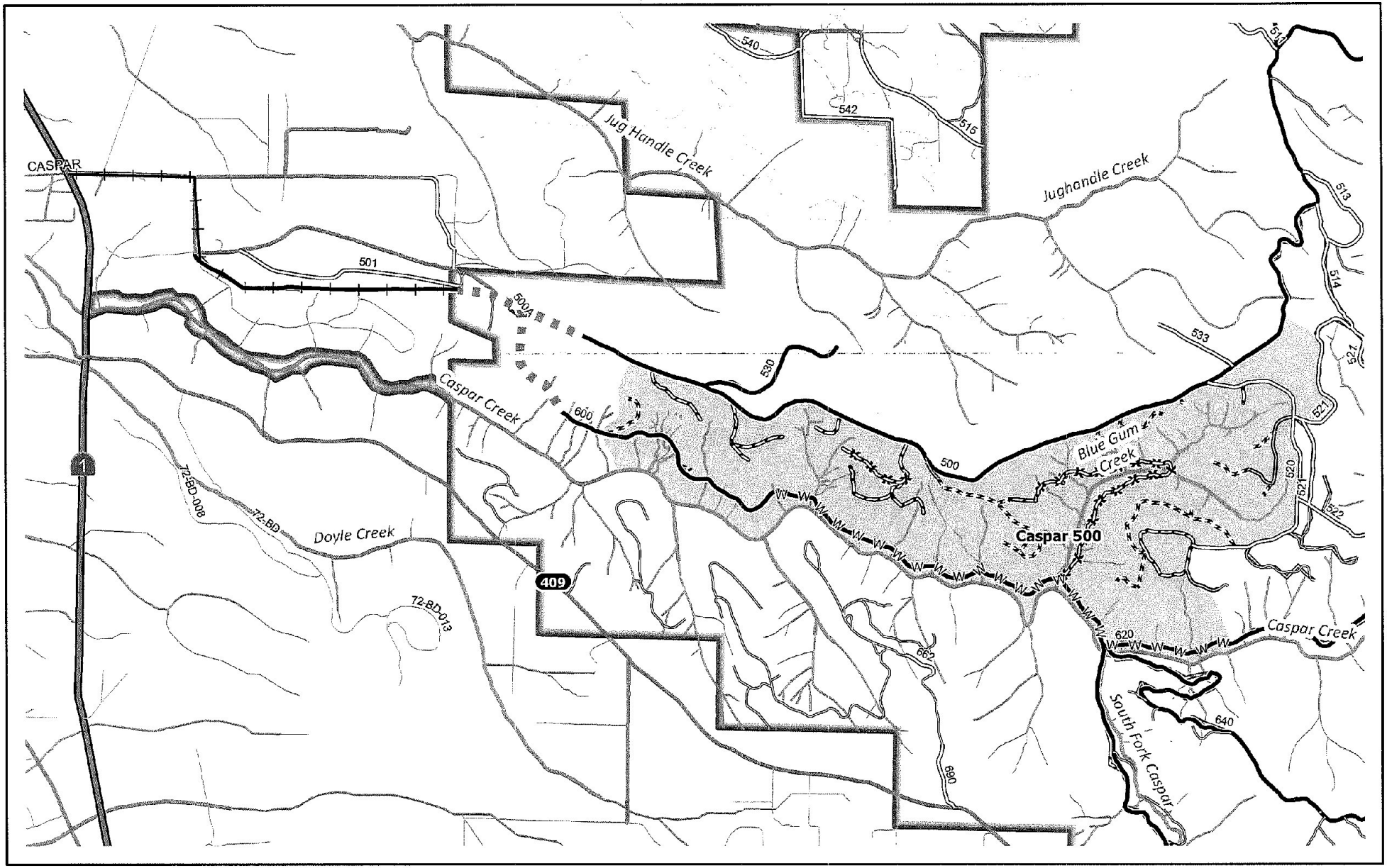
Primary Forest Road

Temporary Road

Proposed Road

JACKSON DEMONSTRATION STATE FOREST

1/28/2020 TN



Section 11

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Caspar 500 THP

Caspar 500 THP

Erosion Hazard Rating and Site Class Map

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

1 inch = 1,175 feet

Contour Interval = 40'

Low EHR

Moderate EHR

All other areas are High EHR

Site Class 2

Site Class 4

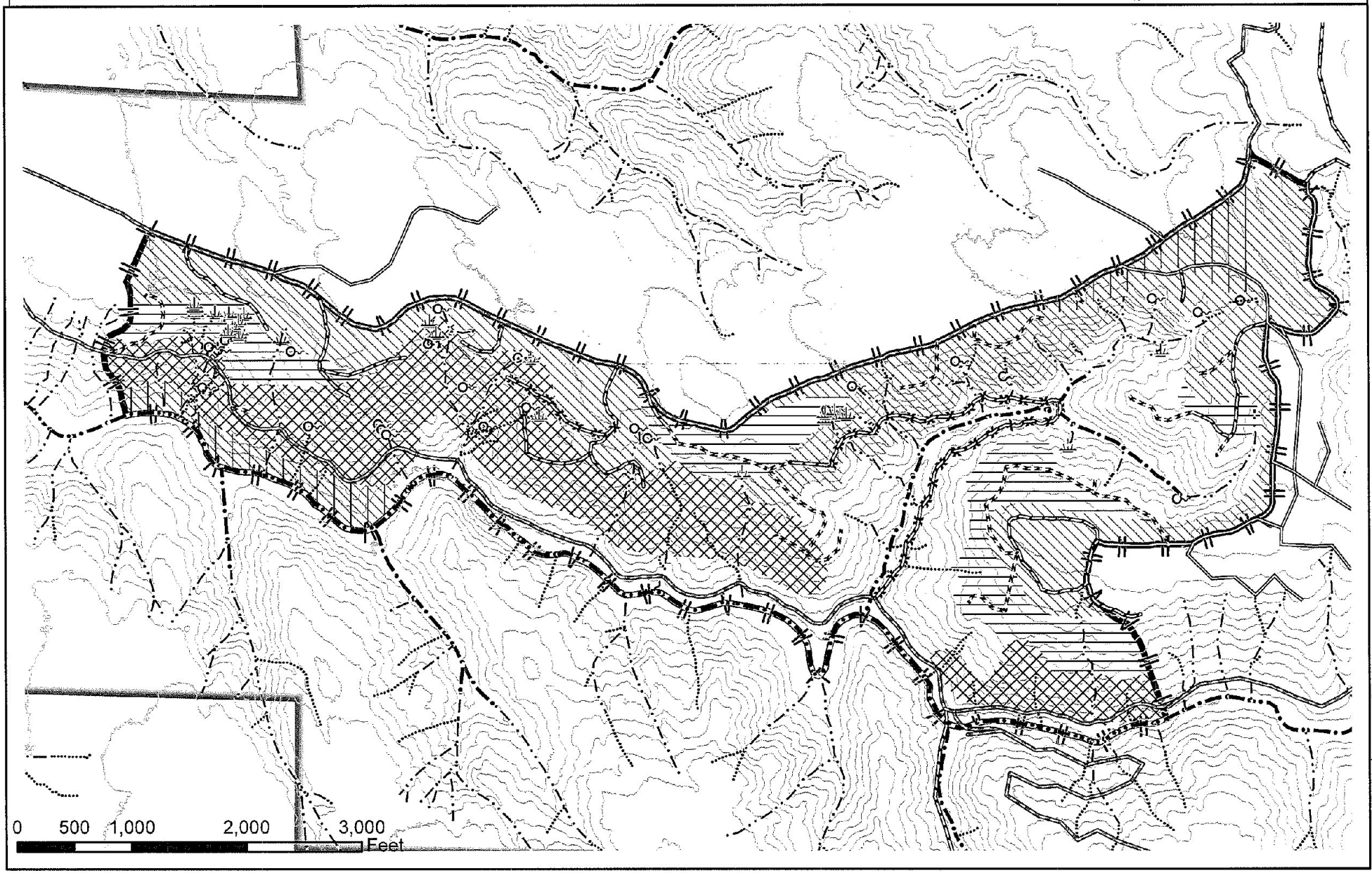
All other areas are Site Class 3

THP Boundary

JDSF Property Line

JACKSON DEMONSTRATION STATE FOREST

1/28/2020 TN



Section 11

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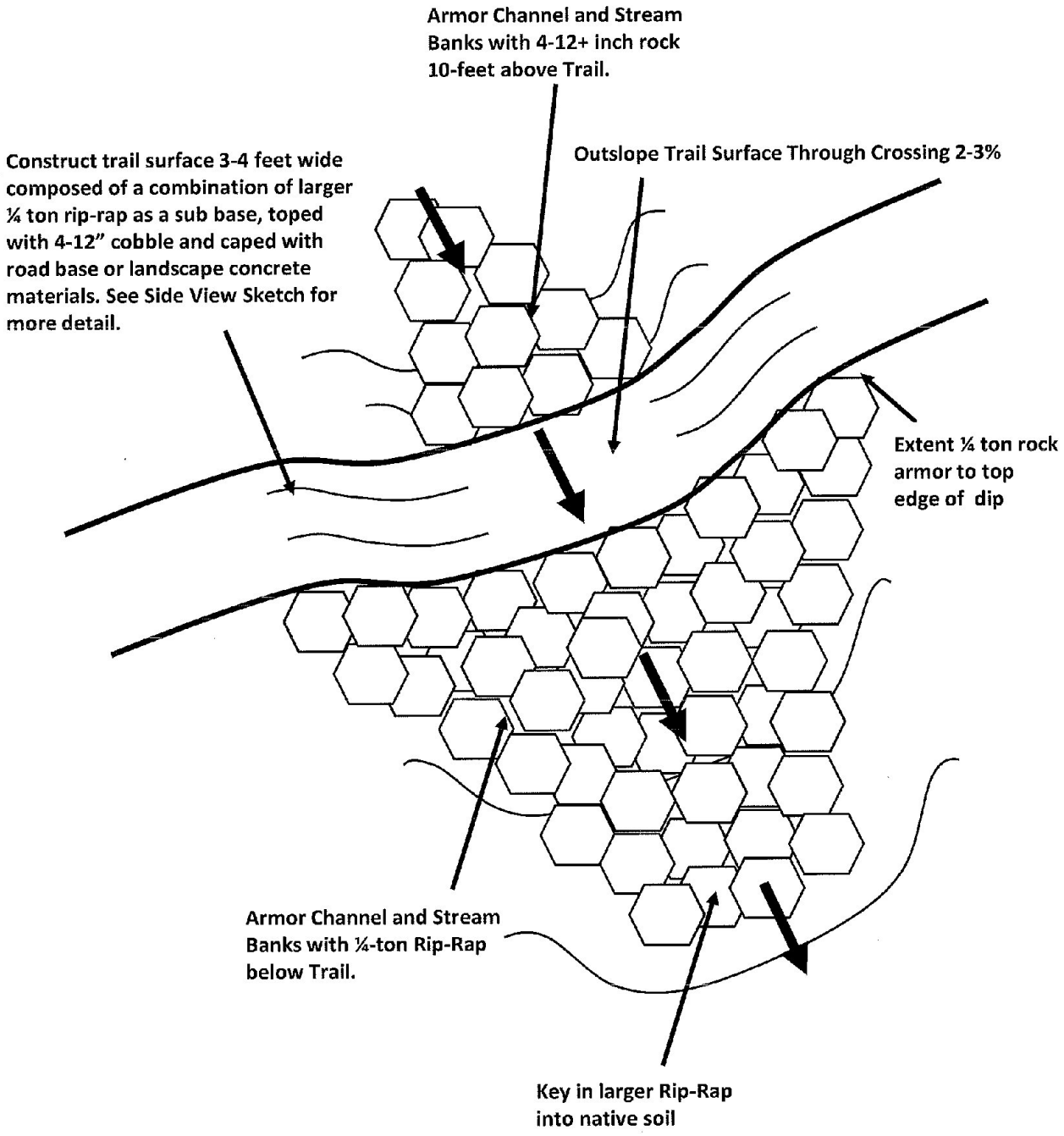
Caspar 500 THP

Map Point Sketches

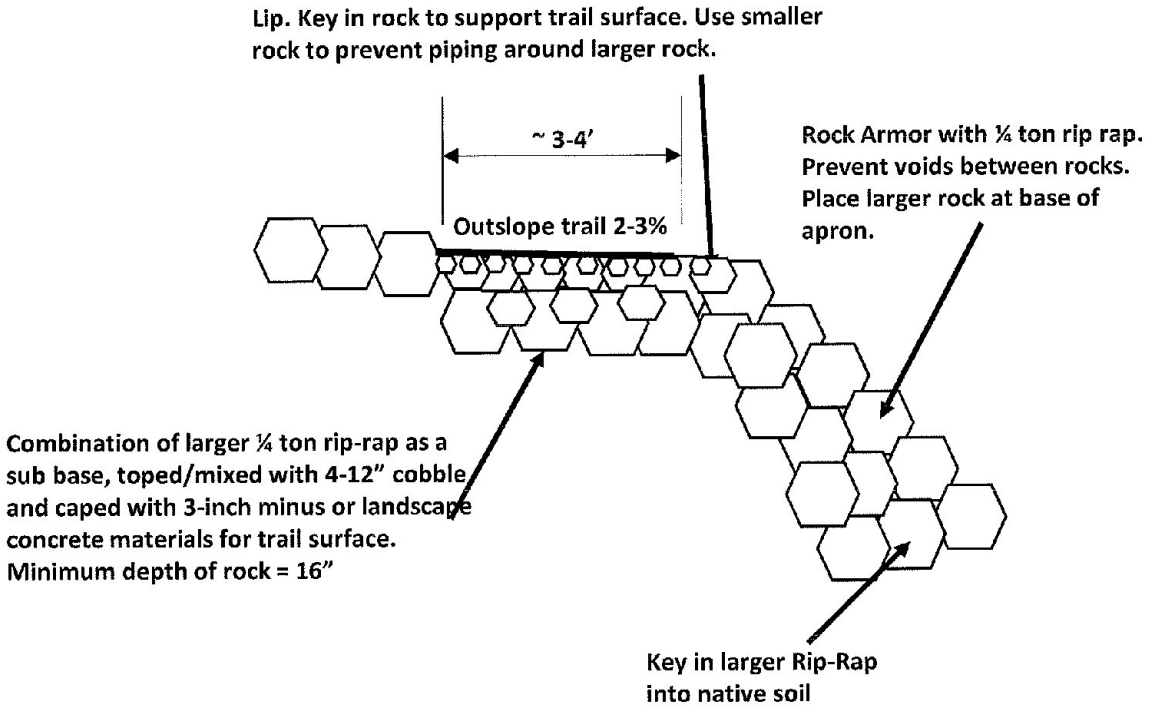
Map Points 3 & 4 – Sketch

Top View



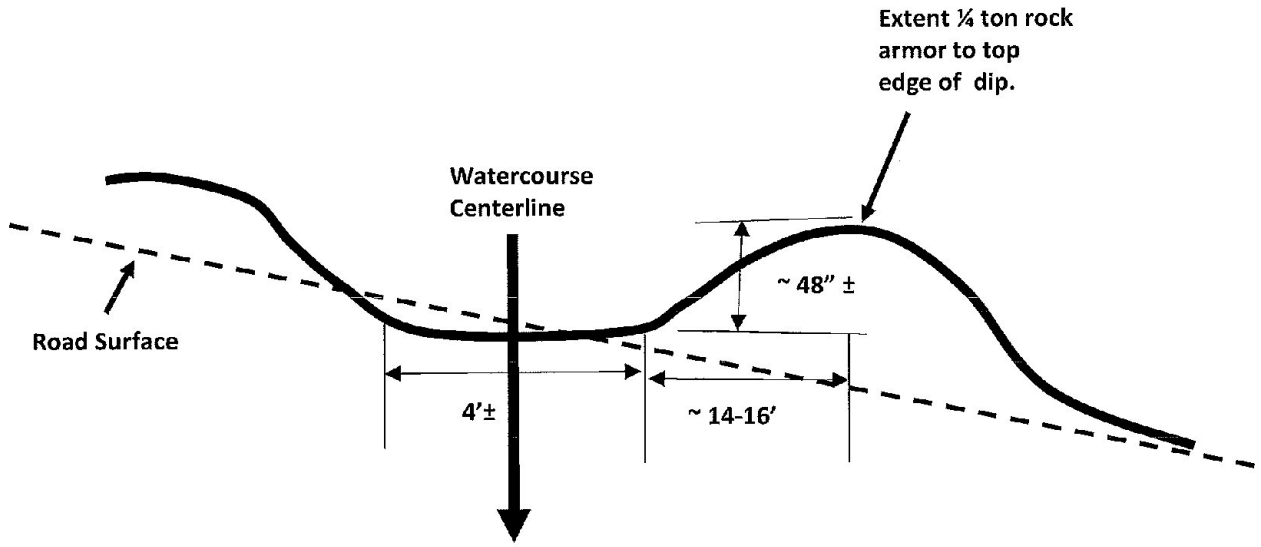
Map Points 3 & 4 – Sketch

Side View of Entire Crossing

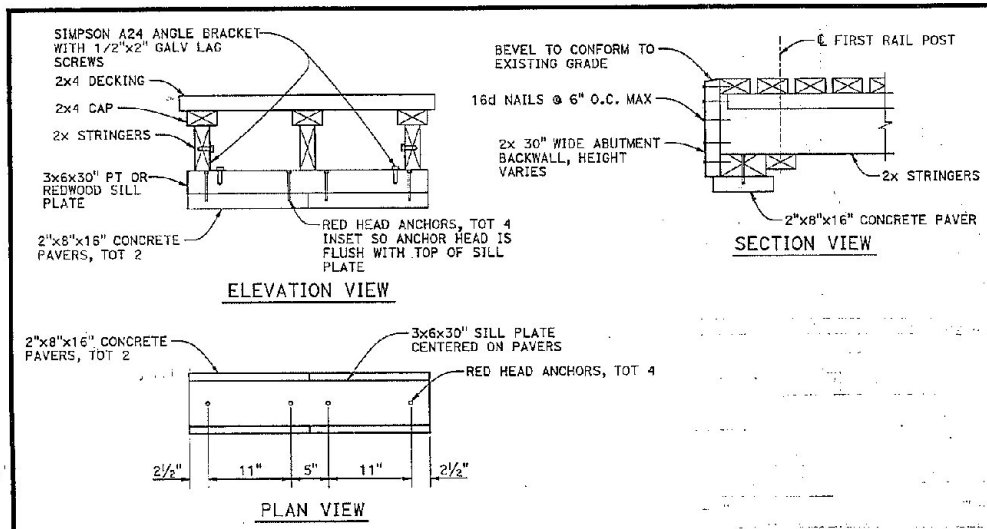


Cross Section at Trail

Utilize spoils to establish armored stream banks and trail surface through dip and each approach.



Map Point 5 Bridge Design



ABUTMENT DETAILS

SCALE: 1½" = 1'-0"

DESIGN NOTES

Redwood: fc = 1200 psi
fb = 975 psi
fv = 160 psi
E = 1,300,000 psi
Density = 28 pcf

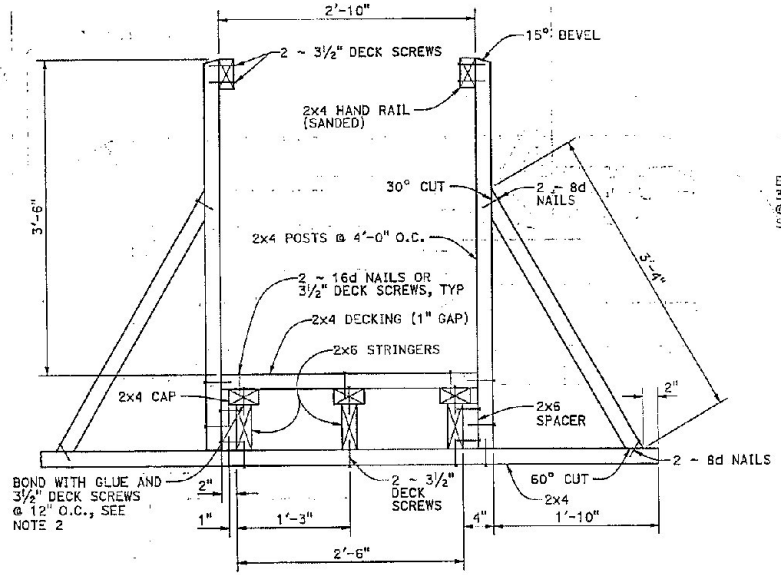
Section properties for stringers were based on 2x4 top plate and dimensioned lumber for the stringers. Larger dimensioned stringers can be substituted for sizes called for in these plans.

Rough sawn lumber can vary by ±3/8" in dimension.

Live load was based on a total load of 800 lbs applied as an 8 foot long moving uniform load of 100 plf.

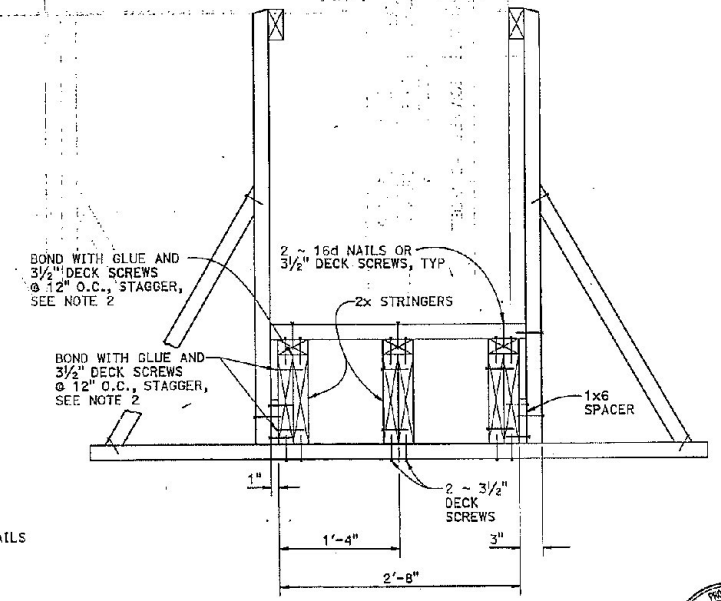
GENERAL NOTES

1. Pre-Treat redwood stringers with Thompsons Water Seal (Multi Surface Waterproof 24105).
2. Use The Hillman Group 47875 5/16 x 3-1/2" Star Drive Construction Lag Screws with Truss Head 1000 Hour Bronze Ceramic Coat or Equivalent.
3. Glue to be Titebond II, Gorilla Glue or All Weather Construction Adhesive. Choice depends on current condition of wood and weather.
4. 16d nails can be substituted for 3-1/2" deck screws except in Fabrication of the Stringers.



TYPICAL SECTION NO. 1
(SPAN LENGTHS 8' TO 16')

SCALE: 1½" = 1'-0"



NOTE:
FOR DETAILS NOT SHOWN SEE "TYPICAL SECTION NO. 1" ON THIS SHEET.

TYPICAL SECTION NO. 2
(SPAN LENGTHS 18' TO 40')

SCALE: 1½" = 1'-0"

NOTE:
The contractor shall verify all controlling field dimensions before ordering or fabricating any materials.

REGISTERED PROFESSIONAL ENGINEER
Robert Valentine
22456
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

CAL FIRE

DESIGNED BY B. VALENTINE
DRAWN BY R. UHLMANN
REVIEWED BY XXX

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SACRAMENTO, CALIFORNIA 95826

STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY & FIRE PROTECTION
TECHNICAL SERVICES SECTION

JACKSON DEMONSTRATION STATE FOREST
PEDESTRIAN STREAM CROSSING

FRAMING DETAILS NO. 1

S-1
ORIGINAL SCALE: AS SHOWN
DATE: 10/26/2018
SHEET 1 OF 4

Section 4

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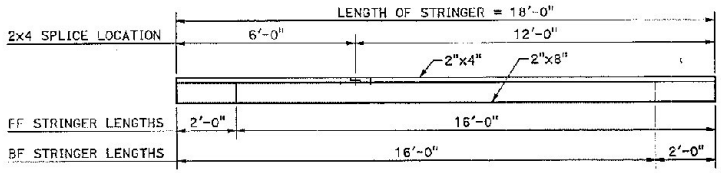
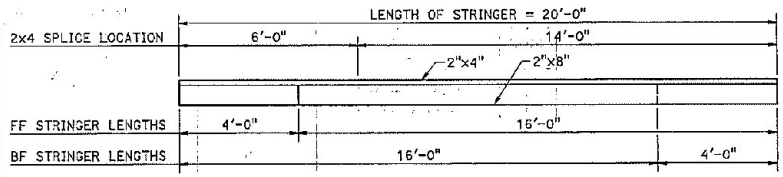
Caspar 500 THP



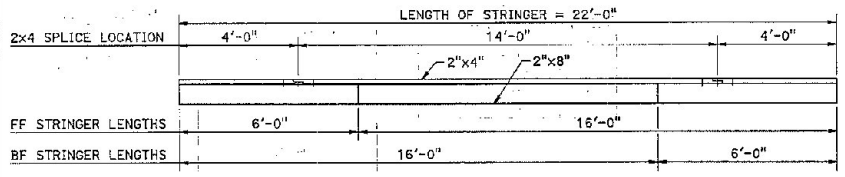
STRINGER CUT LIST

SIZE	EACH
2"x8" x 2'-0"	2
2"x8" x 16'-0"	2
2"x4" x 6'-2"	1
2"x4" x 12'-2"	1



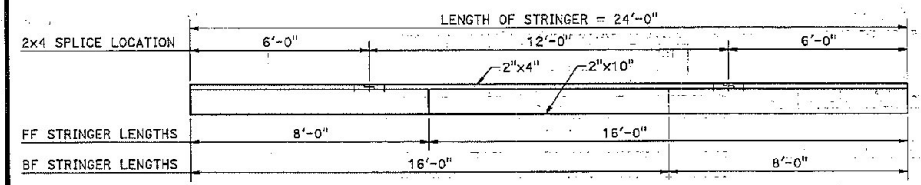
STRINGER CUT LIST

SIZE	EACH
2"x8" x 4'-0"	2
2"x8" x 16'-0"	2
2"x4" x 6'-2"	1
2"x4" x 14'-2"	1



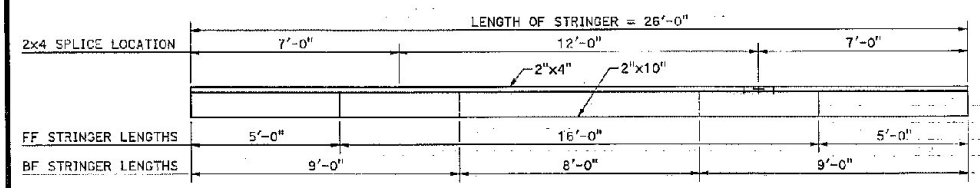
STRINGER CUT LIST

SIZE	EACH
2"x8" x 6'-0"	2
2"x8" x 16'-0"	2
2"x4" x 4'-2"	2
2"x4" x 14'-4"	1



STRINGER CUT LIST

SIZE	EACH
2"x10" x 8'-0"	2
2"x10" x 16'-0"	2
2"x4" x 6'-2"	2
2"x4" x 12'-4"	1



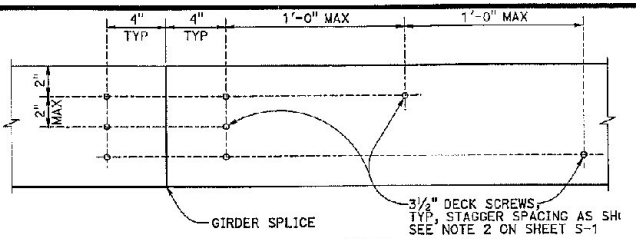
STRINGER CUT LIST

SIZE	EACH
2"x10" x 5'-0"	2
2"x10" x 8'-0"	1
2"x10" x 9'-0"	2
2"x10" x 16'-0"	1
2"x4" x 7'-2"	2
2"x4" x 12'-4"	1

STRINGER ELEVATIONS

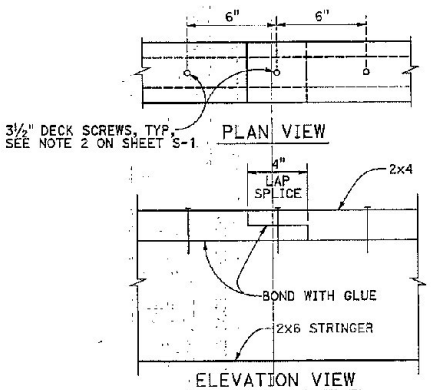
SCALE: 1/2" = 1'-0"

NOTE:
The contractor shall verify all controlling field dimensions before ordering or fabricating any materials.



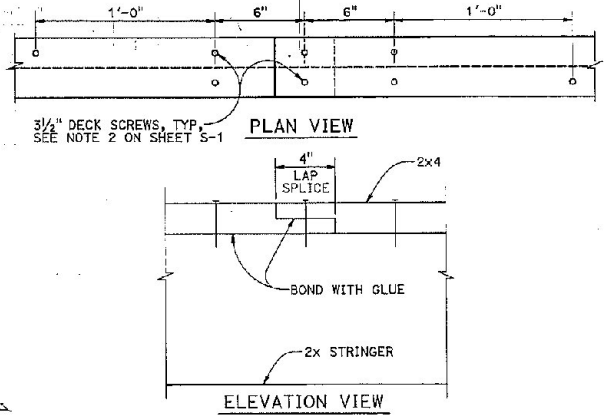
TYPICAL STRINGER SPLICE

SCALE: 3" = 1'-0"



2x4 SPLICE (SPANS 8' TO 16')

SCALE: 3" = 1'-0"



2x4 SPLICE (SPANS 18' TO 40')

SCALE: 3" = 1'-0"



DESIGNED BY: B. VALENTINE
DRAWN BY: R. UHLMANN
REVIEWED BY: XXX

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STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY & FIRE PROTECTION
TECHNICAL SERVICES SECTION

JACKSON DEMONSTRATION STATE FOREST
PEDESTRIAN STREAM CROSSING

STRINGER DETAILS NO. 1

S-2
ORIGINAL SCALE: AS SHOWN
DATE: 10/26/2018
SHEET 2 OF 4

Section 11
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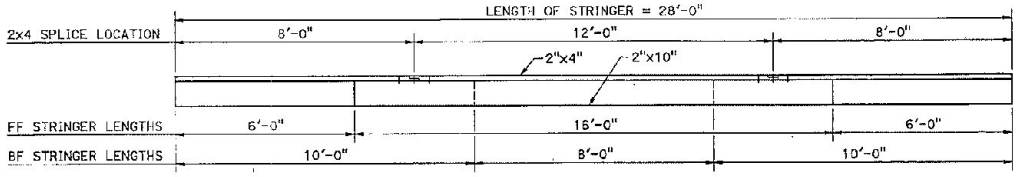
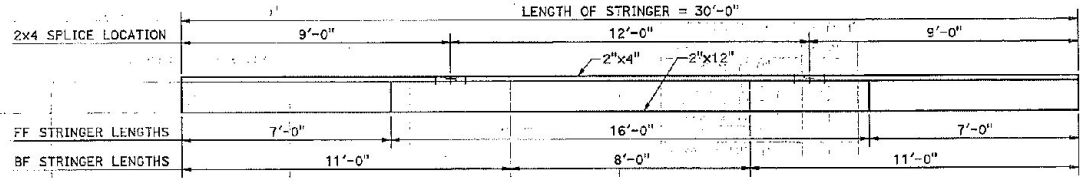
Caspar 500 THP



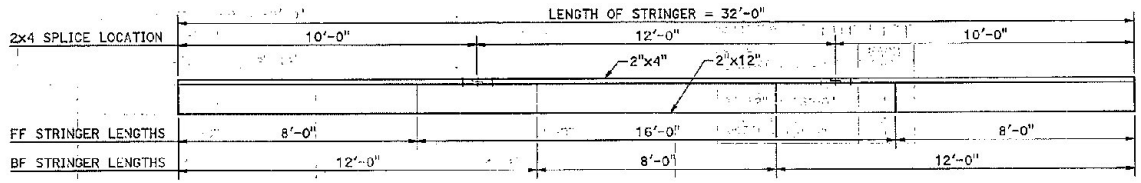
STRINGER CUT LIST

SIZE	EACH
2"x10" x 6'-0"	2
2"x10" x 8'-0"	1
2"x10" x 10'-0"	2
2"x10" x 16'-0"	1
2"x4" x 8'-2"	2
2"x4" x 12'-4"	1



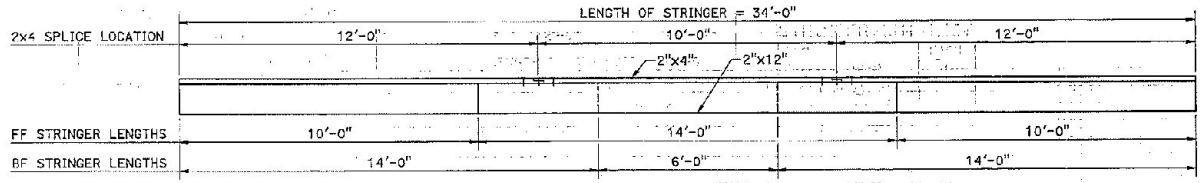
STRINGER CUT LIST

SIZE	EACH
2"x12" x 7'-0"	2
2"x12" x 8'-0"	1
2"x12" x 11'-0"	2
2"x12" x 16'-0"	1
2"x4" x 9'-2"	2
2"x4" x 12'-4"	1



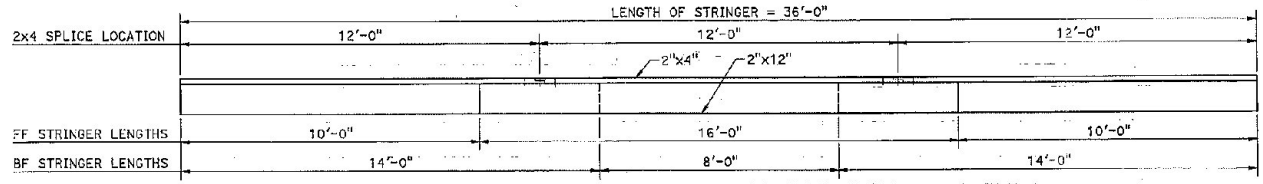
STRINGER CUT LIST

SIZE	EACH
2"x12" x 8'-0"	3
2"x12" x 12'-0"	2
2"x12" x 16'-0"	1
2"x4" x 10'-2"	2
2"x4" x 12'-4"	1



STRINGER CUT LIST

SIZE	EACH
2"x12" x 6'-0"	1
2"x12" x 10'-0"	2
2"x12" x 14'-0"	3
2"x4" x 10'-2"	1
2"x4" x 12'-4"	2



STRINGER CUT LIST

SIZE	EACH
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2"x12" x 10'-0"	2
2"x12" x 14'-0"	2
2"x12" x 16'-0"	1
2"x4" x 12'-2"	2
2"x4" x 12'-4"	1

STRINGER ELEVATIONS

SCALE: 1/2" = 1'-0"

NOTE:
The contractor shall verify all controlling field dimensions before ordering or fabricating any materials.

REGISTERED PROFESSIONAL ENGINEER
Robert Valentine
No. 122466
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

CAL FIRE

DESIGNED BY B. VALENTINE
DRAWN BY R. UHLMANN
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STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY & FIRE PROTECTION
TECHNICAL SERVICES SECTION

JACKSON DEMONSTRATION STATE FOREST
PEDESTRIAN STREAM CROSSING

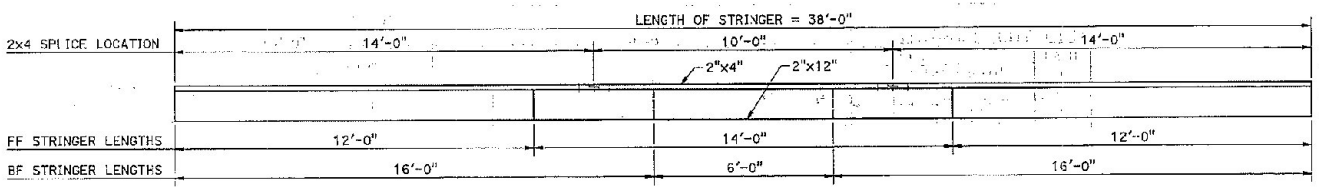
STRINGER DETAILS NO. 2

S-3
ORIGINAL SCALE: AS SHOWN
DATE: 10/26/2018
SHEET 3 OF 4

Section 11

99

Caspar 500 THP



STRINGER CUT LIST

SIZE	EACH
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2"x12" x 12'-0"	2
2"x12" x 14'-0"	1
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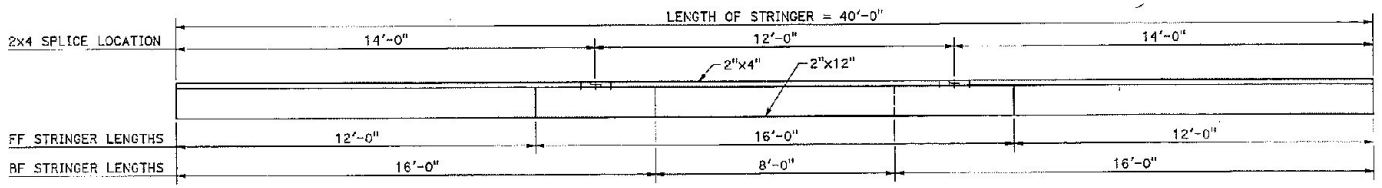
2"x4" x 10'-4"	1



STRINGER CUT LIST

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2"x12" x 16'-0"	3
2"x4" x 12'-4"	1
2"x4" x 14'-2"	2

STRINGER ELEVATIONS

SCALE: 1/2" = 1'-0"

NOTE:
The contractor shall verify all controlling field dimensions before ordering or fabricating any materials.

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STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY & FIRE PROTECTION
TECHNICAL SERVICES SECTION

JACKSON DEMONSTRATION STATE FOREST
PEDESTRIAN STREAM CROSSING

STRINGER DETAILS NO. 3

S-4
ORIGINAL SCALE: AS SHOWN
DATE: 10/26/2018
SHEET 4 OF 4

Section 11

Caspar 500 THP

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RESOURCE MANAGEMENT

GENERAL DESCRIPTION OF PHYSICAL CONDITIONS AT THE PLAN SITE

Project Location

The operational area of this plan is located within the Caspar Creek Planning Watersheds, and is adjacent to Caspar Creek. This watershed is a tributary to the Pacific Ocean. The harvest area is approximately 533 acres in size. The harvest area is approximately 7.3 miles south of the community of Fort Bragg, CA. the legal description is Township 17 North, Range 17 West, Sections 3, 5, 8, 9 and 10; Mount Diablo Base and Meridian.

Soils and Topography

Timber site for conifer species is classified as Site II, III and IV (Approximately 23.3% is Site II, 69.1% is Site III and 7.51% is Site IV). The California State Cooperative Soil-Vegetation Survey map and on-site evaluations were used to classify the plan area as Site II, III and IV timberland with the following soil types: Blacklock and Aborigine Complex, Caspar-Quinliven Complex, Caspar-Quinliven-Ferncreek Complex, Cottoneva, Dehaven-Hotel Coplex, Ferncreek, Irmulco-Tramway Complex, Shinglemill-Gibney Complex. These soil types have generally moderate to high suitability for timber production. The THP areas have an erosion hazard rate (EHR) of low, moderate, and high. The proposed silvicultural prescriptions and harvesting systems were also used to determining the EHR.

The elevation ranges from 120 feet to 620 feet above sea level. The aspect of the project area is generally south-facing. Slopes vary between <5 and 85% with average slopes in the harvest units 45% to 65%.

Vegetation and Stand Conditions

The conifer component of the timber stand is dominated by coast redwood (*Sequoia sempervirens*) and Douglas-fir (*Pseudotsuga menziesii*) and Bishop pine (*Pinus muricata*). Also present are grand fir (*Abies grandis*) and western hemlock (*Tsuga heterophylla*). Hardwood species include tanoak (*Notholithocarpus densiflorus*), golden chinquapin (*Castanopsis chrysophylla*), madrone (*Arbutus menziesii*) and an invasive eucalyptus species (*Eucalyptus glubulus*). Wet areas adjacent to watercourses contain red alder (*Alnus rubra*), and willow (*Salix spp.*). Historic records from the 1960's indicate that Monterey pine (*Pinus radiata*) was planted after the 1964 clear-cut. The plan area borders Mendocino pygmy forest. Endemic species Mendocino pygmy cypress (*Hesperocyparis pigmaea*) and Bolander's pine (*Pinus contorta* spp. *bolander*) are found along the plan boundary.

Shrub species include evergreen huckleberry (*Vaccinium ovatum*), red huckleberry (*Vaccinium parvifolium*), wax myrtle (*Myrica californica*), rhododendron (*Rhodendron macrophyllum*), coast red elderberry (*Sambucus callicarpa*), California hazelnut (*Corylus cornuta ssp. Californica*) wood rose (*Rosa gymnocarpa*) and blue blossom ceanothus (*Ceanothus thyrsiflorus*).

Ferns include western sword fern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), western chain fern (*Woodwardia fimbriata*), California polypody (*Polypodium californicum*), deer fern (Blechnum spicant), lady fern (*Athyrium filix femina*), coastal wood fern (*Dryopteris arguta*), five-fingered fern (*Adiantum pedatum var. aleuticum*), and California maidenhair (*Adiantum jordanii*).

Other plant species include poison oak (*Toxicodendron diversilobum*), red flowering currant (*Ribes sanguineum*), thimbleberry (*Rubus parviflorus var. velutinas*), salmonberry (*Rubus spectabilis var franciscanus*), redwood sorrel (*Oxalis oregana*), western wake robin (*Trillium ovatum*), salal (*Gaultheria shallon*), horsetail (*Equisetum ssp.*), fat Solomon's seal (*Smilacina racemosa var. amplexicaulis*), slim Solomon's seal (*Smilacina stellata var. sessifolia*), wild cucumber (*Marah sp.*), miner's lettuce (*Claytonia perfoliata*),California hedge nettle (*Stachys ajugoides*), stinging nettle (*Urtica dioica ssp. gracilis*), false lily-of-the-valley (*Maianthemum dilatatum*), wild ginger (*Asarum caudatum*), red clintonia (*Clintonia andrewsiana*), wood strawberry (*Fragaria vesca spp. californica*), lupine (*Lupinus spp.*), and assorted grasses (*Poaceae spp.*).

PART OF PLAN

Beginning in the early 1860's, old growth was clear cut in the Caspar Watershed and milled to supply redwood lumber to San Francisco. Oxen and bull teams were used for logging, and stream channels were used for transportation corridors. Naturally regenerated second growth was harvested using single tree and small group selection silviculture in the 1960's and again in the 1990's. Road 669 was constructed during the 1960's harvests. Skid trails were often placed in small Class IIs, Class IIIS and swales. Theses watercourse channels have generally revegetated, but do show signs of continuous significant adjustments. Despite a long history of logging that included splash dams, WLPZ road construction, and extensive tractor logging in the middle and south forks, Caspar Creek retains a native anadromous fish population in all three of its forks.

In and adjacent to the eastern boundary of the plan area, the marine terrace was converted into an apple orchard in the late 1800's. A row of blue gum eucalyptus was planted as a windbreak for the orchard. Since then, the eucalyptus have spread to the surrounding

forest. The maintenance of the orchard was discontinued in the 1940's and a majority of the apple trees were removed. This area seeded in with Douglas-fir. The portion of the orchard within the plan area was cleared and used as an experimental seed orchard in the 1970's. These areas were cleared and replanted in 1994 with redwood and Douglas-fir seedlings.

The western half of the plan area was most recently harvested using single tree selection and "clump" openings silviculture under THP 1-95-021 MEN in 1995. The eastern half of the plan area was most recently harvesting in the 1960's using single tree selection silviculture. Currently, most the THP area consists of an uneven-aged stand of conifer and hardwood trees between the age ranges of approximately 20, 50, and second growth up to 150 years old.

Watershed and Stream Conditions

The plan area lies in the Caspar Creek Planning Watershed. This planning watershed encompasses 5,360 acres. The major watercourse is Caspar Creek which is adjacent to the THP area. Topography in the plan area is varied. Though slopes are generally moderate to steep throughout the THP area, slope gradient increases dramatically near watercourses.

Most of the watercourses within this watershed were impacted by animal-powered yarding practices and splash dam construction which occurred during the late 1800's, and skidding practices of the 1960's. The watercourses exhibit signs of recovery as canopy has developed on adjacent slopes, excess sediment continues to move through the system, and organic debris supplies increases. Canopy shading in watercourse is generally high, and the channels contain a moderate amount of downed woody material as the result of past management activities and natural events. Riparian zones also contain a hardwood component comprised primarily of tanoak, madrone, and red alder. Gradients of the Class II and III watercourses vary greatly depending on where they lie within the THP area. The watercourse gradients range from 10% to 85%. Gravel, finer silt and woody debris are the primary constituents of watercourse channels, with some boulder reaches and outcrops found in some of the larger Class II watercourses. Many springs and wet areas were found at the break in slope throughout the plan area, some creating channels leading to Class II watercourses. Subsurface flows were usually found in the Class II watercourses, especially during the late summer and early fall seasons.

PROJECT ALTERNATIVES ANALYSIS

California Environmental Quality Act Requirements

As a certified regulatory program under California environmental Quality Act (CEQA), the THP process is exempt from the requirement to prepare Environmental Impact Reports (EIRs) and related provision of CEQA. However, a THP must include "a description of the proposed activity with alternatives to the activity, and mitigation measure to minimize any significant adverse effect on the environment of the activity." CEQA § 21080.5(d)(3)(a); 14 CCR §15250-15253. CAL FIRE has provided RPF's guidance in preparing that analysis, based on the CEQA guidelines that control the alternatives analysis in EIRs (14 CCR § 15126.6).

CEQA does not require any fixed number of alternatives, does not require inclusion of every conceivable alternative or consideration of alternatives whose effect cannot reasonably be ascertained. Accordingly, alternatives selected for examination in this THP are limited to ones that would avoid or substantially lessen significant effects of the project. Alternatives selected for examination are reviewed considering the objective of the project and feasibility of the alternative. Finally, under CEQA, the alternatives considered need only relate to the project as a whole, not to its various parks. *Big Rock Mesas Property Owners Assoc. v. Board of Supervisors (1977), 73 Cal. App. 3d 218, 227.*

In preparing this THP, the RPF has applied the prescriptive standards of the Forest Practice Rules. The Forest Practice Rules are developed and adopted by the Board of Forestry as programmatic prescriptions and best management practices designed to mitigate or avoid significant impacts to timber harvesting, road building and other timber operations as they are applied by the RPF in preparing a THP. As proposed, this THP is designed to avoid significant environmental effects or to mitigate such effects to the point where no significant effects will occur.

In additions, the RPF has adopted additional measures in the plan as necessary to mitigate or avoid potentially significant site-specific individual and cumulative effects identified during THP preparation. This project as proposed meets CEQA's objective of avoiding or substantially lessening significant environmental effects.

Project Alternatives Analysis

Prior to, as well as during the creation of this proposed timber harvest plan, alternatives have been considered and are discussed below.

Purpose & Need for the Project

The purpose and need for the proposed project is clearly presented in the Public Resources Code (PRC), and is presented as the basis for the acquisition of the State Forest. The Board of Forestry which represents the State's interest in acquisition and management of State Forests has reaffirmed the role of the State Forest as directed by the PRC. In accordance with the PRC and Board of Forestry Policy, the purpose and need of the project as proposed is to demonstrate economical forest management by producing timber and allowing opportunities for research and demonstration purposes while giving due consideration to other inherent values of the forest.

Jackson Demonstration State Forest (JDSF) was acquired by the State of California in 1947 pursuant to legislation which authorized the purchase of managed timberland for public benefits. As per Public Resources Cod (PRC) 4631: *"It is hereby declared to be in the interest of the welfare of the people of this state and their industries and other activities involving the use of wood, lumber, poles, piling, and other forest products, that desirable cutover forest lands, including those having young and old timber growth, be made fully productive and that the holding and reforestation of such lands is a necessary measure...."*

PRC 4631(d) state that one such acquisition area was to be in the coast range and shall serve *"for the purpose of demonstration of economical forest management."*

PRC 4631.5 gives further direction for the management of state forests: *" it is further declared to be in the interest of the welfare of the people of this state that the state do all of the following: (a) Retain the existing land base of state forests in timber production for research and demonstration purposes."* PRC 4651 further states that *"The management of state forests and the cutting and sale of timber and other forest products from state forests shall conform to regulations prepared by the director and approved by the board. These regulations shall be in conformity with forest management practices designed to achieve maximum sustained production of high-quality forest products while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, and aesthetic enjoyment."*

The Board of Forestry and Fire Protection policies, Chapter 0350 – Forest Management Policies establishes direction for State Forest Management. Subchapter 0351.2 establishes the purpose of the State Forest program and the priorities for land use.

351.2 The primary purpose of the State Forest program is to conduct innovative demonstrations, experiments and education in forest management. All state forests land uses should serve this purpose in some way. In addition:

- *A. Timber production will be the primary land use on Jackson, Latour, and Boggs Mountain State Forests. Timber production will be subordinate to recreation on Mountain Home State Forest;*
- *B. Recreation is recognized as a secondary but compatible land use on Jackson, Latour, and Boggs Mountain State Forests. Recreation is primary use on Mountain Home State Forests as prescribed by section 4658, Public Resources Code;*
- *C. State forest lands may be used for Department administrative sites when such use will benefit State Forest programs or protection;*
- *D. Special uses primarily benefiting non-forestry and/or private interest will have low priority. Such uses that conflict with State forest objectives are discouraged.*

0351.3 The Board, consistent with PRC Section 4631, recognizes and reaffirms that the primary purpose of State Forests is to conduct demonstrations, investigations, and education in forest management. The Board wishes to emphasize and expand demonstrational, experimental, and educational activities on the State Forests.

1) The Project as Proposed

This THP incorporates the prescriptive standards of the Forest Practice rules and includes additional mitigation measures when deemed necessary. The Forest Practice rules are developed and adopted by the Board of Forestry and Fire Protection (Board) as programmatic prescriptions and best management practices designed to mitigate or avoid significant impacts of timber harvesting, road building and other timber operations as they are applied by the RPF in preparing a THP.

The project as proposed meets the goals of the landowner. Potentially significant impacts on the environment, including wildlife habitat and fisheries, which could result from harvest operations such as these have been analyzed and mitigations or protections have been incorporated in the proposed plan to address those potential impacts. After mitigation, impacts of the plan are expected to be insignificant. Forest roads will be maintained and upgraded as described in the THP to reduce and/or eliminate the amount of sediment that reaches the streams. The silviculture prescriptions incorporated within the plan are designed to improve forest stocking and health over time. The conversion of past ground based logging to cable yarding where feasible and restricting tractor yarding to gentler slopes will reduce the possible impacts from harvest operations.

The plan has included resource protection measures such as specific winter and wet weather operations, no harvesting within the first 30 feet of the Class I WLPZs, limited harvesting within Class II WLPZs, no LWD removal, and retention of all snags (except for those that are safety hazards and along the trail network). This project as proposed was carefully designed to meet CEQA's objective of avoiding or substantially lessening significant environmental effects.

The project as proposed would meet all the landowner's objectives. When approved, this proposal would not cause any significant adverse environmental impacts.

2) No Project

The No Project Alternative would involve not carrying out the project as proposed, and not carrying out any alternative project. Although this alternative is clearly inconsistent with the project objectives, the CEQA Guidelines nevertheless require that the no project alternative be evaluated. In accordance with the CEQA Guidelines, the existing conditions have been considered, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans. 14 CCR § 15126(d)(4). The No Project Alternative would avoid potential environmental impacts that might occur in connection with proposed timber operations. For example, any individual or cumulative impacts on fish and wildlife, water quality or stand health and vigor would not occur if the THP were not carried out. Potential erosion from skid trails and roads as a result of a proposed THP would not occur if this plan did not occur.

At the same time, the No Project Alternative would potentially result in other significant adverse effects. For example, the no project alternative would not provide for maintenance of the appurtenant roads associated with the THP, which is necessary and ongoing. Such maintenance includes the upgrading of watercourse crossings which are either undersized or in a state of failure. The project also proposes improving the drainage of the road prism by shaping and outsloping the road where feasible. The THP process provides a funding mechanism which the State Forest can utilize to maintain and improve the road systems. Under the No Project Alternative this valuable source of funding would be forfeited which would allow the risk of a significant adverse impact to water quality from road conditions to continue or worsen. In addition, the opportunity to create a new age class, accelerate the development of larger trees, capture mortality, adjust species composition, and to convert the evenaged stand to an uneven-aged stand would be lost.

The No Project Alternative would meet the State Forest's secondary objectives. The project area is currently available for use by the public for recreation and aesthetic enjoyment and would continue as such while lands are part of the State Forest. However, the "No Project Alternative" would not meet the primary goals or objectives of the State Forest.

Accordingly, this alternative is rejected because it is inconsistent with the project objectives and would not avoid or substantially less such impacts.

3) Alternative Land Uses

This alternative would involve the landowner using the property for a use other than for managing timber for harvest. The number of possible uses for any parcel of land is very large. The THP area could be designated for use of any of the values specified in PRC 4651 other than timber management. This includes use for recreation, watershed, wildlife, range and forage, fisheries and aesthetic enjoyment. The general result would be similar to the No Project Alternative as any potential timber harvest effects would be eliminated while primary objectives of demonstrating economic timber production while providing for research opportunities and education in forest management would not be met.

Another alternative land use could be the sale of State Forest land for residential, recreational, and/or agricultural activities, including timber harvesting. Sal of all or parts of JDSF would provide revenues to a strained State Treasury during a time of budget deficits. Also, in intensive private timber or vineyard production, the property might increase the flow of products into the economy. Sale would require changes in legislation such as PRC 4431(a) and 4651, and in Board policies 0351.2 and 0351.3. As with the Alternative of private acquisition, this alternative would not attain most of the basic objectives of the project. An alternative land use would not allow the landowner to meet the project's objectives.

JDSF has no current plans to change the current zoning status of the plan area. This alternative would meet only one of the owner's multiple objectives and long-term impacts would be greater under this alternative, therefore this alternative was rejected.

4) Timing of Project

This alternative would involve carrying out the project as proposed, except at a time other than that proposed. Delaying the project for 5 to 10 years would attain most of the project objectives by allowing the landowner to manage the parcel as directed by the PRC and Board of Forestry Policy. During this time, the conifer volume would increase, which may offset the cost of project implementation. Though conifer volume would increase, not harvesting would limit the opportunity for maximizing the productivity and health of this stand. The majority of the project area is forested by a densely stocked second growth stand comprised of trees which are showing signs of high competition and decreasing vigor. By not operating at this time, the existing conifers could grow at a slower rate due to competition resulting in not meeting maximum sustained production (MSP) for the stand.

While this alternative would avoid, at least for now, the adverse environmental effects that might be associated with the project as proposed, this alternative could potentially result in other significant effects. Specifically, the delay in making environmental improvement to the site could result in adverse effects. For example, improvements proposed in the THP for the existing roads to enhance road drainage and upgrade stream crossings would not be accomplished at this point in time. The invasive eucalyptus stand would continue to spread downhill.

Under this alternative most of the demonstration and timber management objectives could still be met for the project area, just at a later date. However, the postponement would require proposing a similar project at an alternative location. Need for demonstration, research and education opportunities are ongoing and need to be temporally dispersed. Also, revenue needs to support State Forest infrastructure and other related forest management activities would still have to be met. Potentially significant effects on forest management due to lack of revenue could occur if the project was delayed.

The management of these lands under this THP document was determined to be the highest priority on JDSF's ownership within the associated watershed. JDSF wishes to commence operations on this plan at the first opportunity to maximize stand health and vigor, and capture mortality. This alternative would meet few of the owner's objectives and long-term impacts would be greater under this alternative; therefore, this alternative was rejected.

5) Alternative Site

Locating the proposed project on an alternative site was considered and evaluated. JDSF was purchased with the primary objective of sustained yield timber production to demonstrate economic forest management while providing opportunities for research, demonstration and education in forest management. This timber harvest area was carefully selected in accordance with long term planning goals while considering regulatory, silvicultural, and cumulative effect constraints. At the same time, due consideration has been given to protection of other resources, including aesthetics, recreation, wildlife and watershed resources. An alternative location would also delay meeting MSP as provisions of the plan include thinning conifer dominated areas, initiating advanced

regeneration and reducing hardwood competition as necessary. These measures will result in increased growth in terms of faster radial growth on conifers an increased in-growth population. An alternative location would not meet the objectives above.

CEQA recognizes that, particularly with projects involving natural resources, alternative locations may not be feasible. 14 CCR 15126(f)(2)(A)(B). Further, the key question in analyzing alternative locations is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion. In this case, the THP in this area has no unique potential impacts that would not also typically be potential at other locations. Accordingly, any potential impacts associated with this THP would not be altogether avoided, but would be shifted to another location. Harvesting at other locations would require many of the same measures to avoid or substantially lessen such impacts.

Several of the owner's objectives could be met if the Alternative Site option was selected; however, long term impacts would be greater under this alternative and an alternative site would likely not avoid or substantially lessen potential impacts; therefore, this alternative was rejected.

6) Alternative Approach to Harvesting in the Proposed Stand (silviculture and yarding methods)

The RPF selected the proposed treatments in this THP to best achieve the landowner's goal in terms of environmental, economic and social interests. Alternative silvicultural prescriptions would include even-aged regeneration methods, special prescriptions and other more intensive uneven-aged systems. Implementation of these silvicultural prescriptions has been constrained by current management objectives combined with guidelines included in the JDSF management plan. These alternative silviculture methods could also potentially generate additional adverse environmental impacts such as temporary reduction in northern spotted owl nesting habitat or other species-specific wildlife habitat. Alternative yarding methods includes helicopter yarding. Helicopter logging in this area is cost prohibited and inefficient, given the harvest volume, existing road network, and logging systems in place. Additionally, the disturbance caused by landing excavation would significantly reduce the net benefits gained by the reduced ground disturbance from the alternative yarding system. The RPF assess timber health, growth, regeneration, yarding methods, competition, stocking, soil erosion hazard rating, regulatory constraints, wildlife, plants, watershed, and cumulative effect issues. The RPF also considered the FPR's, JDSF's management plan and Option "a" when developing the silvicultural treatment and logging methods. The RPF has concluded that after considering the objectives and constraints, the proposed silvicultural and yarding treatments are the ones best suited for the proposed project.

These alternatives are rejected because they do not meet all the project objectives and would not avoid or substantially lessen impacts.

7) Private Acquisition

This alternative would mandate the sale of all or a portion of JDSF, with the probable result being private industrial forest use, conversion for agricultural uses other than timber, or rural residential housing development. The potential environmental effects of this alternative are much higher than under current state ownership and management. Depending on conditions that might be made part of this sale, timber management and demonstration objectives could be met. However, it is unlikely that management activities would continue to provide for research, demonstration and forest management education opportunities that are available for the public. Additionally, if maintained as private timberland, agricultural use or if developed as rural residential, the secondary objectives of providing values relating to recreation and aesthetic enjoyment would also be lost to the public. This is an inherent characteristic of private ownership as landowners have the right and responsibility to protect the land and themselves from damage and potential liabilities that may be incurred due to public ingress and egress. It is unknown how the proceeds of the sale would be used to provide long term funding for forest resource improvement programs.

JDSF was purchased from private interests in 1947 for the purpose of providing opportunities for forest management demonstration, research, education, recreation, cultural resource protection, and fish and wildlife habitat protection. These policies are specified in PRC 4631(a) & 4651. The sale of JDSF is not a feasible alternative because it would limit the ability of the state to provide these benefits and is inconsistent with the project objectives.

8) Transfer to another State Agency

This alternative would transfer all or a portion of JDSF from the CA Dept. of Forestry & Fire Protection (CAL FIRE) to another agency which does not manage for timber production. This could include the Dept. of Parks and Recreation or the Dept. of Fish & Wildlife. This alternative is not feasible since CAL FIRE is the most qualified agency to manage JDSF for the purposes, goals, and objectives for which it was originally purchased.

Conclusion on Alternatives

Only Alternative #1 fully satisfies the landowner's objectives and is compatible with the land-use zoning category in which most of the property falls. Silvicultural prescriptions have been specifically designed by timber type to maximize individual tree growth while improving the overall health and productivity of the forest and its inhabitants while providing for the long-term sustained yield of high quality forest products.

The alternative location of the project would not avoid or substantially lessen any potential significant effects of the project but would merely shift any potential impacts. The project area has no unique potential impacts that would not also typically be potential impacts at other locations.

Private or Public Acquisition of JDSF's forest lands could potentially have must greater environmental and social effects than the project as proposed under current state ownership and management. The Forest is currently managed for a multitude of natural resources which include the following, as well as timber: fisheries, wildlife and the beneficial uses of water, in addition to recreation and research values that are generally quite limited on private land. This alternative is also inconsistent with objectives of the project.

Alternative Land uses are inconsistent with the objectives of the project and do not necessarily guarantee decreased potential significant effects. Although it is speculative what the alternative use would be it follows that another land use would have other potentially significant effects on water quality, roads and habitat loss.

The No Project Alternative eliminates all possible adverse impacts associated with timber harvesting. However, future potential impacts that may have caused by not addressing road maintenance and improvement needs would not be addressed. This alternative is inconsistent with the project objectives and would only cause a deviation in location of the project.

The Alternative approach to harvesting in the proposed stand does not meet the objective of management guidelines set forth by the interim guidelines currently governing JDSF's management plan. Therefore, an alternative approach to harvesting does not meet objectives of this project.

The Timing Alternative would allow for the achievement of management objectives with some delay. Potential impacts from harvesting would also be delayed, not avoided. Additionally, impacts caused by a delay in road maintenance and improvement activities may be realized during this timeframe. This project as proposed is preferred over this alternative because a delay in timing would most likely cause a shift in project location as revenue will need to be generated and opportunities for demonstration, research and education provided.

Because the THP as proposed, with all the mitigation incorporated, will not result in significant adverse effects, it is selected as the preferred alternative. Because the proposed THP meets that basic objective of CEQA, the selection of another alternative to this THP is not necessary to avoid or substantially lessen significant impacts. It is entirely consistent with CEQA and pertinent case law to approve a project that has its potential environmental impacts avoided or reduced to relative insignificance, rather than selecting a separate project alternative that would itself result in no significant adverse impacts. See *Laurel Hills Homeowners Association v. City Council of the City of Los Angeles* (1978) 83 Cal. App. 3d 515, 520; *Laurel Heights Improvement Association of San Francisco, Inc. v. The Regents of the University of California* (1988) 47 Cal. 3d 3 76, 401.

PLAN ADDENDUM TO ITEM 14
SILVICUTLURE

MSP Option "a"
As noted in Section II of this THP, Option A has been chosen to meet MSP. 14 CCR 1034 (m)(1) state that all plans using this options must supply a description of the stand before and after harvesting including: volume, growth projecting, stocking and species composition. The following tables show this information by silviculture prescription.

Selection (Single Tree and Group Selection)

	Pre-harvest		Post-harvest	
Gross Volume/acre (BF)	59,126		37,138	
Growth	2%*		>2%*	
Conifer Stocking (BA)	273.6 ft^2/acre		150 ft^2/acre	
Species Composition (% by BA)	Redwood	63.5%	Redwood	70%
	Douglas fir	21.4%	Douglas fir	22%
	Whitewoods	3.3%	Whitewoods	1%
	Pines	8.4%	Pines	2%
	Hardwoods	1.9%	Hardwood	4.5%
	Eucalyptus	1.5%	Eucalyptus	0.5%

**growth rate taken from Option A*

The THP area falls within the Matrix. Areas of the State Forest that have not been designated for special treatment may receive a broad range of silvicultural prescriptions, including both even-aged and uneven-aged methods. The prescriptions proposed in this THP include Single Tree Selection and Group Selection.

Selection and Group Selection
The selection method is described in 14 CCR 913.2 (a):
Under the selection regeneration method, the trees are removed individually or in small group sized from 0.25 acres to 2.5 acres. This method is used to (1) established and maintained an uneven-aged stand structure by establishing and/or maintaining a multi-aged, balanced stand structure, (2) promote growth on leave trees throughout a broad range of diameter classes, and (3) encourage natural regeneration.

Post-harvest stand stocking levels shall be state in the THP. The level of residual stocking shall be consistent with the maximum sustained production of high quality timber products. In no case shall the stocking be reduced below the following standard: On site II and III at least 75 square feet per acre of basal area shall be retained.

The large majority of the project area is proposed to be managed under the selection system. The goal of this silviculture method is to develop another age class where feasible, increase growth rates, improve conifer spacing, provide opportunities for research and demonstration and realize commercial volume to support State Forest infrastructure. The RPF has completed tree marking which will meet or exceed the stocking requirements stated above. Post-harvest conifer will be composed of a representative mixture of the pre-harvest stand conifer composition.

912.7(d).....When considering site occupancy, the Director shall consider the potential long term effects of relative site occupancy of Group A species versus Group B species as a result of harvest. If Group A species will likely recapture the site after harvest, Group B species do not need to be reduced. The time frames from recapturing the site shall be consistent with achieving MSP.

The selection areas have an average of approximately 274 ft^2/acre conifer BA and anticipate a post-harvest basal area of 150-180 ft^2/acre. The implementation of this prescription for stratum averages will be carriable in some areas, due to variable site conditions encountered in the field.

The THP prescription has been planned and implemented continuing to move the stand structure towards an uneven age and size distribution roughly approximating an inverse "j", with a high level of conifer stocking, a relatively low level of hardwood stocking, and a fairly large maximum tree size.

Hardwoods are a relatively low component of majority of the stand, excluding the eucalyptus treatment area in Unit 3. Some hardwoods have been marked for harvest to help decrease competition and maintain conifer site occupancy. More hardwoods will

be removed during falling, yarding, and road maintenance operations. Due to the growth form commonly found in hardwoods, many must be felled to facilitate logging operations. The eucalyptus within the stand will be targeted for removal through mechanical and cultural methods. High density areas of eucalyptus are being treated with group selection with the slash and other logging debris being jackpotted on the larger eucalyptus stumps. This will kill the stumps which will prohibit stump sprouts from emerging. Throughout the rest of the eucalyptus stand area, a higher number of conifers will be retained to promote those species and to shade the stumps. These treatments will decrease the amount of eucalyptus within the stand.

Shaded Fuel Break

The Fuel Break method is described in 913.4 – Special Treatment Prescriptions

Fuel Break 913.4(c) Where some trees and other vegetation and fuels are removed to create a shaded fuel break or defensible space in an area to reduce the potential for wildfires and the damage they might cause. Minimum stocking standards within the timber operating area shall be met immediately after harvest and shall be those found in 14 CCR 912.7 [932.7, 952.7]. The RPF shall describe in the plan specific vegetation and fuels treatment, including timing, to reduce fuels to meet the objectives of the Community Fuelbreak area.

JDSF's Forest Protection Plan provides guidance for projects that will work towards reducing wildfire risks across the forest. Road 500 is part of a planned fuel break system for mainline roads and ridges. Small fuels and brush will be cleared and trees pruned and spaced out along this road, creating a shaded fuel break. The fuel break shall be up to 100 feet wide depending on topography. Hand crews will supplement equipment used for masticating fuels. Depending on weather and ground conditions, work may continue year-around. Post-harvest stocking level will meet the selection standards stated above. The intent in this area is to clear the understory.

No Harvest

There are two areas of No Harvest within the THP. The first area is within Unit 3 where an experimental plantation of unsuitable and unmerchantable conifers have been planted. The second area is Unit 4. Unit 4 is comprised of Bishop pine, Douglas-fir, redwood and hardwoods including tanoak and eucalyptus. Non-commercial timber falling activities will occur within the Unit excluding the Shaded Fuel Break. Chain saw training in Unit 4 may occur. Training will be removing the hardwoods and dying Bishop pines. Fire protection standards shall be implemented where necessary along all roads.

PART OF PLAN

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COAST AREA
RESOURCE MANAGEMENT

PLAN ADDENDUM TO ITEM 14 (f)

GROUP B SPECIES MANAGEMENT

912.7(d) .....*When considering site occupancy, the Director shall consider the potential long term effects of relative site occupancy of Group A species versus Group B species as a result of harvest. If Group A species will likely recapture the site after harvest, Group B species do not need to be reduced. The time frames for recapturing the site shall be consistent with achieving MSP.*

There are two main Group B components within this stand:

1) Monterey Pine

The Monterey pine were aerial seeded after the 1964 clear-cut and have become intermixed with the native conifer species. A portion of these tree will be designated for harvest to open the stand and reduce completion for the Group A species. Harvesting the Monterey pine is not necessary to maintain relative site occupancy of Group A species, however, the pines are reaching their rotational age and declining. The openings created will focus on Group A species regeneration through stump sprouts and natural regeneration, rather than the pine regeneration.

Some areas of the areas are dominated by Monterey Pine, resulting in the pine being used to contribute to the stocking requirements. Snags and culls will be retained for habitat pursuant to the rules and provisions elsewhere in this plan.

2) Hardwoods (Tan oak, Pacific madrone, and golden chinkapin)

Where crowns are competing with nearby conifer and to increase available water and sunlight for retention conifers and redwood stump sprouts Group B hardwood species are designated for harvest. Harvesting Group B hardwood species is not necessary to maintain relative site occupancy of Group A species since Group A are likely to recapture the site after harvest, primarily from redwood stump sprouts and natural regeneration.

Snags and culls will be retained for habitat pursuant to the rules and provisions elsewhere in this plan.

PLAN ADDENDUM TO ITEM 24 (g)

ROADS AND LANDINGS

Road 669 was part of the road network that was built in the 1960's to facilitate the tractor logging to took place. The road is located within the Class I WLPZ buffer of the Caspar Creek tributary known as "Blue Gum Creek." The road has since been converted to an unsanctioned trail from JDSF Road 500 to JDSF Road 600. It is the plan of the landowner to maintain the trail for hikers and cyclists and to adopt the trail into the State Forest's trail network. The RPF is proposing to abandon the road from the bottom to D20/S17. A failed culvert will be pulled, the fill laid back, a rocked ford will be installed to accommodate the trail with the downhill side of the crossing armored. A diverted Class 3 will be realigned with a second rocked, armored ford installed. The rest of the road is proposed to "self-abandon." The RPF met with the Geological Engineer in the field to discuss the full deactivation of the road. It was the Geological Engineer's opinion that due to the number of unstable areas and where those unstable areas were located, deactivation would have more impacts than just letting the road abandon itself. Crossings will be updated to facilitate the safe passage of both hikers and cyclists.

The alternative plan for Road 669 was to abandon the road except for the top segment being reconstructed for use within the THP. The alternative plan would outslope the road while maintaining a section along the prism for a trail. This plan included pulling back the fill from all the crossings, providing gradient control for the restorable Class I's and installing bridges for hikers and cyclists. In order to achieve these objectives, heavy equipment such as excavators and rock trucks would need access. This would require the cutting of many large trees within the outer 50-100 feet of the Class I WLPZ, re-building road either through or around unstable areas, and excavating a large amount of fill. This alternative plan was described to the Geological Engineer, who expressed concerns about working on the unstable areas. This alternative plan was ultimately rejected based on the Geological Engineer's opinion and the RPF's judgement.

PLAN ADDENDUM TO ITEM 26

WATERCORSE AND LAKE PROTECTION

Class I and II WLPZ's are being managed with a combination no-harvest and limited harvest strategy.

Class I Watercourses

All Class I watercourses in the harvest area were found to have confined channels without flood prone areas or channel migration zones. The Watercourse and Lake Protection Zone (WLPZ) for Class I watercourses is 150 feet. This exceeds the width of Class I WLPZ areas required by the FPR when uneven aged prescriptions are utilized. Canopy retention requirements outlines in Section II, Item 26 also exceed those required. Harvesting within the Class I WLPZ will be limited with conifers for future large woody debris input. Native hardwoods are not proposed for harvest within this zone. "Blue Gum Creek" is part of the eucalyptus stand and will have eucalyptus harvests from the WLPZ. See Section II Item 26 (q) and Section III Item 26 (q) for a more detailed description of what is proposed. Enforceable Class I Watercourse protection measures are listed in Section II, Item 26.

No domestic water supplies were in or adjacent to the THP area.

Class II Watercourses

The Watercourse and Lake Protection Zone (WLPZ) for Class II-Standard watercourses is 50-100 feet. Canopy retention requirements for Class II watercourses also exceed those required by the FPR. Harvesting within the Class II WLPZ will be limited with conifers being selected for removal to improve growth rates in retained trees. This transfer of growth will produce larger diameter conifers for future large woody debris input. Native hardwoods are not proposed from harvest within this zone. "Blue Gum Creek" is part of the eucalyptus stand and will have eucalyptus harvests from the WLPZ. See Section II Item 26 (q) and Section III Item 26 (q) for a more detailed description of what is proposed. Enforceable Class II watercourse protection measures are listed in Section II, Item 26. Typing of Class II watercourses was made using the methodology identified in 14 CCR 916.9 (g)(1).

Springs and Wet Areas

With the exception of WLPZ widths, protection measures previously stated about for *"Class II Watercourses"* shall apply to springs/seeps. The WLPZ width shall be 50 feet on slopes <30%, and 75 feet on slopes >30%. WLPZ widths for wet areas shall be 50 feet.

Timber operations within the WLPZ of a Class I watercourse are designed and will be conducted so that the significant objective of protection, maintenance, or restoration of the beneficial uses of water or the populations and habitat of anadromous salmonids or listed aquatic or riparian-associated species will be attained. Specific practices utilized include establishment of WLPZ's and limiting heavy equipment use near watercourses and on steep slopes. WLPZ widths on Class I watercourses exceed those required by the FPR. Canopy retention requirements of the Class I and Class II-S watercourses exceed those required by the FPR. Springs and seeps that contain aquatic habitat have been provided with a WLPZ. Silviculture in the plan area will achieve significant upslope retention. Limiting timber operations as described above and in Section II, Item 26 will allow for future timber production while meeting the requirements of Title 14 CCR 916.2 and Title 14 CCR 916.9.

All LWD found in the harvest areas will be retained. This includes the stream channel and WLPZ. This is not a requirement of the Forest Practice Rules. No salvage logging is proposed within any WLPZ.

Class III Watercourses

Class III watercourse protection measures have been included in Section II, Item 26. The watercourse centerline has been flagged with blue/white dotted flagging.

No significant impacts are anticipated to affect anadromous salmonids or their habitat. By adhering to 14 CCR 916.9, habitat will be maintained or improved and no significant adverse effects are anticipated.

PLAN ADDENDUM TO ITEM 26 (g)
Watercourses

Replacement of the "user built bridge" is proposed on Road 669 at the crossing of the North Fork of Blue Gum Creek (Map Point 5). The replacement of the bridge will help facilitate the goal of the landowner to adopt the user built trail into the State Forest Trail network.

The table below shows calculated 100-year flows, bridge hydraulic capacity and wetted cross section area at 100-year flows. The resent 2017 updated *Designing Watercourse Crossing for Passage of 100-Year Flood Flows, Wood and Sediment* (Cafferata, et al.) was used as reference. See Section V, for cross sectional drawings illustrating the location of existing bridge, 1.4 foot free board elevation, and 100-year flood flow surface water elevation. Square footage of cross sectional areas was calculated utilizing engineers paper, where each square equals 1 square foot. Furthermore, the following equations were used:

Average Channel Water Velocity: $V = (1.49/n)(A/WP)^{0.67} \quad S^{0.5}$

Where:

V = average flow velocity (ft/s)
n = Manning's roughness coefficient
S = channel slope (ft/ft)
A = wetted cross-section area (ft^2)
WP = wetted hydraulic perimeter (ft)

Bridge Hydrologic Capacity: Q = vA

Where:

Q = 100 – year flood flow (cfs)
v = average flow velocity (ft/sec)
A = wetted cross-section area (ft^2)

Location: *Caspar 500 THP*

Magnitude and Frequency Method for 100-year flood flow (A > 100 acres)

Crossing	Area (acres) A	Basin maximum elevation (ft)*	Crossing elevation (ft)*	Area (mi^2) A	Avg. Annual Precipitation (in/yr*) P	Elevation Index (mean basin	100-yr flood flow Q_{100} (cfs) North Coast[1] (NC)	Sierra[2] (S)	North-east[3] (NE)	Central Coast[4] (CC)
MP 5	2,390	1680	360	3.734	49.39	1020	*1327.2*			

Bridge Flow Capacity (cubic feet per second)

Crossing	Sectional Area (A)	Stream Gradient (%)	Wetted Perimeter (ft)	(cfs)
MP 5	14.2	2	44.8	28

Average Channel Water Velocity

Crossing	Wetted Cross Sectional Area (A) (sq.ft)	Channel Slope (S) (ft/ft)	Wetted Perimeter (WP) (ft)	Manning's Roughness coeff. (n)	Average Flow Velocity (v) (ft/s)
MP 5	14.2	0.08	9.9	0.06	9

Bridge Hydraulic Capacity (cfs)

Crossing	Average Velocity (v) (cfs)	Wetted Cross Section (A)	Flow Capacity (Q) (cfs)
MP 5	9	14.2	127

Capacity/100-Flood Flow (cfs/cfs)
0.1

Wetted Cross Section Area - 100 Year Flood Flow

Crossing	Average Velocity (v) (cfs)	Wetted Cross Section (A)	100-yr Floow Flow (cfs)
MP 5	9	9.3	83.0

The bridge hydraulic capacity well exceeds the wetted cross section area at the 100-year flood flow elevation the bridge. Hydraulic capacity was calculated utilized the location of the existing bridge. They hydrologic capacity exceeds the 100-flood flow elevation by a multiple factor for 0.1.

The following table is provided, showing the calculated sizes for each crossing requiring a new or reconstructed permanent culvert.

Location: *Caspar 500 THP*

Rational Method for 100-year flood flow (A < 200 acres)

	** $T_c = 1.2 \times A^{0.5}$			$Q_{100} = CIA$				.67 hw/d projecting inlet
Crossing	Area (km2) A	Elevation difference (ft) H	Concentration time (min) Tc	Runoff coefficient C	100-year Return-Period Precipitation (in/hr) I *	Area (acres) A	100-yr flood flow (cfs) Q_{100}	Culvert Size for Q100 inches
Map Point 18	0.016	120	9	0.35	4.06	4.0	***5.7***	**24**
Map Point 20	0.020	60	10	0.35	4.06	5.0	***7.1***	**36**

* *Use 100-yr precipitation of duration similar to Tc or for 10 min, whichever is larger; convert to in/hr for input as "I"*
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca

PLAN ADDEMDUM ITEM 26 (p) and (q)

WATERCOURSES

14 CCR 916.9 (v)(1-3)(A)(1-7)

(v) Site-specific measures or nonstandard operational provisions

(1) In consideration of the spatial variability of the forest landscape, the RPF may propose site specific measures or nonstandard operational provisions in place of any of the provisions contained in this section. Site specific plans may be submitted when, in the judgement of the RPF, such measures or provisions offer a more effective or more feasible way of achieving the goals and objectives set forth in 14 CCR § 916.9, subsections (a) and (c), and would result in effects to the beneficial functions of the Riparian zone equal to or more favorable than those expected to result from the application of the operational provisions required under 14 CCR § 916.9.

(2) Measures or provisions proposed pursuant to 14 CCR § 916.9, subsections (v) shall only be approved with the plan incorporates an evaluation of the beneficial function of the Riparian zone as set forth in section (3) below. In the event of measures limited in applicability to specific sites, the submitter may instead of an evaluation, obtain written concurrence from CDFW prior to plan submittal. RPF's may request a preconsultation for the site specific plan and the Director may agree and request staff from responsible parties.

(3) The evaluation of the beneficial functions of the Riparian zone shall be included in addition to any evaluation required by all other District Forest Practice Rules, may incorporate by reference any such evaluation, and shall include the following components scaled appropriately to the scope of the proposed measures(s) or provisions(s) and the beneficial functions potentially affect.

(A) The following are required components of an evaluation conducted pursuant to 14 CCR § 916.9, subsection (v)(3):

1. *A description of the evaluation area. If the evaluation area is different than the watershed assessment area described pursuant to Technical Rule Addendum No. 2, the RPF shall briefly explain the rationale for establishing the evaluation area.*
2. *A description of the current condition of the Riparian zone within the evaluation area related to the beneficial functions. The RPF may incorporate by reference any conditions described in the plan pursuant to 14 CCR §916.4, subsection (a). The RPF shall use the best available information, at the appropriate scale, to describe the existing vegetation, timber stand characteristics, roads, skid trails, landings, channel types, unstable areas, flood prone areas, and overflow channels.*
3. *An identification of the beneficial functions that may potentially be affected by the proposed measures(s) or provisions(s).*
4. *An identification of the potential effects to the beneficial functions, both positive and negative. The RPF may use a reasoned analysis to describe the effects and may assign ratings of high, moderate, and low to those effects that may individually or cumulatively limit anadromous salmonid distribution and abundance in the watershed.*
5. *A detailed description of the site-specific measure(s) or nonstandard operational provision(s) proposed. The description should address at a minimum the relationships between the Riparian stand characteristics and ecological functions, the relative importance of the beneficial functions of the Riparian zone to the Watercourse, the cost effectives of the measure(s) or provision(s), and the predicted consequences.*
6. *A schedule for implementing proposed management practices.*
7. *A plan for monitoring consistent with 14 CCR § 916.11*

Description of Evaluation Area and Current Conditions of the Riparian Zone

The area of the proposed nonstandard operational provisions is within the invasive eucalyptus stand within Unit 3 of the THP area. The eucalyptus was originally planted in a single row as a wind break for the apple orchard that was planted in the area in the late 1800's. Since then, the eucalyptus has spread to encompass approximately 160 acres within the THP area. While majority of the stand is along the flat tractor ground bordering JDSF Road 520, a fair amount of the eucalyptus has spread downhill and is established in and along the two Class I forks of "Blue Gum Creek" and tributary Class II's. There are several large eucalyptus within the core zone of both forks of the Class I watercourse that are contributing to seed production. The WLPZ buffers also have a fair amount of eucalyptus within all zones, with the volume decreasing the further down "Blue Gum Creek" one goes. The lowest extent of eucalyptus within the "Blue Gum Creek" watershed is approximately 200 feet below the confluence of the two Class I forks.

Currently, the vegetation within the evaluation area are dominated by second and third growth redwood and Douglas-fir with an understory of tan oak, wax myrtle, huckleberry, and ferns including chain, sword, and five-fingered fern. Bishop pine is mixed with redwood and Douglas-fir in the tractor ground characterized with the marine terrace soils. Eucalyptus is a minor component to the WLPZ currently, but left in its currently state, could spread and increase in volume.

Identification of the Beneficial Functions that may Potentially be Affected by Proposed Measures
The proposed measures are within Class I and Class II WLPZs that function to protect the aquatic life and habitat. Beneficial functions that may be affected by the proposed measures include water temperature control, filtration of organic and inorganic material, and vegetative structure diversity for fish and wildlife habitat.

Potential Effects to the Beneficial Functions
Water Temperature Control
The removal of eucalyptus from the core zone will have a low effect on the water temperature control which in turn has little effect on the salmonid abundance in the watershed. Since the eucalyptus within the core zone will be girdled, the trees will slowly die over a few years. As they die, the will be a steady increase in sunlight that will reach the watercourse. However, the vegetation from around the watercourse will have increased after the harvest so that by the time the trees die, the watercourse potentially needs some sunlight.

Filtration of Organic and Inorganic Material
Currently the areas with a higher density of eucalyptus have a deep layer of eucalyptus duff consisting of leaves, branches and bark. Eucalyptus are allopathic and therefore prohibits the native vegetation from growing. The deep duff layer acts as the filtration strip for organic and inorganic material to the watercourse in these eucalyptus dense areas. Girdling of the eucalyptus will keep the duff layer on the forest floor for years following the harvest as the tree dies and may increase the amount of duff. Eventually, the duff will decompose and new native vegetation will sprout.

This beneficial function is both a positive and a negative. Positively attributes are that the duff layer is acting as a filtration strip in the absence of the native vegetation. Negative attributes are that the duff layer is suppressing the native vegetation. The second negative attribute is that the leaves, bark and branches are falling into the watercourses and introducing different chemical compounds into the ecosystem which may not be good for fish and other aquatic species. There is a moderate potential that the current filtration of organic and inorganic material is effecting the salmonid abundance in the watershed. There is a moderate potential that the future filtration of organic and inorganic material will have a positive effect on the salmonid abundance in the watershed.

Vegetative Structure Diversity for Fish and Wildlife Habitat
As stated above, the deep eucalyptus duff layer is prohibiting the growth of native species that would normally contribute organic material and nutrients into the watercourse. The proposed operations would increase the amount of native vegetation in the long term which would positively affect the salmonid abundance and other aquatic wildlife in the watershed.

The negative cumulative effects of the proposed operations would be low while the positive effects would be moderate to high. Removing eucalyptus from the areas would increase the native vegetation which would increase the correct nutrients into the watercourse, benefiting the abundance of salmonids in the watershed downstream and the other aquatic life within the watercourse.

Detailed Description of the Site-Specific Measure(s) or Nonstandard Operational Provision(s) Proposed
The RPF is proposing operations within the "core and channel migration zones" of Class I and II watercourses to address the eucalyptus stand and managing a way of transport for the seeds. The RPF is proposing to girdle eucalyptus that are > 22" within all zones of the Class I and II WLPZ and where feasible, cut eucalyptus <22". The RPF believes that the reduction of the eucalyptus within the Class I and II watercourse WLPZs will not lower the shade canopy below the minimum.

If a <22" eucalyptus cannot be directionally felled away from the channel of the watercourse or if too many conifers must be felled to remove the eucalyptus, the eucalyptus can be marked to be girdled.

Schedule for Implementing Proposed Management Practices
The proposed management practices would occur during the other operations of the timber harvest. This plan is expected to be sold in 2021.

Plan for Monitoring
As this THP is addressing approximately 150 acres of a eucalyptus stand, there will be monitoring of the different treatments utilized and demonstrated. A photographic monitoring will be utilized. Photos will be taking before operations, after operations and each year for the next three years. After the three years have passed and evaluation will occur to decide if more monitoring is needed or not.

PLAN ADDENDUM TO ITEM 26 (s)

WATERCOURSES

14 CCR 916.6 Alternative Watercourse and Lake Protection

14 CCR 916.3(e): Trees cut within the WLPZ shall be felled away from the watercourse by pulling or other mechanical methods if necessary, in order to protect the residual vegetation in the WLPZ. Exception may be proposed in the THPO and used when approved the Director.
14 CCR 914.1(a): To the fullest extent possible and with due consideration given to topography, lean of trees, landings, utility lines, local obstructions, and safety factors, trees shall be felled to lead in a direction away from watercourses and lakes.

Standard Prescription Replaced: 916.3(e) and 914.1(a)
Description and Explanation: These are alternatives which the RPF is requesting because in the course of field work, there were times when a need for them was perceived in order to achieve the desired result. Additionally, it was noted that in several locations within the THP, WPLZ-protected watercourses are in close proximity to each other, and it is not physically possible to fall a tree in one WLPZ which will not fall towards another nearby watercourse or into the other WLPZ. While this is a rather technical interpretation, the RPF wanted to identify such problems and ensure they are addressed, rather than putting the LTO in a difficult situation.
Beneficial uses of Water which may be Adversely Affected and Evaluation Thereof: There should be no adverse impacts on the beneficial uses of water. The post-harvest condition of the WLPZ stand should be the same, with possibly less damage due to better falling choices.
How it Differs from the Standard Prescription
Justification: There are locations within the THP area where one can not physically fall a tree without falling towards a watercourse. These areas are small in scope, but would qualify under 916.6(a)(1)(D)(cc).
Evaluation: The proposed practices may be evaluated by either party at any time. The evaluation criteria are the same as those for the standard practice. All other pertinent Forest Practice Rules and requirements of the THP apply.

BIOLOGICAL RESOURCES

Birds, Mammals, Amphibians and Reptiles
The current scoping list includes state and federally listed (threatened and endangered) and candidate species, CDFW Fully Protected Species, and CDFW Species of Concern. Species are discussed in Section IV.

Northern Spotted Owl
NSO habitat definitions (From the USFWS Attachment A: Coast District):
Nesting/Roosting Habitat: Forested habitat that supports successful nesting and associated roosting behavior by NSO. Habitat with ≥60% canopy cover of trees that are ≥11" DBH and have a basal area ≥100 square feet per acre of trees ≥11" DBH. Trees may be conifer or hardwood.
Foraging Habitat: Habitat that contains ≥40% canopy cover of trees that are ≥11" DBH and have a basal area ≥75 square feet per acre of trees ≥11" DBH. Trees may be conifer or hardwood.

NSO habitat on JDSF was typed by reviewing 2016 or earlier aerial photos, historical aerial photos, JDSF's harvest history, and field checking. NSO habitat off JDSF was typed using aerial photos. See Section V, NSO Information for detailed Northern Spotted Owl occurrence and habitat information.

Marbled Murrelet
Scoping for potential murrelet habitat within the THP and 0.25 miles is currently occurring. Scoping includes the use of NAIP digital photos. The area has been scoped previously for past adjacent THPs. No murrelet habitat was found to be within or 0.25 miles of the THP area.

Raptors (other than NSO)
During fieldwork for this THP, the RPF and forestry aides have spent numerous hours in the field. Field staff are always listening for raptor calls and looking for signs of nests, plucking posts, and/or white wash. The time of day when foresters were present during this period ranged from 7:30 am to 5:00 pm. No raptor nests have been observed.

Sonoma Tree Vole
The JDSF wildlife biologist and Forestry Assistant II assigned to the THP completed a tree vole nest search in the area of the plan adjacent to the 1996 CNDDB tree vole report. Both reviewed the 2005 M.S. Thesis by James Swingle on red tree voles (Daily Activity Patterns, Survival and Movements of Red Tree Vole (*Arborimus longicaudus)* in Western Oregon) to acquaint themselves with typical tree vole nest characteristics prior to the survey. There was one potential nest found 300 feet outside of the THP boundary.

Plants
The current scoping list for JDSF botanical surveys includes state and federally listed (threatened and endangered) and candidate species, state Rare species, and California Rare Plant Rank (CRPR) 1-4 species that could occur within the State Forest and nearby region. The list was refined through consultation with Tina Fabula (JDSF biologist), and by reviewing current CNDDB lists and the CNPS electronic inventory. Seasonally appropriate botanical surveys will be conducted in 2020 and will be amended into the plan once they are complete.

Foothill Yellow-legged Frog
The Foothill Yellow-legged Frog (*Rana boylii,* FYLF) is a CDFW Species of Special Concern and a State Candidate (as of June 21, 2017).

The primary threats to the FYLF appear to be climate change, water development (impoundments and diversion) and dams, predation (by invasive and native species such as garter snakes, bass, pikeminnow, bullfrog, river otters, and feral pigs); trampling of frogs and their habitat and water contamination by cattle may be a contributing minor factor. Mining activities such as suction dredging and gravel mining destroys habitat. Toxic compounds from the breakdown of herbicides, pesticides, and fertilizers, have been shown to be transported on easterly winds from the Central Valley to the frog's habitat and can cause physical, developmental, and behavioral abnormalities that impact the frog's life cycle. Logging roads and stream crossings can add sediment to the frog's aquatic habitat thus hampering egg attachment to substrate, and reducing algal food for tadpoles.

This highly aquatic species inhabits a variety of small to large sized streams with rocky or cobble substrate, from sea-level to 6,000 feet. They are found in a variety of riparian, oak-woodland, conifer, coastal scrub, mixed chaparral, and meadow stream habitats. Adults bask on sunny exposed rock surfaces near streams and dive into water when disturbed. Breeding can begin as early as March in warm coastal streams and extend into May, and larvae can hatch in as little as 5 or more than 35 days depending on temperature.

Egg clusters are attached to the downstream side of rocks in shallow, slow moving water near stream edges. Rearing habitat for tadpoles consists of sunny low-gradient gravel and cobble bars along vegetated banks. This species is rarely encountered so far (over 39 feet) from permanent water and use watercourses for movement corridors (Nussbaum et al. 1983, Bourque 2008).

CDFW stream surveys have previously recorded the FYLF in the following basins and sub-basins of JDSF: SF Noyo River, NFSF Noyo River, Brandon gulch, Parlin Creek, NF Big River, Chamberlain Creek, West Chamberlain Creek, James Creek and the NF James Creek (S. Harris 2001). Caspar Creek has not had any previously recorded FYLF sightings and this creek has been walked multiple times by researchers and surveys over the years. FYLF habitat in the plan area will be protected by the WLPZ protection measures. Take of adult Foothill Yellow-legged Frog and/or damage to egg masses will be avoided during the critical period season (March 15 through June 30) by the avoidance measures in Section II. Protection of Class I and Class II habitats for the listed fish species (coho and steelhead) will also protect the aquatic habitat of this frog.

Listed Anadromous Salmonids

This harvest plan incorporates protection measures identified in 14 CCR 916.9, 923.3 and 923.9 Protection Measures for Watersheds with Listed Anadromous Salmonids.

Cumulative Impacts Assessment

BOARD OF FORESTRY TECHNICAL RULE ADDENDUM NO. 2

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APPENDIX B: INFORMATION SOURCES AND PERSONAL CONTACTS USED BY THE RPF IN THE ASSESSMENT OF CUMULATIVE IMPACTS

CUMULATIVE IMPACTS ASSESSMENT

INTRODUCTION

The cumulative impacts assessment (CIA) is based on the methodology described in the Board of Forestry Technical Addendum #2, and allows for the analysis of the qualitative and quantitative observations made during the timber harvest plan preparation process. This assessment provides a descriptive report of the resource subjects in association with the proposed harvesting operations, as well as the procedures, conclusions, and any mitigation's that will allow for the prevention of significant impacts to the assessed resources. The conclusions reached by this analysis have been applied to the operational considerations reported in the previous sections of the THP, and supports the plan preparer's statement that the timber harvesting plan will not have a significant adverse impact on the resources of concern.

CUMULATIVE IMPACTS ASSESSMENT CHECKLIST

(1) Do the resource assessment areas that may be affected by the proposed project contain any past, present, or reasonably foreseeable probable future projects?

Yes ☒ No ☐

If the answer is Yes, identify the projects and effected resource subjects.

PAST, PRESENT, AND FUTURE PROJECTS

Historic Timber Harvesting

The Caspar Lumber Company was founded in 1860 by William H. Kelly and Captain William T. Rundle with the purchase of 5,000 acres and the building of the mill at the mouth of Caspar Creek. The logging company expanded through the 1860s under the ownership of Jacob G. Jackson. Timber production has been the primary land use activity within the Caspar Creek Watershed and in the proposed THP area for more than 150 years. Nearly the entire watershed has been under the management of the State Forest since acquisition from the Caspar Lumber Company in 1947. The remaining portions of the watershed on the coast and along Road 409 are owned by small landowners.

During the original entry in the 1860s, timber was typically yarded with teams of oxen (and steam donkeys beginning in 1890s) downhill via swales and creek bottoms, and stored behind splash dams, one of which is located within Caspar Confluence THP's boundaries. These splash dams were triggered in sequence to move thousands of logs to the Caspar millpond located near the mouth of Caspar Creek. Hillsides littered with redwood bark and slash were burned to facilitate the skidding of these large logs to the creeks. Most of the watershed was harvested by the late 1890s. Following these early harvests, stands of second growth redwood and Douglas-fir timber developed with a significant component of tanoak. Modern equipment such as high-power tractors were widely used by the logging industry during the post-World War II era. Timber harvesting during this period was particularly destructive because the new technology provided the means to displace large quantities of soil before there was a general awareness of the environmental consequences of such actions. The practice of skidding down draws and watercourse was common. Some areas within the greater watershed were harvested during the era of tractor logging, specifically the area of 'Caspar Orchard,' which was clear-cut in 1945. The current THP was harvested in the 1960's using tractor logging methods as well. Impacts associated with more recent timber harvesting in the watershed have been lessened or avoided by using less destructive yarding methods and by implementing erosion control and watercourse protection measures mandated in the Forest Practice Act. The most western portion of the current THP was harvested in the 1990's using a combination of tractor and cable yarding systems which lessened the amount of impacts to the watershed.

Long-term watershed effects from the historic logging methods included the large-scale movement of soil, slash and wood debris into watercourses and the removal of the adjacent vegetative canopy. Water temperatures increased and pool volumes decreased, thus degrading aquatic habitat. Recovery over the intervening decades has been an on-going process, both natural and humanly enhanced. Streams continue to move historic sediment during high flow events.

Terrestrial wildlife habitat was also impacted by historic logging activity. Over a period of less than two decades, most of the original old growth forest in the watershed was removed and replaced by a newly regenerated second growth forest.

The Caspar Creek Watershed study is located in the North Fork and South Fork tributary watersheds of Caspar Creek. These watersheds serve as research sites for evaluating the effects of timber management on streamflow, sedimentation, and erosion. Established in 1961 as a cooperative effort between the CAL FIRE and the United States Forest Service Pacific Southwest Research Station (PSW), the Caspar Creek study has evolved from a simple paired watershed study into one of the most comprehensive and detailed investigations of its kind. PSW and CAL FIRE have a 100-year Memorandum of Understanding to continue research at the site at least through 2099. Caspar Creek is one of 11 USFS Experimental Forests and Ranges selected in 2007 to complement the national network of Long Term Ecological Research sites.

The half-century-long record from the North and South Forks of Caspar Creek is unique in providing long-term hydrologic data from small, rain-dominated watersheds located in 2nd and 3rd-growth conifer forests. Because of the kinds of research carried out, the lengthy record, and the relevance of site conditions to major water supply sources, the Caspar Creek Experimental Watersheds have long provided information used both to extend basic knowledge and to guide land management practices.

The State Forest as public land has been used for many additional purposes since its acquisition from the Caspar Lumber Company; uses include hiking, hunting, biking, mushroom picking, and camping has been ongoing. These activities have coexisted with harvesting operations on the State Forest.

CUMULATIVE LOGGING ACTIVITY TABLE

The following are lists of past and present timber harvest plans and the approximate acres within the Caspar Creek Planning Watershed and within the Biological Assessment Area for the last ten years.

1113.300404 Caspar Creek PW

THP Number	*Owner Description*	*Legal Description*	*Silviculture and Acreage (within WAA)*	*Yarding Method*	*Plan Status*
1-06NTMP-26 MEN	Ed Powers & Gregg Kulijian	T17N, R17W, Section 6, 7, MDBM	Selection, 168	Tractor/Cable	Approved
1-16-124-MEN	JDSF	T17W, R17W, Sec. 9, 10, 11, 12, 14, 15, 16 MDBM	Selection, 755 VR, 72 Commercial Thin, 20.5 Road Right of Way, 1.5	Tractor/Cable	Approved
1-15-125-MEN	JDSF	T17N, R17W, Sec. 1, T18N, R17W, Sec. 25,26,35,36, T18N, R16W, Sec. 30,31	Selection, 456* Road Right of Way, 4 ~ 16 ac. In WAA	Tractor/Cable	Completed
1-14-120-MEN	JDSF	T17W, R17W, Sec.8, 9, 16 MDBM	Selection, 356 Group Selection, 19	Tractor/Cable	Completed
1-14-058-MEN	JDSF	T17N, R17W, Sec. 1, 12 MDBM	Selection, 310 Road Right of Way, 10	Tractor/Cable	Completed
1-13-079-MEN	JDSF	T17W, R17W, Sec. 1, 2, 10, 11, 12, 15, MDBM	Selection, 247	Tractor/Cable	Completed
1-13-007-MEN	JDSF	T17W, R17W, Sec. 3, 10, MDBM	Selection, 247 Alternative Prescription, 40	Tractor/Cable	Completed
1-12-101-MEN	JDSF	T18N, R17W, Sec. 26, 27, 34, 35, 36, MDBM	Group Selection, 278	Tractor/Cable	Completed
1-11-097-MEN	JDSF	T17N, R17W, Sec. 1 T17N, R16W, Sec. 6 T18N, R16W, Sec. 31 T18N, R17W, Sec. 36 MDBM	Group Selection, 340 (4 acres within BAA)	Tractor/Cable	Completed

0.7 miles – Biological Assessment Area

THP Number	*Owner Description*	*Legal Description*	*Silviculture and Acreage (total plan area)*	*Yarding Method*	*Plan Status*
1-13-125-MEN	JDSF	T17N, R17W, Sec. 13,14,23,24 MDBM	Selection, 153 Group selection, 86	Tractor/Cable	Completed

Stand History
The THP area was progressively harvested from the coast eastward starting in the 1860's while under the ownership of the Caspar Lumber Company. Most merchantable trees were felled, the logs bucked, and the area then broadcast burned to clear the slash and burn off the thick redwood bark. A few acres of the THP area were harvested in 1945 within what is known as the 'Caspar Orchard' area. Majority of the plan area was harvested in the 1960's with a clear-cut in about 90 acres in 1964. The rest of the plan was heavily selectively harvested in the later 1960's. The most westerly portion of the THP are was harvested in 1995. This THP (Nettle) utilized a prescription of gap silviculture, which is being implemented again in the current THP.

Reasonably Foreseeable, Probable Future Projects
The majority (80%) of the watershed assessment area (WAA), which is 5,393 acres, is within Jackson Demonstration State Forest (JDSF). Land uses on JDSF in the WAA include timberland management and recreational activities such as hiking, hunting, biking, mushroom picking and horseback riding. Land uses within the WAA outside of JDSF consist primarily of residential properties with <15 acres of land. Small timber land conversions could occur which would impact the flatter ground along the ridgetops along Road 409.

Forest management activities, including timber harvesting, will continue within the watershed into the future. The majority of the Caspar Creek watershed consists of forestland which is zoned for timber production. The intention of JDSF is to manage the ownership within the watershed for demonstration, research, timber production and recreation. Based on current regulation and JDSF standards, it can be assumed that all present and future timber harvesting in the Caspar Creek Watershed on JDSF land will be designed to employ modern, environmentally sound harvesting methods in conjunction with research and demonstration objectives.

A portion of Jug Creek THP is proposed as a future timber harvesting project within the Caspar Creek Watershed in 2022. The future harvest in the WAAs is anticipated to likely utilize even and uneven-aged silvicultural prescriptions. However, the actual silviculture to be implemented has not been finalized and mapping required per Technical Addendum No. 2 provided in this section, is a best guess. It is likely that future projects will be affected by continuing strategic planning, experimental design, economics, and political conditions. Opportunities for harvesting hardwood stands in the planning watershed may arise in the next 10 years as well.

Timber Harvesting: Other Ownerships
While majority of the Caspar Creek Watershed is owned by the State Forest, other ownerships are mainly located along County Road 409 and at the mouth of the watershed. While most of these ownerships are smaller (<15 acres), it is likely that privately owned timberlands in the assessment area will continue under forest and resource management, which will include further harvesting of timber, related road construction and reconstruction, reforestation and timber stand improvement but for non-commercial purposes. There is the potential for the ownerships to be subdivided and conversations with construction to occur.

Recreation
Activities other than demonstration, research, and timber production on the JDSF ownership in the WAA are expected to continue. Such activities may include hiking, biking, mushroom picking, horseback riding, hunting, road maintenance, and other activities: brush control and invasive weed management.

This area is heavily utilized

(2) Are there any continuing, significant adverse impacts from past land use activities that may add to the impacts of the proposed project?

Yes ☒ No ☐

If the answer is Yes, identify the activities, describing their location, impacts and affected resource subjects.

Past Activities
Question (2) above is checked 'Yes' regarding impacts that have occurred in the Caspar Creek Planning Watershed. Impacts are primarily associated with historical harvesting (i.e. pre-Forest Practice Act). Significant impacts occurred primarily from log transportation systems. These types of past harvesting practices, when exposed to significant weather events such as floods in the 1950s and 1960s (i.e. above average rainfall year) resulted in significant cumulative impacts to watersheds (i.e. landslides, road failures, plugged culverts and watercourse bank mass wasting).

Timber harvesting prior to the passage of the modern Forest Practice Rules, which came into effect in the mid-1970's, was largely unregulated. Prior to the new Forest Practice Rules there was no control on the size of harvest units; therefore, harvested areas

tended to be large. During this period, no special protection was afforded riparian areas so impacts to streams from timber harvesting activities, including timber falling, skidding logs by tractors and cable logging systems, road construction, road maintenance and development of local borrow pits for road rocking materials, were common.

Impacts

The early logging operations caused direct impacts to streams, watercourse channels and draws as logging practices used equipment available at the time and did not observe any protection zones around watercourses or unstable areas. Logs were skidded down watercourse channels and haul roads were commonly located near or sometimes even up and down stream channels. Impacts to watercourse channels included direct deposition of soil, slash and logging debris into the channel areas. Old roads were not always maintained and crossing facilities were designed to hold up for individual operations, rather than the long term. Crossing facilities often consisted of stumps and logs (Humboldt crossing) or in some cases, crossings on small streams consisted only of a temporary soil fill.

Since the practices prior to the modern Forest Practice Rules did not recognize the protection of stream corridors, most of the trees along streams were removed. Removal of streamside timber and vegetation could result in increased water temperatures.

Modern forest management activity within the watershed has been conducted in compliance with the Forest Practices Act and Rules, and has consisted primarily of selection, and group selection, and alternative prescription operations. Please see the list of recent management operations within the watershed assessment area.

Resources Affected

Resources affected by the past activities include overall water quality, fish, and aquatic species, and in-stream fish and aquatic species habitats resulting from old watercourse crossings, fills, decomposing and undersized culverts throughout the Caspar Creek Planning Watershed. Within the Caspar Creek Watershed (WAA), evidence of past land use activities are found within the fish bearing watercourses. Activities that may have caused damage to the watercourses within the WAA include skidding down watercourse channels and utilization of splash dams in the late 1800s and logging and road building during the 1960s and 70's.

The 1995 and 2006 Stream Inventory Reports, prepared by the California Department of Fish and Game (Wildlife), indicate that all forks of the Caspar Creek Watershed are habitat for both coho salmon and steelhead trout. These reports recommended that Caspar Creek should be managed as an anadromous, natural production stream. Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries. The addition of high quality complex woody cover in the pools and flatwater habitat or engineered pool enhancement structures is desirable. The North and South Fork weirs and associated structures were identified in the report as problematic for upstream and downstream migrants, and were replaced in 2008.

The resources primarily affected by sedimentation are aquatic species and water quality. Road maintenance and construction standards, which follow the Forest Practice Rules, will help alleviate the continuing adverse impacts from roads that were not designed to minimize erosion potential.

This THP incorporates protection measures to reduce and/or eliminate sources and potential impacts to water temperature to ensure that significant cumulative adverse impacts do not occur as a result of this project. These measures are discussed in the Watershed Assessment section of the Cumulative Impact Assessment below.

Geologic Events

Timber harvesting prior to the passage of the modern Forest Practice Rules, which came into effect in the mid-1970's, was largely unregulated. Prior to the new Forest Practice Rules, there was no special protection afforded to unstable areas, so impacts to streams and timberlands by timber harvesting activities, including timber falling, skidding logs by tractors and cable logging systems, road construction, and road maintenance was common. These historic practices combined with the geology and seismology of the north coast has created an increased chance of future instabilities.

The resources affected by geologic events include aquatic resources, water quality and timberland productivity. Considering the mitigation measures proposed in this THP, it is the Plan Submitter's opinion that no significant incremental adverse impacts will occur as a result of this THP.

(3) Will the proposed project, as presented, in combination with past, present, or reasonably foreseeable probable future projects identified in (1) and (2) above, have a reasonable potential to cause or add to significant cumulative impacts in any of the following resource subjects?

		Yes After Mitigation (a)	No After Mitigation (b)	No Reasonably Potential Significant Effects (c)
1.	Watershed		X	
2.	Soil Productivity		X	
3.	Biological		X	
4.	Recreation		X	
5.	Visual		X	
6.	Traffic		X	
7.	Greenhouse Gas (GHG)			X
8.	Wildfire Risk and Hazard			X
9.	Other			X

(4) If column (a) is checked in (3) above, describe why the expected impacts cannot be feasibly mitigated or avoided, and what mitigation measures or alternatives were considered to reach this determination of impacts. If column (b) is checked in (3) above, describe what mitigation measures have been selected which will substantially reduce or avoid reasonably potential significant cumulative impacts, except for those mitigation measures or alternatives mandated by application of the rules of the Board of Forestry.

Cumulative impacts are two or more effects which, when considered together, are considerable (significant) or which compound or increase other environmental impacts. The cumulative impact of a project is the change in the environment that may result from incremental project impacts when added to other closely related past, present, and reasonably foreseeable, probable future projects. Based on experience, consultation with listed research into potential impact issues, and utilizing identified resources as stated in the Cumulative Impacts Assessment, it is this RPF's professional judgment that potential impacts resulting from this project have been mitigated to a level that prevents significant adverse impacts.

Practices to Minimize Potential Cumulative Impacts

Silviculture- The use of single tree selection silviculture will result in a high level of forest cover near watercourses and a moderate to high forest cover throughout the remainder of the plan area. The maintenance of continual canopy cover provides root support, interception, and evapotranspiration resulting in reduced soil pore pressure, raindrop impact and overland flow. These measures are designed to minimize the potential for soil mass wasting and surface erosion. In areas of group selection silviculture, the results will be a gap of up to a ½ acre surrounded by moderate to high forest cover.

Yarding- The extensive use of skyline-cable yarding on slopes exceeding 50 percent will limit ground disturbance by providing full or partial suspension of logs yarded to landings, eliminating the need for tractor roads in those locations. Cable yarding also requires fewer miles of logging road than ground –based systems. These measures are designed to minimize soil disturbance thereby reducing the potential for sediment production and transport.

Soil stabilization practices- Treatments designed to reduce the movement of soil from tractor roads, logging roads and landings, and other disturbed areas include treatment of greater than 100 ft^2 of bare mineral soil within ELZ or WLPZs, restrictions on heavy equipment operations, road use, timing of installation of erosion control facilities, and year-round wet weather restrictions on timber operations. These measures are designed to minimize soil disturbance and restrict operations when soils are most susceptible to sediment production and transport.

Winter Period operations- Timber operations during the Winter Period are limited to timber falling, road inspection, and emergency maintenance activities to insure proper functioning of drainage facilities and structures. These measures are designed to minimize soil disturbance and restrict operations when soils are most susceptible to sediment production and transport. Extended Wet Weather Period restrictions provide further protections.

Road and landings- During the 1940's and 1960's, roads leading into the plan area were constructed primarily on ridgetops, mid-slope and nearby watercourses. Approximately 2.24 miles of new seasonal roads are proposed to access additional areas for cable logging. In addition, abandonment of a seasonal road and a historic road within a Class I WLPZ, upgrading ditch relief culverts and other proposed improvements to the existing road drainage system will make the road hydrologically disconnected, minimizing the potential for sediment delivery to watercourses.

Watercourse and lake protection- Class I and II WLPZs provide a buffer to filter sediment that may be produced upslope. For Class I WLPZs no timber operations will occur within 30 feet from the water transition line, very light harvest from 30' to 100', and light harvest in the remaining 50 feet. For Class II-S WLPZs no timber operations will occur within 25 feet from the water transition line and light harvest in the remaining zone. These protection measures exceed the Forest Practice Rules.

Biological- Cull trees, snags and down logs, except for along the trail system, will be retained where they do not interfere with operations or safety, providing structural diversity and habitat for wildlife. Surveys have been conducted for rare plants and populations have been protected. Surveys have been conducted for northern spotted owl. Harvests will be limited within Class I and Class II WLPZs.

Recreational & Visual- The selection silviculture will leave a well-stocked stand, lessening potential aesthetic impacts. There are no designated campgrounds within sight of the plan area. Hazard trees within the trail system will be removed to provide for safety of the public. The trail system within the THP area will be closed to recreationalist during operations, but an alternate route is provided on the opposite side of JDSF Road 500 to access other trails in the area.

Traffic- Roads within the THP, with the exception of JDSF Road 500, will be closed to recreational traffic during logging operations and signs will be posted for public safety. Road 500 will be open to the public as normal, but will be closed intermittently for public safety to accommodate tree falling and road work.

IDENTIFICATION OF RESOURCE AREAS

(5) Provide a brief description of the assessment area used for each resource subject.

1. Watershed Assessment Area (WAA)

The watershed assessment area (WAA) was developed so that it would comprise an area where conditions could best be evaluated to determine impacts from a representation of past, present and future projects. The assessment area for watershed resources will be the Caspar Creek Planning Watershed (1113.200404) as identified in the Watershed and Biological Assessment Area Map.

The Watershed Assessment Area is 5,360 acres in size of which JDSF owns 4314.4 acres or 80% of the planning watershed. A range of elevations occur within the WAA from around 100 feet along the Caspar Creek up to about 500 feet above mean sea level. Major tributaries to Caspar Creek in the Caspar Creek Planning Watershed include South Fork Caspar Creek and North Fork Caspar Creek. This watershed boundary is consistent with the Planning Watershed boundary as defined in 14 CCR 895.1. Impacts were evaluated as individual impacts that when combined may cause a "significant adverse impact" on the environment.

The area of assessment focuses primarily on the THP and the Caspar Creek WAA. Other attributes under consideration include but are not limited to: agricultural activities, range management, areas historically known to be unstable, industrial and domestic use. This WAA allows for a logical consideration of effects when projects combined with watershed attributes in the WAA drainage are analyzed. This WAA was developed and assessed as per CDF guidelines set forth in 14 CCR 912.9 Board of Forestry Technical Rule Addendum No. 2 Cumulative Impacts Assessment - Appendix Technical Rule Addendum.

2. Soil Productivity Area

Only the area within the project area (THP area) will be considered. This is the area where a potential impact to soil productivity could occur from timber operations. This area was assessed following the guidelines of 14 CCR 912.9 Technical Rule Addendum No. 2.

3. Biological Assessment Area

The Biological Assessment Area (BAA) is the area within 0.7 miles of the plan. The BAA boundary has been chosen to evaluate cumulative effects on wildlife habitat for the purposes of this document. These areas have been the standard used by agencies for reviewing potential effects on biological resources in and adjacent to the plan area. Movement of animals does not directly correlate

The Biological Assessment Area (BAA) is the area within 0.7 miles of the plan. The BAA boundary has been chosen to evaluate cumulative effects on wildlife habitat for the purposes of this document. These areas have been the standard used by agencies for reviewing potential effects on biological resources in and adjacent to the plan area. Movement of animals does not directly correlate to watershed boundaries or ownership boundaries. As such, the area surrounding the harvest area is a logical assessment area to determine potential impacts to various habitat structures. The BAA was developed following the guidelines of 14 CCR 912.9 Technical Rule Addendum #2. This assessment area is large enough to include all biological resources of concern that could be affected by this project, while being biologically practical in nature. The BAA is shown on the Watershed, Biological and Visual Assessment Areas Map attached in Section IV.

4. Recreation Assessment Area

The logging area and the area within 300' of the project area were considered. This 300' assessment area surrounding the plan was chosen because it offers adequate evaluation when considering audio and visual impacts of timber operations. This area was assessed as per CAL FIRE guidelines set forth in Title 14 CCR 912.9 Board of Forestry Technical Rule Addendum No. 2, Cumulative Impacts Assessment - Appendix Technical Rule Addendum No. 2.

5. Visual Assessment Area

Defined as the project area that is readily visible to a significant number of people who are no further than three (3) air miles from the forest operation. This area was assessed following the guidelines of 14 CCR 912.9 Technical Rule Addendum No. 2. This boundary equates to an area readily visible to members of the public traveling on roads within 3-miles of the THP area. The size of the VAA permits evaluation of visual impacts to JDSF visitors who access the watershed.

Guidelines for choosing the VAA include the logging area readily visible to significant numbers of people who are no further than 3-miles with a view of the THP area. The THP area is generally shielded by topography and visible only from points on seasonal roads adjacent to the project.

6. Traffic Assessment Area

The traffic assessment area (TAA) is the traveled surface of roads and highways not part of the logging area on which logging traffic must travel to access the plan area and to deliver logs to mills. Logging traffic will travel JDSF Roads 70, 70 series roads, and State Highway 20. All JDSF roads within the TAA are accessible to the public but are closed to vehicular traffic year-round. Highways that may be used to transport forest products are: State Routes 1, 20, 101, and 128.

7. Greenhouse Gases (GHG)

Only areas within the project area (THP area) will be considered. This is the only areas where equipment will be operated and carbon sequestering materials harvested, thereby providing a potential impact of carbon emissions and potential impact to climate change. This area was assessed following the guidelines of 14 CCR §912.9 Technical Rule Addendum No. 2.

8. Wildfire Risk and Hazard Assessment Area

The logging area and the area within 500' of the project area were considered. Areas up to within 500' feet of permanently located structures maintained for human habitation should be assessed for unusual fire risk or hazard, where logging slash should be treated for hazard reduction. Within the assessment area, logging operations have the potential to contribute and combine to create a change in fuel loading, continuity, and composition as well as affect ingress and egress for fire suppression resources.

IDENTIFICATION OF INFORMATION SOURCES

(6) List and briefly describe the individuals, organizations, and records consulted in the assessment of cumulative impacts for each resource subject. Records of the information used in the assessment shall be provided to the Director upon request.

See Section IV, Appendix B.

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APPENDIX A– TECHNICAL RULE ADDENDUM NO. 2

1. WATERSHED RESOURCES- Watershed Effects

Beneficial uses of water listed and defined in the Water Quality Control Plan for the North Coast are listed below.

Municipal and Domestic supply	Industrial Service Supply	Groundwater Recharge
Hydropower Generation	Cold Freshwater Habitat	Freshwater Replenishment
Agricultural Supply	Industrial Process Supply	Wildlife Habitat
Water Contact Recreation	Warm Freshwater Habitat	Fish Spawning
Non-Contact Water Recreation	Migration	Preservation of Rare & Endangered Species

Impacts to the above listed beneficial uses from timber operations could occur if the proposed operations affect such factors as sedimentation, water temperature, organic debris, chemical contamination, or peak flows. These factors are addressed below:

a. Sediment Effects

Aquatic habitat is present for California chinook salmon (*Oncorrhynchus tshawytscha)*, coho salmon (*Oncorrhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*) within the WAA, with all three species susceptible to the effects of sedimentation. Their eggs are buried in gravels located within the stream substrate. The eggs rely on a steady flow of clean, cold water to deliver oxygen and remove waste products. In coastal streams the eggs usually hatch in about 30 days, depending on water temperatures. Eggs hatch into alevin and remain in the gravel another 30 days or so, living on the nutrients in their yolk sacs. As they develop into fry, the yolk is used up, and the fry must emerge through spaces in the gravel to take up life in the stream. During the 60-day period when eggs and alevin are in the gravel, major shifts of the stream bottom can kill them (Nawa and Frissell, 1993).

Increased fine sediments are a problem for salmon due to their negative effects on spawning, hiding cover, and insect abundance. Too much coarse sediment is a concern because it fills pools, destabilizes stream beds, and reduces water depth leading to warmer water. In a healthy stream, young salmon and trout hide in the interstitial spaces between cobbles and boulders to avoid predation. The area of the stream where flowing water extends down into the gravel is also extremely important for aquatic invertebrates, which supply most of the food for young salmon, steelhead and cutthroat trout. Juvenile salmonids may lose their source of cover and food if fine sediment fills interstitial spaces within the streambed gravel.

Current Conditions- Past road and railroad construction and timber operations in the assessment area (particularly prior to the 1973 Z'berg-Nejedly Forest Act) were a major source of sediment and created a legacy of accumulated channel deposits, road conditions, and erosion sites that continue to contribute sediment to streams in the assessment area. Combining these legacy effects from past projects with natural sediment sources and future sediment production from proposed operations could create new or add to existing significant adverse cumulative impacts to on-site and downstream beneficial uses of water.

Findings- The THP area was investigated by a California Geological Survey (CGS) Certified Engineering Geologist (CEG) in 2019. CGS utilized aerial photo analysis and field mapping in order to evaluate the potential of proposed operations to adversely affect water quality related to downstream beneficial uses. The goal of the CGS evaluation was to characterize the impacts of timber management in terms of mass wasting and sedimentation. CGS determined that the landscape geomorphology is indicative of potentially unstable slopes and related historical land use. Observations included stream bank erosion and shallow landslides along some steep inner gorge slopes of the larger watercourses and first order headwalls.

CGS provided recommendations designed to minimize potential sediment movement have been incorporated into the proposed timber harvest operations. Reference the CGS Engineering Geologic Review, THP Section V, for more information.

The use of cable yarding, avoidance of unstable areas, and WLPZ protection measures should limit sediment production to minor surface erosion from seasonal roads, tractor skid trails, and other disturbed areas. This sediment is expected to be contained within erosion control facilities. Tractor skid trails and seasonal road embankments/fills will gradually re-vegetate and stabilize following disturbance over time. With the application of mitigation measures for the proposed and future projects within the WAA, significant or cumulative adverse sediment effects are not expected to occur.

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Road improvement, maintenance and monitoring are proposed as part of this THP. An erosion control plan (attached in Section V) has been prepared for this THP to comply with General Waste Discharge Requirements for timber harvest activities on non-federal

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land (Order #R1-2004-0030). The erosion control plan in conjunction with the road work order in the Section II Attachments provide a plan for treating identified sediment sources as well as other road related improvements. New roads constructed with out-sloped road prisms, where feasible, will improve road drainage consequently minimizing road surface erosion. Road berms and perched material will be removed where feasible, minimizing the potential for road related landslides. Removal of existing watercourse crossings and stabilization of fill materials will reduce potential sediment inputs.

Mitigation Measures- THP Item #14 (Silviculture): The use of single tree selection silviculture in over half of the plan area will result in a relatively high level of post-harvest overstory and understory vegetation throughout the THP area. The areas that are proposed for group selection are within tractor ground and the openings will be no larger than a ½ acre which will also contribute to a higher level of post-harvest over and understory vegetation. The maintenance of tree cover provides root support, rainfall interception, and evapotranspiration, resulting in reduced soil moisture content, reduced raindrop impact, and reduced channel flow.

THP Item #16 (Yarding Methods): The use of cable yarding on all terrain greater than 50% slope will limit ground disturbance by providing full or partial suspension of logs yarded to upslope locations. Approximately 37% (205 acres) of the THP area will be tractor-yarded, 57% (314.1 acres) will be cable-yarded.

THP Item # 18 (Soil Stabilization Practices): Specific treatments to reduce the movement of soil from tractor skid trails, logging roads and landings, and other disturbed areas sites during dry and wet weather; specific mitigation for active erosion sites as described in the THP; timing of heavy equipment activity and installation of erosion control facilities.

THP Item # 21 (Use of Ground-based Equipment): No heavy equipment use on unstable soils/ slide areas or slopes greater than 50%.

THP Item # 23 (Winter Operating Plan); Timber operations during the Winter Operating Period are limited to timber falling, road inspection and maintenance activities necessary to insure proper functioning of drainage facilities and structures and to repair storm damage. Implementation of a Year-Round Wet-Weather Operating Plan limits erosion potential.

THP Item # 26 (Watercourse & Lake Protection Zone): Class I and II watercourses have a no-harvest core zone, with the exception of the watercourses within the eucalyptus portion of the THP, and limited-harvest outer zones of variable widths. Class III watercourses have limited harvests within the channel zone.

Potential impacts from water drafting on sediment- The proposed drafting guidelines contain specific mitigations for limiting the sedimentation produced by water drafting provisions. The main source for sedimentation into the watercourse is improper stabilization of the approach road to the drafting location. All approach roads are either rocked or shall be rocked prior to starting drafting operations. Sediment can also enter watercourses as a result of overland water flow from water trucks or storage tanks. Water drafting locations where overland flow could cause sediment to enter a watercourse shall have sediment containment devices such as straw waddles or straw bales as required within the water drafting plan.

Assessment of Road 669 Abandonment - Road 669 runs from Road 500 along the top of the THP down to Caspar Creek by looping through what is known as 'Blue Gum Creek,' a Class I restorable tributary to Caspar Creek. This road has been converted into an unsanctioned trail by recreationalists. The State Forest is proposing to abandon the road and adopt the trail into the State Forest network which would allow for the trails maintenance in perpetuity.

During the assessment of Road 669, it was determined that all the watercourses are undrained, there are multiple unstable areas and a failed culvert was discovered. After consulting with a certified Engineering Geologist, the RPF determined that a full abandonment would cause more environmental impacts than the result could offset, therefore proposing to let the road "self-abandon" while addressing approximately 830 feet of road at the bottom that equipment can access. Based on this assessment, the RPF and JDSF staff have developed a plan to mitigate some of the erosion from the crossings along the trail by putting in turf rock or bridges. Where feasible, minor handwork will be done to remove perched fill along the road.

The work along the lower 830 feet of Road 669 will include pulling the failed culvert and replacing it with a rocked, armored ford to accommodate the trail, correcting a Class III diversion which will include installing a second rocked, armored ford and installing waterbars along the entirety of the bottom section. This work will remove water off the road and maintain a safe trail surface.

It is believed that this alternative is the best with the least amount of impacts, see Section III, Item 24 for a description of the full deactivation alternative. The "self-abandonment" will still contribute sediment into the Class I restorable tributary at all the crossings

and will leave Road 669 hydrologically connected. However, the road surface that is still intact, is stable, and the crossings will deliver minimal sediment.

b. Water Temperature Effects

Stream temperature is an important environmental factor affecting aquatic ecosystems as it controls the body temperatures and metabolic demands of most aquatic organisms. Spence, et al (1996), described some of the physiological and behavioral processes of fish that are affected by temperature:

- Metabolism
- Food requirements, appetite, and digestion rates
- Growth rates
- Developmental rates of embryos and alevins
- Timing of life-history events, including adult migrations, fry emergence, and smoltification
- Competitor and predator-prey interactions
- Disease-host and parasite-host relationships

Cold-water fish present within the WAA include coho salmon (*Oncorrhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*), and California chinook salmon (*Oncorrhynchus tshawytscha*). These species are adversely affected by elevated summer water temperatures. Water temperature tolerance varies slightly between species, with coho preferring lower temperatures. The National Marine Fisheries Service (1996) characterizes properly functioning conditions for all adult Pacific salmon as between 10-13.9° C and temperatures from 13.9 to 15.5° C as "at risk." McCullough (1999) noted that egg size and development was substantially altered when adults were exposed to temperatures over 17.5° C. In northern California, Hines and Ambrose (1998) found that coho salmon juveniles were absent in stream reaches where the moving weekly average water temperature exceeded 16.8° C, or the moving weekly maximum temperature exceeded 18.3° C. Welsh et al. (2001) located coho salmon juveniles in streams with MWATs up to 16.7° C.

Water temperature tolerance also varies between life stages of the same species. Steelhead trout (*Oncorhynchus mykiss*) are listed for a maximum weekly average temperature (MWAT) threshold of 9° C for spawning, 13° C for embryo survival, and 19° C for growth (EPA 1973). This suggests that the criterion for a specific location should be determined by the most sensitive life stage of a species likely to be present in that location at that time. An MWAT threshold for the growth development stage of a salmonid species can be higher than the MWAT threshold for embryo development.

The amount of solar radiation intensity, summer water temperature and diurnal temperature fluctuations throughout the year are closely related riparian canopy (Chamberlin et al, 1991). The removal of too much canopy can adversely affect growth and survival of rearing salmonids by increasing stream temperature.

Current Conditions- During most years since 1996, water temperatures have been collected from various locations throughout the Caspar Creek Planning Watershed. The water temperature has been monitored by placing a temperature data logger in the stream during the summer months of these years. The most recent maximum weekly average temperature recordings during 2012, 2014, 2016, 2017, and 2018 respectively were 13.42, 14.78, 13.78, 15.06, and 14.19 degrees Celsius. The optimal temperature for Pacific salmonids has been shown to range between 12 and 14 degrees Celsius, though there is considerable debate about what exactly is the optimal temperature and what it means. The temperatures lethal to salmonids have been determined in the laboratory and range from 23-29 degrees Celsius (Beschta et. Al., 1987). Conifers found in the riparian areas are approximately 100-150 years old and are relatively young for the coastal redwood forest. These riparian areas are developing, and will with time mature to a point where the canopy can close.

Findings- Stream temperatures recorded at sites within the Caspar Creek PW are within the temperature range preferred by coho salmon juveniles. The average shade canopy for the segment of Class I watercourse within the THP area ranges from 85-90%. A significant change in water temperature due to timber harvest activity is not expected because there is limited timber harvesting proposed within the Class I and II WLPZs. Existing shade canopy conditions related to water temperature will be maintained under proposed project activities and will improve over time with forest growth.

With the application of mitigation measures for the proposed and future projects within the WAA, water temperature effects which would have the potential to combine with the effects of other activities to cause a significant cumulative impact are not expected.

Mitigation Measures- THP Item # 26 (Watercourse & Lake Protection Zone): Class I and II watercourses have a no-harvest core zone and limited-harvest outer zones of variable widths. Class III watercourses have limited harvests within the channel zone. Additional watercourse protection measures are described under Item #26 in Section II.

c. Organic Debris Effects

Cumulative watershed effects produced by organic debris can occur when logs, limbs, and other organic material are introduced into a stream or lake at two or more locations. Decomposition of this debris, particularly the smaller sized and less woody material, removes dissolved oxygen from the water and can cause impacts similar to those resulting from increased water temperatures. Introduction of excessive small organic debris can also increase water acidity.

Large organic debris is an important stabilizing agent that should be maintained in small to medium size, steep gradient channels, but the sudden introduction of large, unstable volumes of bigger debris (such as logs, chunks, and larger limbs produced during a logging operation) can obstruct and divert streamflow against erodible banks, block fish migration, and may cause debris torrents during periods of high flow.

Current Conditions- No concentrated sources of small woody debris (logging slash) were identified within Class I watercourses within the WAA. The portions of Caspar Confluence observed by the RPF appear to have low to moderate levels of LWD. LWD was only observed sporadically in the watercourse with the majority of LWD occurring in a couple of small debris jams. Normal toppling of trees into watercourses due to windthrow and/or undercut banks has occurred sporadically throughout the WAA, but appears to be within background levels for watersheds with similar vegetative cover.

Findings- This THP proposes buffers with tree retention and limited harvest on unstable areas that will retain high levels of potential organic debris recruitment to watercourses, and it contains provisions to remove accidental deposition of small, potentially harmful debris. Other flowing tributary watercourses in the assessment area contain substantial tree canopy to provide organic debris within the assessment area, and future projects are likely to provide adequate tree retention. Significant adverse cumulative watershed effects caused by organic debris changes are not expected because of these factors.

Mitigation Measures- THP Item # 26 (Watercourse & Lake Protection Zone): Class I and II watercourses have a no-harvest core zone and limited-harvest outer zones of variable widths. Class III watercourses have limited harvests within the channel zone. Additional watercourse protection measures are described under Item #26 in Section II.

THP Item # 27 (Site-specific WLPZ practices): The felling of trees directionally away from watercourses will minimize exposure to accidental introduction of logging slash into Class I or II watercourses.

14 CCR 916.3 (b) Accidental depositions of soil or other debris in lakes or below the watercourse or lake transition line in waters classed I, II, and IV shall be removed immediately after the deposition or as approved by the Director.

d. Chemical Contamination Effects

Potential sources of chemical cumulative watershed effects include run-off from roads treated with oil or other dust-retarding materials, direct application or run-off from pesticide treatments, contamination by equipment fuels and oils, and the introduction of nutrients released during slash burning or wildfire from two or more locations.

Current Conditions- JDSF records indicate herbicides primarily associated with timber harvest plans and timber stand improvement projects have not been used within the WAA. Approximately 20% of the WAA is privately owned, and is managed for timber production or other agricultural purposes and chemicals may have been applied on these lands. No chemical point sources are known to currently exist within the WAA. Slash burning within the WAA has been limited to piles of less than 1/5th acre in size. The last known major fire that occurred on a watershed scale within the WAA was the broadcast burning of slash that was conducted concurrently with the original harvest during the late 1800s.

Findings- Accidental contamination from heavy equipment within the THP area is not expected due to the limited number of proposed Class III watercourse crossings on truck roads. The balance of the road, landing and skid trail system is located away from watercourses. Broadcast burning as a site preparation measure is proposed, and piles may be burned to reduce excess accumulations of slash at landing locations.

Because there are currently no known chemical contamination problems within the assessment area, and any future project proposing chemical use would require unique permits for that purpose and be regulated to prevent chemical contamination, no significant adverse cumulative watershed effects caused by chemical contamination are expected.

Mitigation Measures- THP Item # 26 (Watercourse & Lake Protection Zone): No heavy equipment entry.

Potential impacts of water drafting activities on chemical contamination- Prior to entering any Watercourse and Lake Protection Zone, Equipment Exclusion Zone or Equipment Limitation Zone, equipment will be cleaned of all external materials, which could be deleterious to aquatic life, wildlife, and riparian habitat. All heavy equipment shall be checked daily and maintained when necessary to prevent leaks of deleterious materials from entering a WLPZ or channel zone. Water truck operators are required under the water drafting plan to carry containment devices such as drip pans sufficient to contain any fluids which may emanate/leak from drafting equipment. No significant impact with regards to chemical contamination is expected to occur as a result of water drafting activities.

e. Peak Flow Effects

When soils become saturated and excess water is present, the result is run-off. The factors that determine flooding are the timing, intensity, and duration of the rainfall or water source; soil properties and topographic controls that affect the volume and timing of available runoff, and the depth or carrying capacity of the channel.

Timing refers to the intervals between storms. Intensity is a measure of the rate of rainfall (i.e. inches per hour). Duration is a measure of how long the rain continues to fall. Depth is the total amount of rain that fell (in inches). It is recognized that there is no reasonable control over the timing, intensity, depth, or duration of rainfall. Simply put, if it rains hard enough and long enough, flooding will result in almost any watercourse.

Peak flows have been documented numerous times, most recently during the 1995-96, '96-97, '98-99 and '05-06 winter periods, with other notable high rainfall events in 1955, 1964, 1969, 1972, 1975, and 1983. The intense storms caused downstream property flooding in a number of watersheds in this region. These historic rainfall years are associated with weather phenomena described by the National Oceanic and Atmospheric Administration (NOAA) as La Niña and El Niño related weather. La Niña is characterized by unusually cold ocean temperatures in the Equatorial Pacific, compared to El Niño, which is characterized by unusually warm ocean temperatures in the Equatorial Pacific. According to NOAA, 1955, 1973, 1975, 1988, 1999, and 2010 were strong La Niña weather years, which all had rain on snow peak flow events. 1957, 1965, 1972, 1982, 1991, and 1997 were strong El Niño years, typified by intense tropical storms. (www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.html)

Although rainfall is the most significant factor determining the likelihood of flooding, several anthropogenic activities (i.e. timber harvest operations) may increase the risk of downstream flooding. Removal of vegetation can reduce canopy interception and evapotranspiration losses such that soils are more quickly saturated, with resultant flow increases. Improperly timed ground-based yarding equipment may compact the soil, thereby reducing the infiltration capacity, resulting in quicker saturated overland flow. Roads, especially watercourse crossings, can increase the effective drainage density, acting as an effective stream channel network and reducing the time required to move water from hillslopes to channels. Watercourse channel capacity may also be reduced by rapid influxes of sediment and debris.

Wright, et al, (1990) conducted research on the South Fork of Caspar Creek, Mendocino County to determine the effects of timber harvesting practices on peak stream flow. The study determined that there was no significant increase in storm runoff, volume, or peaks following a selective harvest removal of 65% of the forest canopy utilizing a ground-based harvest system with an estimated 15% of the watershed compacted with skid trails, landings and logging roads.

Thomas & Megahan (1998) conducted an analysis of methods and data used in peak flow responses to clear-cutting and roads in small and large basins in the Western Cascades, Oregon. They examined data from 3 small watersheds ranging in size from 60-101 hectares and 3 pairs of large basins of 60 to 600 square kilometers and evaluated effects of timber harvest and road construction on peak flows. They could not detect any effect of cutting on peak flows in one of the large basin pairs and results were inconclusive in the other two large basin pairs. One small watershed was 100% clearcut, a second was 31% patchcut with 6% of the area affected by road construction, and a third was held as a long-term control. Peak flows were increased up to 90% for the smallest peak events on the clearcut watershed and up to 40% for the smallest peak flows on the patchcut/roaded watershed. Percentage treatment effects decreased as flow event size increased and were not detectable for flows with two-year return intervals or greater on either treated watershed.

Beschhta, et al (2000) determined that peakflow increases of 13-16% occurred following treatment for 1-year recurrence interval storm events and 6-9% for 5-year recurrence interval events. The treatment consisted of clearcut silviculture, along with road building and broadcast burning, on small (30-220 acre) paired watersheds on the H.J Andrews, Coyote Creek, and Fox Creek experimental watersheds in Oregon. Beshcta, at al (2000) did not find any statistical evidence for peakflow increases on basins ranging from 280 to 2,500 sq miles in size.

Jones (2000) examined the magnitude, seasonality, and duration of peak discharge responses to forest removal and regrowth and roads in 10 pairs of experimental basins in the western Cascade Range of Oregon over 10- to 34-year post-treatment periods. The basins ranged from complete to partial clearcuts with varying amounts of road construction. She found that changes in evapotranspiration associated with forest canopy removal and regrowth accounted for significant increases (31–116%) in peak discharges during the first postharvest decade in 8 of 10 treated basins, but the events that were affected were small (0.22- or 0.28-year return periods) and occurred in the Fall (September–November), when soils are in moisture deficit, rather than in Spring (March–May), when soils are in moisture surplus.

Lewis, et al (2001) determined that increases in peak flows from clearcut logging and road building are related to the proportion of the area logged, catchment basin wetness, time after logging, and storm size in the Caspar Creek watershed (located in JDSF). Proportional increases in peak flows resulting from both selective and clearcut logging are greatest for smaller runoff events. Increased peak flows become progressively smaller as the catchment basin becomes increasingly wetter; however large peak flows occurring during the mid-winter period are responsible for the greatest amount of sediment transport. It was determined that increased peak flows following timber harvest returned to pre-harvest conditions within approximately 12 years.

Ground-based yarding systems have the greatest potential to compact soil surfaces, which may reduce infiltration and increase the volume of runoff. These effects can be minimized by limiting ground-based equipment to gentle slopes and periods of dry weather conditions, and by excluding equipment from WLPZs, or by using cable and or helicopter yarding systems.

Roads, and especially watercourse crossings, are highly compacted (i.e. have very low infiltration rates). Therefore, a significant portion of incoming water that is intercepted by roads rapidly becomes runoff. If this runoff is directed to a watercourse, there is potential to increase the flows in the watercourse. In the past, this was considered an unavoidable consequence of industrial timberland management. Current road drainage practices are designed to dewater the road by outsloping (where feasible) which minimizes concentrated runoff and disconnect the road drainage from watercourses.

Watercourse channel capacity may be impacted by both natural and human-caused factors. The depth is the measure of the carrying capacity of the stream, which is quite variable depending on channel depth, in-stream obstructions, gradient, topography, etc. Timber harvest operations, watercourse crossings, and mass wasting events have the potential to increase sediment influx to watercourses, thereby potentially reducing the conveyance capacity.

Timber harvest operations, including skidding and hauling roads, are likely sources of fine sediments from surface erosion. However, fine sediments are typically transported through watercourse systems quickly. Therefore, this source of sediment is unlikely to affect the channel conveyance capacity. Watercourse crossings are sources of both fine sediment (from surface erosion) and coarse sediment and debris (if the crossing fails).

Mass wasting events, both natural and anthropogenic, have the potential to rapidly reduce channel capacity. The THP does not propose to operate on any areas which have been identified as potentially unstable. These voluntary restrictions significantly reduce the likelihood that the proposed THP will result in a mass-wasting event that contributes sediment to watercourses. Therefore, these measures significantly reduce the likelihood that the proposed THP will diminish channel conveyance capacity, thereby having an insignificant effect on flooding potential and risk.

The watercourses in this plan area have been evaluated and a comprehensive assessment has been completed (including peak flows). Implementation of the mitigation measures proposed in the THP will provide protection to watercourses from any significant harvesting and road-building impacts, through the designated WLPZs, proper channeling of waters to filter strips, cable harvesting methods on steeper ground, and many other measures.

Precipitation in the form of snow is generally light and rare within the THP area. Impacts from peak flows are not likely to increase due to the harvest of the THP. Significant impacts to watercourses as a result of timber harvesting on this proposed THP is not expected, based on the mitigations included in this plan.

Findings- Paired-watershed studies have produced mixed results regarding the magnitude and persistence of mechanisms responsible for peak flow changes following timber harvest. Wright (1990) determined that peak flow changes were not affected by selective logging conducted with a ground-based harvest system. Thomas & Megahan (1998) determined that large storm events of 2-year return interval or higher do not show any relationship to the percent of harvest within watersheds. Beschta et al, determined that small peakflow increases occurred as a result of clearcut silviculture on small watersheds. Jones (2000) and Lewis, et al (2001) determined that increases in peak flows resulting from timber harvest are most likely to occur during the early part of the winter period when soils are not saturated. Thomas & Megahan (1998), Jones (2000) and Lewis, et al (2001) all determined that peak flows increase when a high percentage of a sub-watershed basin is clearcut logged.

Proposed timber harvest operations will cover approximately 10% of the Caspar Creek PW. Within this THP, cable-yarding covers 57% (314.1 acres), and ground-disturbed areas (tractor/skidder yarding, road construction) cover 37% (205 acres) of the total area. 6% (35.9 acres) of the THP is a no harvest area.

The WAA and the Caspar Creek watershed share the same rain-dominated hydrologic environment, including regional flood events. Bank-full stage recurrence intervals differ, however, due to different basin characteristics and local climatic variation. Proposed timber harvest activity in the WAA, both from present and future projects, is not expected to approach the magnitude of harvest levels in the Caspar Creek watershed study. With the application of mitigation measures for the proposed and future projects within the WAA, peak flow effects which would have the potential to combine with the effects of other activities to cause a significant cumulative impact are not expected.

Mitigation- THP Item #14 (Silviculture): The use of Selection silviculture will result in a relatively high level of post-harvest overstory and understory vegetation. The maintenance of continual tree cover provides root support, interception, and evapotranspiration for hillslopes, resulting in reduced soil moisture content, raindrop impact and overland flow.

THP Item # 21 (Use of Ground-based Equipment): No ground-based logging will be allowed on unstable soils/slide areas or slopes greater than 50%.

THP Item # 23 (Winter Operating Plan); Timber operations during the Winter Operating Period are limited to timber falling, road inspection, and maintenance activities necessary to insure proper functioning of drainage facilities and structures and to repair storm damage.

f. Watercourse Condition, Stream Conditions and Watershed Condition Elements

Current Stream Channel Condition- Watercourse channel characteristics and factors that describe current watercourse conditions along the entire Caspar Creek were analyzed in order to evaluate potential THP impact within the WAA.

Gravel Embeddedness- Embeddedness of spawning gravels can be used as an indicator of the amount of fine sediment present in gravel reaches. Flosi and Reynolds (1998) consider a stream with an embeddedness value of two or higher to have poor quality fish habitat. The 2006 DFG Stream Inventory Report found gravels and small cobble were the main substrate in 85% of the surveyed habitat along the mainstem Caspar Creek. 78% of the pool tailouts measured had embeddedness rating of 1 or 2. Tributary watercourses exhibit low amounts of gravels depending on the location and gradient of the watercourse. Embeddedness has mainly occurred from the introduction of sediment from past land use activities which used the large low gradient watercourses as roads and lesser watercourses as skid trails and downhill yarding routes.

Pool Filling- Small to large-sized pools were observed in the Class I and II watercourses found in the harvest area. Pools found in the Class I watercourse are generally of poor quality and are partially filled. Some pools located in Class II watercourses are partially filled, however most do not appear to be storing sediment depending on the location and gradient. The material moving through the fluvial system appears to be largely introduced sediment. The RPF observed multiple locations where large soil pipes have formed in Class II watercourses that were filled for log transport. These pipes appear to be delivering sediment as they are formed and as they collapse. The 2010 CDFG Stream Inventory Report identified a pool:riffle:flatwater ratio of 40:8:52 for the mainstem of Caspar Creek. Forestry Assistant II, Tori Norville, surveyed Blue Gum creek in 2019. In a 2,821 feet reach of the Class I, there were 40 pools, 50 riffles and 15 flatwater. This equates to a pool:riffle:flatwater ratio of 2:86:10.

Aggrading- Several short reaches of low gradient Class II watercourse express symptoms of streams where aggrading has occurred. However, it is unclear if stream channels in these areas simply have not developed since the original channel was filled for log transport during historic harvesting operations. Pools in these areas are infrequent, flow is meandering and braided channels are often present. Material in these areas is a combination of fines, gravels and cobbles and large accumulations of fresh material were not observed. In general streams in the harvest area do not appear to be aggrading. Sediment introduced into the watercourse channel seems to be moving downstream except where small pools have formed allowing suspended sediments to fall out. Aggrading of the stream channel has also occurred where large woody debris has temporarily trapped material. It is expected that these trapped materials will eventually become mobile and will move through the watershed.

Bank Cutting- Stream banks that have already been formed do not appear to be experiencing bank cutting. Collapsed stream banks were observed during the inspection and appear to be largely related to the reformation of the watercourse after a large scale introduction of fill material. Streams in the harvest area are reestablishing themselves through subsurface mining which has expressed itself through the formation of soil pipes. As the streams approach the natural gradient, material on top of the stream (soil pipes) is failing which causes the overburden left on top of stream banks to fail. This process is continuing and appears to be a major sediment input to the fluvial system.

Bank Mass Wasting- Bank mass wasting was not observed during the field inspection. Small bank failures related to bank cutting and reformation of watercourses was observed as discussed above. However, channels with landslides directly entering the stream system were not observed during the field inspection.

Downcutting- Downcutting was not observed during the inspection. Streams in the project area are reestablishing themselves and material is moving through the fluvial system as previously stated. However, this process appears to be occurring from the bottom up in the form of soil pipes and not from the top down as would occur with active downcutting.

Scouring- Little scouring was observed in watercourses in the harvest areas. There were no signs of flow events or debris torrents which have stripped streamside vegetation.

Organic Debris- The portions of the Caspar Creek observed by the RPF appear to have moderate levels of LWD. LWD was only observed sporadically in the watercourse with the majority of LWD occurring in small debris jams. Class I and II watercourses located in the harvest area have low to moderate amounts of LWD although signs of buried LWD have been observed in streamside fill material. Class III watercourses contain low to moderate amounts of woody debris but usually in a small form (branches, twigs, etc.). Generally, concentrations of small organic debris were not observed in the harvest area. See Organic Debris discussion above for additional information.

Streamside Vegetation- Most of the watercourses within the harvest areas have a dense layer of vegetation covering banks and adjacent stream-side areas. The mid and overstory vegetation consists mainly of second growth Douglas-fir and redwood with low levels of hardwoods, primarily tanoak and alder. Understory vegetation consists of sword fern, and evergreen huckleberry.

Recent floods- Flooding beyond bankfull stage, was observed adjacent to the harvest area. The 2018-2019 winter period was considered a mild El Niño year that had two 3-year storm events occur. The flooding occurred beyond the bankfull stage but not outside of the large floodplain that is along Caspar Creek.

2. SOIL PRODUCTIVITY

The assessment area for cumulative soil productivity impacts is limited to the area of the proposed project.

Cumulative soil productivity adverse impacts occur when the effects of two or more activities, from the same or different projects, combine to produce a significant decrease in soil biomass production potential. These impacts most often occur on-site within the project boundary, and the relative severity of productivity losses for a given level of impact generally increases as site quality declines. Below are the primary factors related to the proposed timber operations that could adversely affect soil productivity within the THP boundary.

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Forest management activities are required to be conducted in a manner that assures "where feasible, the productivity of timberlands is restored, enhanced, and maintained." Therefore, productivity losses resulting from site disturbance in excess of that required by suitable silvicultural and harvesting practices, whether conducted individually or in sequence, must be considered as significant.

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Impact significance must also be considered relative to the soil productivity potential of the area in question. Losses that can be considered acceptable on highly productive lands may be unacceptable, or even exceed the productive potential, of lower site lands. For example, productivity reductions from loss of growing space associated with development of roads and skid trails necessary for timber management on high site lands may be greater than the total unit-area productivity of a poor site.

Site factors to be assessed for cumulative soil productivity impacts include:
1) Organic matter loss
2) Surface soil loss
3) Soil compaction
4) Growing space loss

The relationship between these site factors and soil productivity is described below. The potential impact of successive management activities must be assessed for each of these factors individually and in combination, and the overall impact should be classed as significant when:

- The area disturbed by proposed timber operations will exceed that required by the silvicultural and harvest systems approved for use under proposed THP, including unnecessary duplication of existing skid trails, roads, landings, yarding disturbance, and mechanical site preparation.
- The amount of organic matter loss and soil displacement with use of the proposed silvicultural and harvesting systems will substantially exceed that of other, feasible systems.
- The amount of compaction and puddling with use of the proposed silvicultural and harvesting systems will substantially exceed that of other, feasible systems, under the soil moisture conditions expected at the time of proposed operations.
- The combined loss of soil productivity from loss of growing space, organic matter loss, soil displacement, and soil compaction from the proposed operations will substantially exceed that of other feasible combinations of silvicultural and harvesting systems.

1) Organic Matter Loss

Significant losses of organic matter can result in long-term loss of soil productivity. Loss of organic matter will expose topsoil to erosion, which along with duff, litter layer and woody debris provides the source of nutrients for future forest growth. Organic matter loss can occur by displacement of surface organic materials during skidding, mechanical site preparation, and other land disturbing timber operations and from erosion, burning, or oxidation of exposed fine organic material. Soil productivity is affected by the loss of nutrients stored in organic matter, surface exposure that results in higher temperatures and increased evaporation during the dry season, and reductions in soil porosity from loss of soil organic matter. Because this THP proposes to remove forest products from the assessment area using logging methods that will disturb soil, moderate organic matter loss will occur (Powers 1990).

Minimizing the amount of disturbed soil is the most effective method of limiting organic matter loss. Non-harvest of trees on unstable areas and in riparian zones leaves large areas of the assessment area with complete tree cover.

In the coastal lands where this THP is proposed, organic layer loss is a short-term condition, as rapid plant growth after harvest leads to quick replenishment of the organic layer when removed. This is particularly notable following controlled burning, where rapid vegetation growth is spurred by sunlight exposure and availability of fire-released nutrients previously stored in debris.

Finding- A temporary organic matter loss is expected to occur overall, while the harvesting operations are expected to result in a temporary increase in organic matter at the soil surface. Replacement through regrowth is expected to prevent a significant or cumulative adverse effect. Measures contained in the THP that help to reduce organic matter losses are as follows:

a) The use of existing permanent rocked and seasonal roads.
b) No ground based equipment yarding when soils are saturated.
c) Timber falling is the only activity allowed during the winter operational period.
d) Downed woody debris will be retained post-harvest within the THP area.

No significant adverse impact to organic matter is expected to occur in relation to this project.

2) Surface Soil Loss

As stated in 14 CCR § 912.9, Technical Rule Addendum #2, topsoil is the major storehouse of nutrients that provide current and future site fertility. Displacement or loss of topsoil can have an immediate and long-term negative effect on an area to grow trees and plants,

which may not be readily measurable. The forester evaluated the extent and depth of surface soil loss inferred through use of the Disturbance Index and surface erosion procedures calculated for this THP.

Soil loss occurs from mechanical displacement during road building and maintenance, harvesting, or site preparation and by surface erosion or mass wasting on harvest units. Removing the surface soil has a disproportionate effect on soil productivity because the upper layers of soil are the storehouse of organic matter and nutrients that have accumulated from decomposing plant materials and atmospheric sources. Loss of soil by surface erosion from harvesting units is generally small for timber operations conducted under current Forest Practice Rules, and mass wasting (above background rates) from timber operations is prevented by identifying and placing limits on operations in unstable areas.

Surface soil loss may occur as a result of road and landing construction, skid trail construction, displacement into piles or windrows or mass wasting, and burning. Road and landing construction constitute a small percentage of the THP area and are, therefore, not likely to cause a significant reduction of soil productivity. Skid trail construction also affects only a small portion of the property, and will cause a minimal impact to soil productivity. Displacement of surface soil during slash piling or windrowing affects only a portion of the topsoil, and is done on a very small percentage of the ownership. This activity will, therefore, cause a minimal impact to soil productivity.

Finding- Within the proposed THP area, surface erosion due to harvesting activities is expected to be minimal. Proper road drainage and erosion control facilities will help mitigate the problem by lowering the erosion potential on associated roads. The THP proposes a minimized amount of new road construction. No ground-based timber operations timber operations are proposed during periods when soils are saturated. No mechanical site prep is proposed. Further mitigation that will reduce the occurrence of surface erosion is as follows:

a) Cable yarding 57% of the THP area.
b) Soil stabilization where required as outlined in Section II, Item 18.
c) No new road watercourse crossing.
d) Limited skid trails in Water/Lake protection zones.
e) No layouts.

No significant loss of surface soil is anticipated due to this project.

3) Soil Compaction

Highly compacted soils inhibit plant growth for a variety of reasons, and can cause increased surface water runoff and hence, erosion. Soil compaction in timberland is typically caused by heavy equipment running repeatedly over soils that are partially saturated. Heavy equipment operations will be conducted, pursuant to the FPRs, during dry periods.

Finding- Operations on saturated soils are not proposed. Road construction is limited by practicality, the FPRs, and the positive force of the landowner having complete access to the assessment area through right-of-way ownership.

The use of cable yarding systems over half of the THP area will minimize the soil compaction potential. The concentration of cable yarding roads will be reduced by the distribution and location of yarder landings. Over time, soil texture and structure will be enhanced after harvest operations by future biotic and microbiotic activities.

No significant adverse impacts related to soil compaction are expected to occur as a result of operations associated with this THP.

4) Growing Space Loss

Potential losses to growing space would primarily result from new road construction, and/or mass wasting events. 2.24 miles of new roads are proposed for the plan area. Minimal new skid trail construction will be required, minimizing land taken out of production.

Findings- The plan will utilize existing road systems and landings and adds eleven new road spurs. These roads are the minimum necessary to access cable logging units that were previously logged with tractors or steam donkeys. The construction and use of tractor roads will be limited, and is not expected to result in a significant loss of growing space. The canopy of adjacent trees will be capable of fully occupying these sites. These roads are expected to become a permanent part of the log transportation network, and are expected to partially revegetate between harvest entries.

The Caspar Creek watershed study provides an example of how practices related to growing space have improved over the past two to three decades. When the South Fork was logged selectively with crawler tractors from 1971 to 1973, approximately 15% of the watershed was compacted through the creation of roads, skid trails and landings. When the North Fork was logged from 1985 through 1991, only about 3% of the basin was found to be compacted by creating new roads, skid trails and landings (Henry 1998). Since practices have continued to improve, this level of impact to growing space can be anticipated to continue at the 1985 through 1991 level or decline further.

No significant adverse impacts related to growing space loss are expected to occur as a result of operations associated with this THP.

3. BIOLOGICAL RESOURCES

Significant cumulative impacts to biological resources may occur when individual adverse effects of one or more projects in an assessment area combine to produce a significant adverse effect to a species or its habitat. When evaluating the cumulative impacts associated with these resources, species observations, and/or potential habitat in the assessment area need to be identified. The California Natural Diversity Database (CNDDB), the California Wildlife Habitat Relationships (CWHR) publications, and the California Native Plant Society (CNPS) online Electronic Inventory were screened for species that might potentially occur in the harvest area and the Biological Assessment Area (terrestrial species) or the Watershed Assessment Area (aquatic species). In addition, JDSF wildlife and botanical data was utilized for the discussion below.

The California Department of Fish and Wildlife's (CDFW) Mammalian Species of Special Concern (SSC) most recently approved list originates from 1986. According to the CDFW website the list was revised in 1998, but never approved. The draft 1998 list is almost completely unique from the 1986 list. CDFW is currently undergoing a third revision of the list, contracting the work out to the Conservation Biology Institute. This revision was scheduled to be completed in July 2011, but no data has been released. The date shown below after each species indicates which DFG SSC list the species is on.

The following special status species were determined to have the potential to occur within the BAA (terrestrial species) or the WAA (aquatic species).

MAMMALS

Townsend's Big-eared Bat (*Corynorhinus townsendii*) - CDFW Species of Special Concern. The species is no longer a State Candidate for listing as of November 4th, 2016. After review of the best available science, written and oral comments received from the public and the scientific community, the Fish and Game Commission determined that the existence of the Townsend's big-eared bat was not in serious danger or likely to be threatened in the foreseeable future. The Commission examined six potential threats to the species: modifications or destruction of the bat's habitat, overexploitation, predation, competition, disease, or other natural occurrences or human-related activities.

Townsend's big-eared bat is a sedentary species that hibernates or rests in winter roosts in low to moderate numbers. During spring females live in maternity roosts with other females, and may move between sites while raising one offspring. The use of redwoods for basal hollows in redwoods for maternity roosts and individual roosts is known, but their use as hibernacula is unlikely because of their relative small size. Roosts include natural openings such as caverns, caves and basal hollows of large trees, and artificial openings such as mines, shafts, bridges, and vacant buildings. There is some evidence that roosts near waterways are preferred. Surveys in the late 1980s indicate that the species may have declined by as much as 55%. However, more recent studies concluded that site specific populations are stable or increasing (California Fish and Game Commission, 2016). An ongoing statewide survey of known and highly suitable locations for maternity roosts is due out during 2017.

The use of large basal hollows as maternity roosts for the Townsend's big-eared bat has been studied relatively little. Redwood trees require time and repeated fire to create the basal hollows that provide the roosting habitat needed by Townsend's big-eared bats. Most old growth on JDSF was harvested during the initial logging. Documented remaining areas with old growth stands on JDSF (459 of 48,652 acres, or <1% of JDSF) are now protected from harvesting.

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Protection Measures: Scattered individual old growth trees are retained during plan preparation when they contain structural characteristics such as basal hollows. JDSF is managing portions of the forest as late seral development areas; those areas may eventually grow suitably-sized older, bigger trees, but whether those trees will be exposed to the repeated fires needed to create basal hollows is uncertain. No significant adverse cumulative impacts are expected.

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Pallid Bat *(Antrozous pallidus)* - CDFW Species of Special Concern (1998 list). Found throughout most low elevations within California, the pallid bat occupies a wide variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level to mixed conifer forests. It is most common in dry open habitats. Roosts must protect bats from high temperatures. This species hibernates in winter near the summer day roost. Roosts usually are comprised of 20-160 animals. In the plan area, potential roosting or hibernating habitat may occur in tree hollows.

Protection Measures: The THP will maintain potential habitat for the pallid bat by retaining larger decadent trees in areas that currently have less than one 30-inch DBH snag per acre and also by retaining trees with unique structural characteristics. No significant adverse cumulative impacts are expected.

Gray Wolf (*Canis lupus*) - State endangered, federally endangered. The gray wolf is federally listed as endangered in portions of its range, (including California), and very recently state listed as endangered (June 2014). *Current distribution: Shasta Pack* - In 2015 CDFW confirmed the presence of a gray wolf pack (referred to as the Shasta pack) in Northern California. Previously a radio-collared wolf (OR7) had been tracked into northern California in late 2011 from Oregon. OR7 spent almost a year going back and forth in northeastern California before returning to Oregon. CDFW believes that the "Shasta Pack" no longer exists, but evidence from 2017 suggests that there is a lone wolf roaming the territory. *Lassen Pack* - During summer of 2016, remote trail cameras captured images of two wolfs traveling together in Shasta County, CA08M and a female believed to have dispersed from a northern Rocky Mountain wolf population. On June 30, 2017, the female was successfully collared and had given birth to four pups during spring, 2017. As of 2017 CDFW confirmed the presence of the Lassen Pack in Lassen County, Northern California; the new pack of wolfs have been named the "Lassen Pack". The breeding male's presence has not been confirmed since spring 2019 and in late spring, the breeding female began being detected with a black male wolf. The pack has produced 3 litters (2017, 2018, and 2019) since being detected. As of October 2019, the Shasta pack is estimated to consist of two adults, one yearling, and four pups. *Historic distribution:* Historically, wolves occurred in the Klamath Mountains, Cascade Ranges, the Modoc Plateau and portions of the Sierra Nevada. Only two scientifically confirmed historical wolf occurrences are known. Many historic casual observations likely confused larger coyotes with gray wolves. The lack of historical evidence tends to suggest the wolf population in California was never large. *Size*: males are slightly larger and heavier than females. Adults range from 40-175 lbs. and 26-32 inches at the shoulder in height. Wolves have rounder ears and muzzles than coyotes. They have relatively longer legs and a narrower chest than domestic dogs. *Prey:* Wolves prey primarily on elk and deer. Mendocino has relatively high levels of deer but few if any elk and no antelope. *Social behavior:* wolves live in packs with one breeding alpha pair and other non-breeding adults that may or may not be related to the alpha pair. Pups are born in an underground den that can be formed by an overhanging rock, hollow log, stump, or holes in the ground. The pups are reared by the pack with non-breeding adults assisting in their care. Wolves require large tracks of public land and areas with very low human presence. *Population status:* Gray wolves are increasing in numbers and expanding their range since their reintroduction by the USFWS into the northwestern United States. Some populations have been delisted because a few regional populations have met or exceed recovery goals. California will probably continue to get dispersing wolves from Oregon as that population expands. The redwood region near Fort Bragg (and JDSF) is depicted as having a low likelihood of providing suitable wolf habitat in the most recent CDFW Status Review habitat model. *Potential threats:* The greatest threat to wolves is from human contact through the intentional shooting, intentional or unintentional trapping, vehicle collisions, exposure to diseases from domestic dogs and habitat destruction and fragmentation.
Protection Measures: Protection measures in Section II will prevent take of the species should a wolf be sighted or a wolf den or rendezvous site discovered during operations. No significant adverse cumulative effects are expected.

Sonoma Tree Vole, Pomo Tree Vole (*Arborimus pomo*) - CDFW Species of Special Concern (1986; dropped from 1998 draft list). At the time of original listing as a species of special concern, this species was included with the red tree vole of Oregon (*Arborimus longicaudus*). Red tree vole taxonomy was revised in 1991, and the range of *Arborimus pomo* is now endemic to coastal California, from Marin to Humboldt County. Behavior and ecology is similar between the two species. Nests are found in both old growth and younger forests, from 1.8 to 48 meters high, in Douglas-fir, grand-fir, hemlock and Sitka spruce. The nest is usually near the tree bole in a whorl of limbs, often in broken off top of younger trees, and out on the limbs among the living boughs in older trees. The nest is made from the discarded fir needle parts that remain after eating the needles. Moisture is obtained from licking the dew off foliage. Moisture or cold climate may be the limiting factor in its eastern range extent. Nests have been observed in trees as young as 25 years old. In the master's thesis study of radio-collared red tree voles in Douglas County, OR, by JK Swingle (2005), ground-based searches were used to initially find tree vole nests. Tree climbing to the nest was then undertaken to ascertain its status and capture the vole. Many additional nests were found by following radio-collared voles. The Swingle study concluded that, on average, 78% of tree vole nests identified were not initially seen from the ground, and only 66% of ground-located nests were accurately assessed as active or not.

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Several studies have shown that tree voles often use multiple nests, occupy nests built by other species, and frequently abandon or re-occupy nests. Swingle's study confirmed that female nests are larger than male nests and showed that these larger nests are the ones most frequently found during ground based surveys. Long-tailed weasels were shown to be the primary predator, but many other animals (including spotted owls) prey on them. Due to their highly arboreal life, tree voles are obviously difficult to capture by

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traditional small mammal trapping methods such as Sherman live traps. Males seem to make more ground-based forays and are caught more frequently than females in pitfall trapping studies. The species has a limited dispersal distance (maximum of 366 meters), especially across non-forested habitat. Sub-adults in the Swingle study dispersed only a few trees away from their natal nest site. The apparent need for contiguous older forest habitat has created doubt about the species long-term persistence in rotational forestry, despite the fact that active red tree vole nests are found in younger forests. Review of older tree vole surveys (in the early 1900s) seems to indicate that tree voles were found much more easily and occurred in higher numbers than recently. The 1992 mammal trapping efforts using Sherman traps, smoke plates, and cameras by Humboldt State University professor (Kitchen), did not document tree voles at JDSF. However, the CNDDB database showed one occurrence in the adjacent plan, Caspar Orchard THP from 2013 (occurance 119).

Protection Measures: High amounts of forest canopy, comprised of approximately 25% Douglas-fir, will remain post-harvest providing both forage and canopy connection for habitat of the Sonoma tree vole. The Class I WLPZ protection measures will retain the older and larger trees that they are known to inhabit. No significant adverse cumulative effects are expected.

Fisher (*Pekania pennanti*) – Species of Special Concern, Federal Candidate – Proposed to be listed for a 2nd time, West Coast District population segment (DPS).

The fisher was a state candidate until recently when the Fish and Game Commission determined that only the southern California Evolutionary Significant Unit (ESU) should be listed. The norther California ESU is located along the California coast near the Oregon boarder then moves inland to the Klamath Range (Figure 14 CDFW 2015 Fisher Status Review). The US Fish & Wildlife Service recently re-proposed to list the west coast DPS of fishers as threatened (Federal Register Vol 84, No.216, 9/7/2019) and expects to make a final determination by April 25, 2020. A 4(d) rule for forestry has been proposed with the listing. Until then the fisher is still a candidate. Federally proposed (candidate) species do not receive the protection of a listed species. The West Coast DPS includes Mendocino County. Fishers are carnivores in the weasel family. *Potential to be in the Project Area:* According to CDFW status review of the fisher (August 2015), JDSF lies outside the current range of the fisher and in an area of predicted low habitat suitability (Figure 9, CDFW 2015 Status Review). Several track plate and baited camera station efforts undertaken at JDSF have not detected marten or fisher. In 2012, CDFW placed baited camera stations, at random forested locations throughout Mendocino, including JDSF. The project did not detect fisher on JDSF, but did document fisher in Lake County west of Middletown. *Denning and resting habitat* consists of large limbs and large cavities in hardwoods or conifers. Structures include live trees, snags/broken-top trees, stumps, downed logs or downed large limbs, log piles and rock structures/crevices. Dense coniferous forest with a deciduous component and abundant physical structure near the ground are its preferred habitat. Younger forests, in which complex forest structural components such as large logs and snags, and tree cavities are maintained in significant numbers, may be suitable for fishers (Lewis and Stinson 1998, p. 34). *Prey:* Diet studies in California have indicated fishers prey predominantly on mammals and but their diet may also include birds, insects, and reptiles (Zielinski et al. 1999, Golightly et al. 2006). *Potential Threats*: Historically drastic population declines were caused by unregulated trapping, forest clearing and clearcut logging throughout much of its range. The fisher has been extirpated from many central states and portions of Canada. More recent studies have shown that fishers are dying from second-hand exposure to rodent pesticides (anticoagulants) left out at illegal marijuana grow sites (Gabriel et al 2012). *Barriers to movement*: Highway 20 bisects the complete length of JDSF and would pose a potentially lethal hazard to fisher movements. Highway 101 and perhaps the Eel River would be more significant barriers to movement to fishers trying to migrate westward from MNF.

Protection Measures: The retention of existing downed woody debris, 22-inch and larger tanoaks, snags and old-growth trees will maintain habitat elements for this species in the plan area. Management guidelines aimed at creating late-seral forest characteristics in portions of Class I & II WLPZ buffers will also help to grow potential habitat elements for the fisher in the future. No significant adverse cumulative impacts to potential fisher habitat are expected.

Humboldt Marten (*Martes americana humboldtensis*) – State Endangered (as of March 18, 2019)/ State Species of Special Concern. Federally proposed as a Threatened Species (coastal Distinct Population Segment (DPS) of the Pacific marten (as of October 9, 2018). No final action has been taking on the federal proposal.

The American marten once occurred in the coastal forests of northern California, the Sierra Nevada of California, into Oregon, Washington, through to British Columbia and on to Alaska. Recent grid-based surveys concluded that the Humboldt marten is now restricted to 5% of its original range, and has less than 100 individuals remaining. The current range lies mainly in Del Norte and Humboldt County. The federal DPS considers Pacific martens from costal Oregon and northern California as genetically related but located in four discrete populations in one DPS. The four small (<100) populations between Oregon and northern California occupy 7.3% of the historical range of the DPS. *Potential to be in the project area:* Extremely low; considered extirpated form Mendocino

County. JDSF is not within the current range of the Humboldt marten (CAL FIRE Forest Practice Historic and Current Range Map, April 2016). JDSF lies in the historic range of the Humboldt marten.

Martens are carnivores in the weasel family (Mustelidae). The species was a legally-trapped fur-bearing game animal in California until the 1950s. As curious creatures, they were easily trapped, and were quickly over-harvested. Habitat alteration from early mining and logging, and the ensuing encroaching human population expansion followed severe losses from trapping, so that the marten is restricted mainly to remaining suitable habitat in National Parks in the Sierra Nevada. A recent publication (2001) by Zielinski, Slauson, Carroll, Kent and Kudrna undertook literature and field surveys at over 2,360 track-plate stations in California, Oregon, and Washington between 1989 and 2000 to look for the three coastal marten subspecies. They documented *M.a. humboldtensis* at four sample locations in California; all sites were within Siskiyou Wilderness area, in southern Del Norte County, over 200 miles to the north. None of the detections were within redwood forest. A more recent field study by Zielinski and Slauson (2007) in Mendocino National Forest (MNF) attempted to document the marten but located none, and found Pacific fisher instead. Repeated sampling efforts by Slauson and other researchers at the northern California population in 2008 and again in 2012 estimated the entire coastal northern California population to be fewer than 100 individuals (Federal Register April 7, 2015). According to the publication, Ecology of American Martens in Coastal Northwestern California, by K. Slauson, W. Zielinski, and J. Hayes, this species inhabits two major vegetation types associated with serpentine and non-serpentine soils. On serpentine soil types, this species occupies areas of rock outcrops with a moderate to heavy understory component. On non-serpentine soils, this species occupies mainly late-seral and old-growth structure (dense shrub layers, large diameter trees, snags, and logs). Martens will avoid areas without good overhead cover and they prefer the more mesic aspects of forested areas (north-facing slopes). According to the above cited study, the decline of this species is mainly due to historic trapping for its fur and loss of old-growth forests.

Several wildlife surveys for carnivore presence have occurred on JDSF. In 1992, Humboldt State University professor David Kitchen and his student field crew placed 50 smoked track-plate stations throughout JDSF. In 2003, CDFW Environmental Scientist; T. Nelson, placed baited photo stations in the James Creek area (eastern side of JDSF). In 2012 and 2013 CDFW camera stations placed at eight locations within JDSF for fisher did not document the marten. Due to the lack of recent sightings in the local regional area the marten is unlikely to exist within JDSF, nor is it likely to expand its range to JDSF in the future. Due to the extremely low probability that the Humboldt marten would be found in JDSF, the species was not address in Section II.

Protection Measures: The retention of existing downed woody debris and old-growth trees as mentioned above for the Pacific fisher will maintain habitat elements for this species in the plan area. No significant adverse cumulative impacts are expected.

Ringtail (*Bassariscus astutus)* - CDFW Fully Protected species. Before 1967, the ringtail was a CDFW game species, and legal to harvest. It is not on any CDFW Species of Special Concern list. Ringtails occur from southwestern Oregon to central Colorado and south through to Texas and southern Mexico. Ringtails become active late at night and spend much of their time in trees or on rocky ledges near rivers. They are found in tanoak, coniferous forest, riparian woodland, and even wooded desert habitats. Miners were known to tame ringtails because they were excellent mousers. A study on the distribution of ringtail by CDFW in 1980 found that ringtails were still widely distributed and recommended removing the species from the Fully Protected list. Little information regarding its current distribution and abundance is available. The ringtail was detected at 13 of 50 track plate stations during Kitchen's study at JDSF in 1992 and has been seen on the state forest recently.

Protection Measures: WLPZ buffers should retain adequate wooded riparian habitat for this species. No significant cumulative adverse impacts to ringtail are expected.

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The California Bird Species of Special Concern was revised in 2008. It was a collaborative project of the California Department of Fish and Game, PRBO Conservation Science (now Point Blue), and Western Field Ornithologists. It replaced the CDFW 1992 SSC list. Taxa that had been on previous lists but were removed from the 2008 list were placed on what CDFW is calling a "Watch List".

Northern Spotted Owl (*Strix occidentalis caurina*) - The northern spotted owl (NSO) is both state and federally listed as Threatened, and a Board of Forestry sensitive species. There are three spotted owl sub-species in western North America – the NSO, the California spotted owl (*S. o. occidentalis*), and the Mexican spotted owl (*S. o. lucida*); all are geographically isolated from one another. The NSO is found in forested areas near the coast from Marin County north to British Columbia. The NSO is one of the most studied owls in North America. Primarily associated with older forest and structures (large cavities, protected snags) for nesting and roosting, the owl has been shown to forage in a wider variety of stand ages. In the coastal redwood zone owls have smaller home ranges and thus higher

breeding densities than inland. The Final Revised Recovery Plan was released in June, 2011. The Revised Recovery Plan focuses on the threat posed by the barred owl invasion, and proposes an updated modeling effort to design and evaluate conservation networks.

JDSF began spotted owl monitoring as required prior to timber harvesting in 1989. Since then, survey effort has varied in relation to the amount of predicted harvesting and/or available funding. The first forest-wide inventory was undertaken in 1994 (Jones & Stokes). Thirteen pairs and one single female were located for a total of 14 territories. In 2001 and 2005, the second and third inventories were undertaken. In 2001, the inventory documented a total of 12 spotted owl territories (11 pairs and 1 single owl). In 2005, 18 territories (14 pairs and 4 single owls) were documented. Telemetry observations at five owl territories was undertaken between 2001 and 2005 as part of a larger research effort by Irvin and Rock to study owl home ranges and resource selection. Barred owl detections are continuing to be heard during spotted owl calling at JDSF. In 2001, a single male barred owl was detected at the southern edge of JDSF near Mendocino Woodlands State Park (Stephens 2001). They have been known from Mendocino Woodlands for at least ten years by that time. By 2007, up to five territories were thought to be known in JDSF. Most recently NSO calling has detected barred ols to the east across all of JDSF.

Protection Measures: Owl protection (both for the species and its habitat) at JDSF for timber harvest planning is normally provided by the USFWS technical assistance; 3-15-2011 "Attachment A" – Take Avoidance Analysis and Guidance for the Coast District. This guidance requires utilization of the most recent FWS approved NSO Survey Protocol. Currently the protocol doubles the number of project-related NSO surveys for the first two years of surveys (from 3 to 6 surveys each year) and requires the retention of a no-harvest 100-acre Core Area and 200 acres of Nest/Roost habitat retained within 0.7 miles of every activity center.

The THP has two known activity center within 0.7 miles of the plan and one adjacent to the plan: MEN 659 and 585. The 100-acre Core Area has been excluded from harvest, and suitable owl habitat will be retained in a large portion of the plan area post-harvest. No significant adverse cumulative impacts are expected.

Sharp-shinned Hawk *(Accipiter striatus)* and **Cooper's Hawk** *(Accipiter cooperii)* - CDFW Watch List. The Cooper's hawk has been documented on JDSF. Optimal habitat requirements for both species are mid-seral timber with dense canopy closure. Both species are also known to occur in more open forests, forest edges, and riparian corridors. Habitat for this species is found throughout the harvest area, as well as most of JDSF. Habitat within the plan area will be present post-harvest as a result of the selection silviculture and associated post-harvest conifer stocking.

Any active raptor nest found in the harvest area will be protected as discussed in Section II, Item #32. No significant adverse cumulative impacts are anticipated.

Northern Goshawk (*Accipiter gentilis*) - Board of Forestry sensitive species and CDFW SSC 1992 and 2008. This species is listed as a yearlong resident in the northern half of Mendocino County. The species uses larger diameter conifer and deciduous stands for cover and nests in the densest parts of the stand. While hunting, snags and dead-topped trees are often used for observation and prey-plucking perches. Habitat may be present within the THP area and BAA.

JDSF wildlife records report two possible sightings of northern goshawk that occurred in the Little North Fork Big River. The first sighting was in 1992 and the second was in 1994. No nests were observed and no sightings have been reported in the area since. No occurrences of the northern goshawk were noted in the CNDDB within the BAA. The RPF has walked through all portions of the harvest area looking for signs of raptors. No raptor nests were observed and no signs of any raptors in the harvest area have been found. Any active raptor nest found in the harvest area will be protected as discussed in Section II, Item #32. No significant cumulative adverse impacts are expected.

Bald Eagle (*Haiaetus leucocephalus*) - The bald eagle is a state endangered species, a Board of Forestry sensitive species and a CDFW fully protected species. The range distribution map (CDF&G 1990) shows occurrence only in the winter throughout most of Mendocino County, however, recent summertime sightings have been made along the Albion River and near Elk (Mendobirds Yahoo Group 2011). For feeding, this species requires large bodies of water or free flowing rivers where fish are abundant, and hunting perches are available. Bald eagles are only very rarely seen in coastal forests of Mendocino County.

There are no large bodies of water within the plan area or the BAA. No bald eagles or large nests were found within or adjacent to the plan area during plan preparation. Snags will be retained to the extent feasible to provide perching opportunities if this species were to utilize the area. The proposed operations are unlikely to negatively affect this species and listed bird species nest protection measures in Sec II. Item 32 will protect active raptor nests. No significant adverse cumulative impacts are expected.

Golden Eagle (*Aquila chrysaetos*) - The golden eagle is a Board of Forestry sensitive species, and a CDFW fully protected species. All of Mendocino County is listed as both summer and winter range for this species. Golden eagles nest on cliffs and in large trees in open areas. Secluded cliffs with overhanging ledges and large trees are used for cover. Feeding requires open terrain for hunting which includes early successional forests. This species is not known to occur on JDSF. Foraging habitat is not found in the plan area or the BAA. The proposed operations are unlikely to negatively affect this species and default raptor nest protection measures in Sec II. Item #32 will protect active listed bird species nests. No significant adverse cumulative impacts are expected.

American Peregrine Falcon (*Falco peregrinus anatum*) - The peregrine falcon is a state endangered species, a Board of Forestry sensitive species, and a CDFW fully protected species. This species almost went extinct in the 1960s due to egg-shell thinning from pesticide exposure. Despite the fact that the greater North American population has been delisted, (because population rebounds after the US banning of DDT) the California coastal population still has known problems with egg-shell thinning and therefore, low reproductive success. This coastal population is suspected of exposure to DDE (the breakdown product of DDT) because of higher levels in their prey food gotten from migrating birds coming from southern latitudes that carry DDE and DDT in their bodies. Mendocino County is listed as both summer and winter range for this species. This bird nests on cliffs 50 – 200 feet high. The peregrine is not known to occur on JDSF, however rocky outcrops with a history of peregrine nesting are found nearby to the east of JDSF and more recently peregrines have begun to nest again along the coast. Both Sonoma and Mendocino coast have had nesting peregrines for the last few years (since 2017). There are no peregrine nests within the plan area or the BAA and significant adverse cumulative impacts are not expected.

Osprey *(Pandion haliaetus)* - The osprey is a Board of Forestry sensitive species. Ospreys are locally common in western N. America during the breeding season. They fly south to Mexico, Chile and Argentina for the winter. North American populations crashed in the 1950s-1970s due to hunting, DDT exposure, and encroachment on their breeding grounds. Many populations have now recovered after a DDT ban, successful use of artificial nesting platforms (especially in the east), and protection from hunting. Osprey hunt for fish over open waters (rivers, lakes, reservoirs, bays, estuaries and ocean surf zones) Osprey usually nest within 1,300 feet of fish producing waters on easily accessible snags, flat topped trees, cliffs, or man-made structures. Their large stick nests are used year after year, and re-built as needed after winter storms.

Potential nesting structures for the osprey are present in the BAA and watershed. The late-seral area streamside of the North Fork of Caspar has areas of decadent older second growth trees and snags that would provide good nesting surfaces. No osprey nests have been detected during plan preparation. Raptor nest protection measures in Section II, Item #32, will prevent destruction of any newly discovered active nest. Snag retention will retain potential nesting trees for this species. No significant adverse cumulative impacts are expected.

White-tailed Kite *(Elanus leucurus)* - The white-tailed kite is a CDFW fully protected species. This species is not known to occur on JDSF. This kite hunts over open grasslands and savannah-like habitats, hovering with vigorous wing beats while looking for prey directly below. They nest in the top-third of trees, often in oak woodland or wooded riparian habitat adjacent to their foraging area. Infrequently they have been known to nest in coniferous forest. Small mammals (voles) comprise more than 95% of their diet. *Protection Measures:* During the process of plan layout, no signs of this species were detected. Raptor nest protection measures in Section II, Item #32, will prevent destruction of any newly discovered active nest. No significant cumulative adverse impacts are expected.

Marbled Murrelet (*Brachyramphus marmuratus*) - The marbled murrelet is a federally threatened and a state endangered species. This seabird prefers dense mature forests of redwood and Douglas-fir for nesting, but has also been found in single or small groups of mature trees. The Pacific Seabird Group, a professional organization of seabird biologists, defines potential habitat as 1) mature (with or without an old-growth component) and old-growth coniferous forests, and 2) younger coniferous forests that have deformations or structures suitable for nesting. A recent study by R. Golightly, C. Hamilton and P. Hebert in 2009 in occupied northern California redwood forests found that murrelets nested more frequently in redwood than Douglas-fir, and in very large trees (mean of 266 cm DBH [100"] and 80 m [262'] tall). Murrelet nests were also found to be at least 200 m (656') from paved roads, and in forests with more downed wood and numerous small platforms. They interpreted the distance from paved roads as an avoidance of human disturbance and the increase in downed wood to indicate areas with natural openings. These openings may facilitate murrelet flight into nest sites. Another habitat study in northern California (C. Meyer, S. Miller & J. Ralph 2009) found that murrelet nests were only found in redwood forest stands where the mean tree DBH was at least 100 cm (40"), and more often >140 cm (>55"). Nest sites were located on gentle low-elevation slopes or on alluvial flats close to streams. The study found low elevation was important even when

proximity to marine habitat was taken into account; murrelets occupy stands at the bottoms of local major drainages rather than occupying ridge tops.
Protection Measures: No habitat is within the THP area. No known murrelet are present in the area. No significant adverse cumulative impacts are expected.

Great Blue Heron (*Ardea herodias*) (rookery) - The great blue heron is listed as sensitive species by the Board of Forestry. The great blue heron is common throughout most of California year-round (including Mendocino County). It is commonly found foraging in fresh and saline emergent wetlands, along riverine and rocky marine shores, in croplands, pastures and in mountains above foothills. This heron feeds upon mostly fish, but also feeds upon small rodents, amphibians, snakes, lizards, insects and crustaceans. Rookeries are often located in large trees near open bodies of water. Key habitat potentially impacted by timber harvest includes rookery trees.
Protection Measures: No rookery trees were observed in the plan area and no large bodies of water are located within the plan area or BAA. No significant adverse cumulative impacts will occur to great blue heron nesting habitat.

Great Egret (*Casmerodius albus*) - The great egret is listed as a sensitive species by the Board of Forestry and is a common, but sparse resident throughout California (wintering in the west 1/3 of Mendocino County). This species is not known to occur (nest) on JDSF. The great egret feeds in fresh and saline emergent wetlands, along the margins of estuaries, lakes, slow moving streams, on mudflats and in irrigated croplands and nests in rookeries much like the great blue heron. The great egret mainly feeds upon fish, amphibians, snails, snakes, crustaceans and small mammals.
Protection Measures: Foraging habitat may exist in the lower portions of Caspar Creek near the coast. Class I WLPZ protection measures will buffer any potential foraging habitat. No signs of the great egret or rookeries of the great egret were observed during plan preparation. No significant adverse cumulative impacts will occur to great egret nesting habitat.

Vaux's Swift *(Chaetura vauxi)* – CDFW SSC (2008). The Vaux's swift breeds in coniferous forest along the central and northern California coast. The species requires natural or artificial cavities such as burned out hollow trees for nesting. Vaux's swifts feed aerially, catching flying insects.
Protection Measures: Larger, decadent trees will be retained for snags, and trees with unique structural characteristics such as broken and hollow tops will be retained. No significant adverse cumulative impacts are expected.

Purple Martin *(Progne subis arboricola)* – CDFW Species of Special Concern (2008). This migratory bird arrives in California mid-March through May to begin its nesting season (Williams 1998). As a secondary cavity nester dependent on pre-existing cavities, purple martins compete with many other species for access to cavities. In urban areas, European starlings and house sparrows are competitors for nesting cavities and have forced purple martins to resort to using holes in concrete bridges to nest. In woodland and forested habitats, where they still nest in natural structures, nesting trees must have suitable cavities and open aerial access to cavity entrances. The species forages over riparian areas, forest and woodland habitat.
Protection Measures: Management for late seral development in Class I WLPZ and snag retention policies in the plan will protect nesting habitat for this species. No significant adverse cumulative impacts are expected.

Olive-sided Flycatcher (*Contopus cooperi)* - CDFW Species of Special Concern (2008). Olive-sided flycatchers are associated with forest openings and edges occurring in mature forests and following natural and anthropogenic disturbances, such as tree fall gaps, fire, and logging (Kotliar 2007). The olive-sided flycatcher winters in mountainous areas throughout South America. Spring migrants arrive in southern California in mid-April and in northern California in early May. These flycatchers utilize tall perches above the canopy to aerially forage for flying insects. Bark beetles and bumblebees are the majority of their diet. Fire and specific management practices can increase habitat for this species. However, large stands of evenly aged saw log are detrimental (Brandy). This species has been detected infrequently during JDSF bird surveys.
Protection Measures: Application of WLPZ buffers in Class I and Class II streams and creating new openings within the canopy of the harvest units should increase foraging structure for the olive-sided flycatcher within the plan area. No significant adverse cumulative impacts are expected.

Yellow Warbler (*Dendroica petechia brewsteri)* – CDFW Species of Special Concern (2008). This species nests in dense, medium-sized, riparian woodlands (willows, cottonwoods, and alders), and low shrubby openings in montane forests. In migration, it is found in a variety of sparse to dense woodland and forested habitats. This species was noted during the JDSF 1992 Kitchen wildlife study, however, only one bird was seen. It has not been noted by the JDSF wildlife biologist since. The yellow warbler is declining in many parts of its range, particularly along the southern coast and in the central valley. Although it is highly unlikely to nest within JDSF, riparian hardwood vegetation within JDSF such as red alder may provide spring and fall migration habitat. Alders are not a commercially-harvested species at JDSF.

Protection Measures: WLPZ protection measures will prevent any adverse impacts to this species. No significant adverse cumulative impacts are expected.

REPTILES AND AMPHIBIANS

The CDFW Reptile and Amphibian Species of Special Concern list dates from 1994. The CDFW website mentions an update, but no additional data has been released.

Northern Red-legged Frog (*Rana aurora*) - The northern red-legged frog (NRLF) is a CDFW Species of Special Concern. Recent genetic research (Shaffer et al 2004) determined that the northern red-legged frog is separate from its sister species, the California red-legged frog (*Rana draytonii*) (a federally Threatened species). The northernmost area of intergrade between the two species is south of JDSF in southern Mendocino County at Greenwood Creek (USFWS 2009). The northern red-legged frog inhabits quiet pools of streams, marshes and occasionally ponds. The frog requires permanent or nearly permanent water for larval development. Mating and egg-laying occurs in permanent bodies of water in mid-winter. Females lay large gelatinous clusters of eggs which float to the surface and are visible from above. Tadpoles metamorphose into frogs in 4-5 months.
Protection Measures: There are known NRLF frog CNDDB occurrences in the Class I and Class II streams found within the WAA. Potential habitat for the NRLF will be protected by the large stream buffers (WLPZ). No significant adverse cumulative impacts are expected.

Foothill Yellow-legged Frog (*Rana boylii*) – The foothill yellowed-legged frog (FYLF) is a State Candidate (as of June 21, 2017), and a CDFW Species of Special Concern. The Species is under review for listing by the USFWS.

The September 30, 2019 CDFW Status Review recommended listing as Threatened for all the California populations of the FYLF except the Northwest/North Coast clade, which includes Mendocino County. Until the California Fish and Game Commission agrees and publishes their findings the FYLF remains a State Candidate Species. CDFW confirmed that the FYLF appears to have been recently extirpated or has seriously declined in numbers from over half its historically occupied sites in California. Areas of decline are the sourthern and central coast, central valley, portions of the Bay area, and southern Sierra foothills of California. The primary threats to the FYLF appear to be climate change, water development (impoundments and diversions) and dams, predation (by invasive and native species such as garter snakes, bass, pikeminnow, bullfrog, river otters, and feral pigs), and the spread of the fungal pathogen Bd (*Batrachochytrium dendrobatidis).* Trampling of frogs and their habitat and water contamination by cattle may be contributing minor factor. Mining activities such as suction dredging and gravel mining destroys habitat. Toxic compounds from the breakdown of herbicides, pesticides, and fertilizers, have been shown to be transported on easterly winds from the Central Valley into the frog's habitat and can cause physical, developmental, and behavioral abnormalities that impact the frog's life cycle. Logging roads and stream crossings can add sediment to the frog's aquatic habitat thus hampering egg attachment to substrate, and reducing algal food for tadpoles. JDSF has one CNDDB record in Sixteen Gulch (Occ. No. 62). CDFW stream surveys have previously recorded the FYLF in the following basins and sub-basins of JDSF: SF Noyo River, NFSF Noyo River, Brandon Gulch, Parlin Creek, NF Big River, Chamberlain Creek, West Chamberlain Creek, James Creek and the NF James Creek (S. Harris 2001). A recent sighting of an adult FYL frog was made in the upper reaches of the Little North Fork Big River. Class I (breeding) and Class II (over-wintering or non-breeding adult) streams may have habitat for this frog.

The highly aquatic species inhabits a variety of small to large sized streams with rocky or cobble substrate, from sea-level to 6,000 feet in parts of California and Oregon. They are found in a variety of riparian, oak-woodland, conifer, coastal scrub, mixed chaparral, and meadow stream habitats. Adults bask on sunny exposed rock surfaces near streams and dive into the water when disturbed. Egg clusters are attached to rocks in moving water near stream edges. Breeding can begin as early as March in warm coastal streams and extend into May, and larvae can hatch in as little as 5 or more than 35 days depending on temperature. Egg clusters are attached to the downstream side of rocks in shallow, slow moving water near stream edges. Larvae prefer temperatures between 16.5 to 22.2 degrees Centigrade (Catenazzi and Kupferberg 2013). Rearing habitat for tadpoles consists of sunny low-gradient gravel and cobble bars along vegetated banks. Tadpoles eat diatoms and filamentous algae. Post-metamorphic frogs eat terrestrial and aquatic invertebrates such as flies, moths, mosquitos, ants, beetles, water striders, snails, and arachnids. Time to metamorphosis takes 3 to 4 months. This species is rarely encountered far (over 39 feet) from permanent water and use watercourses for movement corridors (Nussbaum et al. 1983). Wheeler et al. (2006) found that the mean distance moved for females was 436 ft (range 0-1,462 ft) and only 32.8 ft. (range 0-1,837 ft) for males for those adult frogs that moved between breeding sites. There are no FYLF occurrences in the WAA. FYLF habitat in the plan area will be protected by the WLPZ protection measures. Surveys will occur were necessary at map points. No significant adverse cumulative impacts are expected.

Western Tailed Frog (*Ascaphus truei*) - The western tailed frog (WTF) is a CDFW Species of Special Concern. The WTF is a flat toad-like frog with hardened toenails that act as claws. This frog is a stream-dweller that does not vocalize. This species is restricted to perennial streams of low temperature in steep-walled valleys with dense vegetation. Intermittent streams are unsuitable. Egg embryos tolerate water temperatures between 5-18 degrees Centigrade. Tailed frogs do not inhabit ponds or lakes. In drier conditions, they can be found under rocks near streams. A rocky streambed is necessary for cover for adults, eggs, and larvae. Siltation, stream warming and reduction of habitat may have contributed to a decline in this species.
Protection Measures: The WTF is documented in the WAA in the NF Caspar Creek (Occ. No. 401-2006); this was 5 adult observations during an electrofishing survey of the creek. This observation is within the THP area. Suitable habitat is likely to occur on other portions of the mainstem of Caspar Creek, however the WLPZ protections and erosion protection are in place to protect the riparian areas of the THP and it is unlikely that timber operations will negatively affect this species. WTF with habitat in the plan area will be protected by the WLPZ protection measures. No significant adverse cumulative impacts are expected.

Southern Torrent Salamander (*Rhyacotriton variegatus*) - The southern torrent salamander is a CDFW Species of Special Concern. Habitat includes coastal redwood, Douglas fir, mixed conifer, montane riparian and montane hardwood-conifer, and old-growth forests. Microhabitat consists of cold, well shaded, permanent streams and seeps or within splash zone or on moss-covered rocks within trickling water. The species inhabits areas of gravel and cobble with permanent flowing water.
Protection Measures: Habitat characteristics may exist within the harvest area. The harvest area contains streams where dark, cool habitats are present, cobbles and gravels where this species might be found, but these areas are limited. WLPZ protection measures for all watercourse sizes will ensure that watercourses are maintained. No significant adverse cumulative impacts are expected.

Red-Bellied Newt (*Taricha riverularis*) – the red-bellied newt is a CDFW Species of Special Concern. A California endemic species, it is known only from coastal areas (especially redwood forests) of Sonoma County north to Humboldt County. Little data is available on abundance. A highly philopatric species, with good homing ability, however, individuals can make long-distance movements between breeding sites. Does not breed in ponds, prefers faster moving streams. Eggs attached to underside of rocks, usually a single string of 10 eggs. Long-lived (20-30 years), taking five years to attain breeding status. Threatened by habitat loss (vineyard development, water diversions, road building), and road kill and fragmentation of breeding sites. Adults are terrestrial, living in underground retreats (May to October) breeding in aquatic (February to May). CDFW has recently added two historic collection locations on JDSF in the CNDDB: one taken in the 1960s at the confluence of Chamberliain Creek and North Fork Big River (Occ. 22) and several taken during the 1960s and 70s at the confluence of James Creek and the NF Big River (Occ. 19).
Protection Meausres: Habitat characteristics may exist within the harvest area. The harvest area contains streams with faster moving water and deep underground retreats where the species might be found, but these areas are limited. WLPZ protection measures for all watercourse sizes will ensure that watercourses are maintained. No significant adverse cumulative impacts are expected.

Northwestern Pond Turtle (*Actinemys marmorata marmorata*) - The northwestern pond turtle is a CDFW Species of Special Concern. The turtle inhabits a wide range of fresh or brackish water habitats and utilizes adjacent upland areas for reproduction. Pond turtles may live for 30 to 40 years, reaching sexual maturity at about 8 years of age. Nests are dug by females in loose dirt along wetland margins or in adjacent uplands, during this time they are vulnerable to a multitude of threats. Active from February to November, they hibernate during winter months underwater in the muddy bottoms of deep pools. Prime habitat includes low flow regions of rivers, channels and backwater areas. Deep, still water with emergent woody debris, overhanging vegetation, and rock outcrops is optimal for basking and thermoregulation. Pond turtles have been documented at several locations on JDSF, both in or near slow moving waters and small ponds.
Protection Measures: WLPZ protections and erosion protection are in place to protect mainstem (Class I) habitat in the THP and it is unlikely that timber operations will negatively affect this species. Class I WLPZ protection measures will ensure that healthy watercourses are maintained and disturbance is limited. No significant adverse cumulative impacts are expected.

FISH

Coho Salmon (*Oncorhvnchus kisutch*) – Coho salmon are listed as state and federally endangered. The species is known to be present in most watersheds within JDSF. The species historically ranged from northern Monterey Bay coastal streams north to the Oregon-California border. After spawing, adults die. Redds are laid in cold, clear, gravel-bottomed streams. Juvenile fish live in freshwater and migrate to saltwater. Coho population abundance had a 90 to 95 percent decline between the 1940s and 1990s (Moyle, 2002). Several factors contributed to this population decline, including: commercial fishing, water diversions and fish screens, dredging, gravel mining, streambed alteration, barriers, instream flow alterations, and timber harvest activities.

Protection Measures: Coho are found in the WAA. Compliance with the FPR's and the increased Class I watercourses buffer widths and canopy cover retention standards will provide additional watercourse protection. The proposed operations are not expected to have a significant adverse cumulative impact on the species.

Steelhead (Rainbow Trout) (*Oncorhychus mykiss*) are a federally Threatened species and a CDFW Species of Special Concern. Not all steelhead migrate, and those that do, migrate to different locations. Some migrate to the ocean, others upstream to the tributaries of lakes, and some migrate within the stream corridor. Along the coast, young fish migrate to the ocean as early as two and as late as seven years old. These steelhead return to their natal origins to spawn and do not necessarily die after spawning, but can return to spawn again. Cool stream temperatures, gravel-bottomed, and well-oxygenated streams are critical to successful spawning.

JDSF is in the Northern California steelhead Evolutionary Significant Unit (ESU). *Protection Measures:* Steelhead are present in South Fork Noyo. Compliance with the Threatened and Impaired regulations is expected to provide protection for steelhead and steelhead habitat, and is discussed in Section II, Item 32. The proposed operations are not expected to have a significant adverse cumulative impact on the species.

Chinook Salmon (*Oncorhychus tshawytscha*) - Federally Threatened. There are 17 ESUs of chinook salmon in Washington, Oregon, Idaho and California; each ESU is treated as a separate species by the federal government under the Endangered Species Act. JDSF is in the Coastal California ESU which includes all naturally spawned populations of Chinook salmon from south of the Klamath River to the Russian River, California. Evidence that suggests populations have been extirpated in the southern part of the ESU. Chinook display diverse life histories, especially in timing of return migration. Juveniles may spend up to a year in their spawning river or head to the ocean within months after emerging from their spawning beds. Chinook face threats are similar to steelhead; habitat loss and water quality and quantity challenges are the biggest problems.
Protection Measures: Chinook have not been observed in the WAA. The protection measures employed for the coho salmon will serve to protect habitat for this species. Based on the WLPZ protection measures, no significant adverse cumulative impacts are expected.

River Lamprey (*Lampetra ayresii)* The river lamprey is a CDFW species of special concern. Adult river lampreys are relatively small lampreys (17 cm) that migrate from oceans to small tributary streams to spawn in gravel riffles. The ammocoetes live in salty back waters of such streams. River lampreys are anadromous and spend much of their adult life in estuaries before entering the ocean where they spend 3-4 months. In the ocean, they are obligate parasites, and typically kill their host (mainly herring and salmon, 10-330 cm in length). There is potential habitat for this species in the watershed.
Protection Measures: Measures described above for Coho is expected to provide adequate protection for lamprey habitat. No significant adverse cumulative impacts to River Lamprey are expected.

PLANTS
Botanical surveys are completed during JDSF THP preparation and explicit protection measures, if warranted, (usually ground-based equipment exclusion or equipment limitation zone buffers) are incorporated in THP Section II. Additionally, default buffers are initially required if new occurrences are found during operations (see Section II). No significant adverse cumulative impacts to state or federally listed or Rare Plant Rank 1-2 plants are expected to occur with these protection measures in place. The botanical survey will be amended in upon its completion in 2020. Species descriptions and local occurrence information follows. One occurrence of Piperia candida (white-flowered rein orchid) was found along a PG&E access road which will be re-used as a skid trail. The location will be avoided. Protection measures are described in Section II of the THP.

The CNDDB (Rarefind), CNPS online electronic inventory, The Jepson Manual, A California Flora by Munz, and various online floras for North America, Oregon, Washington and California were utilized for range information, species descriptions, habitat associations, and listing status. Species are grouped by listing status, then in alphabetical order by scientific name.

State or Federally listed species

Astragalus agnicidus (Humboldt milk vetch) - Humboldt milk vetch is state endangered, and RPR 1B.1 species. The vetch is a short-lived perennial herb in the Fabaceae family, blooming from June to October. The habitat is described by Walker and CNPS as occurring in openings and disturbed habitats. This plant is endemic to California and was thought to be extinct until rediscovered in 1987 in Humboldt County near where it was first collected by the ranch owner H. Tosten in 1931, and later described by Fabaceae expert R.C. Barneby in 1957. Since then, thousands of plants (~ 5,000) were located on ridge line slopes by foresters after a logging operation in JDSF in 1999. Following the 1999 discovery, Humboldt milkvetch has been found during the course of botanical surveys conducted

throughout Mendocino and Humboldt counties. As of June 2012, there are 47 occurrences in CNDDB; 41 within Mendocino County, four within JDSF. Within JDSF all locations are on upper ridges where disturbance (usually logging or road building) has recently occurred. These plants live 5-10 years. The hard seed coat may allow for long-term dormancy capability. No Humboldt milkvetch occurrences were located in the BAA.

Pleuropogon hooverianus (North Coast semaphore grass) - North Coast semaphore grass is a recently listed state Threatened (2002) and a RPR 1B.1 species endemic to California and found in Sonoma, Marin and Mendocino counties. This species is found in broadleafed upland forest (open, moist areas in mixed evergreen hardwood forest or woodland), meadows and seeps, and open, mesic areas in North Coast coniferous forest from 10-635 meters. Most nearby occurrences are from Willits, Ukiah and Redwood Valley areas in open oak woodland habitat especially along riparian corridors of Valley oak and Oregon white oak but also with a Douglas-fir overstory. Some occurrences may have been misidentified plants of *Plueropogon californicus var. davyi* (CNDDB).

Trifolium tricocalyx (Monterey clover) – Monterey clover is a state and federally endangered, diminutive much-branched annual clover in the pea family. It is responsive to fire and ground disturbance. It was, until recently, known only from a small area in Monterey pine forest. It was, until recently, known only from a small area in Monterey pine forests. In 2011, it was found for the first itme during a botatnical survey in Mendocino along a haul road in redwood/Douglas-fir forests.

California Rare Plant Rank 1A, 1B, 2A and 2B list species

Arctostaphylos nummularia ssp. mendocinensis (Pygmy manzanita) – RPR 1B.2. Pygmy manzanita is a small-leaved, evergreen shrub in the Ericaceae family. As is typical for many manzanita species it blooms in the middle of winter through early spring. This species is restricted to closed cone forest on acidic soil. Within JDSF it is found only in pygmy forest or adjacent areas of Bishop pine forest. It is indistinguishable in the field from *Arctostaphylos nummularia.*

Calamagrostis crassiglumis (Thurber's reed grass) - RPR 2.1. Thurber's reed grass occurs from Marin County north to Vancouver Island, Canada. Only one occurrence is documented within Mendocino County. The type specimen was collected in "Mendocino swamps," by botanist and educator, H.N. Bolander in 1866. Its blooming period is from May to July and it is listed as an obligate wetland species. This species is found in mesic areas of coastal scrub and freshwater marsh and swamp habitats usually in marshy swales surrounded by grasslands and shrubs at elevations ranging from 30-135 ft (10-45 m). Potential habitat for this species is extremely low within the plan and within JDSF.

Campanula californica (Swamp harebell) - RPR 1B.2. This species is native and endemic to California, and is found in coastal counties from Santa Cruz to Humboldt. Habitat consists of bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, marshes, swamps, and mesic areas within the North Coast coniferous forest. The blooming period for this species is June through October. Habitat for this species occurs in the plan area. Four known occurrences are located outside the plan in the BAA (three outside the WAA and one in the WWA on the side of Appurtenant Road 600.

Carex californica (California sedge) - RPR 2.2. California sedge is a rhizomatous perennial herb in the sedge family (Cyperaceae). California sedge blooms May to August in closed-cone coniferous forest, bog and fen, coastal prairie, meadows and seeps and the margins of marsh and swamp habitats at elevations ranging from 270-1005 ft (90-335m). As a facultative wetland plant species, California sedge has a 34-66% likelihood of occurring in wetlands. This species occurs on the western end of JDSF in openings in Northern Bishop Pine and Mendocino Pygmy Cypress Forest. Habitat for this species occurs within the BAA. Numerous plants are found in the state forest areas along Road 500 in the BAA outside and north of the plan area.

Carex saliniformis (Deceiving sedge) - RPR 1B.2. Habitat for deceiving sedge consists of coastal prairie, coastal scrub, meadows, marshes and swamps (coastal salt) in mesic areas. It ranges in elevation from 0-393 feet and blooms between May and July and is endemic to California. Several locations occur on the Fort Bragg USGS quadrangle, but all within 1 mile of the coast. Habitat for this species is highly unlikely to be found within JDSF because of its affinity for coastal wetland habitats.

Cornus canadensis (Canadian bunchberry) - RPR 2.2. Canadian bunchberry is in the dogwood family (Cornaceae) and is found as a native species in Canada, northern Greenland, northern Asia and northern USA. Coastal Mendocino County had some of the southernmost occurrences in the U.S. Unlike its small tree and shrub-sized relatives, it is a creeping, rhizomatous perennial growing to only about 20 cm (8 in) tall. It blooms in May through July, below 3600 ft, and is found in wet areas in redwood, Douglas-fir, and yellow-pine forest. Potential habitat for this species occurs near seeps in low lying areas.

Erythronium revolutum (Coast fawn lily) - RPR 2.2. Coast fawn lily is found in bogs and fens, broad-leaved upland forest, and North Coast coniferous forest (mesic/streambanks) from 0 –1350 meters. It is native to the coastal ranges from northern California to British Columbia. The closest known occurrence is north approximately 10 miles at the headwaters of Ten Mile Creek. If potential habitat exists for this species, it will be found along Class I or II areas or potential wet areas such as seeps or springs. The small portions of Class I WLPZ have adequate protection measures to protect habitat for this species.

Glyceria grandis (American manna grass)- RPR 2B.3. American manna grass is described by Walker and/or CNPS as occurring in riparian, streambank, lake-margin, meadow, bog/fen and edge habitats. It is native to Canada and the United States, where it is widespread in distribution. In Mendocino occurrences were found most recently in the 1930s and 40s at the Garcia slough near the town of Manchester. Habitat for this species is was not found within the THP area, and is highly unlikely to exist within JDSF..

Hesperocyparis pygmaea (Pygmy cypress) - RPR 1B.2. Mendocino Cypress is normally a small (1-2 m) tree, found on sterile soil (podzols) in the pygmy forests of Mendocino County. It has a long whip-like terminal shoot and serotinous cones. It can occasionally occur (usually after a disturbance such as logging or fire (Sholars, 1982) on fertile soils where it obtains a much larger stature (10-50m). Mendocino Cypress and Mendocino Pygmy Cypress forest occurs in small portions of the plan along Road 500.

Kopsiopsis hookeri (Small groundcone) - RPR 2B.3. Small groundcone occurs at low elevations from northern British Columbia to northern California. There are 15 occurrences in the CNDDB (8/2009); only two are in Mendocino County. The closest known occurrence is near Albion Ridge Road. These plants are root parasites, known to parasitize salal (Gaultheria shallon), kinnikinick (Arctostaphylos uva-ursi), and huckleberry (Vaccinium ovatum). Habitat for this species is North Coast coniferous forests and the blooming period is April through August. Habitat for this species is found throughout the harvest area.

Lilium maritimum (Coast lily) – RPR 1B.2 Coast lily is a bulbiferous herb known from many community types and locations near the northern California coast. A California endemic, coast lily is a tall plant (~1 m) with large, showy flowers. The species primarily inhabits moist or wet habitats with a relatively sparse overstory canopy, including coastal prairie and scrub, bogs, and gaps in closed-cone coniferous forests (Hickman 1993). The species also occurs in roadside ditches and forest openings of North Coast conifer forests and has been reported at several locations in JDSF near or in Mendocino Pygmy Forest or Bishop Pine Forest. CNDDB Occ. No. 70 is in the BAA northwest of the plan area at the junction of Road 500 x Road 600.

Packera bolanderi var. bolanderi (Seacoast ragwort) - RPR 2.2. This plant is a rhizomatous perennial herb in the sunflower family (Asteraceae) that occurs in northern California and into southern Oregon. It blooms from April to July. This species is found in coastal scrub and North Coast coniferous forest habitats/sometimes roadside at elevations ranging from 98 to 2132 feet. There are currently 52 occurrences in the CNDDB, most are in Humboldt and Del Norte Counties. Many of the forest occurrences are on steep slopes. According to the CNDDB, there is a documented occurrence along Highway 20. (report by Freeman and Wetter, 1983). This occurrence has not been re-reported since then. Habitat for this species may occur within JDSF.

Pinus contorta ssp. Bolanderi (Bolander pine) – RPR 1B.2. Bolander pine is a subspecies of the more common Lodgepole pine *(Pinus contorta* ssp. *murrayana)* that occurs in wet meadows throughout the Sierra Nevada. Bolander pine has small closed-cones that break open during fire or very hot summer temperatures. The species is endemic to the Pygmy Cypress Forest in Mendocino and Sonoma counties and is somewhat more restricted to that plant community than is the Pygmy Cypress. It was first collected by botanist H.C. Bolander in 1866 in Mendocino. Several known occurrences of Mendocino Pygmy Cypress Forest with Bolander pine are found within the BAA on both the north and south side of the Caspar drainage.

Piperia candida (White-flowered rein orchid) - RPR 1B.2. The plant is a perennial herb in the family Orchidaceae. It blooms between May-September at elevation ranges from 90 to 3930 feet. It is found from the Santa Cruz county coastal ranges north to British Columbia. Habitats include conifer and mixed evergreen forests, chaparral, sometimes on serpentine soils, not more than 150 km from coast.

Sanguisorba officinalis (Great burnet) - RPR 2.2. Great burnet is a perennial herb and has a blooming period of July through October. It is native throughout the cooler regions of the Northern Hemisphere in Europe, northern Asia, and northern North America. In California, it is found from Mendocino to the Oregon border along the immediate coast. This species occurs in Broad-leaved upland forest, meadows, marshes and swamps (freshwater), bogs and fens, North Coast coniferous forest, and Riparian forest/often serpentine. The Fort Bragg occurrences have been in wet meadows near the immediate coast. Habitat for this species is unlikely to be found within JDSF.

Sidalcea calycosa* ssp. *rhizomata (Point Reyes checkerbloom) - RPR 1B.2. This plant is a rhizomatous perennial herb in the mallow family (Malvaceae). Plants flower from April to September. Habitats include marshes and swamps near the coast and elevations range from 3-75 meters. Although marshes and swamps are included in scoping for this THP it is unlikely that habitat for this species occurs in the plan area due to its association with coastal habitats.

Thermopsis Robusta (Robust false-lupine) - RPR 1B.2. This lupine is found only in far northwestern California in broadleafed upland forest and north coast coniferous forest, and until recently was not known from Mendocino County. A recent discovery was made near the town of Branscomb in central Mendocino. In the Fabaceae family, this lupine is usually found midslope to ridgetop, dry, open, sunny, disturbed sites. Habitat for this species is unlikely to be found in the plan area.

Trifolium buckwestiorum (Santa Cruz clover) – RPR 1B.1. The nearest known occurrences of Santa Cruz clover are found at Cazadero and Pt. Reyes Seashore. Its habitat is gravelly margins of broad-leafed upland forest, cismontane woodland and coastal prairie. It is unlikely to occur in the redwood/Douglas-fir forest.

Viburnum ellipticum (Oval-leaved viburnum) - RPR 2.3. Habitat for this species consists of chaparral, lower montane coniferous forest and cismontane woodlands. Elevations range from 215 to 1400 meters and the blooming period is May through June. Chaparral and lower montane coniferous forest is found on ridgelines and south-facing slopes in the far eastern end of JDSF. No suitable habitat is found in the BAA.

Rare Plant Rank 3 and 4 plant species known to occur within JDSF

Botanical surveys conducted for timber operations scope for, and report findings of RPR 3 and 4 plants. All newly discovered occurrences are reported to CDFW, despite the fact that CDFW does not track them in the CNDDB. These plants do not normally qualify as being rare, threatened or endangered under CEQA Guidelines 15380 and as such are not specifically protected during timber operations. A few species are considered locally significant and equipment buffers are often utilized to protect them.

- RPR 3: plants that need more information.
- RPR 4: plants of limited distribution, a "watch list" plant; present in large enough numbers that the potential for extinction at this time is low.

Calamagrostis bolanderi (Bolander's Reedgrass) - RPR 4.2. This grass is endemic to the coastal counties of northern California (north of San Francisco). It is found in meadows, freshwater-marsh, and bogs/fens of Northern Coastal Scrub, Closed-cone Pine Forest, North Coastal Coniferous Forest, and Freshwater Wetlands. On JDSF it has been found in the western portions of the forest in Northern Bishop Pine forest, Closed-cone Pine Forest, or mixed Redwood/Northern Bishop Pine. It is most often found at the edge of seasonal roads on clay soils where the soil stays moist. At least five occurrences on JDSF have been submitted to the CNDDB. Habitat for this species is found throughout the plan and along the seasonal appurtenant roads.

Ceanothus gloriosus var. exaltatus (Glory brush) – RPR 4.3 This lilac is a stiffly-branched perennial evergreen shrub usually found in early successional chaparral vegetation, but also known from closed- cone pine forest and Douglas-fir forest. Plants have thick, leathery dark green holly-like leaves. The plant blooms March – May. Blossoms are deep-blue to violet. The species is found from Humboldt County to Marin County. It has been located on JDSF in the drier east half in sunny openings created by along old logging roads or power line corridors.

Coptis laciniata (Oregon goldthread) - RPR 2.2. Oregon goldthread is restricted to the western portions of Oregon, Washington and California. It is a rhizomatous herb in the buttercup family (Ranunculaceae). It blooms in March through April, below 1000 m, and is listed as a facultative and facultative-wetland species. Its habitat includes meadows and seeps (MdwsSeeps), and north-facing streambanks in North Coast coniferous forest (NCFrs/mesic). Potential habitat for this species occurs near Class I and II streams in JDSF, especially where rocky banks are found. The species was added to the California Rare Plant Rank list as of 2006. The CNPS Electronic Inventory reports 67 occurrences have now been recorded. Since adding it to the JDSF botanical scoping list this species has been found during project surveys at twenty-four different areas within JDSF. Most locations have been near Class I and large Class II streams, often within the water and lake protection zones where timber harvesting is either minimized or absent. As of 2012, the species has now been found in the following watersheds within JDSF: SF Noyo River, NF of the SF Noyo River, Peterson Gulch, the NF Big River, and Chamberlain Creek. With this rapid increase in occurrences, we expect to continue to find it at more locations.

Lilium rubescens (Redwood lily) - RPR 4.2. This 3 foot+ tall lily is endemic to California's northwestern counties in broadleafed upland forest, chaparral, lower montane coniferous forest and upper montane coniferous forest. Its large white blossoms turn purplish as

they age. It blooms from late April through August, from 30-1715 meters. On JDSF, redwood lily has been found in the eastern half of the forest, in 16 localized areas, with 1 to 150 plants occurring at each area. The species is often found at the edge or on the berm of seasonal roads, or in the roadbed of abandoned roads. Habitat for this species is unlikely in the plan area because of its more coastal location.

Listera cordata (Heart-leaved twayblade) - RPR 4.2. This small orchid blooms from February to July from 5-1370 meters in bogs and fens, lower montane coniferous forest and North Coast coniferous forest. The species is found in many forested areas within the United States and much of Canada. Only one location with one individual has been found during botanical surveys on JDSF. It was found in relatively dry Douglas-fir Redwood forest on an upper ridgeline.

Lycopodium clavatum (Running pine) - RPR 4.1 Running Pine has been recently downlisted to 4.1 species from the 2.3 CA Rare Plant Rank. It is known from three locations on JDSF. The habitat for this species is freshwater wetlands in Douglas-fir forest. Its habitat is further described as occurring under moist conditions in freshwater marsh habitats. CNPS list habitat for the species as lower montane coniferous forest, marshes and swamps and North Coast coniferous forest/often edges, openings and roadsides. Habitat may also occur in seasonal wet areas, roadside depressions and water drafting locations.

Mitella caulescens (Leafy-stemmed miterwort) - RPR 4.2. This species is a native perennial herb in the Saxifragaceae family. It is found in Mixed Evergreen Forest, Yellow Pine Forest, Douglas-Fir Forest, in wetland-riparian areas, between 0 and 5577 feet. It occurs mainly in northwestern California, then north to southwestern coastal British Columbia. On JDSF it has been documented at numerous coastal locations, mainly in streamside vegetation. The species is found in the plan area in the majority of the Class II tributaries. Due to the fact it is a RPR 4.2 plant that does not require protection, it will not be buffered from operations. It is found primarily in the core area of Class II and Class I WLPZ and therefore it will not likely be impacted by operations.

Pityopus californicus (California pinefoot) - RPR 4.2. Pinefoot is an inconspicuous perennial herb (mycoparasitic) in the Ericaceae family that is native to California and small parts of Oregon and Washington. It occurs in Red Fir Forest, Yellow Pine Forest, Mixed Evergreen Forest, and North Coastal Coniferous Forest at an elevation of between 0 and 5000 feet. Over 16 occurrences have been located on JDSF during THP botanical surveys. It often occurs in light leaf litter under tanoak *(Notholithocarpus* densiflora).

Usnea longissima (Long-beard lichen) – RPR 4.2. This species is a fruiticose lichen. It occurs in North Coast coniferous forests, usually at low elevations. In Western America, this *Usnea* extends from northern California to Alaska. It occurs circumboreally, but its abundance has declined significantly, especially in Europe. This species occupies bark and wood of other species to survive. Long-beard lichen is sensitive to air pollution. This lichen is known from several locations in JDSF. It has been found in residual redwoods and section-growth Douglas-fir trees.

Veratrum fimbriatum (Fringed corn lily) - RPR 4.3. This corn lily is endemic to the coast in Mendocino and Sonoma Counties in California. Its habitat is bogs and fens, meadows and seeps, coastal scrub, and north coast coniferous forest. It blooms from July to September. It is found between 3 and 183 meters. There are three known locations on JDSF; they are found in roadside ditches, watercourses or seeps in the far western side of the forest.

No adverse impacts to special status species (state or federally listed, or RPR 1 and 2 species) are expected. Default plant protection buffers will be established and consultation with CDFW will occur if any rare species (other than pygmy cypress trees) are found during operations (see Sec II Item 32). The botanical survey results are found in Section V.

The Biological Habitat condition of the THP and Immediate Surrounding Area (Terrestrial Habitat Features Discussion)
Board of Forestry Technical Rule Addendum No. 2, Cumulative Impacts Assessment, lists general guidelines, which may be used when evaluating biological habitat. Other factors that may be unique to a certain set of group conditions must also be considered where appropriate. A brief conclusion by the RPF will be given, based on site-specific information on how the proposed THP activities affect impacts to these features.

Snags / Den / Nest Trees
Based on field observations, young-growth redwood mortality is closely related to stand density. The greatest amount of mortality occurs in the densest stands. Trees in the suppressed and/or intermediate crown classes are over-topped and eventually die due to the inability to produce sufficient food. Some broken tops and snapped trunks are due to winter storms, but this damage is not common. These snags are generally less than 18" in diameter.

Some of the Douglas-fir stands have suffered the same density-related fate, with larger trees also succumbing to root disease and/or insect related mortality. This is evidenced by the 30.8" QMD for Douglas-fir. The overall occurrence for the larger Douglas-fir snags is low at approximately 0.1 trees per acre.

Old growth redwood snags tend to be large and short (less than 30-ft in height). Their density is low at 0.1 trees per acre. At least one redwood snag was identified. Snags tend to be unevenly distributed across the landscape in both riparian and hill slope areas.

Future snag development will be influenced by the number of trees greater than 24" DBH which are retained at the conclusion of each cutting cycle and the amount of natural mortality which occurs. As the latter factor is low in managed redwood stands, it is expected that most future snags greater than 24" will be Douglas-fir or grand fir affected by insect/disease organisms with some Redwoods snags also present. Although some of these potential future snags will be "captured" through harvest while in a state of declining vigor, it is expected that the overall number of snags created during the duration of the cutting cycle will increase with increasing stand age. Retention and recruitment of snags throughout the forest is one of JDSF's management objectives. Snags are not proposed for harvest under this THP unless they present a hazard.

Downed large, woody debris

Downed redwood logs (LWD) greater than 24" diameter occupy a small percent of the THP area. Most LWD is concentrated mainly along the Class II and III watercourses where many were placed to assist in the skidding of logs down slope by steam yarders. The majority of the LWD remaining from the original clearcut/burn harvest consist of segments in the range of 12-24" diameter, with the density being high in the vicinity of old log chutes / steam yarder settings and low to moderate throughout the rest of the THP area. Overall, the THP area appears to exceed the JDSF Management plan goal of two downed logs per acre at least 20-ft in length with a minimum diameter of 16" on the large end and one log per acre at least 20-ft long with a minimum diameter of 24". LWD will be retained unless it poses a safety hazard.

Multistory canopy

The THP area consists of even-aged young-growth stands, only a small portion which has been entered for the purpose of logging. These stands are generally multi-storied (two or more canopy layers), which affects species diversity through vertical complexity. Most stands in the THP and W/BAA consist of two-storied stands with redwood, Douglas-fir and grand fir comprising the over story and tanoak comprising the under story. Use of selection silviculture on the THP area will maintain the existing canopy structure, although stocking at both levels will be temporarily reduced. The creation of group openings, small openings between 1/5th and 2.5 acres, will result in an additional layer through natural conifer and hardwood regeneration. Aggregate and dispersed retention in the Variable Retention units will maintain structural diversity.

Multistoried stands within the BAA will continue to develop with age and in locations where single tree/cluster/ group selection silviculture is utilized.

Hardwood Cover

The BAA is composed of a mixture of conifer and hardwood forest types. The primary component is tanoak, with minor components of madrone and golden chinquapin. Riparian zone hardwoods include California laurel, red alder, big-leafed maple, and willow.

Within the THP area, marked hardwoods will be felled where openings are being created for natural conifer regeneration. Within select acres which have a high hardwood component (totaling approximately 100 acres), tanoak under 22" dbh and outside a WLPZ will be treated with herbicide. Additional hardwoods will be felled or knocked over as a consequence of conifer falling and cable yarding. It is estimated that hardwood basal area will be reduced by approximately 10% though no hardwoods >24" are marked for harvest.

Proposed hardwood management is described in THP Sections II & III, Item #14, and hardwood stocking is described in THP Section III, General Site Description, Stand Types.

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Road Density

Seasonal road access is restricted to the public and controlled by locked gates. The existing roads are in good condition with the exception of mitigation sites proposed in Section II Attachments. Approximately 11,296.324 feet of temporary road construction is proposed. Existing roads under this THP has been previously designed to allow access for cable yarding in as much of the plan areas as possible while allowing access for future timber harvest plans. This planning in road system layout will minimize road densities and

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minimize road densities and future road construction needs necessary for future harvesting operations. Road maintenance related to this THP is not expected to have a significant adverse cumulative effect on road density in the watershed.

Late Seral (Mature) Forest Characteristics

Late seral forest characteristics are defined in the FPRs (Appendix Technical Rule Addendum #2, C. Biological Resources, 4., f.) as follows:

Characteristics include large trees as part of a multilayered canopy and the presence of large numbers of snags and downed logs that contribute to an increased level of stand decadence; may be evaluated by estimating the percentage of the land base within the project and the biological assessment area occupied by areas conforming to the following definitions:

- forests not previously harvested should be at least 80 acres in size to maintain the effects of edge (this acreage is variable based on the degree of similarity in surrounding areas)
- the area should include a multi-layered canopy, two or more tree species with several large coniferous trees per acre (smaller subdominant trees may be either conifers or hardwoods), large conifer snags, and an abundance of large woody debris
- (note: previously harvested forests are in many possible stages of succession and may include remnant patches of late seral stage forest which generally conform to the definition of unharvested forests but do not meet the acreage criteria) (Board of Forestry Technical Rule Addendum No. 2 Cumulative Impacts Assessment, C., f.)

Most of the forested acres within the Parlin Creek Planning Watershed (which will, in this case, represent the biological assessment area (BAA) have been managed/harvested in the past. While there are some residual trees and residual stands, there are no forest stands within or adjacent to this THP that meet the definition of late seral forest characteristics.

The managed second growth stands, combined with some residual forest, existing today within the BAA provide some functional wildlife habitat for species primarily associated with late seral forest, even though previous management activities were not designed to retain any particular characteristics. No significant long-term cumulative adverse impacts to the functional wildlife habitat of species primarily associated with late seral forest characteristics should occur as a result of activities on this proposed THP. A long term beneficial effect is anticipated as a result of future management activities.

4. RECREATIONAL RESOURCES

1. Recreational activities involving significant numbers of people in and within 300-ft of the logging area.

The assessment area is zoned TPZ. The assessment area is within Jackson Demonstration State Forest, which is open for public recreation and includes vehicle access on JDSF Road 500, access to other Forest roads is controlled by gates. Recreational activities on JDSF include hunting, hiking, target shooting, equestrian use, berry-picking, bicycling, firewood cutting (with permit) and mushroom picking (with permit).

The assessment area is very frequently used for recreation as compared to other areas on the state forest. Most visitors appear to hike along JDSF Roads 600, 500 and 520, however the non-official trail system (Rd 600x500 trail system) is heavily utilized by bikers and horse riders. These trails primarily follow the old logging and tractor roads from the 1960's and 1990's harvests. During the warmer weather months, this area is very popular for locals and tourists alike. During the wetter, colder months of the year, locals utilize the spot because it is close to town and the canopy cover intercepts the rain thus making a slightly less wet area to walk through.

During the layout of the plan, members of the public voiced concerns over temporary closure of the area in regards to access to other trails and public health. The RPF held conversations with the members of the public to discuss the THP goals and objectives, silviculture, and the plan for the non-official trail system to be updated and improved where feasible. To address access to other trail for the public to use, a lesser known route utilizing State Forest roads on the north side of JDSF Rd 500 was identified as a possible alternative route to by-pass the temporarily closed area. The State Forest has agreed that this area will be kept open during the timber operations of the Caspar 500 THP. The members of the public were agreeable to the THP goals, objectives, possible improvements to the trail system, and the alternative route; and agreed that the temporary closers would not be an issue. Signs advertising the closure will be put in place well before operations begin along with a timeline for the closure and information about the THP to help educate the public about JDSF's other land management activities.

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To address the public health aspect, the RPF explained to the member of the public that there are numerous of easy trails that the public has access to within the same general vicinity to Fort Bragg and Mendocino. The public member's concern was that exercise is

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a health benefit and that exercising in nature has added benefits. The proximity to the 500x600 trail network to the communities of Mendocino, Caspar and Fort Bragg is ideal for the average person. The RPF believes that the alternative trail on the north side of Road 500, as well as the other trails on the State Forest such as Camp One Loop and the trails within the newly re-opened South Fork Caspar THP area (County Roads 408 and 409) will provide adequate opportunities for the public to have easily accessed trails that are close to the communities.

A short-term impact on recreational activities will occur during harvesting operations. During this period, the area in and adjacent to the project will be temporarily closed to recreation for safety purposes. Ample opportunities to pursue these activities exist on portions of JDSF which are not subject to temporary closure. The impact to recreation resources from this project will be temporary and the area will be reopened for recreation following the completion of operations. Based on this and the positive interaction with the public members the RPF interacted with, there does not appear to be significant adverse impacts to recreation within the plan area.

For public safety, signs will be posted and maintained through the duration of timber operations. These signs will be posted at all points where roads and trails enter the area of timber operations and will include information defining the period of closure.

2. Board of Forestry Special Treatment Areas
Not applicable.

5. VISUAL RESOURCES
The visual assessment area is defined as the project area that is readily visible to a significant number of people who are no further than three air miles from the forest operation (see map, APPENDIX A). This area was assessed following the guidelines of 14 CCR § 912.9 Technical Rule Addendum #2.

The plan area is visible from road adjacent to or within the plan area, including JDSF Roads 600, 620, 500, 520 and associated road spurs. This plan may be view by people from these roads and within the plan area. The public may view the logging area from passing vehicles, stationary viewpoints at turnouts along Road 500, and while recreating along the forest roads within the plan area. The operations proposed as part of this THP will also be in view of residential properties adjacent to and within 3 miles of the THP.

The visual experience can be divided into three primary subgroups. The first visual experience is those driving, biking, or otherwise traveling on JDSF Road 500. The silvicultural practices and load locations are designed bearing this in mind. Near road harvesting and to some extent the non-official trail system harvesting is designed to retain a strong visual impression of trees in the foreground, while dispersed but constant tops of spaced trees fill the background. Where whole clumps of redwoods are harvested, the visual impact will be striking for about a season before it greens up. The small opens are less than a ¼ acre and therefore only be a temporary visual impact.

Many travelers are interested in this industry and land management. It is part of many travelers' expectations to see areas of on-going timber management, saw mills, log trucks and lumber trucks in northern California, just as they expect to see orchards and row crops from Interstate-5, or fishing boats and freighters in our harbors, or residences in suburban areas, or office buildings and industrial parks in urban areas. Many are interested in how and where we produce the material used by our society. The juxtaposition of the preserved redwood groves and these timber production zones is striking and interesting and exemplifies competing and incompatible land and resource uses. That our society values both commodity production and resource preservation is apparent. The fact that the view of the portions of the landscape planned for timber production changes more over time is not found to be a significant adverse effect.

The second visual experience is that from inside the THP area, and mostly concerns recreational elements. The non-official trail system followed the closed JDSF Road 669 from JDSF Road 500 to JDSF Road 600. This loop has a view of at least half of the plan area. Much of this non-official trail loop is within the WLPZ buffer for Class I creeks which will still provide a pleasant view. Portions of the non-official loop that are outside of the WLPZ buffer are within a selection harvest and therefore will be stocked at the end of operations, minimizing any aesthetic impacts that may be created.

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The last visual experience is distant views from areas within 3 miles. The majority of the plan is in the mainstem of the Caspar Creek Watershed with a small portion in the North Fork Caspar Watershed, both of which are heavily forested. These elements mean it would be difficult to get substantial view of the harvest area from a distant location accessible by a significant number of people. New roads and landings created off JDSF Road 500 have a minor possibility of creating new vistas but this would be a minor impact.

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However, it potentially could be refreshing for recreationalist to have a vista within a redwood forest. Redwood forests grow rapidly and harvested areas will not remain open ground over time.

Finding- After considering the risk for the proposed project to harm visual resources, the RPF has determined that there is not a reasonable potential to join with the visual impacts of any other project to cause, add to, or constitute significant adverse cumulative impacts.

6. VEHICULAR TRAFFIC IMPACTS

The traffic assessment area includes those roads not part of the logging area on which logging traffic must travel to transport forest products to a primary manufacturer. The following roads may be used to transport forest products:

- State Route (SR) 20 between Fort Bragg and Willits.
- SR 1 between SR 128 and US 101.
- US 101 from Cloverdale to Eureka.
- SR 128 between Cloverdale and SR 1.

A significant portion of the land served by highway routes mentioned above are zoned for timber production and frequently used as haul routes to mills located in the interior of Mendocino County. Traffic from this project will contribute to the annual pattern of logging traffic typically occurs in western Mendocino County. The truck traffic resulting from the proposed operation is not expected to create a significant adverse cumulative impact to traffic on the public roads.

7. GREENHOUSE GAS (GHG) IMPACTS

Global climate change and the variables that influence this change are subject to intensive scientific investigation and debate. For now, the consensus is that temperature within the earth's atmosphere is increasing, although exactly how and to what extent human activity plays a role in global climate change appears to be unknown. As the concern for global climate change evolves, policies to combat or offset the impacts to this trend are in the stages of development, where some have already been set in place. In California, the California Global Warming Solutions Act of 2006 (Assembly Bill 32) is the State's legislative effort at reducing greenhouse gas (GHG) emissions to 1990 levels by 2020. This statute attempts to address global warming by establishing goals and measures for reducing GHG emissions. In 2016, SB 32 was passed with legislation for an emissions target for 2030. SB 32 states that the emissions reduction target for the State of California is 40% below the 1990 levels. This target puts California halfway to reaching its emission reduction target for 2050 which is 80% below the 1990 levels. To aid in this directive, the California Air Resources Board (CARB) has developed a scoping plan, that is updated every five years, that outlines the State's strategy to ultimately achieve 2050 GHS emission limits. The scoping plan for the 2020 target recognizes that California's forestlands reduce GHG emissions by sequestering atmospheric carbon and are currently a carbon sink (atmospheric removal of carbon through sequestration is greater than atmospheric emissions from processes like fire and decomposition of wood). The Scoping Plan current target for California's forest sector is to maintain sequestration through sustainable forest management practices, reducing the risk of catastrophic wildfire and the avoidance or mitigation of land-use changes that reduce carbon storage.

The 2017 Scoping Plan to aid in the achievement of the 2030 emission reduction target focus heavily on transportation as it is the largest (38% in 2015) sectoral contributor to GHG emissions. The 2017 Scoping Plan indicated that 1). changes will be made to improve freight and goods movement through more efficient and sustainable measures; 2). clean vehicles or vehicles with alternative fuels become the "market winners" and 3). to plan cities and other areas that are centered around public transportation and walking. The 2017 Scoping Plan indicates to transport freight and goods, vehicles that use "near-zero emissions and equipment powered by renewable energy" are going to be highly encouraged and a goal of 100,000 of such vehicles and equipment to be in used has been set for 2030. Many of the local logging companies have already started phasing these vehicles into their fleet to comply with new regulations. The 2017 Scoping Plan mentions developing a "Low-Emission Diesel Standard" to out-compete conventional diesel. As many of the equipment used during harvesting operations use diesel, the new "Low-Emission Diesel" will decrease emission loads during harvest.

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The CARB recognizes that the current abundance of forest carbon stock in California is partly due to implementation of the CA Forest Practice Rules which, in part, require sustainable forest management practices on all private and non-federal public timberland. These rules are adopted by the Board of Forestry and Fire Protection (Board), one of several agencies participating in the evaluation of current regulations and programs that address GHG emissions. JDSF's management direction is based upon the Forest Practice Rules,

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Board policy, and, other legislative statutes. Sustainable forest management on JDSF has always been and continues to be one of the main management objectives. Currently, projected annual harvest represents less than half the total annual growth increment.

The table below shows estimated current and 100-year projected timber inventories and net carbon sequestered on JDSF. Timber volume estimates were derived from JDSF's Option A plan. These figures are provided to illustrate a basic estimate, considering the difficulty in quantifying carbon sequestered while considering carbon emitted through disturbance, manufacturing of forest products, etc.

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Total Net Carbon Sequestered at End of 100-Year Period							
(1) Standing Timber Inventory (MBF)	(2) Above Ground Carbon Stored in Current Standing Timber (M tons)	(3) Total Harvest Over 100-Years (MBF)	(4) Total Estimated Carbon Sequestered in Forest Products at End of 100-Years (M tons)	(5) Standing Timber Inventory at end of 100-Years (MBF)	(6) Above-Ground Carbon Stored in Standing Timber at End of 100- Years (M tons)	(7) Total Net Carbon Sequestered at End of 100-Years (M tons) (columns 4+6-2)	(8) Net Carbon Dioxide Equivalent Sequestered at End of 100-Years (M tons) (column 7 X 3.666)
1,966,424	1,032	3,849,980	1,390	3,545,934	1,862	2,219	8,135

Stored carbon is expected to increase by 688% over the 100-year projection period.

The eastern boundary of the JDSF ownership is approximately 19 air miles from the Pacific Ocean. Due to the mild climate, catastrophic wildfires are uncommon within the coast region. Additionally, two Conservation Camps are located within the Forest and trained personnel are available to respond rapidly to fires that may occur within the JDSF ownership. No stand replacing catastrophic fires have occurred on JDSF in the past 60 years (while under State ownership).

Per the Scoping Plan for the 2020 target, deforestation is noted to be the single largest contributor to global GHG emissions. The current 2017 Scoping Plan asks that manage natural and working lands in California "to reduce GHG emission from business-as-usual by at least 15-20 million metric tons in 2023." The 2017 Scoping Plan indicates that "forests should be a healthy carbon sink where appropriate, supply new markets for woody waste and non-merchantable timber, and provide multiple ecosystem benefits." JDSF is managed on the sustained yield principle, and expects to add significantly to the existing carbon base over the next 100 years. There are no current or foreseeable plans to sell, convert or alter land use that may result in deforestation or significantly decrease the capacity of the forest to sequester carbon over time. No significant cumulative adverse impacts associated with carbon storage, greenhouse gasses, or global warming are expected to occur as the result of the management of JDSF. JDSF holds firewood sales for the local community, where appropriate, to decrease the amount of non-merchantable timber that was harvested from the landscape. Within the community, heating fuels are diesel, propane, kerosene or wood. Wood is a renewable energy source and is a way for the local timber industries to manage wood wastes and non-merchantable timber since there is no co-gen plant within a feasible distance.

To address GHG emissions on a THP level, CAL FIRE has developed a THP Green House Gas emissions calculator. This calculator has been made available to RPF's and the public on the CAL FIRE website. The calculator accounts for the release of carbon related to harvesting operations including non-biological sources as well as carbon sequestered in sinks and reservoirs. The calculator estimates that carbon stocks will be recouped within 10 years of the initial harvest, allowing approximately 10 years to sequester carbon after balancing emissions. The proposed project and next 4 projected harvest rotations have total emissions of 284.1 metric tons of CO2, and net sequestration of 300,293 metric tons of CO2. Data used for projections in the calculator were taken from JDSF inventory data for the project area. The summary page from the GHG emissions calculator is included in the Section V.

8. WILDFIRE RISK AND HAZARD

Cumulative increase in wildfire risk and hazard can occur when the effects of two or more activities from one or more projects combine to produce a significant increase in forest fuel loading in the vicinity of residential dwellings and communities. The following elements were considered in the assessment of potential Cumulative Impacts:

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i. Fire hazard severity zoning

The California Department of Forestry and Fire Protection is directed to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. The Fire and Resource Assessment Program (FRAP) designated the fire hazard severity rating in the region of the project as high (on a scale of moderate to very high). The project is in the cool, Coastal Redwood Region, where fire hazard is lower than inland regions. However, the project area does include an infestation of an invasive species of eucalyptus, which is highly flammable and fire reactive. The project area has Pygmy, Bishop pine forest and residential neighborhoods within its vicinity. The project area is also a high recreational use area that attracts many visitors. These factors would increase the potential immediate impact to communities in the event of wildfire ignition in the project area or vicinity.

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ii. Existing and probable future fuel conditions including vertical and horizontal continuity of live and dead fuels

Both vertical and horizontal continuity of fuels is reduced through selective harvesting. The proposed logging activities in this project will create a temporary increase in fuel loading near landings where slash is piled for burning. There will be some additional slash scattered about the harvest units, which will take several years to break down. Treatment of slash along roadsides will interrupt fuel

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continuity. The treatment of the invasive Eucalyptus stand has the potential to decrease the amount of slash and downed woody material after harvest.

iii. Location of known existing public and private fuelbreaks and fuel hazard reduction activities

No current fuel breaks are near the project area. The project proposes to treat an invasive eucalyptus stand. Eucalyptus bark is highly flammable and peels off the tree in strips. By treating the eucalyptus stand, there is potential to decrease the amount of slash that occurs on the forest floor after a time.

iv. Road access for fire suppression resources

Maintaining the existing road network and opening roads that have been brushed over for 25 years will increase access for fire suppression. Two seasonal roads are proposed for abandonment; however, these roads will not hinder suppression efforts as these roads are either redundant or historic roads that are no longer in use. Several new roads will be constructed which will gain better access into areas that were inaccessible before. Overall, access will be improved.

While there may be temporary increases in wildfire risk during operations and in some areas of the project thereafter, the project generally reduces wildfire risk. The project is not expected to create a significant adverse cumulative impact to wildfire risk.

APPENDIX B
INFORMATION SOURCES AND PERSONAL CONTACTS USED BY THE RPF IN THP DEVELOPMENT

Individuals contacted

JDSF Staff 802 North Main Street, Fort Bragg, CA 95437 (707) 964-5674
- Mike Powers, Forest Manager
- Jason Serna, Forester II
- Lynn Webb, Forester II
- Robert Horvat, Forester II
- Julie Rhoads, Forester I
- Kirk O'Dywer, Forester I
- Tina Fabula, Biologist
- Peter Rowland, GIS Manager
- John Griffin, Retired Annuitant

Patrick Brant, Professional Geologist, CGS
- 135 Ridgway Ave
- Santa Rosa, CA 95401
- (707) 576-2904

Ben Harris, CAL FIRE Archaeologist
- 135 Ridgway Ave
- Santa Rosa, CA 95401
- (707) 562-2966

Local Tribal Groups listed by the Native American Heritage Commission

Forestry

Administrative maps & photographs of Jackson Demonstration State Forest

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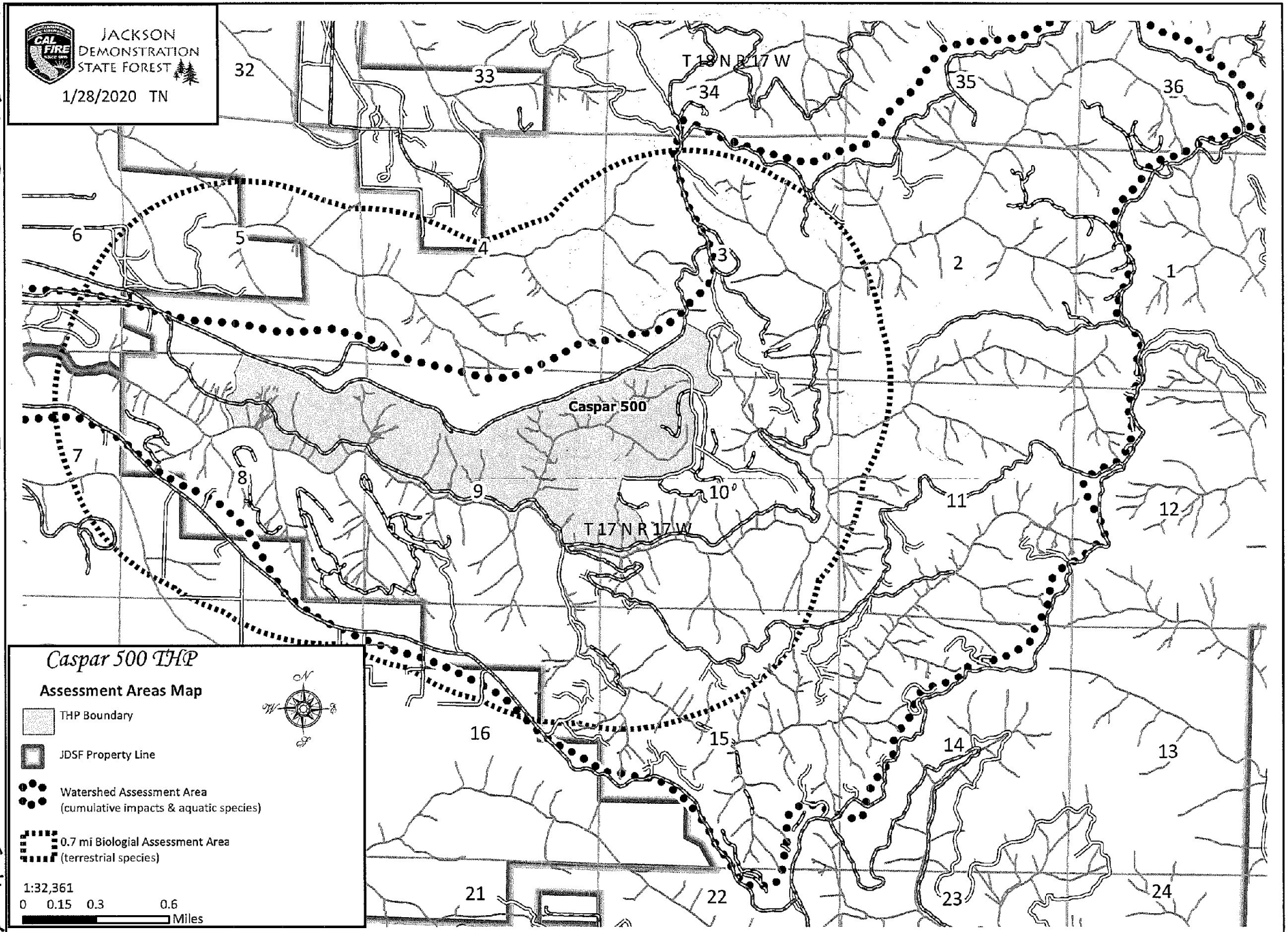
Section V

Attachments

1. Assessment Area Map
2. Past, Present and Probably Future Projects Map
3. Stream Habitat Maps
4. Erosion Hazard Rating Worksheet
5. Soil Type Maps
6. Focused Engineering Geologic Report for the Caspar 500 THP
7. Erosion Control Plan
8. Northern Spotted Owl Package
9. Sonoma Tree Vole Survey
10. Green House Gas (GHG) Sequestration Summary
11. Map Point 5 – Class I Stream Cross Section & 100-Year Flood Flow


JACKSON
DEMONSTRATION
STATE FOREST
1/28/2020 TN
T 18 N R 17 W
T 17 N R 17 W
Caspar 500
Caspar 500 THP
Assessment Areas Map
THP Boundary
JDSF Property Line
Watershed Assessment Area
(cumulative impacts & aquatic species)
0.7 mi Biologial Assessment Area
(terrestrial species)
1:32,361
0 0.15 0.3 0.6
Miles

COAST AREA
RESOURCE MANAGEMENT

Caspar 500 THP

Past, Present, & Future Project Map

CAL WATER v2.2
Caspar Creek Watershed #1113.300404
Data Source: JDSF internal GIS data

1:40,000 0 0.25 0.5 1 Miles

THP Boundary
JDSF Property Line
State Planning Watershed

PART OF PLAN

Silviculture Methods - Past, Present, and Future
Unevenaged
Evenaged
Intermediate
No Cut

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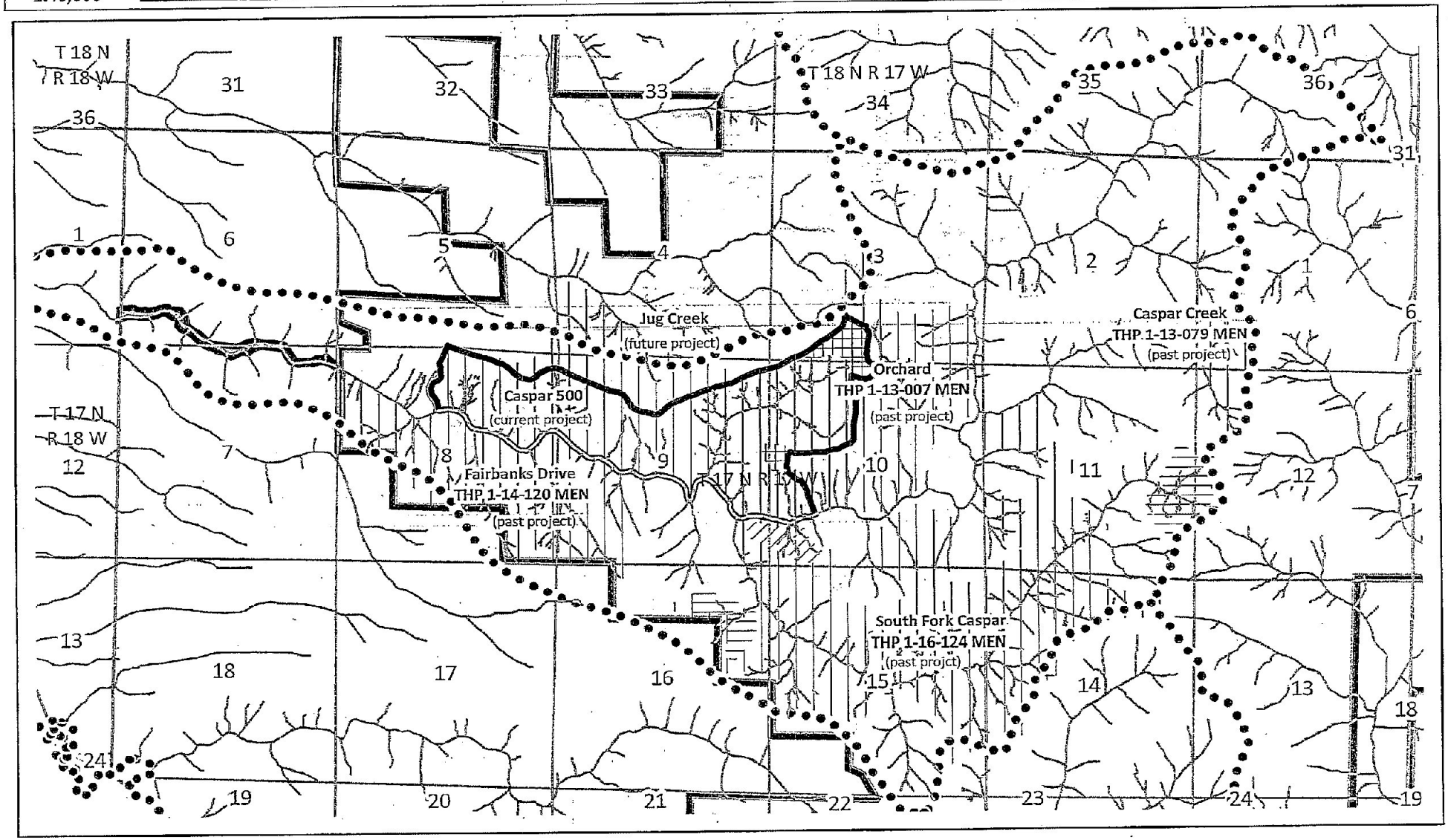
JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

Note: Silviculture, harvest year, THP names, and spatial extent subject to change for future projects.



Revised 2/18/20 Section V
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Caspar 500

Caspar 500 THP

Stream Habitat Map Page 1 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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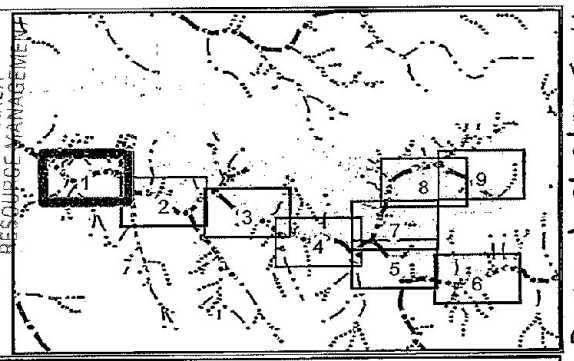
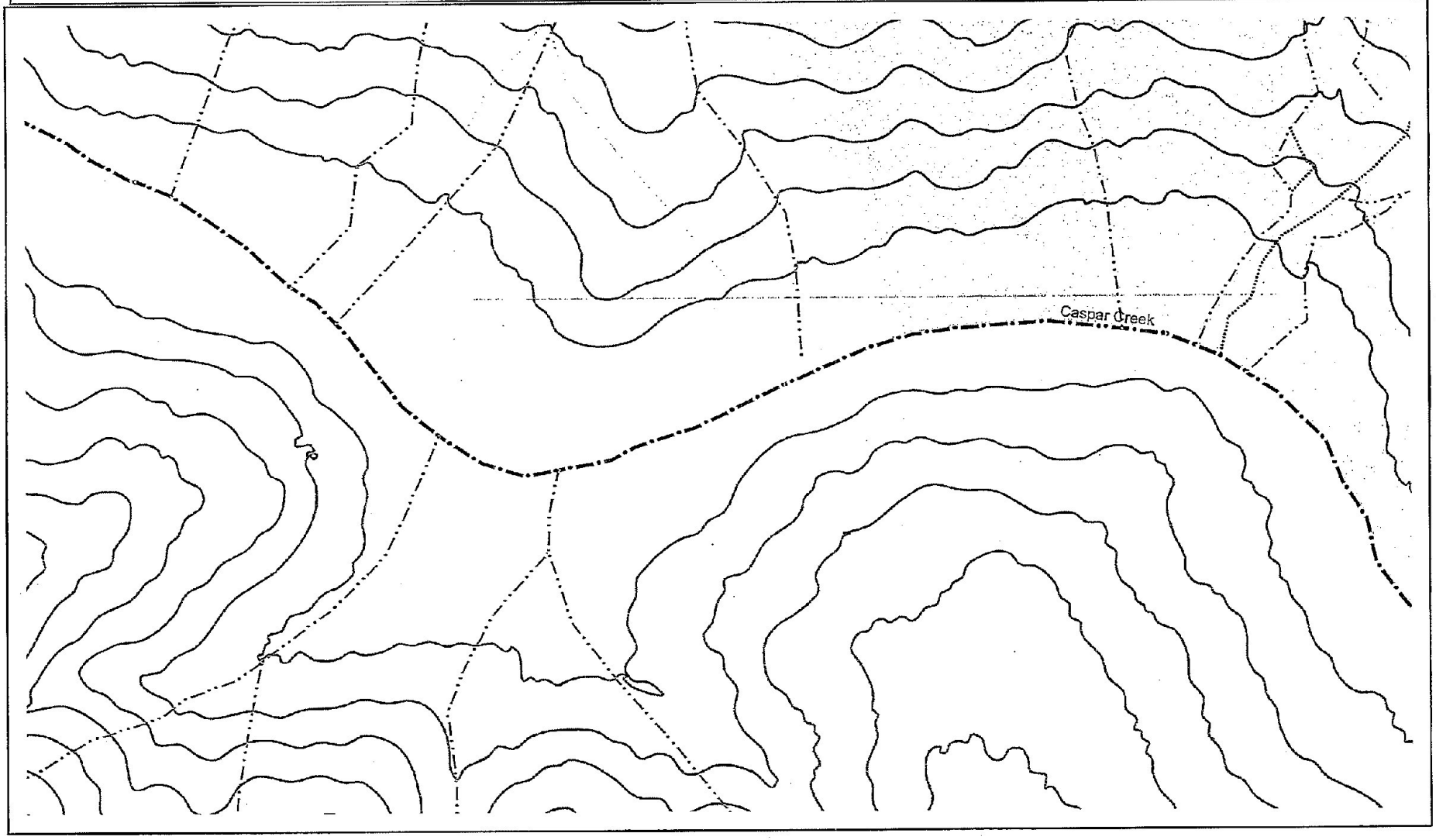
COAST AREA
RESOURCE MANAGEMENT
PART OF PLAN





Revised 2/18/20 Section V

169

Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 2 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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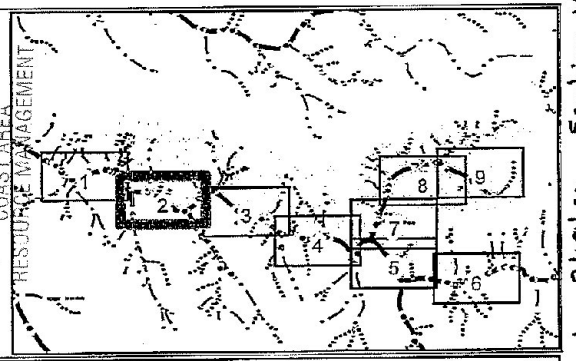
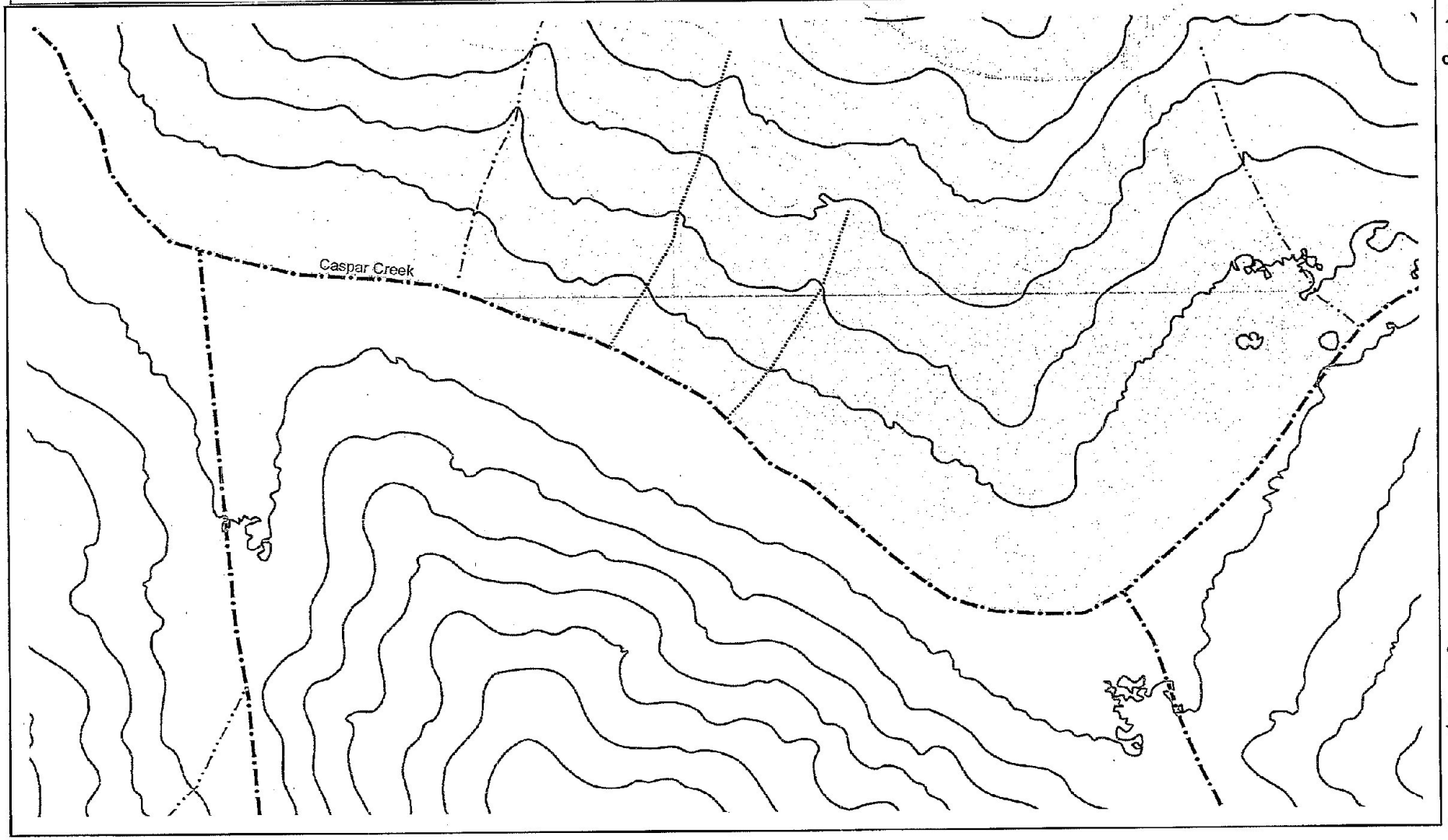
PART OF PLAN





Revised 2/18/20 Section V
170
Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 3 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'

1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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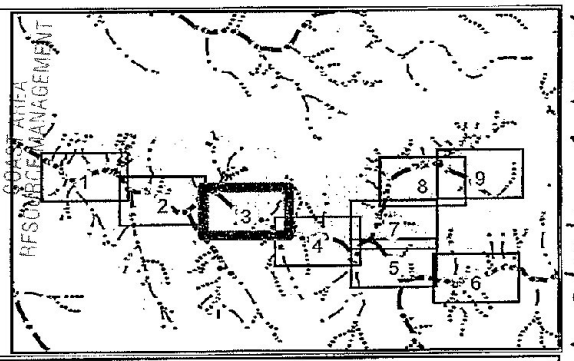
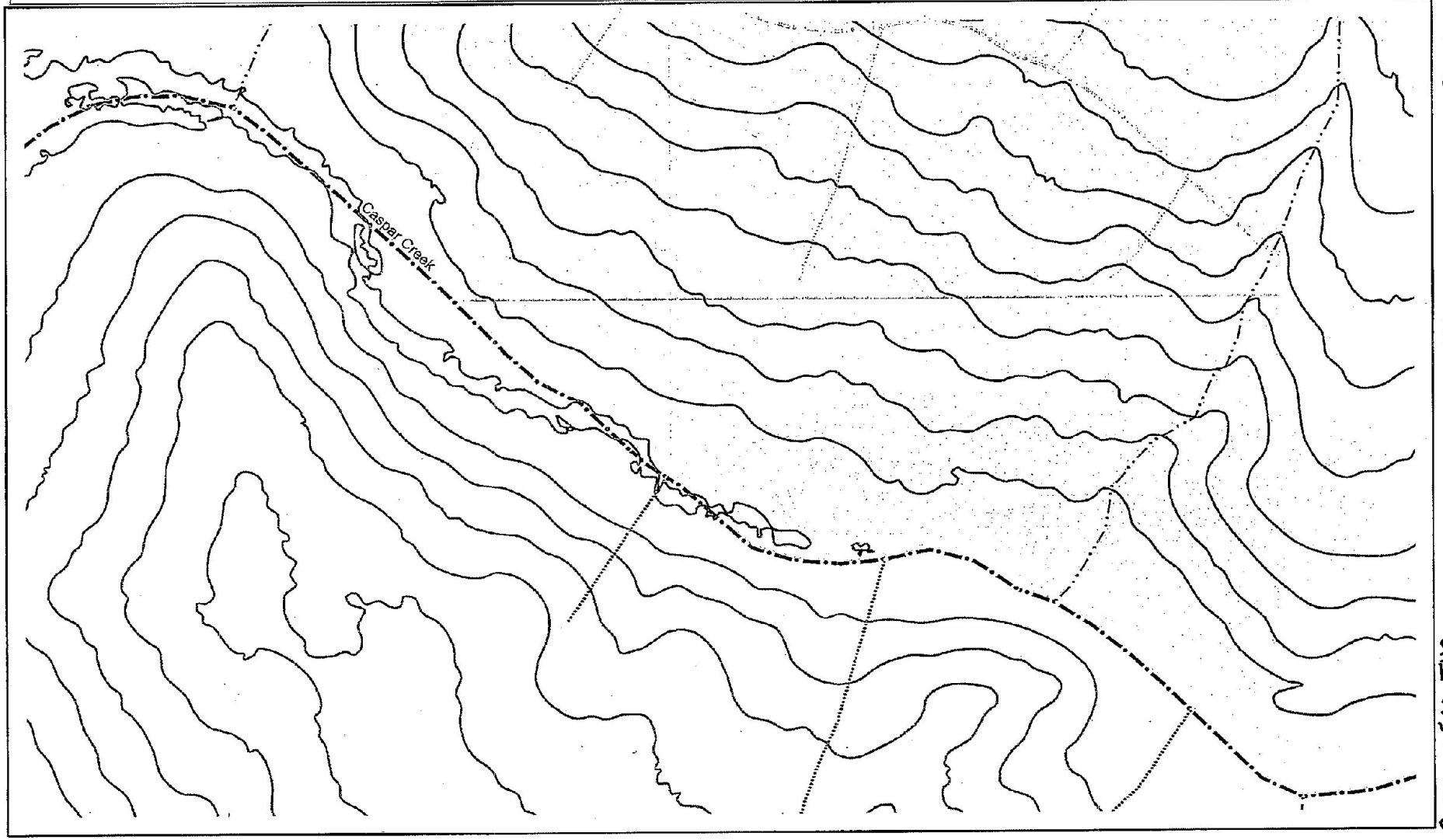
COASTAL AREA RESOURCE MANAGEMENT

PART OF PLAN





Revised 2/18/20 Section V

171

Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 4 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'

1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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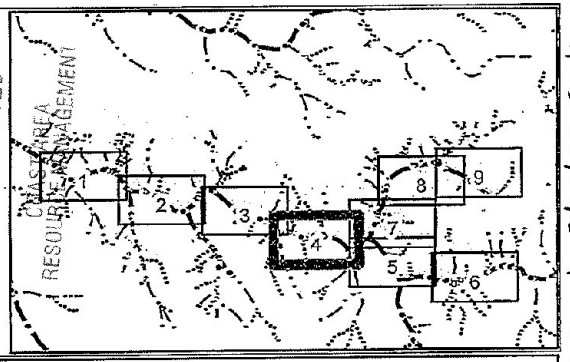
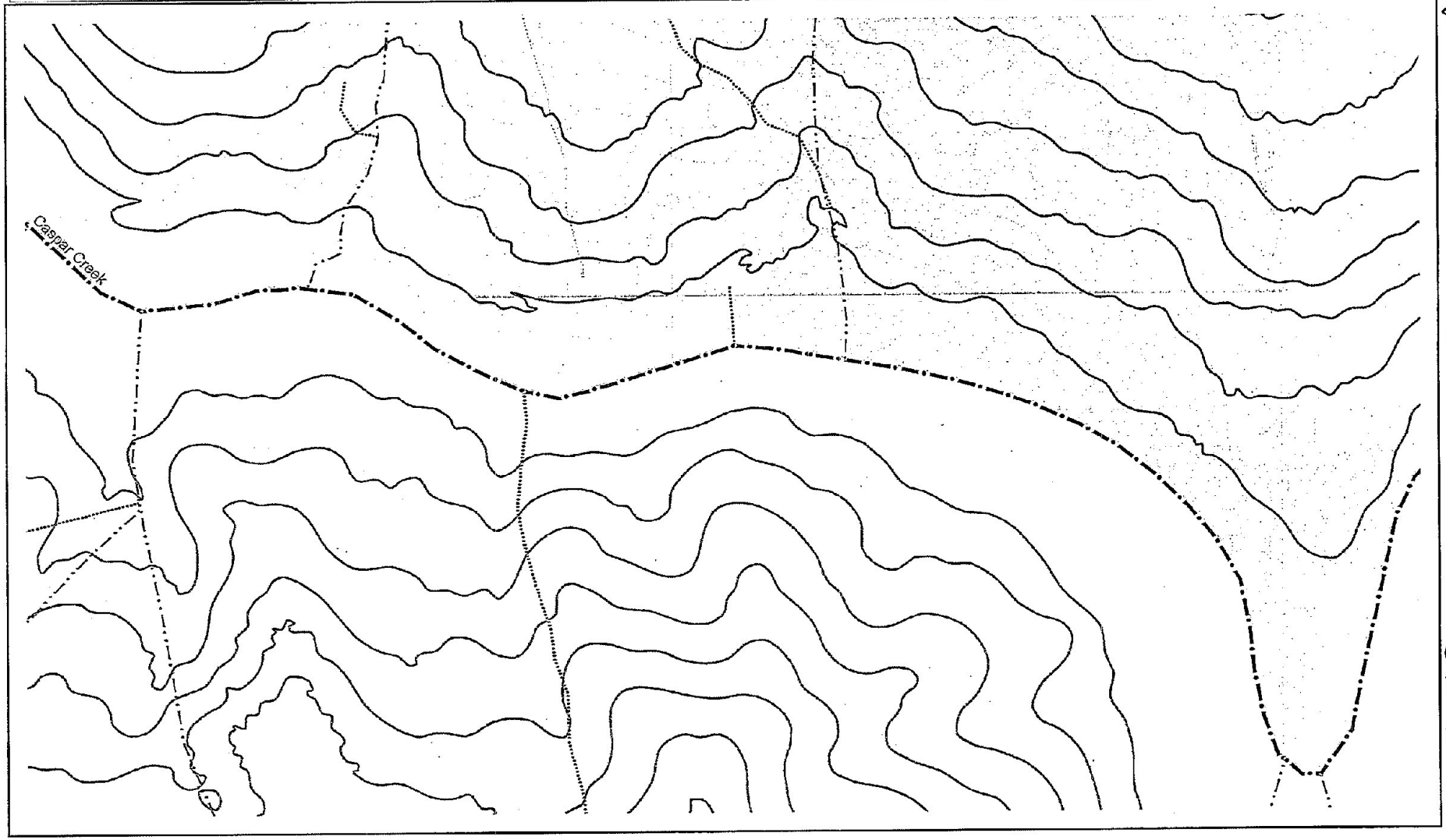
CALIFORNIA RESOURCES MANAGEMENT

PART OF PLAN





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Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 5 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'

1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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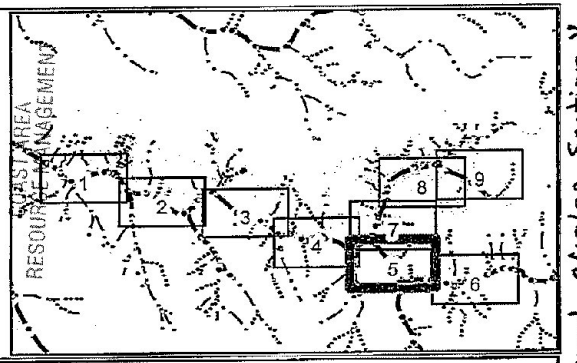
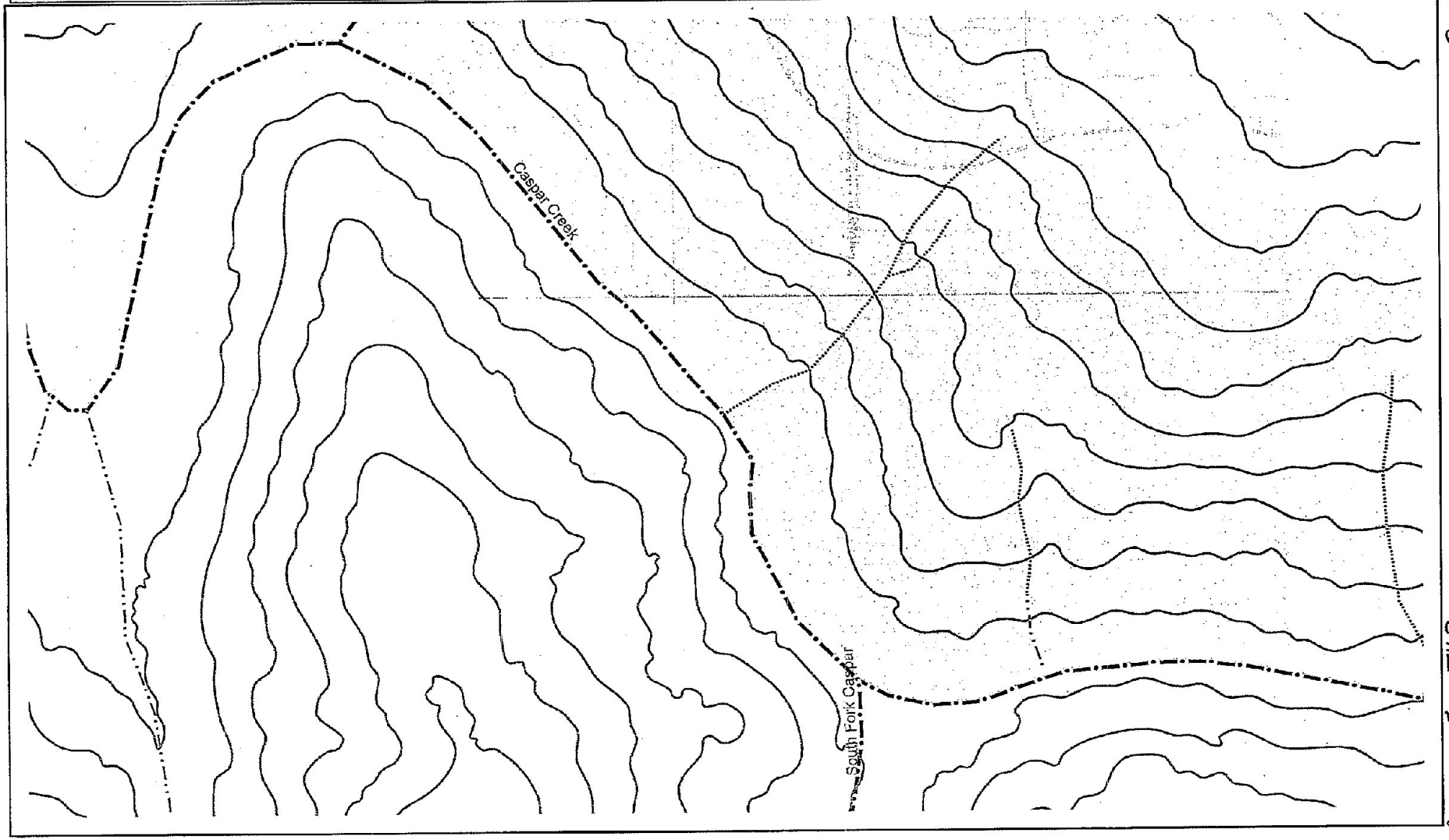
FEB 27 2020
PART OF PLAN





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Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 6 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN:

THP Area
Class I Watercourse (Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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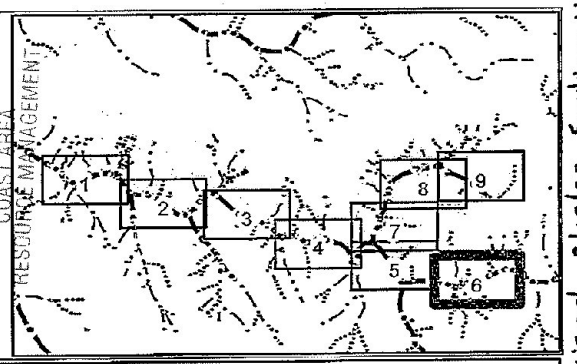
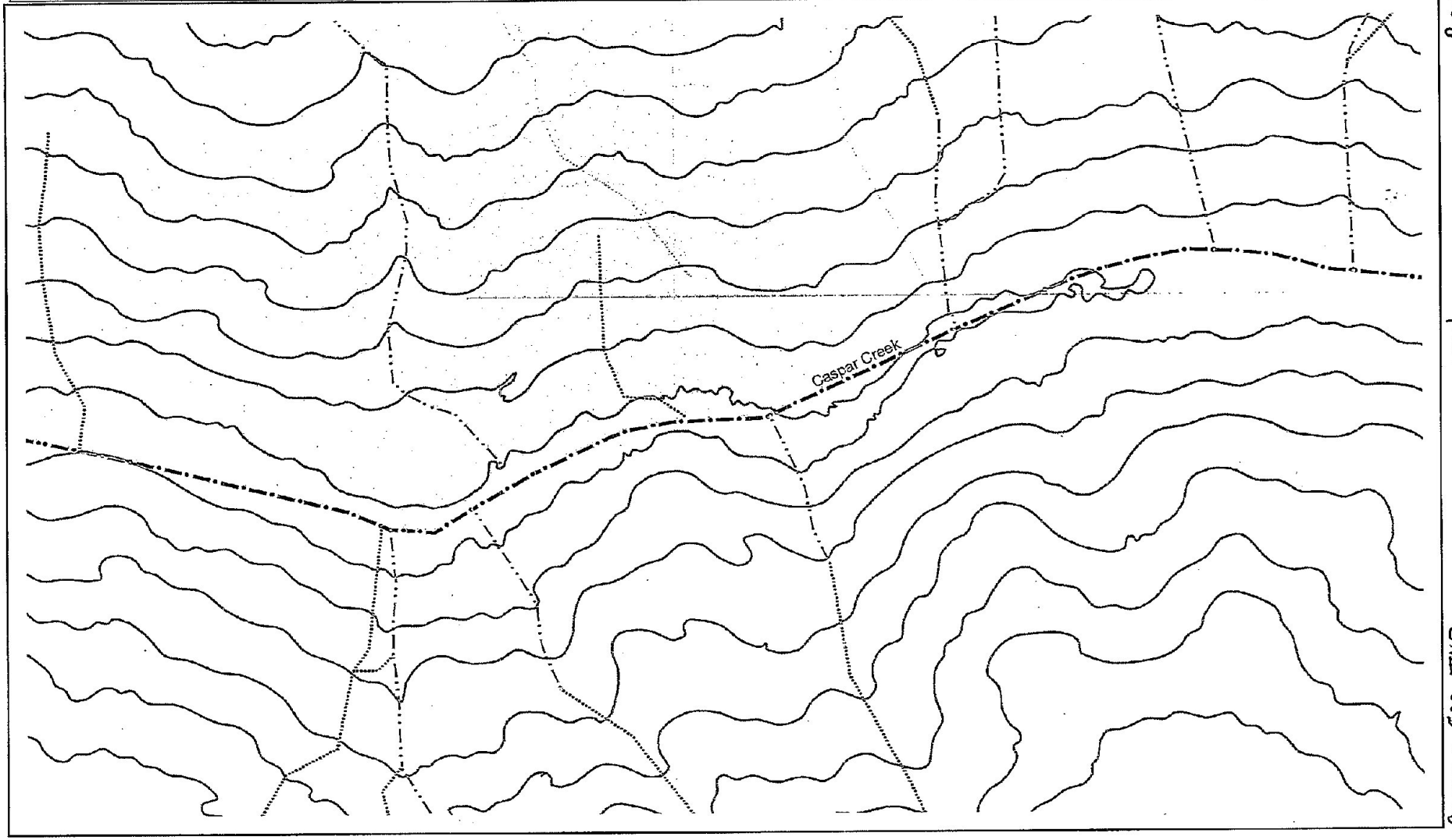
COAST AREA RESOURCE MANAGEMENT

PART OF PLAN





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Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 7 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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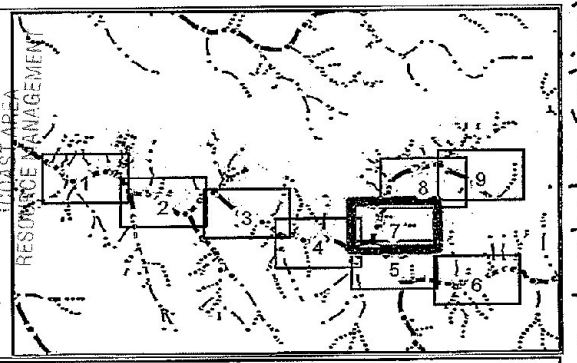
RESOURCE MANAGEMENT
COAST AREA

PART OF PLAN



Caspar Creek

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Caspar 500 THP

Caspar 500 THP

Stream Habitat Map Page 8 of 9

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST

2/19/2020 TN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

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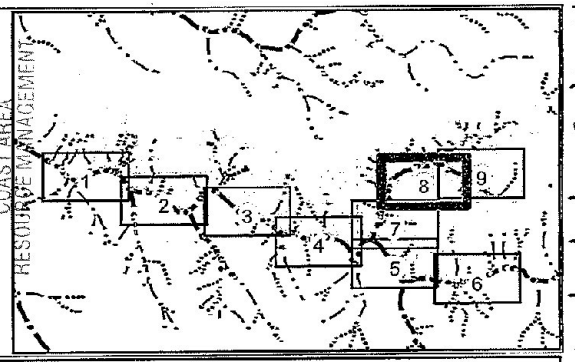
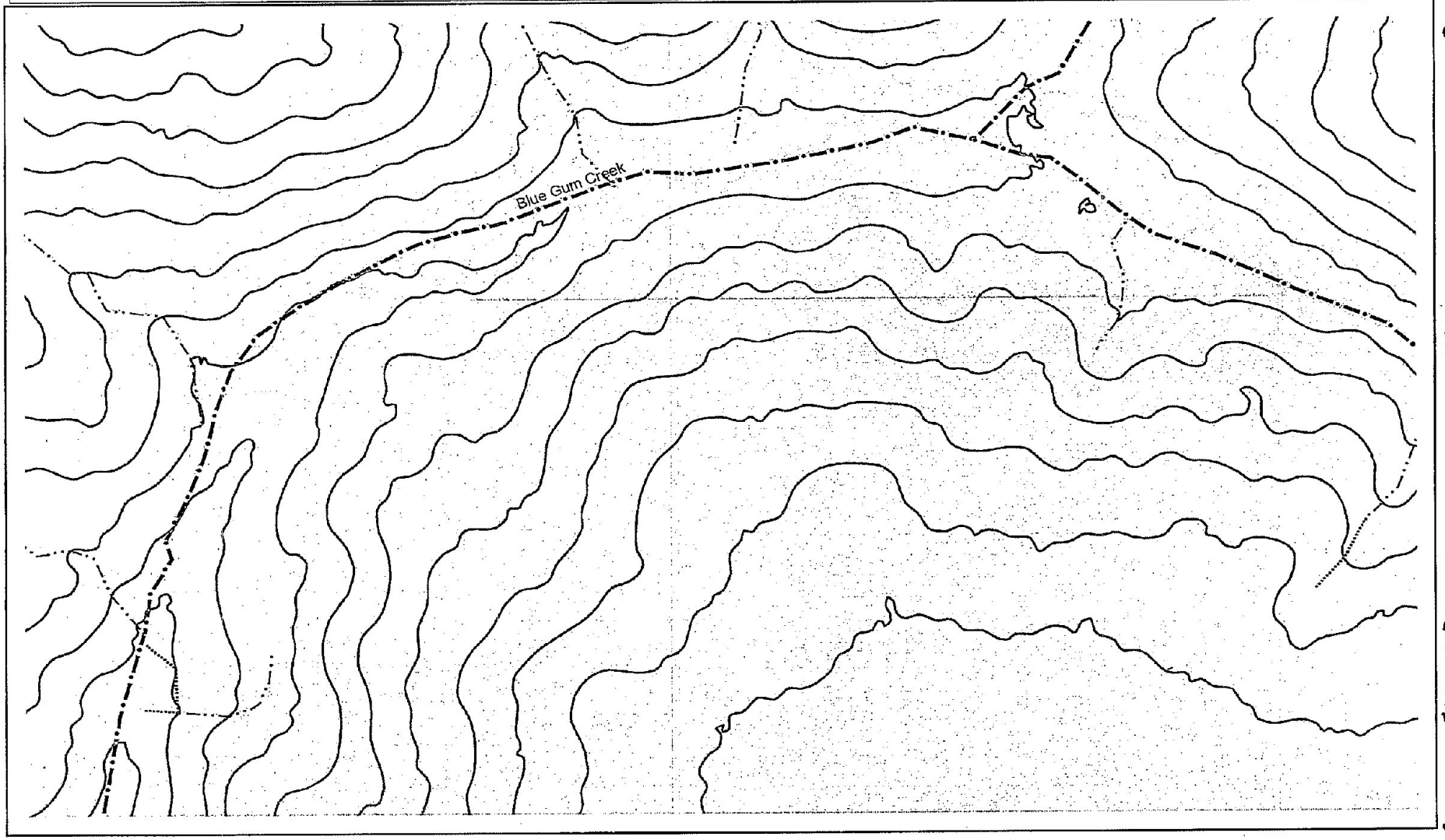
FEB 27 2020
COAST AREA
RESOURCE MANAGEMENT

PART OF PLAN





Revised 2/18/20 Section V
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Caspar 500 THP

Caspar 500 THP

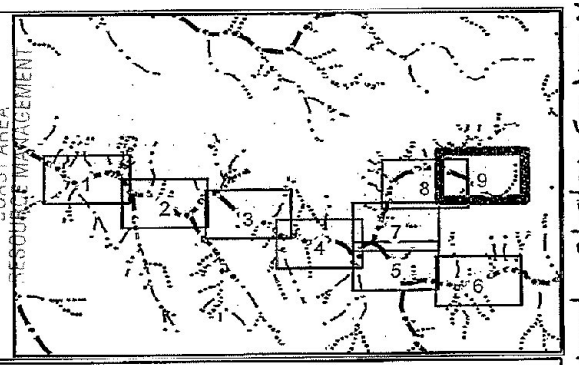
Stream Habitat Map Page 9 of 9

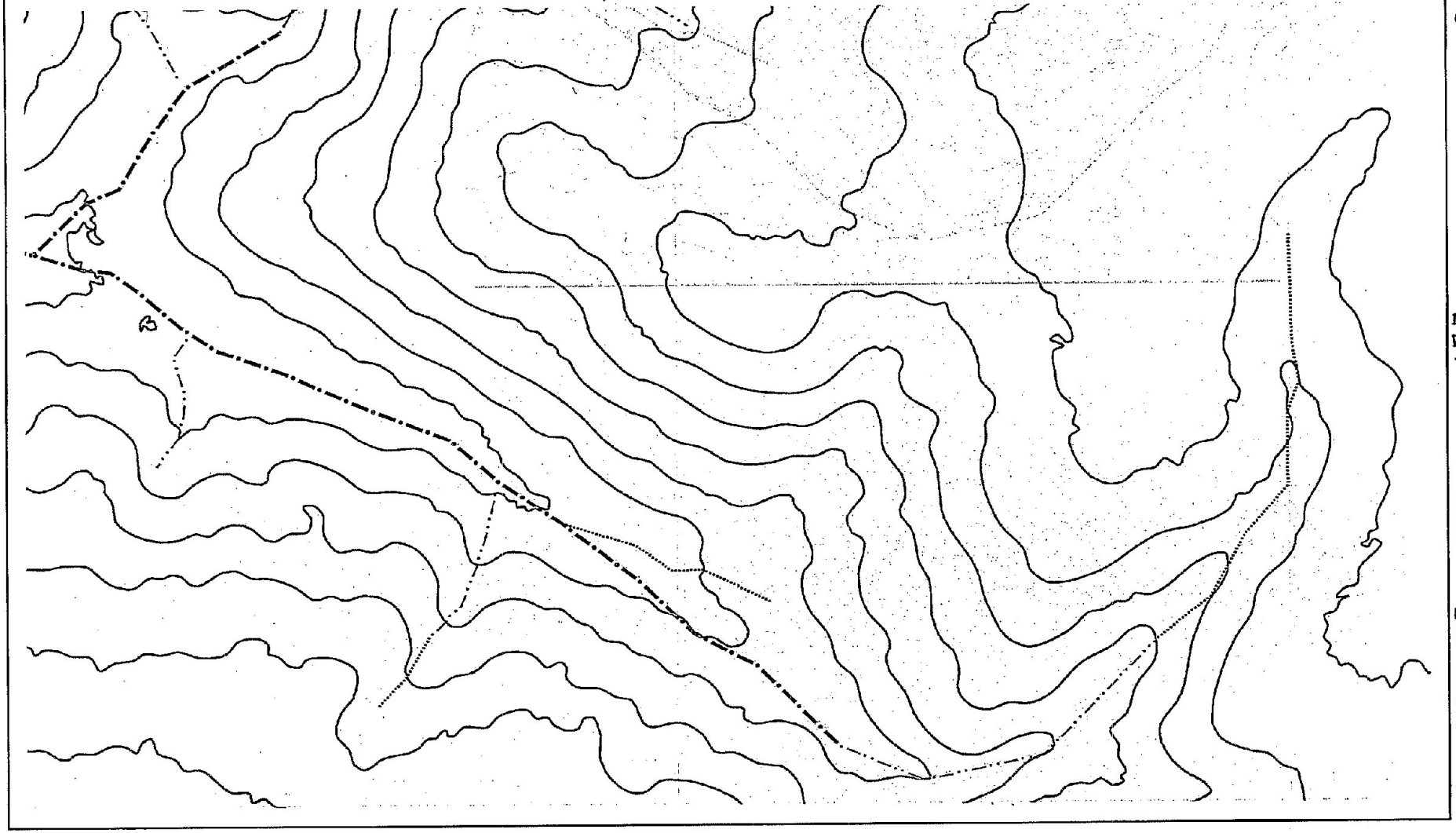
Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Fort Bragg and Mathison Peak
Contour interval = 40'
1:2,400 0 37.575 150 225 300 Feet

JACKSON DEMONSTRATION STATE FOREST
2/19/2020 JN

THP Area
Class I Watercourse
(Salmonid Spawning & Rearing Habitat)
Class II Watercourse
Class III Watercourse

RECEIVED
FEB 27 2020
COAST AREA
RESOURCE MANAGEMENT
PART OF PLAN





Revised 2/18/20 Section V
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Caspar 500 THP

Caspar 500 THP

STATE OF CALIFORNIA
BOARD OF FORESTRY
ESIMATED SURFACE SOIL
EROSION HAZARD

Soil Types

1. 108 Blacklock and Aborigine Complex 0-5% slopes
2. 123 Caspar-Quinliven Complex 35-80+% slopes
3. 124 Caspar-Quinliven-Ferncreek Complex 5-39% slopes
4. 124 Caspar-Quinliven-Ferncreek Complex 40-80% slopes

I. SOIL FACTORS

A. SOIL TEXTURE	FINE	MEDIUM	COURSE	FACTOR RATING 1	2	3	4
1. DETACHABILITY	LOW	MODERATE	HIGH				
RATING	1-9	10-18	19-30	19	23	23	23
2. PERMEABILITY	SLOW	MODERATE	RAPID				
RATING	5-4	3-2	1	2	1	1	1
B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK							
	SHALLOW	MODERATE	DEEP				
	1"-19"	20"-39"	40"-60" (+)				
RATING	15-9	8-4	3-1	1	1	1	1
C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2MM IN SIZE INCLUDING ROCKS OR STONES							
	LOW	MODERATE	HIGH				
	(-) 1--39%	40-70%	71-100%				
RATING	10-6	5-3	2-1			10	10
SUB TOTAL			>	22	25	35	35

II. SLOPE FACTOR							1	2	3	4
SLOPE	5-15%	16-30%	31-40%	41-50%	51-70%	71-80%(+)				
RATING	1-3	4-6	7-10	11-15	16-25	26-35			8	20

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE				1	2	3	4
	LOW	MODERATE	HIGH				
	0-40%	41-80%	81-100%				
RATING	15-8	7-4	3-1	4	4	4	3

IV. TWO-YEAR, ONE HOUR RAINFALL INTENSITY (Hundredths Inch)								
	LOW	MODERATE	HIGH	EXTREME				
	(-) 30-39	40-59	60-69	70-80				
RATING	1-3	4-7	8-11	12-15	13	13	13	13
TOTAL SUM OF FACTORS					39	42	60	71
EROSION HAZARD RATING								
	<50	50-65	66-75	>75				
	LOW	MODERATE	HIGH	EXTREME				
THE DETERMINATION IS				>	Low	Low	Moderate	High

Caspar 500 THP

STATE OF CALIFORNIA
BOARD OF FORESTRY
ESIMATED SURFACE SOIL
EROSION HAZARD

Soil Types

5. 131	Cottoneva 0-5% slopes
6. 135	Dehaven-Hotel Complex 5-80%+ slopes
7. 141	Ferncreek 0-10% slopes
8. 173	Irmulco-Tramway Complex 30-80%+ slopes

I. SOIL FACTORS				FACTOR		RATING	
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	5	6	7	8
1. DETACHABILITY	LOW	MODERATE	HIGH				
RATING	1-9	10-18	19-30	18	17	23	17
2. PERMEABILITY	SLOW	MODERATE	RAPID				
RATING	5-4	3-2	1	2	3	4	3
B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK							
	SHALLOW	MODERATE	DEEP				
	1"-19"	20"-39"	40"-60" (+)				
RATING	15-9	8-4	3-1	1	5	1	4
C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2MM IN SIZE INCLUDING ROCKS OR STONES							
	LOW	MODERATE	HIGH				
	(-) 1--39%	40-70%	71-100%				
RATING	10-6	5-3	2-1	10	9	10	9
SUB TOTAL			>	**31**	**34**	**38**	**33**

II. SLOPE FACTOR							5	6	7	8
SLOPE	5-15%	16-30%	31-40%	41-50%	51-70%	71-80%(+)				
RATING	1-3	4-6	7-10	11-15	16-25	26-35	1	23	1	23

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE							
	LOW	MODERATE	HIGH				
	0-40%	41-80%	81-100%				
RATING	15-8	7-4	3-1	3	4	3	3

IV. TWO-YEAR, ONE HOUR RAINFALL INTENSITY (Hundredths Inch)								
	LOW	MODERATE	HIGH	EXTREME				
	(-) 30-39	40-59	60-69	70-80				
RATING	1-3	4-7	8-11	12-15	13	13	13	13
TOTAL SUM OF FACTORS					**48**	**74**	**55**	**72**
EROSION HAZARD RATING								
	<50	50-65	66-75	>75				
	LOW	MODERATE	HIGH	EXTREME				
THE DETERMINATION IS				>	Low	High	Moderate	High

Caspar 500 THP

STATE OF CALIFORNIA
BOARD OF FORESTRY
ESIMATED SURFACE SOIL EROSION HAZARD

Soil Types

8. 174	Irmulco-Tramway Complex 40-80%+ slopes
9. 199	Shinglemill-Gibney Complex 0-5% slopes

I. SOIL FACTORS										
						FACTOR		RATING		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE		8	9				
1. DETACHABILITY	LOW	MODERATE	HIGH							
RATING	1-9	10-18	19-30		17	17				
2. PERMEABILITY	SLOW	MODERATE	RAPID							
RATING	5-4	3-2	1		3	4				
B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK										
	SHALLOW	MODERATE	DEEP							
	1"-19"	20"-39"	40"-60" (+)							
RATING	15-9	8-4	3-1		4	1				
C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2MM IN SIZE INCLUDING ROCKS OR STONES										
	LOW	MODERATE	HIGH							
	(-) 1--39%	40-70%	71-100%							
RATING	10-6	5-3	2-1		9	10				
	SUB TOTAL		>		**33**	**32**				
II. SLOPE FACTOR							**8**	**9**		
SLOPE	5-15%	16-30%	31-40%	41-50%	51-70%	71-80%(+)				
RATING	1-3	4-6	7-10	11-15	16-25	26-35	23	1		
III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE										
	LOW	MODERATE			HIGH					
	0-40%	41-80%			81-100%					
RATING	15-8	7-4			3-1		3	3		
IV. TWO-YEAR, ONE HOUR RAINFALL INTENSITY (Hundredths Inch)										
	LOW	MODERATE	HIGH	EXTREME						
	(-) 30-39	40-59	60-69	70-80						
RATING	1-3	4-7	8-11	12-15			13	13		
				TOTAL SUM OF FACTORS			**72**	**49**		
EROSION HAZARD RATING										
	<50	50-65	66-75	>75						
	LOW	MODERATE	HIGH	EXTREME						
	THE DETERMINATION IS			>			High	Low		

Caspar 500 THP

Caspar Confluence THP

Soil Type Map

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M

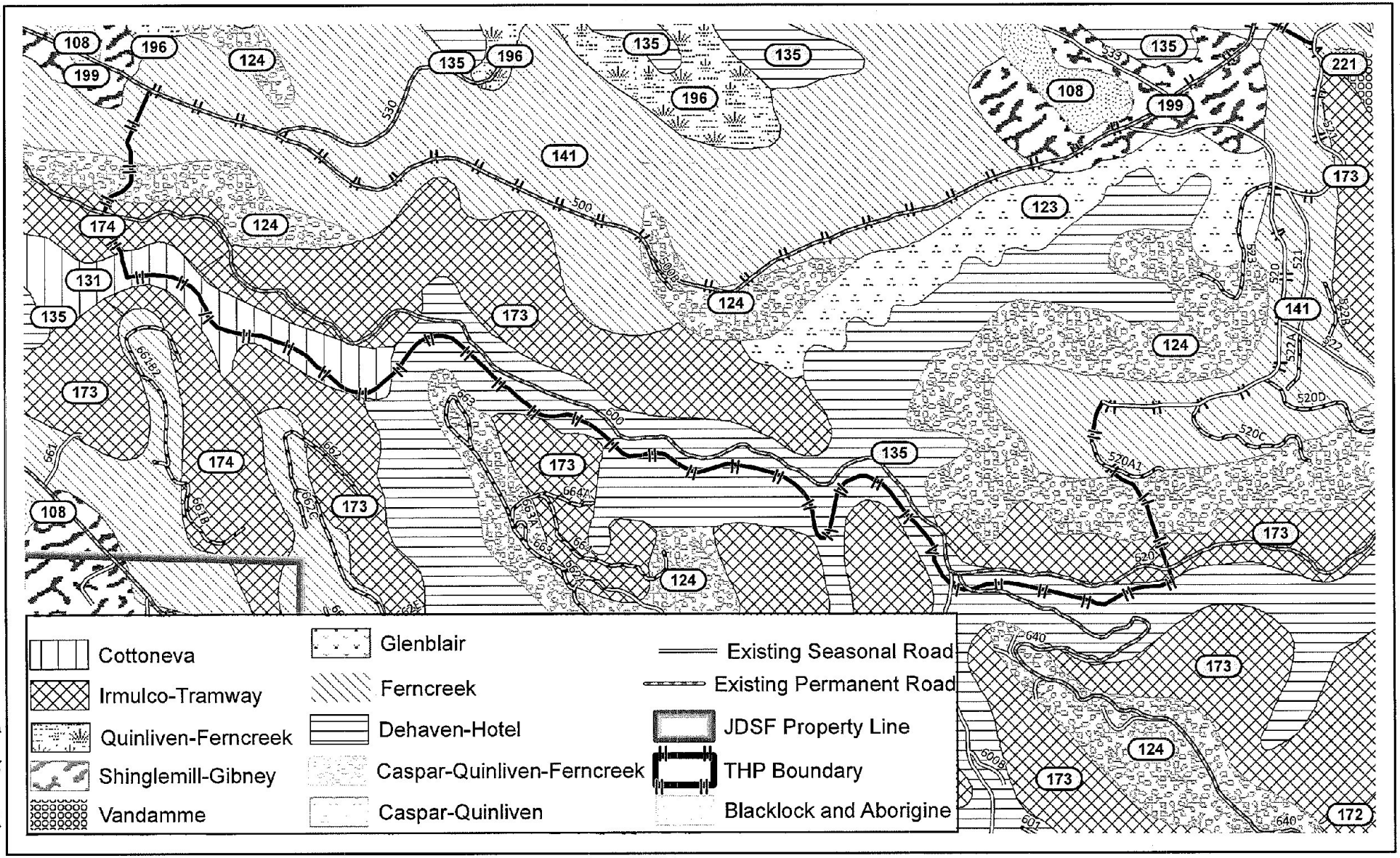
USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

1 : 14,500
1 inch = 1,208.33 feet

0 500 1,000 2,000 3,000 Feet

JACKSON DEMONSTRATION STATE FOREST

Date: 1/28/2020 TN



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Section V

MEMORANDUM

DATE: December 23, 2019

TO: Tori Norville
California Department of Forestry and Fire Protection
Jackson Demonstration State Forest
802 N. Main Street
Fort Bragg, CA 95437

FROM: Patrick Brand
Department of Conservation
California Geological Survey
135 Ridgway Avenue
Santa Rosa, California 95401

SUBJECT: Engineering Geologic Report, Caspar 500 Timber Harvesting Plan, Jackson Demonstration State Forest (JDSF)

I). General Information:

A. Timber Owner: State of California, the Resources Agency, California Department of Forestry and Fire Protection (CALFIRE)

B. Timberland Owner: State of California, the Resources Agency, California Department of Forestry and Fire Protection (CALFIRE)

C. Name of Project: Caspar 500 Timber Harvesting Plan (THP)

D. Location:

7.5' Quadrangles:	Mathison Peak and Mendocino 7.5'
Legal Description:	Sections 3, 4, 5, 8, 9 10; T17N, R17W; MDBL&M
Area:	563 acres
County:	Mendocino
Watersheds:	Caspar Creek Planning Watershed, #1113.300404

E. Method of Investigation:

This engineering geologic assessment was conducted using the outline "Guidelines for Engineering Geologic Reports for Timber Harvesting" (CGS Note 45, 2013a). Specific scope of services provided includes:

1- Review of pertinent published and unpublished geologic reports and maps relevant to the THP (referenced at the end of this report).

2- Geomorphic interpretation of LiDAR imagery, stereoscopic aerial photographs and NAIP images (referenced at the end of this report).

3- Geomorphic field reconnaissance of the THP area conducted between June 2019 and October 2019.

4- Discussions with JDSF forestry assistant Tori Norville; and JDSF forester Jason Serna, RPF #2779.

5- Analysis of geologic mitigations designed to minimize operational impacts on slope stability.

6- Preparation of this report and accompanying geologic map.

II). Introduction

This report presents the results of our Engineering Geologic assessment of the Caspar 500 Timber Harvesting Plan (THP). The THP proposes to harvest approximately five hundred sixty-three (563) acres on gentle to steep slopes that primarily drain into Caspar Creek within Jackson Demonstration State Forest (JDSF). The THP proposes to primarily reuse the existing road network and to construct several road segments high on the slopes to facilitate cable yarding in areas that were historically tractor logged.

The first entries into the Caspar Creek watershed occurred between 1860 and 1904, during which old growth redwoods in the plan area were harvested. Felled areas were broadcast burned and the timber was then yarded downhill and floated downstream with the aid of crib dams to a sawmill at the mouth of Caspar Creek (Henry, 1998; Napolitano and others, 1989). In the proposed THP area, JDSF staff reports that this clearcutting occurred in the late 1880's. JDSF staff reports that the next harvest of the proposed plan area occurred via multiple entries between 1961 and 1968 before the implementation of the modern California Forest Practice Rules. These entries generally utilized single tree selection of varying harvest intensities. The southeast corner of the plan area was clear cut in 1964. The western portion of the plan area was reportedly most recently harvested under THP 1-95-021 MEN utilizing selection silviculture.

III). Scope of Focused Investigation

The primary objective of this assessment is to evaluate the potential impacts of proposed timber harvesting operations on slope stability and resultant erosion and sediment delivery, especially as it pertains to public safety, water quality, listed animals or plant species, and public lands. Based on this assessment, mitigations were developed to reduce the potential for adverse geologic impacts associated with the proposed timber harvesting plan. Discussions with JDSF staff during our field review resulted in the development of THP mitigations designed to minimize the potential for adverse impacts to slope stability and resultant erosion and sediment delivery to watercourses.

A. Public Safety: The THP appears to be in a location that would not directly or indirectly affect residential structures or public buildings. JDSF Road 500 is a publicly accessible road that marks a significant portion of the northern boundary of the THP area. Several hiking and bicycling trails also pass through the THP area. JDSF staff reports that existing trails will be temporarily closed during active timber operations and that proposed road and trail locations will consider recreational, visual, and safety (wind firmness) values. Unstable areas throughout the plan area, including along the publicly accessible roads, were evaluated during our review. Augmented with recommendations provided in this report, the mitigations proposed in the THP appear reasonable and appropriate to minimize the potential for adverse impacts to slope stability and resultant sediment delivery that may have the potential to impact public safety.

B. Water Quality: The plan area is primarily located within the Caspar Creek planning watershed, which is described as located in a coastal anadromous zone in which Chinook and Steelhead salmonids are listed as threatened and Coho salmonids are listed as endangered. JDSF staff reports that no domestic water sources are located downstream of the plan area.

The watersheds in the plan area have been adversely impacted by historic in-stream and near stream logging activities during previous entries that predate the modern Forest Practice Rules. It appears that previous entries in the plan area utilized ground-based yarding methods and a road network located low on the slopes near Caspar Creek and tributaries. During our assessment, we observed a relatively dense network of legacy skid trails, including many in the axis of Class II and Class III watercourses. Some of these legacy skid trails have resulted in watercourse diversions onto skid trails, resulting in erosion and sediment delivery to watercourses in the plan area. Observations conducted during this engineering geologic assessment conclude that the area continues to recover from the past harvesting practices. California Geological Survey (CGS) did not evaluate road and skid trail crossings for this THP. We understand that JDSF staff has performed a detailed evaluation of the plan area to identify and mitigate existing and potential road and skid trail sediment sources.

Augmented with recommendations provided in this report, the mitigations proposed in the THP appear reasonable and appropriate to minimize the potential for adverse impacts to slope stability, erosion and resultant sediment delivery that may impact water quality in the plan area or downstream.

C. Listed Animal or Plant Species: The THP includes a detailed discussion of listed plant and animal species and associated habitat. Augmented with recommendations provided in this report, the mitigations proposed in the THP appear reasonable and appropriate to minimize the potential for adverse impacts to slope stability and resultant sediment delivery that may impact listed plant and animal species and/or associated habitat.

D. Public Lands: The THP is located within Jackson Demonstration State Forest (JDSF) a public forest owned by the State of California and managed by the California Department of Forestry and Fire Protection. Augmented with recommendations provided in this report, the mitigations proposed in the THP appear reasonable and appropriate to minimize the potential for adverse impacts to slope stability and resultant sediment delivery that may impact public lands.

IV). Geologic Conditions:

The THP area is located on gentle to steep ground that varies from 10 to 30 percent gradients along ridge tops and averages 30 to 70 percent on canyon slopes that drain to Caspar Creek and tributaries. Slopes locally exceed 80 to 90 percent, primarily along steep streamside slopes.

A. Bedrock Geology:

Published geologic maps indicate that the Caspar 500 THP is located in an area underlain by Cretaceous to Tertiary age Coastal Belt of the Franciscan Complex (Short and Spittler, 2002; Kilbourne and Mata-Sol, 1983; Kilbourne, 1983; Durham, 1979a; Durham, 1979b; Figures 1 and 2). The Coastal Belt Franciscan Complex is described as a

broken and sheared formation consisting of light colored, clastic sedimentary rocks including arkosic sandstone, pebble conglomerate, and shale with smaller amounts of greenstone, chert, and limestone.

Portions of the plan area are mantled with Pleistocene Marine Terrace Deposits deposited on a series of wave cut platforms. These areas generally consist of relatively flat and broad ridge top topography (Short and Spittler, 2002; Kilbourne and Mata-Sol, 1983; Kilbourne, 1983; Durham, 1979b; Figures 1 and 2). Marine Terrace Deposits are described as well-sorted sand with minor gravel. Short and Spittler (2002; Figures 1 and 2) also identify Holocene Recent Alluvium along portions of the Caspar Creek channel. Recent alluvium is described as interbedded gravel, sand, silt, and clay.

Bedrock outcrops observed in the plan area generally appeared as yellowish-brown sandstone. Outcrops of Marine Terrace Deposits were not observed along the ridgeline during our assessment. The area mapped as Marine Terrace Deposits appeared to be characterized by reddish brown sandy loam soils. Recent alluvium along the South Fork Caspar Creek channel generally consisted of unconsolidated, clastic stream channel deposits.

B. Surficial Soils:

Slopes in the plan area are typically mantled by a thin to thick veneer of colluvium that thickens toward the axes of swales and drainages. In general, colluvial deposits consist of unconsolidated sandy to gravelly loam with local angular clasts of fractured bedrock. Soils mapped in the THP are the Irmulco-Tramway complex 30 to 50 percent slopes, Irmulco-Tramway complex 50 to 75 percent slopes, Dehaven-Hotel complex 50 to 75 percent slopes, Ferncreek sandy loam 2 to 9 percent slopes, Caspar-Quinliven-Ferncreek complex 9 to 30 percent slopes, Shinglemill-Gibney complex 2 to 9 percent slopes, Cottoneva loam 0 to 2 percent slopes, Caspar-Quinliven complex 30 to 50 percent slopes, and Blacklock and Aborigine complex 0 to 5 percent slopes (USDA, 2019). Soil materials observed in the THP area generally consist of yellowish brown to reddish brown loam, clay loam, and sandy to gravelly loam that appears moderately well drained.

C. Seismotectonic Considerations

The THP area is in a seismically active area of California. The main trace of the San Andreas Fault is located approximately 5 miles west and off shore (Jennings and Bryant, 2010). This fault is capable of generating a Maximum Moment Magnitude 7.9 earthquake with a reoccurrence interval of roughly 210 years which last ruptured in the southern Mendocino County in 1906 (Petersen and others, 1996). The active Maacama Fault Zone is mapped approximately 20 miles east of the plan area (Jennings and Bryant, 2010). The Maacama fault is capable of generating a Maximum Moment Magnitude 7.1 earthquake with a recurrence interval of 220 years (Petersen and others, 1996). High ground acceleration associated with fault rupture along either of these two fault systems is likely a contributing factor for movement on deep-seated landslides in Mendocino County.

D. Geomorphology

The San Andreas Fault Zone and the related Maacama fault zone form the major tectonic structures near JDSF. Uplift in central Mendocino County began about 8 million years ago when the East Pacific rise migrated to a subduction zone, forming the San

Andreas Fault System (Short and Spittler, 2002). Ocean levels dropped about 2 million years ago when glaciers advanced. The falling level of the sea combined with mountain uplift formed steep coastal bluffs resulting in topographic steps. During interglacial periods with rising sea levels broad expanses of sand and gravel accumulated in the surf zone on wave cut platforms forming marine terrace deposits. This interaction of tectonic uplift and fluctuating sea level developed a sequence of at least seven marine terraces along the Mendocino County Coast (Kilbourne, 1986). About 25,000 to 10,000 years ago the sea level was about 400 feet lower than it is today (Harden, 1998). River gradients were greatly steepened from the combined effect of lower sea level and tectonic uplift resulting in deep incisions of river canyons through marine terraces and underlying Coastal Terrane bedrock resulting in steep stream side slopes prone to landsliding. This is observed in the plan area where Caspar Creek has eroded through terrace deposits and underlying Coastal Belt Franciscan bedrock.

Melting of continental glaciers caused rises in sea level which resulted in flooding at the mouths of coastal rivers and creeks, forming estuaries such as the Big River and Noyo River estuaries. These areas are now zones of deposition and have slowed the rate of river downcutting. The effects of this are most pronounced near the ocean where the flooding has occurred. Farther inland the rise in sea level has had less effect on stream channel incision. Consequently, the slopes in the western part of JDSF are less steep with more mature topography when compared to the east.

1). Landsliding

Landsliding is the movement of a mass of rock, earth or debris down a slope (Cruden and Varnes, 1996). The THP area is located within mountainous terrain of coastal Northern California where the process of landsliding is a common occurrence. As such, the identification and characterization of landslides within the THP area is a primary goal of this assessment. Several landslide mapping efforts in the plan area have been produced over time (Short and Spittler, 2002; Kilbourne and Mata-Sol, 1983; Kilbourne, 1983; Durham, 1979a; Durham, 1979b). Short and Spittler (2002: Figures 1 and 2) compiles the previous efforts and presents the most recent regional geologic and geomorphic map of the plan area.

CGS conducted field based geomorphic mapping of the plan area between June and October 2019 to provide updated, georeferenced landslide information that can be used in THP preparation. Landslides within the THP area were identified through a process of review of the referenced regional geologic maps, review of LiDAR data, review of aerial photographs (sets 1947, 1952, 1963, 1981, 1984, 1988, 1992, 1996, 2000, NAIP Images), and field reconnaissance and confirmation. Field observations were recorded using Avenza Maps Pro running on an iPad with internal GPS. The results of our updated geologic mapping were used during preparation of the Caspar 500 THP (Figures 3-6). Only the landslides that were readily apparent in the LiDAR imagery or aerial photographs, encountered during field reconnaissance, identified in the literature, or brought to our attention by JDSF staff are mapped. The age and level of landslide activity is based on the landslides appearance according to the morphological age classification of Keaton and DeGraff (1996).

a). Deep-seated Landsliding. Deep-seated landsliding is generally characterized by rotational/translational rockslides and earthflows that are generally more than 50 feet

thick (though "moderately deep" landslides can be between 10 and 50 feet thick). It is not uncommon for deep-seated landslides to consist of complex features that exhibit characteristics of both rockslides and earthflows, although one type of movement generally dominates over the other. The most recent geologic and geomorphic mapping of the plan area (Short and Spittler, 2002; Figure 1) does not identify deep-seated landslides in the plan area, however it should be noted that review of limited sets of aerial photographs were utilized to interpret landforms. Mapping conducted during preparation of this engineering geologic assessment utilizing LiDAR derived data and field reconnaissance identifies twenty-six deep-seated landslides that range in size from an acre to tens of acres within the plan area (Figures 3-6). The landform morphology is generally visible on LiDAR derived hillshade imagery and slope gradient maps via some combination of bowl shaped head scarp slopes and somewhat benched, hummocky, and/or lobate topography. The deep-seated landslides identified and evaluated as part of our investigation (slides D1 through D26) are shown on Figures 3 through 6 and are described in detail in the Specific Observations portion of this report.

b). Shallow-Seated Landsliding. Shallow-seated landsliding is generally characterized by rapid ground movement including debris slides, debris flows, and channel bank failures that are generally less than 10 feet thick. It has been our experience that shallow-seated landslides associated with timber harvest operations are commonly related to movement along road and skid trail prisms and failure of watercourse crossings, especially those constructed prior to the development of the modern Forest Practice Rules. Short and Spittler (2002; Figures 1 and 2) identify nine landslides that are "too small to delineate" at map scale within the plan area. We utilized the previous geologic mapping (Short and Spittler, 2002), aerial photographs, LiDAR derived data, or features brought to our attention by JDSF staff to identify shallow-seated landslides in the plan area. Mapping conducted during preparation of this engineering geologic assessment identifies twenty-six shallow-seated landslides within the plan area. Landslides previously mapped but not observed during our field observations are not included on our maps (Figures 3-6). Most of these shallow-seated landslides are dormant-historic features associated with existing roads or skid trails in the plan area that were constructed prior to the development of the modern Forest Practice Rules.

2). Inner Gorge Geomorphology

Kelsey (1988) describes the formation of inner gorge where a stream down cuts through competent rock, resulting in an abrupt change in slope angle, with steep channel banks and upper, less steep valley slopes. In the California Coast Ranges, Kelsey (1988) describes a mechanism of inner gorge formation controlled by tectonic uplift, climate, and underlying rock characteristics. This process occurs over a geologic time scale of thousands to hundreds of thousands of years and can be temporally and physically intermittent depending on controlling factors. California Geological Survey Note 50 (CGS, 2013b) defines inner gorge as a geomorphic feature consisting of very steep slopes situated immediately adjacent to the stream and below the first break in slope above the channel. They are formed by coalescing scars originating from mass wasting and erosional processes caused by active stream erosion.

The most recent geologic and geomorphic mapping of the plan area identifies inner gorge geomorphology along the main stem of Caspar Creek and a tributary creek

locally referred to as Blue Gum Creek (Short and Spittler, 2002; Figures 1 and 2), based primarily on aerial photographic interpretations. During our assessment, we observed portions of the streamside slopes in these areas where inner gorge geomorphology is mapped. Many of the streamside slopes in the plan area are altered by roads constructed very low on the slopes (for example Road 600, Road 600A, Road 620 and Road 669). While streamside slopes were often steep, a continuous break in slope marking the upper boundary of an inner gorge was generally not observed. Furthermore, we did not observe extensive landsliding in these areas that was not attributable to legacy road construction. Our review of LiDAR imagery and the referenced aerial photographs does not indicate evidence of active and widespread landsliding on these stream side slopes. As such, it appears that active stream erosion is not presently undermining these slopes and it appears that inner gorge geomorphology is not present in the plan area.

3). Debris Slide Slopes

Debris slide slopes are a geomorphic feature characterized by steep, usually well vegetated slopes that have been sculpted by numerous debris slide events. The most recent geologic and geomorphic mapping of the plan area (Short and Spittler, 2002; Figures 1 and 2) does not identify debris slide slopes within THP area. Mapping techniques described above and conducted during preparation of this engineering geologic assessment identifies debris slide slopes within the plan area. Debris slide slopes are discussed in the General Observations section of this report.

V. Proposed Timber Harvest Activities

A.) Silviculture

The THP proposes approximately 563 acres of selection and group selection silviculture:

- Selection silviculture: The Forest Practice Rules require that a minimum basal area of 75 square feet per acre of existing conifers shall be retained; however, JDSF staff reports that the selection harvest for this THP is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, which is reportedly equivalent to at least 60 percent of the existing conifer basal area (outside of WLPZ areas where the proposed retention is expected to be higher, as discussed below).
- Group Selection silviculture: The Forest Practice Rules indicate that a minimum basal area of 75 square feet per acre of existing conifers shall be retained. We understand that there are two types of group selection proposed, 1) cluster group selection and 2) eucalyptus area group selection. The cluster group selection will reportedly harvest ¼ of all coastal redwood clumps, creating openings up to about ¼ acre in size. Thinning between the redwood clumps will also occur. The eucalyptus area group selection will target areas heavier in eucalyptus stocking and will reportedly consist of groups ¼ to ½ acres in size with one group per acre. Eucalyptus between groups will be cut, while conifers will remain. In both cases, JDSF staff reports that the group selection harvest is designed to retain an average post-harvest conifer basal area of approximately at least 160 square feet per acre between group openings (outside of WLPZ areas where the proposed retention is expected to be higher, as discussed below).

Hardwood treatment is not proposed across the plan area, however the THP does propose to cut all eucalyptus (where feasible) within the plan area. JDSF staff reports that a higher conifer basal area will be retained in these areas in an attempt to shade out the eucalyptus stumps.

Additionally, Watercourse and Lake Protection Zones (WLPZ) along Class I and Class II watercourses will provide high levels of conifer retention. The THP does not propose ground-based yarding or herbicide/hardwood treatment within WLPZ's. We also understand that the THP proposes a 30- to 50-foot Equipment Limitation Zone (ELZ) along Class III watercourses where a selective, single tree harvest will be utilized. Ground based yarding or herbicide/hardwood treatment is not proposed within these Class III ELZ's. JDSF staff reports that the THP does propose to remove eucalyptus within WLPZ's and Class III ELZ's. Based on our observation, we anticipate that the WLPZ's and Class III ELZ's will retain much of the existing canopy and root function over much of the steepest portions of the plan area where steep stream side slopes flank watercourses.

B.) Yarding Systems

The THP proposes tractor yarding located on the upper portions of the slopes where cable yarding is not feasible. Existing skid trails proposed for used in these areas are generally in good condition. Cable yarding is proposed where feasible in the upper portions of the plan areas, and throughout the lower portions of the plan area. Based on our observations, the proposed yarding systems appear appropriate for site conditions and appear designed to minimize the potential for adverse impacts to slope stability.

C.) Road and Landing Construction

The THP proposes to construct eleven new spur road segments totaling about 2.24 miles of seasonal road construction high on the slopes within the plan area. The addition of these roads within the plan area facilitate cable yarding of steep slopes that were previously tractor logged. JDSF staff reports that the seasonal road construction will utilize existing, stable skid trails and/or is proposed on relatively gentle slopes, which will minimize the volume of cuts and fills required to construct the road prism. We understand that road construction is not proposed on slopes that exceed 50 percent gradients. Based on our observations, the proposed road construction appears reasonable from a slope stability standpoint. Where applicable, the proposed road construction is discussed below under Specific Observations.

D.) Winter or Wet Weather Operations

The THP proposes winter operations in compliance with the JDSF Winter Period Operating Plan which are generally limited only to timber falling, tree planting, slash pile burning, maintenance of erosion control structures and other vegetation or slash treatments not requiring the use of heavy equipment. Please refer to the THP for a detailed discussion. Based on our review, the proposed operations during the winter period appear designed to minimize potential adverse impacts to slope stability and excessive erosion.

E.) Equipment Operations On Steep Slopes

The THP does not propose skidding operations on slopes greater than 50 percent with High EHR or slopes over 65 percent. As such, use of heavy equipment proposed in the

THP appears designed to minimize the potential for adverse impacts to slope stability that could possibly result from heavy equipment use on steep slopes.

VI. Potential Effects from Proposed Operations.

Shallow landslide hazards are greatest on steep stream side slopes, headwall swales, and debris slide slopes. The THP proposes partial harvesting (selection and group selection) throughout the plan area that is designed to retain a minimum basal area that will generally greatly exceed the requirements of the Forest Practice Rules (as reported by JDSF staff). Additionally, it appears that Class I and Class II WLPZ's and Class III ELZ's will retain much of the existing canopy and root function across much of these sensitive areas within the THP. While harvesting can reduce canopy and root functions, partial harvesting retains a significant component of the overstory and understory vegetation, maintaining root strength and evapotranspiration and rainfall interception processes. Much of the conifer stand proposed for harvest consists of redwoods which stump sprout and retain post-harvest root function. Studies (Sidle and Ochiai, 2006) suggest that partial harvesting minimizes the potential for shallow seated landsliding by retaining canopy and root function.

The THP proposes tractor operations on the gentle to moderate slopes along ridge tops and cable yarding over steeper slopes that flank watercourses. We understand that it is proposed to maintain and upgrade road drainage where necessary on existing roads. The proposed operations appear designed to minimize disturbance to the steep slopes and are anticipated to minimize adverse impacts to slope stability. As augmented with the recommendations provided in this report, the THP will provide accurate and detailed description of existing unstable areas observed in the plan area in which mitigations are proposed to minimize potential adverse impacts to slope stability (see Specific Observations).

VII. General Observations *(keyed to Figures 3, 4, 5, 6)*

Debris Slide Slopes

Debris slide slopes are geomorphic features characterized by steep, usually well vegetated slopes that have been sculpted by numerous debris slide events. These areas are generally characterized by well vegetated slopes that generally exceed 60 percent gradients. Short and Spittler (2002; Figures 1 and 2) do not identify debris slide slopes within the THP area; however, mapping conducted during preparation of this engineering geologic assessment identifies several areas of debris slide slopes across the THP area. Evidence of recent shallow-seated landsliding (for example bare scarps, unvegetated debris piles or tilted conifers) was generally not observed. Shallow-seated landslides in these areas generally consists of isolated dormant-historic failures along old roads and skid trails that appear to be related to offset of mass balance due to grading. Although harvesting can potentially change the hydrologic balance via reduced canopy cover and root function, past harvesting of the slopes (circa 1960, circa 1995) does not appear to have exacerbated ground movements along the steep debris slide slopes. Mitigations proposed in the THP, including partial harvesting and retention of canopy and root strength within the steep streamside slopes, appear adequate to minimize the potential for adverse impacts to slope stability in the mapped debris slide slopes area.

VIII. Specific Observations: *(keyed to Figures 3, 4, 5, 6)*

Deep-Seated Landslides:

Map Point D1: A moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is generally hummocky. Road 600 is constructed across the base of the head scarp, and movement appears to be limited to the portion of the slide below Road 600. Road 600 currently appears adequate for use and does not require modification. Downslope of Road 600 we observed several tilted second-growth stumps in this area as well as scattered tilted and swept merchantable conifer regeneration. We also observed two legacy skid trails that appear to be truncated by the slide. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection and "cluster" group selection silviculture with cable yarding on deep-seated landslide D1. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. As described previously, JDSF staff reports that the proposed partial harvest will retain an average post-harvest conifer basal area that exceeds 125 square feet per acre (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D1.

Map Point D2: A large, deep-seated rotational/translational rockslide complex that is characterized by subtle bowl-shaped head scarp slopes and benched and hummocky topography with poorly defined lateral margins. This slide, including sub-block D2A (discussed below), was likely identified in THP 1-95-021 MEN. An existing permanent road (600) crosses the slide and is proposed for reuse. With the exceptions noted below under sub-block D2A, evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. The landslide topography appears subdued and our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

Sub-block D2A is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is marked by relatively fresh, near vertical, 1- to 2-foot scarps at the outside edge of Road 600 and an associated landing. JDSF staff reports that these scarps have been present for at least several years and that the road width and condition in currently adequate for use without modification. Downslope of Road 600 we observed youthful, hummocky morphology and scattered tilted and swept merchantable conifer regeneration. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection and "cluster" group selection silviculture on deep seated landslide D2 and sub-block D2A. Ground based harvesting operations are proposed along the upper half of slide D2A, while the lower portions of slide D2 and sub-block

D2A are proposed for cable yarding; however, it appears that WLPZ protections will preclude ground-based operations from occurring on most of the upper portion of slide D2 as well. The existing skid trails in this area generally appear to be in good condition, and minimal grading will be necessary for reuse of skid trails in this area. As such, the proposed ground-based yarding in this area appears unlikely to adversely impact slope stability.

Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D2 and D2A. As described previously, JDSF staff reports that the proposed partial harvest will retain an average post-harvest conifer basal area that exceeds 125 square feet per acre (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D2 and D2A.

Map Point D3: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes, benched and hummocky topography with poorly defined lateral margins, and numerous seeps/springs/wet areas. An existing permanent road (600) crosses the slide and is proposed for reuse. The road appears to be in good condition and no offset in the road prism was observed during our site visit. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture on deep seated landslide D3. Ground based harvesting operations are proposed along the upper half of the feature, while the lower portions are proposed for cable yarding; however, it appears that WLPZ protections will preclude ground based operations from occurring on most the upper portion of slide D3. The existing skid trails in this area generally appear to be in good condition, and minimal grading will be necessary for reuse of skid trails in this area. As such, the proposed ground-based yarding in this area appears unlikely to adversely impact slope stability. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D3.

Map Point D4: A questionable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins, an existing permanent road (600) crosses the slide and is proposed for reuse. The road appears to be in good condition and no offset in the road prism was observed during our site visit. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture on deep seated landslide D4. Ground based harvesting operations are proposed along the upper half of the feature, while the lower portion is proposed for cable yarding. The existing skid trails in this area generally appear to be in good condition, and minimal grading will be necessary for reuse of skid trails in this area. As such, the proposed ground-based yarding in this area appears unlikely to adversely impact slope stability. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D4.

Map Point D5: A probable moderately deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins, The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D5. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D5.

Map Point D6: A moderately deep-seated rotational/translational rockslide that appears to be historically active and that appears to have been identified in THP 1-95-021 MEN. The upper portion of the landslide is characterized by a 20- to 25-foot, near-vertical, bowl-shaped head scarp and benched and hummocky topography downslope with tilted old-growth stumps. The slide is revegetated with straight merchantale conifers. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D6. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D6.

Map Point D7: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins, The landslide

topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D7. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D7.

Map Point D8: A questionable deep-seated, rotational/translational rockslide complex that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing seasonal road (668) proposed for reuse crosses the uppermost portion of the landslide. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide complex corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection and "cluster" group selection silviculture on deep seated landslide D8. Ground based harvesting operations are proposed at the uppermost portion of the feature, while the lower portions are proposed for cable yarding. It appears that the ground-based operations on the slide will consist of use an existing seasonal road (668) that is in good condition. As such, the proposed ground-based yarding in this area appears unlikely to adversely impact slope stability. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D8.

Map Point D9: A large, deep-seated rotational/translational rockslide complex that is characterized by subtle bowl-shaped head scarp slopes and benched and hummocky topography with poorly defined lateral margins. An existing permanent road (600) crosses the toe of the slide and an existing seasonal road (668) proposed for reuse is located just upslope of the landslide. With the exceptions noted below under sub-block D9A, evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. The landslide topography appears subdued and our observations confirm that the landslide corresponds to the "dormant-young" to "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

Sub-block D9A is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is marked by weathered, mossy, 5-foot scarps and the slide mass is characterized by broken ground

and tilted and swept sub-merchantable to merchantable conifers. The sub-block descends down to Road 600 but does not impact the existing road prism. Based on our observations, it appears that legacy road construction may have offset the mass balance in the area and that the sub-block likely experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The segment of Road 600 is generally in good condition and does not require modification. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D9 and sub-block D9A. Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D9 and D9A. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D9 and D9A.

Map Point D10: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing permanent road (600) crosses the toe of the slide. The road appears to be in good condition and no offset in the road prism was observed during our site visit. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D10. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D10.

Map Point D11: A probable deep-seated rotational/translational rockslide that is characterized by subtle bowl-shaped head scarp slopes and benched and hummocky topography with poorly defined lateral margins. An existing permanent road (600) crosses the toe of the slide and is generally in good condition. With the exceptions noted below under sub-block D11A, evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. The landslide topography appears subdued and our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

Sub-block D11A is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is marked by

weathered, mossy, 6-foot scarps and the slide mass contains tilted old-growth stumps and straight merchantable conifers. The sub-block descends down to Road 600 but does impact the existing road prism. Based on our observations, it appears that legacy road construction may have offset the mass balance in the area and that the sub-block likely experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The segment of Road 600 is generally in good condition and does not require modification. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes to construct a seasonal road on gentle slopes upslope of the crown of landslide D11, which will minimize the volume of cuts and fills required to construct the road prism. Based on our observations, the mass balance of deep-seated landslide D11 is unlikely to be affected by the proposed road construction. As such, the proposed construction appears to be designed to minimize the potential for adverse impacts to slope stability and appears reasonable from a slope stability standpoint.

The THP proposes selection silviculture and cable yarding on deep seated landslide D11 and sub-block D11A. Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D11 and D11A. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D11 and D11A.

Map Point D12: A probable deep-seated rotational/translational rockslide that is characterized by subtle bowl-shaped head scarp slopes and benched and hummocky topography with poorly defined lateral margins. An existing permanent road (600) crosses the toe of the slide and is generally in good condition. With the exceptions noted below under sub-block D12A, evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. The landslide topography appears subdued and our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

Sub-block D12A is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active and appears to have been previously identified by Short and Spittler (2002). The upper portion of the landslide is marked by weathered, mossy, 5-foot scarps and the slide mass contains hummocky ground, tilted old-growth stumps, and straight merchantable conifers. We also observed truncated skid trails along the lateral margins. The sub-block descends down to Road 600 but does impact the existing road prism. Based on our observations, it appears that legacy road construction may have offset the mass balance in the area and that the sub-block likely experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The segment of Road 600 is generally in good condition and does not require modification. Based on these observations, the

slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes to construct a seasonal road upslope of the crown of landslide D12. The proposed road alignment reportedly utilizes an existing skid trail in good condition, which will minimize the volume of cuts and fills required to construct the road prism. Based on our observations, the mass balance of deep-seated landslide D12 is unlikely to be affected by the proposed road construction. As such, the proposed construction appears to be designed to minimize the potential for adverse impacts to slope stability and appears reasonable from a slope stability standpoint.

The THP proposes selection silviculture and cable yarding on deep seated landslide D12 and sub-block D12A. Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D12 and D12A. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D12 and D12A.

Map Point D13: A deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is characterized by a prominent mid-slope bench, generally hummocky topography, and isolated weathered and mossy internal scarps. We observed scattered tilted old-growth stumps and merchantable conifers amidst a stand of straight merchantable conifers. An existing permanent road (600) crosses the toe of the slide. The road appears to be in good condition and no offset in the road prism was observed during our site visit. Based on these observations, the slide appears to correspond to the "dormant-historic" to "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D13. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D13.

Map Point D14: A deep-seated rotational/translational rockslide that is characterized by steep head scarp slopes and benched and hummocky topography with poorly defined lateral margins. An existing permanent road (600) crosses the toe of the slide. *Sub-block D14A* is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active. The crown of the sub-block is marked by 3- to 4-foot high mossy scarps with broken ground downslope. We observed a gabion wall

supporting the cutbank along the inside edge of the Road 600 across this area and it appears that the road prism was reconstructed across this slide at some point in the past. LiDAR imagery also supports that the slide extended downslope to Caspar Creek. Outside of sub-block D14A, slide D14 is characterized by hummocky topography with scattered tilted stumps and merchantable conifers amidst a stand of straight merchantable conifers. Road 600, which crosses the toe of the slide, is generally in good condition and does not require modification. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D14 and sub-block D14A. Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D14 and D14A. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D14 and D14A.

Map Point D15: A moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is characterized by generally benched and hummocky topography with scattered tilted stumps. The slide is generally revegetated with straight merchantable conifers. An existing permanent road (620) crosses the toe of the slide. The road appears to be in good condition and no offset in the road prism was observed during our site visit. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D15. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D15.

Map Point D16: A deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is characterized by generally hummocky and broken topography with isolated weathered and mossy internal scarps on the order of 1 to 3 feet. We observed scattered tilted old-growth stumps amidst a stand of generally straight merchantable conifers. An existing permanent road (620) crosses the toe of the slide. The road appears to be in good condition and no offset in the road prism was observed during our site visit. Based on these observations, the slide appears

to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D16. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability.

The THP also proposes to construct a seasonal road and landing upslope of the crown of landslide D16 to facilitate cable yarding of the steep slopes below. We observed that the proposed road alignment utilizes existing skid trails or is proposed on relatively gentle slopes (less than 30 percent) upslope of the steep crown of the slide. Some portions of these existing skid trails are constructed immediately upslope of the crown of the landslide. These skid trails are generally in good condition, though at one location we observed an approximately 15-foot wide slump at the outside edge of an existing skid trail at the crown of slide D16. The proposed road alignment generally seems to be laid out to minimize the volume of cuts and fills required for road construction; however, we discussed that placing fill within the historically active deep-seated landslide and/or the skid trail slump may potentially offset the mass balance of the slide and/or result in failure of the road prism. JDSF staff flagged the crown of the slide and the skid trail slump with Special Treatment flagging and moved the flagged road alignment upslope so that road fills shall not extend into the unstable area. We also discussed upgrading the waterbar spacing along the entire road segment to Extreme EHR spacing to minimize the potential for concentrated runoff draining into the landslide, which will reduce the potential for saturation of slide debris and possible adverse impacts to slope stability. Based on our observations, these mitigations appear adequate to minimize the potential for adverse impacts to slope stability.

Map Point D17: A moderately deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is characterized by generally hummocky topography. We observed scattered tilted old-growth stumps and merchantable conifers amidst a stand of straight merchantable conifers. An existing permanent road (620) crosses the toe of the slide. The road appears to be in good condition and no offset in the road prism was observed during our site visit. Based on these observations, the slide appears to correspond to the "dormant-historic" to "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D17. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention

appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D17.

Map Point D18: A deep-seated rotational/translational rockslide that is characterized by steep head scarp slopes and hummocky and broken topography with many apparent internal scarps. We observed tilted stumps and merchantable conifers scattered across the slide area. An existing permanent road (620) crosses the toe of the slide. *Sub-block D18A* is a nested, moderately deep-seated rotational/translational rockslide that appears to be historically active. The crown of the sub-block is marked by 1- to 3-foot high mossy scarps with broken ground and tilted conifers downslope. We observed a gabion wall supporting the cutbank along the inside edge of the Road 620 across this area and the road fill appears to be buttressed with large-diameter rock armoring. Based on these observations, it appears that the road prism was reconstructed across this slide at some point in the past. LiDAR imagery also supports that the sub-block extended downslope to Caspar Creek. Outside of sub-block D18A, slide D18 is characterized by hummocky topography with scattered tilted stumps and merchantable conifers amidst a stand of straight merchantable conifers. Road 620, which crosses the toe of the slide, is generally in good condition and does not require modification. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D18 and sub-block D18A. Retaining adequate root and canopy function will minimize the potential for adverse impacts to slope stability of Map Points D18 and D18A. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslides D18 and D18A.

Map Point D19: A deep-seated rotational/translational rockslide that appears to be historically active. The upper portion of the landslide is characterized by steep head scarp slopes, while the downslope topography is characterized by a broad mid-slope bench and broken and hummocky topography at the toe, where we observed scattered tilted and swept merchantable conifers. An existing legacy road (669) that crosses the slide and is not proposed for reuse. Based on these observations, the slide appears to correspond to the "dormant-historic" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture with cable yarding on deep-seated landslide D19. Retaining adequate root and canopy function in this area will minimize the potential for adverse impacts to slope stability. JDSF staff reports that the selection harvest is designed to retain an average post-harvest conifer basal area of approximately 125 to 150 square feet per acre, or about 60 percent of the existing conifer basal area in this area (outside of WLPZ areas where the proposed retention is expected to be higher). Based on our observations, this proposed level of retention appears adequate to minimize changes to canopy cover and root function that could

adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D19.

Map Point D20: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing legacy road (669) that crosses the slide is not proposed for reuse. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D20. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D20.

Map Point D21: A questionable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing legacy road (669) that crosses the slide is not proposed for reuse. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D21. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D21.

Map Point D22: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing legacy road (669) that crosses the slide is not proposed for reuse. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D22. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-

seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D22.

Map Point D23: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing legacy road (669) that crosses the slide is not proposed for reuse. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D23. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D23.

Map Point D24: A questionable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. An existing legacy road (669) that crosses a portion of the slide is not proposed for reuse. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection and "eucalyptus" group selection silvicultures and cable yarding on deep seated landslide D24. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. The THP also proposes to construct a seasonal road across the upper portion of landslide D24 in order to allow cable yarding of the steep slopes below. We observed that the proposed road alignment is located on gently sloping ground (less than 30 percent slopes), which will minimize the volume of cuts and fills required to construct the road prism. Based on our observations, the proposed road construction appears reasonable from a slope stability standpoint. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D24.

Map Point D25: A probable deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-mature" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D25. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. The THP also proposes to construct a seasonal road across the upper portion of landslide D25 in order to allow cable yarding of the steep slopes below. We observed that the proposed road alignment is located on relatively gently sloping ground (less than 30 to 40 percent slopes), which will minimize the volume of cuts and fills required to construct the road prism. Based on our observations, the proposed road construction appears reasonable from a slope stability standpoint. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D25.

Map Point D26: A deep-seated, rotational/translational rockslide that is generally characterized by subtle bowl-shaped head scarp slopes and somewhat benched and hummocky topography with poorly defined lateral margins. The landslide topography appears subdued and evidence of recent large-scale, deep-seated earth movement (for example off-set road prisms, ground cracks, bare scarps) was not observed. Our observations confirm that the landslide corresponds to the "dormant-young" morphological age classification of Keaton and DeGraff (1996).

The THP proposes selection silviculture and cable yarding on deep seated landslide D26. Because of the apparent lack of or very slow rate of deep-seated landslide movement and that the mass balance of the deep-seated landslide is unlikely to be affected by the proposed operations, it appears unlikely that the proposed timber harvesting operations will have a significant impact on the slope stability of the deep-seated landslide. As such, additional mitigations or recommendations appear unwarranted for deep-seated landslide D26.

Shallow-Seated Landslides:

Because a large component of the conifer stand contains redwoods that stump sprout and the proposed silviculture is partial harvesting (selection, group selection, WLPZ) designed to retain canopy and root function, it appears the potential adverse impacts to slope stability of shallow-seated features identified in the plan area will be minimized when augmented with recommendations contained in this report. Please see additional discussion of the proposed timber operations on shallow-seated landslides below:

Map Point S1: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600) that appears to have been previously identified in THP 1-95-021 MEN. The slide is about 25 feet wide and extends about 75 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 6-foot scarps. The slide is revegetated with straight, pole-size conifer regeneration. Based on our observations, it appears that legacy road construction may have offset the mass balance in this area and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes "cluster" group selection silviculture and tractor yarding in this area. Based on our

observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability; however, tractor use on the unstable area could potentially result in reduction of canopy and root function and potentially offset mass balance of the unstable area. As such, we discussed creating an Equipment Exclusion Zone (EEZ) around the unstable area to avoid tractor operations on the unstable area.

Map Point S2: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600). The slide is about 30 feet wide and extends about 70 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 2- to 4-foot scarps. The slide is revegetated with brush and straight, non-merchantable conifer regeneration. Based on our observations, it appears that legacy road construction may have offset the mass balance in this area and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. Additionally, an undrained legacy skid trail terminates at the crown of the slide and may have contributed to the failure by concentrating runoff at this location.

The THP proposes "cluster" group selection silviculture and cable yarding in this area. The undrained skid trail located upslope of the slide will be utilized under this THP and will have waterbars installed in compliance with the Forest Practice Rules, which will minimize the potential for concentrated runoff from draining to the unstable area. Given the lack of merchantable timber on this feature, it appears that operations will essentially be avoided on the unstable area which will minimize impacts to slope stability by retaining canopy and root function. As such, additional mitigations or recommendations appear unwarranted for slide S2.

Map Point S3: This feature consists of a dormant-historic to dormant-young debris slide scar that is about 50 feet wide and may extend about 120 feet down 55 percent slopes. The downslope extent of the deposit is obscured by a skid trail constructed at the toe of the feature. The crown of the feature is marked by mossy, weathered scarps on the order of 10 feet in height. The slide is revegetated with slightly swept and tilted, pole-size conifers. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S3.

Map Point S4: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600). The slide is about 80 feet wide and extends about 120 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 6-foot scarps. The slide is revegetated with straight, non-merchantable conifers. The slide appears to initiate as a landing/skid trail fill failure, and based on our observations, it appears that legacy road and skid trail construction may have offset the mass balance of the slope and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes

selection silviculture and cable yarding in this area. Given the lack of merchantable timber on this feature, it appears that operations will essentially be avoided on the unstable area which will minimize impacts to slope stability by retaining canopy and root function. As such, additional mitigations or recommendations appear unwarranted for slide S4.

Map Point S5: This feature consists of a suspended debris slide above an existing permanent road proposed for use (Road 600). The slide consists of a large cutbank failure that reportedly occurred in February 2017. JDSF staff reports that slide debris blocked the entire road and that the debris was cleared with an excavator. The failure is about 275 feet wide and extends about 70 feet downslope to the existing road. The slide scar is generally bare of vegetation. Minor calving of the slide scar appears to have occurred since the debris were cleared from the road; however, the debris does not appear to impact the proposed use of the road. The THP proposes selection silviculture and cable yarding in this area. Avoiding operations on and within 15 feet of the unstable area will minimize the potential for adverse impacts to slope stability by retaining canopy and root function.

Map Point S6: This feature consists of a probable dormant-historic debris slide located west of a Class II watercourse. The debris slide appears to be a skid trail fill failure where a legacy skid trail was constructed on steep slopes. The failure is about 25 feet wide and extends up to about 35 feet downslope to the watercourse. Several swept and/or tilted conifers were observed in the area, and it appears that the slide debris may be buttressed behind a redwood clump downslope. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S6.

Map Point S7: This feature consists of a dormant-historic debris slide located along the right bank of a Class II watercourse. The failure is located along the margin of a legacy skid trail that descends to the watercourse. The failure is about 30 feet wide and extends about 60 feet downslope to the watercourse. The slide is revegetated with brush and non-merchantable conifers. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S7.

Map Point S8: This feature consists of a dormant-historic debris slide along an existing legacy road not proposed for use (Road 669). The slide is about 70 feet wide and extends about 120 feet downslope to a Class I watercourse (Blue Gum Creek). The slide is revegetated with straight, merchantable conifers. The slide appears to initiate as a fill failure of Road 669, and based on our observations, it appears that legacy road construction on steep slopes may have offset the mass balance of the slope and that the fill failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and

root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S8.

Map Point S9: this slide number was accidentally omitted during digitization. As such, there is no Map Point S9 on Figures 3 through 6.

Map Point S10: This feature consists of a dormant-historic debris slide along an existing permanent road proposed for use (Road 600). The crown of the slide is marked by 8- to 10-foot high weathered scarp about 75 feet wide, with tilted 2nd growth stumps observed downslope. LiDAR imagery suggests that the slide extended about 150 feet downslope to Caspar Creek, though Road 600 appears to have been repaired/reopened at some point in the past. The slide is revegetated with straight, merchantable conifers. Based on our observations, it appears that legacy road construction may have offset the mass balance in the area and that the debris slide likely experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The segment of Road 600 currently appears adequate for use and does not require modification. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S10.

Map Point S11: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600). The slide is about 50 feet wide and extends about 50 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 3-foot scarps. The slide is revegetated with straight, pole-size to merchantable conifers. The slide appears to initiate as a skid trail fill failure, and based on our observations, it appears that legacy road and skid trail construction on steep slopes may have offset the mass balance of the slope and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S11.

Map Point S12: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600) that appears to have been previously identified by Short and Spittler (2002). The slide is about 30 feet wide and extends about 65 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 3-foot scarps. The slide is revegetated with straight, non-merchantable conifers. The slide has offset a segment of a skid trail constructed upslope of Road 600. Based on our observations, it appears that legacy road and skid trail construction may have offset the mass balance of the slope and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes

to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S12.

Map Point S13: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600). The slide is about 65 feet wide and extends about 70 feet downslope to the existing road. The slide is revegetated with straight, non-merchantable conifers. The slide appears to initiate as a skid trail fill failure and/or cutbank failure, and based on our observations, it appears that legacy road and skid trail construction may have offset the mass balance of the slope and that the debris slide experienced movement after Road 600 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S3.

Map Point S14: This feature consists of a dormant-historic debris slide above an existing permanent road proposed for use (Road 600) and along an existing legacy road not proposed for use (Road 600A). The slide is about 90 feet wide and extends about 150 feet down 65 percent slopes to Road 600. The slide is revegetated with straight, pole-size conifers. The slide appears to initiate as a fill failure of Road 600A and adjacent skid trails, and based on our observations, it appears that legacy road and skid trail construction on steep slopes may have offset the mass balance of the slope and that the debris slide experienced movement after Road 600A construction (which appears to have been between 1963 and 1975 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S14.

Map Point S15: This feature consists of a dormant-historic debris slide (cutbank failure) above a legacy road (Road 669) that appears to have been previously identified by Short and Spittler (2002). The slide is about 80 feet wide and extends about 50 feet downslope to Road 669, but it appears that the slide deposit was cleared from the legacy road at some point in the past. The slide is revegetated with straight, merchantable conifers. Based on our observations, it appears that legacy road construction on steep slopes may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location).

The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. The THP proposal to decommission this segment of Road 669, where the slide debris have previously been cleared, also appears unlikely to adversely impact slide S15. As such, additional mitigations or recommendations appear unwarranted for slide S15.

Map Point S16: This feature consists of a dormant-historic debris slide along an existing legacy road not proposed for use (Road 669). The slide is about 60 feet wide and extends about 150 feet downslope to a Class I watercourse (Blue Gum Creek). The slide is revegetated with non-merchantable conifers. The slide appears to initiate as a fill failure of Road 669, and based on our observations, it appears that legacy road construction on steep slopes may have offset the mass balance of the slope and that the fill failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S16.

Map Point S17: This feature consists of a dormant-historic debris slide (cutbank slump) above a legacy road not proposed for use (Road 669). The slide is about 30 feet wide and extends about 30 feet downslope to Road 669. The slide is revegetated with straight, non-merchantable conifers. Based on our observations, it appears that legacy road construction on steep slopes may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S11.

Map Point S18: This feature consists of a dormant-historic debris slide along an existing legacy road not proposed for use (Road 669). The slide is about 45 feet wide and extends about 140 feet downslope to a Class I watercourse (Blue Gum Creek). Tilted old-growth and second-growth stumps were observed within the slide mass. It appears that concentrated runoff drained off of Road 669 at this location and may have contributed to the failure. The slide is revegetated with merchantable conifers. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S18.

Map Point S19: This feature consists of a dormant-historic debris slide along an existing legacy road not proposed for use (Road 669). The slide is about 30 feet wide and extends about 100 feet downslope to a Class II watercourse. The slide is revegetated with a mix of tilted and straight merchantable conifers. The slide appears to initiate as a fill failure of Road 669, and it appears that a Class II watercourse may have been diverted down Road 669 to this location in the past. Concentrated runoff likely saturated the road fill at this location and adversely impacted slope stability. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S19.

Map Point S20: This feature consists of a series of shallow debris slides along an existing legacy road not proposed for use (Road 669). The entire complex is about 125 feet wide and extends about

Map Point S20A is the crown of a probable dormant-historic debris slide scar. The lower portions of the slide are obscured by more recent movement. The area does not contain conifers and is vegetated with brush and pampas grass.

Map Point S20B is a dormant-historic slump at the eastern portion of the slide complex where the entire Road 669 prism is downdropped about 6 feet. The slump appears to extend about 100 feet downslope but does not reach the Class I watercourse (Blue Gum Creek). The slide is revegetated with straight, pole-size conifers.

Map Point S20C is a dormant-historic to suspended debris slide at the western portion of the slide complex that has removed the entire Road 669 prism. The crown of the slide is marked by mossy near-vertical scarps 3- to 6-feet in height. The slide extends downslope to a Class I watercourse (Blue Gum Creek). The slide is revegetated with brush and non-merchantable conifers.

Based on our observations, it appears that legacy road construction on steep slopes may have offset the mass balance of the slope and that the debris slide complex experienced multiple episodes of movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Avoidance of operations on and around the margins of the feature appears adequate to minimize the potential for adverse impacts to slope stability by retaining canopy and root function.

Map Point S21: This feature consists of a dormant-historic debris slide (cutbank failure) above a legacy road not proposed for use (Road 669). The slide is about 70 feet wide and extends about 45 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 6-foot scarps. The slide is revegetated with straight, merchantable conifers. Based on our observations, it appears that legacy road construction may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection silviculture and cable yarding in this area. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S21.

Map Point S22: This feature consists of a dormant-historic debris slide (cutbank failure) above a legacy road not proposed for use (Road 669). The slide is about 75 feet wide and extends about 50 feet downslope to the existing road, and the margins of the feature are marked by weathered, mossy 3-foot scarps. The slide is revegetated with straight, merchantable conifers, and we observed tilted old growth and second growth redwood stumps in the displaced slide mass. Based on our observations, it appears that legacy road construction may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection

silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S22.

Map Point S23: This feature consists of a dormant-historic debris slide (cutbank failure) above a legacy road not proposed for use (Road 669). The slide is about 70 feet wide and extends about 55 feet downslope to Road 669. The slide is revegetated with straight, merchantable conifers. Based on our observations, it appears that legacy road construction may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 669 construction (which appears to have been between 1963 and 1975 at this location). The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S19.

Map Point S24: This feature consists of a dormant-young to dormant-historic debris slide along a legacy skid trail not proposed for use. The slide is about 25 feet wide and extends about 120 feet down 50 to 60 percent slopes but does not reach a watercourse. The slide is revegetated with straight, merchantable conifers. It appears that a legacy skid trail as constructed across the feature in the past, and that a small outside fill failure occurred at some point after the skid trail construction. The THP proposes selection silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S24.

Map Point S25: This feature consists of a dormant-historic debris slide (cutbank failure) above a portion of an existing permanent road proposed for use (Road 620). The slide is about 75 feet wide and extends about 40 feet downslope to Road 620, and the margins of the feature are marked by weathered, mossy 3-foot scarps. The slide is revegetated with straight, merchantable conifers. Based on our observations, it appears that legacy road construction may have offset the mass balance of the slope and that the cutbank failure experienced movement after Road 620 construction (which appears to have been between 1952 and 1963 at this location). The slide deposit generally appears to have been cleared in the past and, as such, does not impact the proposed use of the road. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S25.

Map Point S26: This feature consists of a dormant-historic debris slide. The slide is about 60 feet wide and extends about 130 feet downslope to a Class II watercourse. The crown of the feature is marked by weathered 6- to 8-foot scarps, and we observed tilted old-growth stumps downslope within the displaced slide mass. The slide is revegetated with straight, merchantable conifers. The THP proposes selection (and WLPZ) silviculture and cable yarding in this area. Based on our observations, the proposed partial harvest appears adequate to minimize changes to canopy cover and

root function that could adversely impact slope stability. As such, additional mitigations or recommendations appear unwarranted for slide S26.

IX. General Recommendations.

Debris Slide Slopes

None. The proposed operations in these areas appear adequate to minimize adverse impacts to slope stability and no additional recommendations appear warranted at this time. Specific concerns regarding unstable areas identified in areas mapped as debris slide slopes are addressed under Specific Recommendations.

X. Specific Recommendations.

Deep-Seated Landslides

Map Points D16: Section II of the THP shall describe that proposed road construction and road fill shall not extend into the flagged landslide area. The THP shall also describe that waterbar spacing along the entire road segment shall be upgraded to Extreme EHR spacing. For clarity to the LTO and reviewers, this road segment shall be identified on the THP Operations Map.

Map Points D1 – D15 and Map Points D17 – D26: None. Assuming the proposed operations on these deep-seated landslides are consistent with those considered during our assessment the operations proposed in the THP appear appropriate to minimize adverse impacts to slope stability and no additional recommendations appear warranted at this time.

Shallow-Seated Landslides

Map Point S1: Section II of the THP shall specify that an Equipment Exclusion Zone shall be established around this feature to avoid tractor operations on the unstable area. The EEZ shall be flagged prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

Map Point S5: Section II of the THP shall describe that harvesting will be avoided on and within 15 feet of the slide. The boundaries of this area shall be flagged for avoidance prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

Map Point S20: Section II of the THP shall describe that harvesting will be avoided on the slide complex. The unstable area shall be flagged for avoidance prior to operations. For clarity to the LTO and reviewers, this feature shall be shown on the THP Operations Map.

Map Point S2 – S4; S6 – S19; S21 – S26: None. Assuming the proposed operations on these shallow-seated landslides are consistent with those considered during our assessment the operations proposed in the THP appear appropriate to minimize adverse impacts to slope stability and no additional recommendations appear warranted at this time.

XI. Conclusions:

Based upon this geologic assessment and augmented with recommendations provided in this report, it appears that the proposed THP is unlikely to significantly affect slope stability or to result in substantial increases in sedimentation. Timber harvesting operations conducted under the Caspar 500 THP are unlikely to result in significant immediate or long-term adverse impacts to Caspar Creek or unnamed tributaries with respect to slope stability and sedimentation.

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Attachments: Figures 1 through 6

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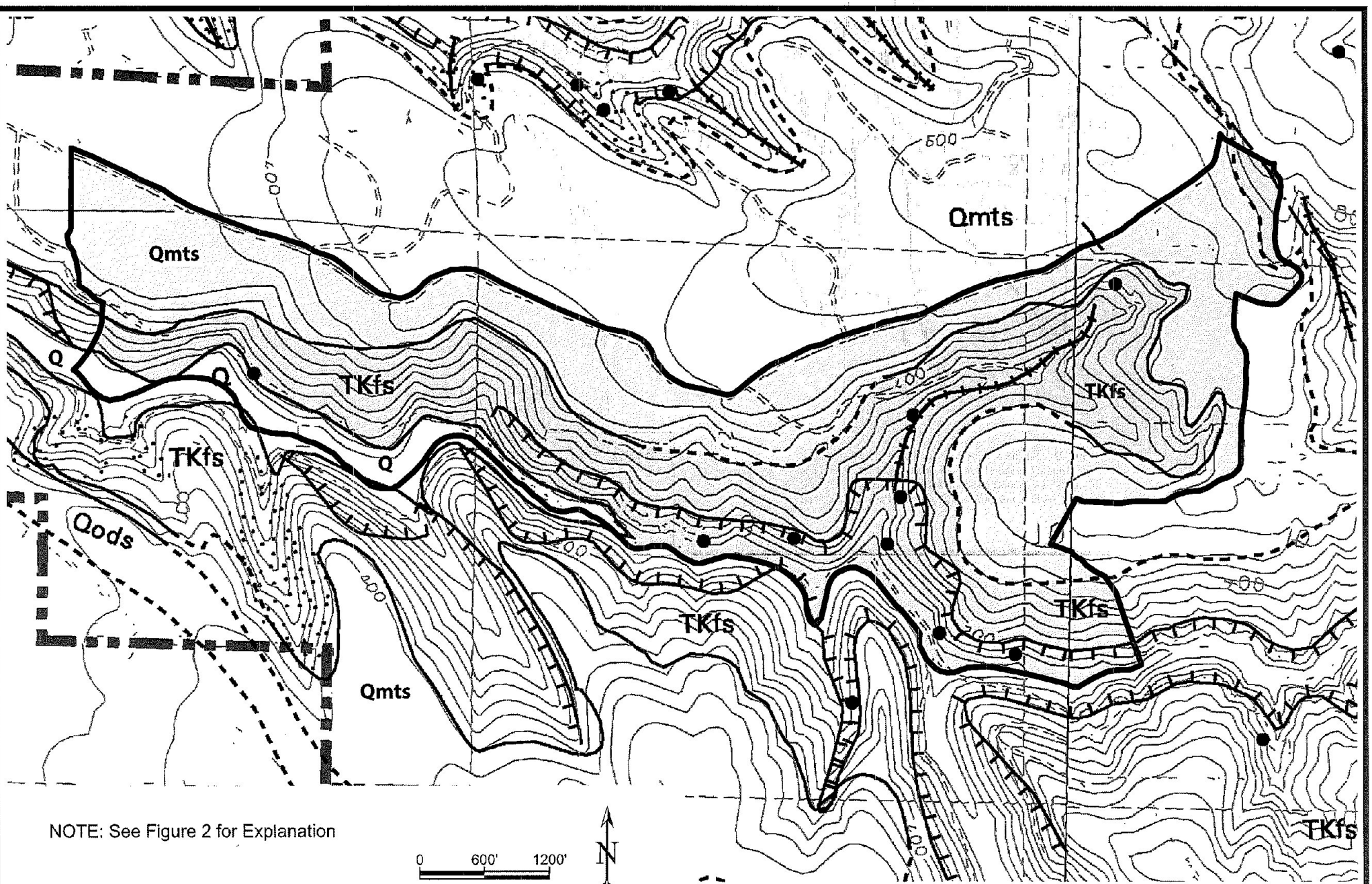
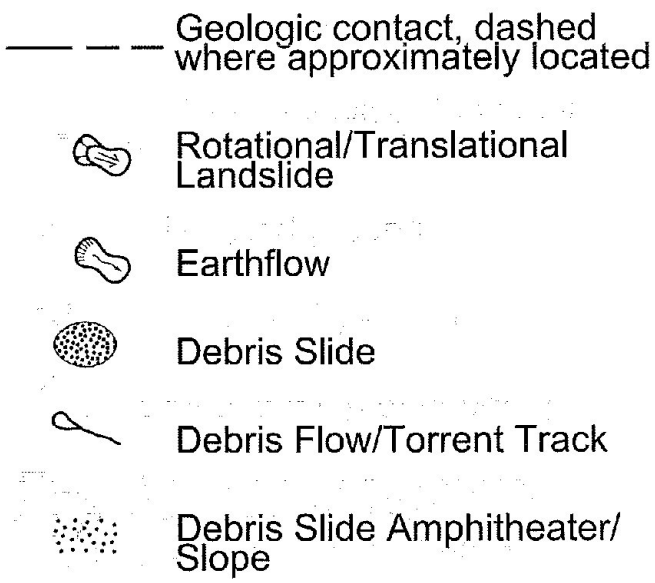


Date: 12/2019 Scale: 1" = 1200'	Regional Geologic Map To Accompany Engineering Geologic Review of South Fork Caspar Timber Harvesting Plan	Figure: 1

Base Map: Modified from Short, W.R., and Spittler, T.E., 2002, Preliminary Map of Geologic and Geomorphic Features Related to Landsliding, Jackson Demonstration State Forest, Mendocino County, California: California Geological Survey, Watershed Mapping Series, Map Set 2, Scale 1:24,000.

Explanation



Q	Recent Alluvium
Qods	Older Dunes
Qmts	Marine Terrace Deposits Undifferentiated
TKfs	Franciscan Formation, Coastal Belt

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Date: 12/2019	Explanation to Regional Geologic Map To Accompany Engineering Geologic Review of Caspar 500 Timber Harvesting Plan	Figure: 2

Caspar 500 THP

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

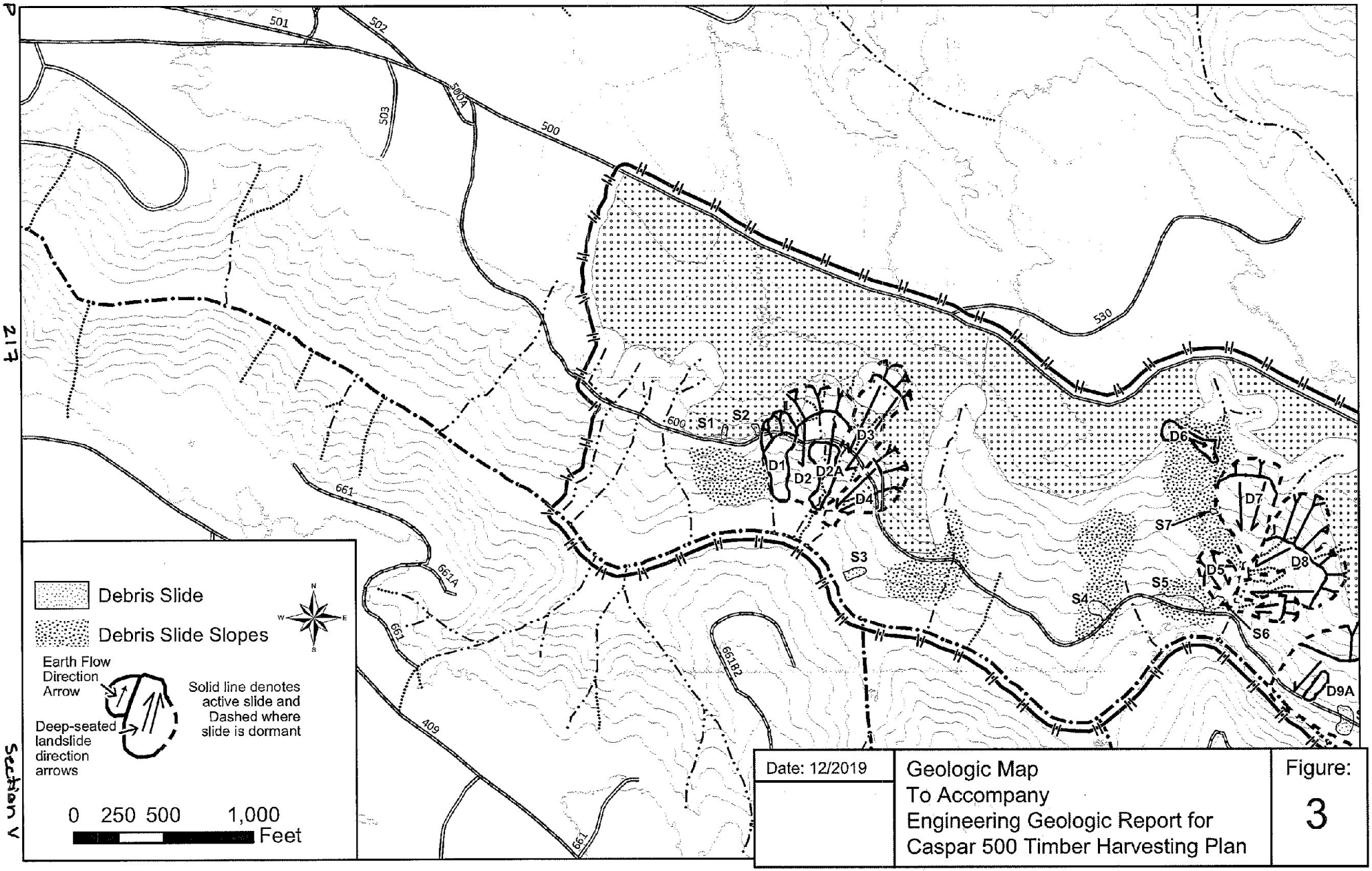
THP Boundary
Tractor Yarding

* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST

217

Section V



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 3

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

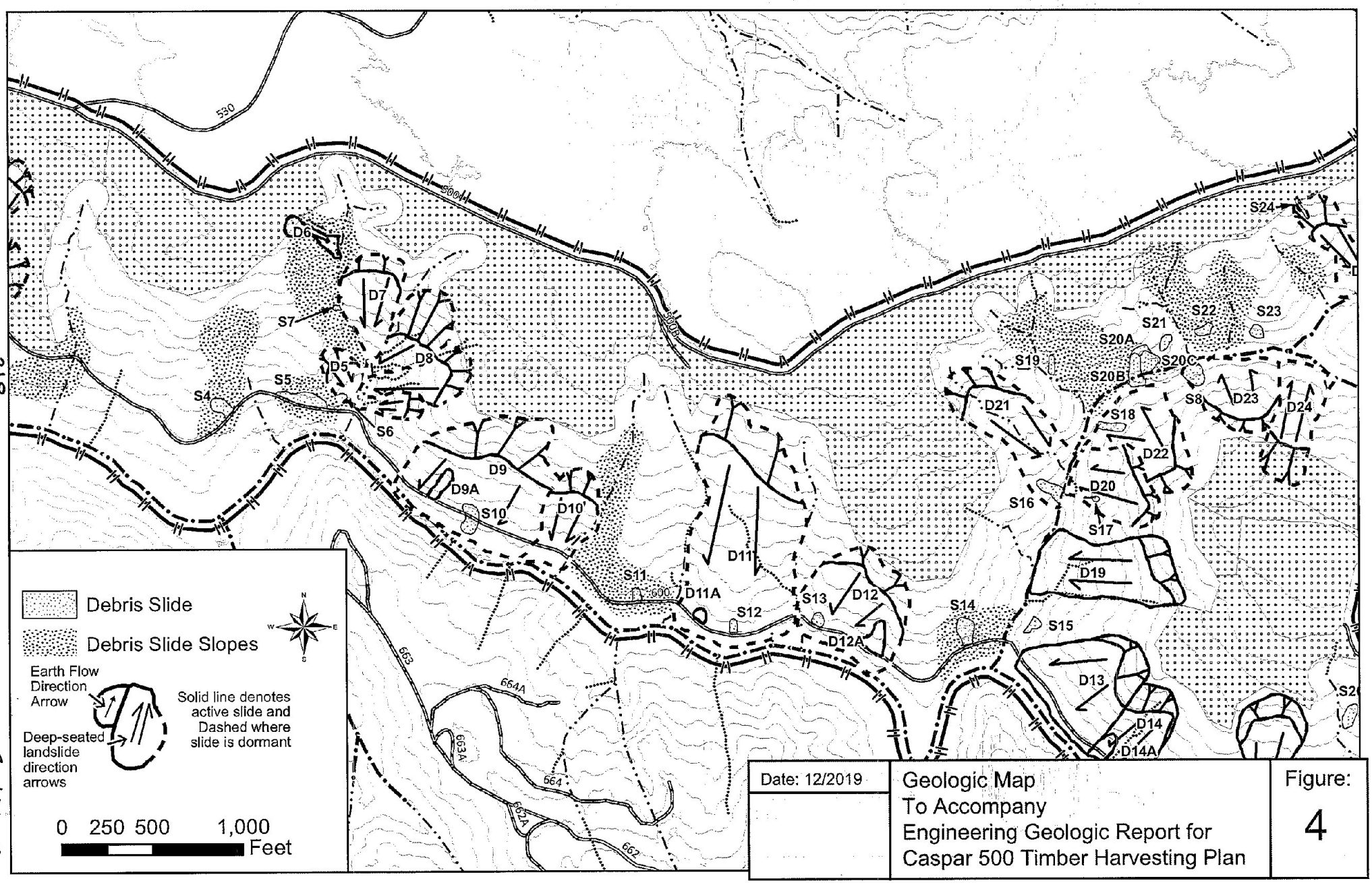
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding

* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST



Debris Slide
Debris Slide Slopes

Earth Flow Direction Arrow
Deep-seated landslide direction arrows

Solid line denotes active slide and Dashed where slide is dormant

0 250 500 1,000 Feet

Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 4

Caspar 500 THP 219 Section V

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

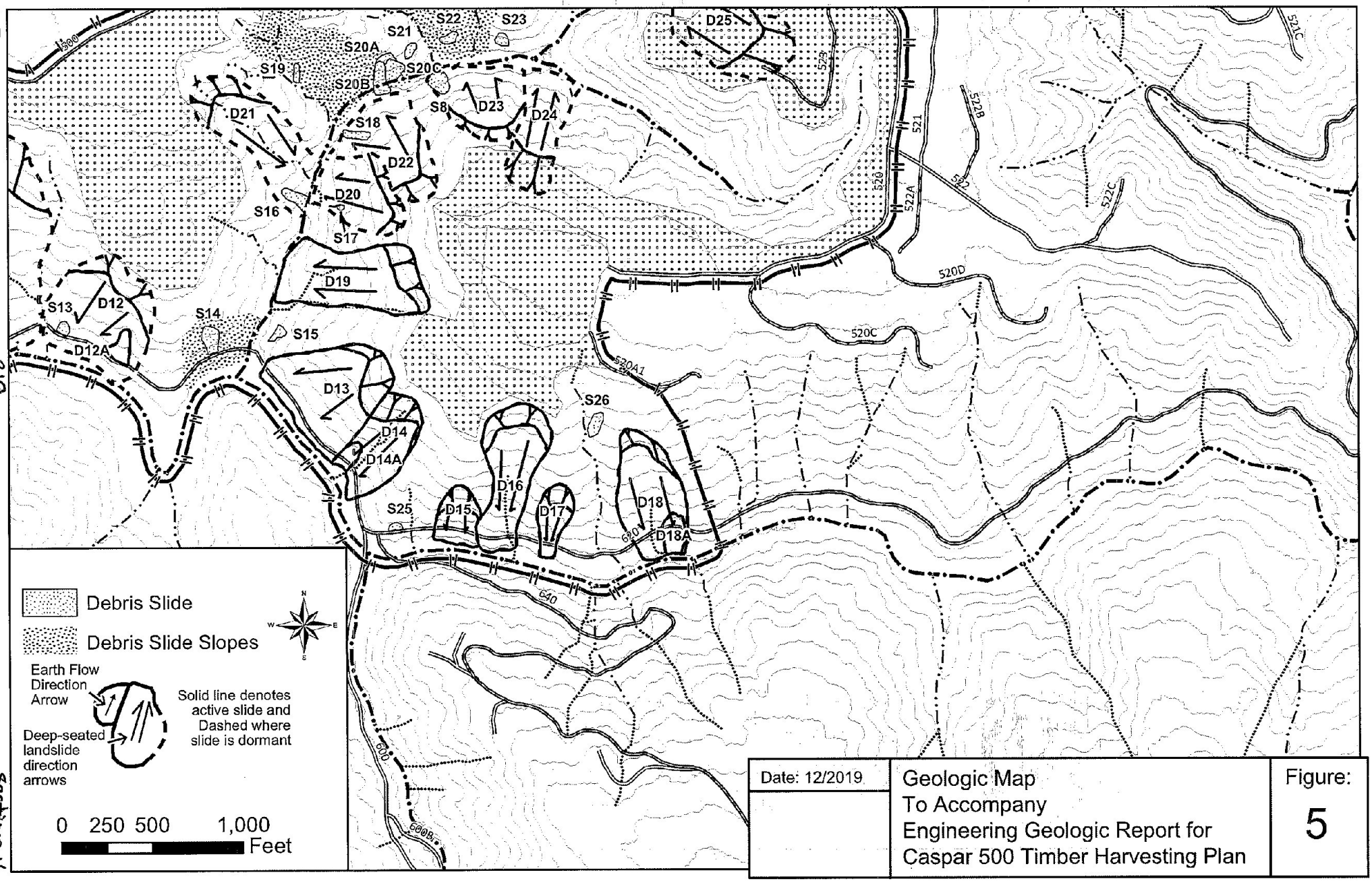
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding

* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 5

Caspar 500 THP

Caspar 500
Geology Map

Basemap from JDSF Data
Date: 12/23/2019 P Rowland

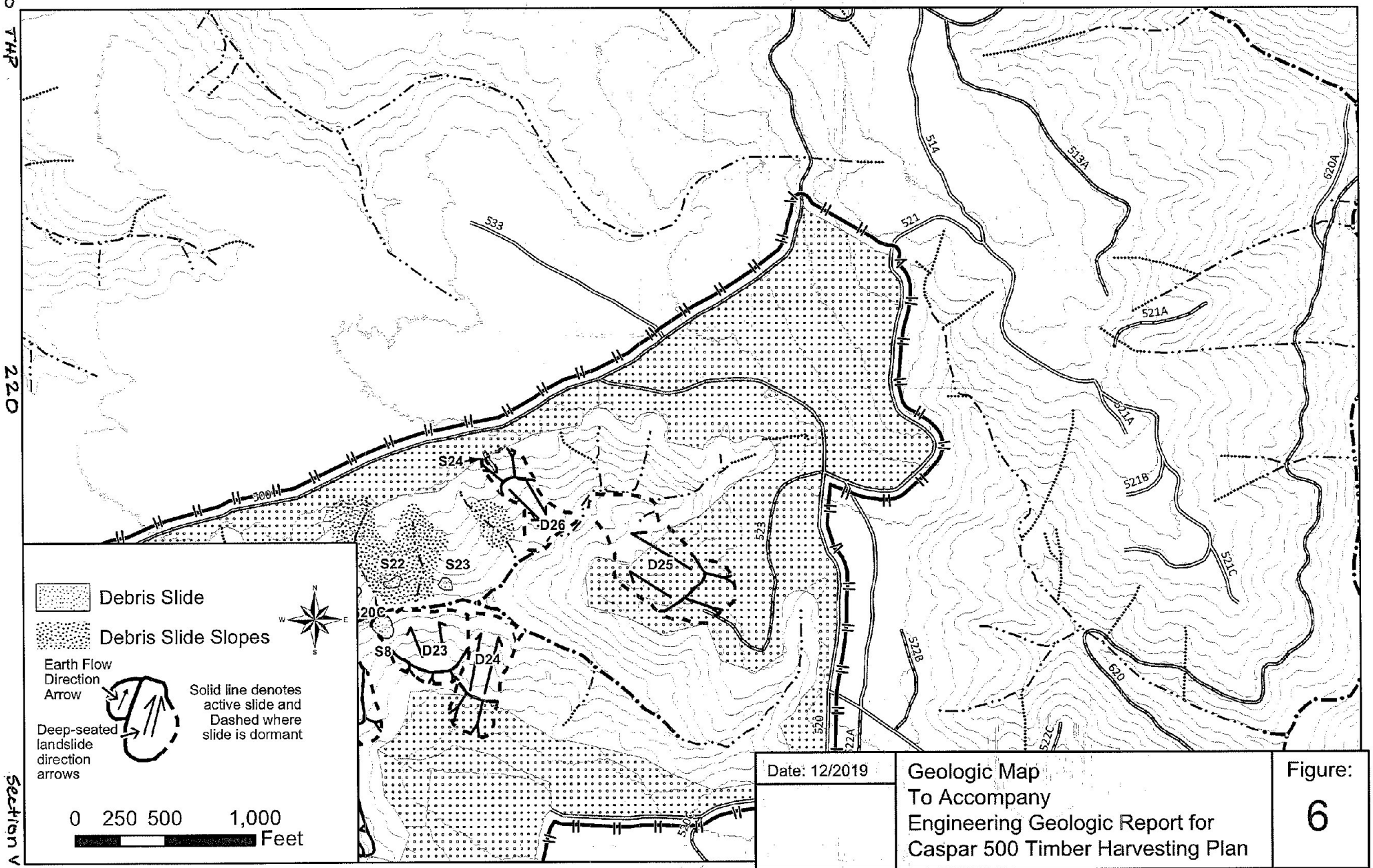
Existing Permanent Road
Existing Seasonal Road
Existing Temporary Road
Contour interval = 40ft

Class I
Class II L
Class II S
Class III

THP Boundary
Tractor Yarding

* All areas not designated as Tractor Yarding will be cable.

JACKSON DEMONSTRATION STATE FOREST



Date: 12/2019	Geologic Map To Accompany Engineering Geologic Report for Caspar 500 Timber Harvesting Plan	Figure: 6

Caspar 500 THP 220 Section V

Caspar 500 Timber Harvest Plan
EROSION CONTROL PLAN

On June 23, 2004, the North Coast Reginal Water Quality Control Board adopted General Waste Discharge Requirements for timber harvest activities on non-federal land (Order #R1-2004-0030). These requirements require technical reports to be developed as a basis for corrective actions undertaken to control sediment, fuel, and other potential waste discharge sources with the project area. These repots include an Erosion Control Plan (this document) and an Inspection Plan. AS per Order #R1-2004-0030, Section III C1, the Inspection Plan will be submitted with the Application/Report of Waste Discharge.

RPF who prepared the Erosion Control Plan: Jason Serna, RPF #2779
Date Erosion Control Plan prepared: December 11, 2019

The Erosion Control Plan must identify all controllable sediment discharge sources in the project area, including those roads used for timber harvest activities owned by or under the control of the landowner. "Controllable sediment discharge sources" is defined as sites or locations, both existing and those created by proposed timber harvest activities, within the project area that meet all of the following conditions:

1. Is discharging or has the potential to discharge sediment to waters of the state in violation of applicable water quality requirements or other provisions of the General Waste Discharge Requirements (WDRs),
2. Was caused or affected by human activity, and
3. To the maximum extent practicable may feasibly and reasonably respond to prevention and minimization management measures.

Between the months of March and December 2019 the proposed timber harvest area, including those roads used for timber harvest activities owned by or under the control of the landowner, was inspected for sites defined as controllable sediment discharge sources. Many of the sites had been previously reviewed on the ground in preparation of the Caspar 500 THP. All watercourses and the harvest unit were walked during the preparation of the THP. Slide areas were found near watercourses but are not discussed here because they do not meet 2 and 3 of the definition for controlled sediment discharge sources. A map is attached showing the project area, roads owned or controlled by the landowner, and controllable sediment discharge sources.

The following table describes the controllable sediment discharge sources observed with a discussion of management measures for prevention or minimization of sediment. Estimated controlled volume was calculated by measuring the width, depth and length of the site in feet. This number was then divided by 27 to convert the cubic yards. This volume was divided in half to correct for the slope of the cutbank. The potential for sediment delivery is defined as "high" is 66%-100% of the volume of the site had potential to access a watercourse, "moderate" if 33-65% of the volume of the site had potentialito access a watercourse, and "low" if 1-32% of the volume of the site had potential to access a watercourse.

General Prevention and Minimization Measures for Controllable Sediment Discharge
In addition to the site specific measures detailed above, the general measures proposed in this project, either as required by another State or Federal regulating agency, or as a matter of Jackson Demonstration State Forest policy, will prevent or minimize future sediment delivery. These measures include, but are not limited to:

Watercourse Protection Zones
All watercourses receive a protection zone commensurate with classification. The protection may range from limiting equipment operations to exclusion of all harvest activities.

Within these zones, measures to stabilize soil erosion, and prevent discharge of sediment into waters in amounts deleterious to aquatic species or the quality and beneficial uses of water, or that threaten to violate applicable water quality requirements, are applied to accordance with the following standards:

- For areas disturbed from May 1 through October 15, treatment will be completed prior to the start of any rain that causes overland flow across or along the disturbed surface.
- For areas disturbed from October 16 through April 30, treatment will be completed prior to any day for which a chance of rain of 30 percent or greater is forecast by the National Weather Service or within 10 days, whichever is earlier.
- The traveled surface of logging roads will be treated to prevent waterborne transport of sediment and concentration of runoff that results from timber operations.
- The treatment for other disturbed areas, including: (A) areas exceeding 100 contiguous square feet where timber operations have exposed bare soil, (B) road cut banks and fills, and (C) any other area of disturbed soil that threatens to discharge sediment into waters in amounts deleterious to the quality and beneficial uses of water, may include, but need not be limited to, mulching, rip-rapping, grass seeding, or chemical soil stabilizers. Where straw, mulch, or slash is used, the minimum coverage will be 90%, and any treated area that has been subject to reuse or has less than 90% surface cover will be treated again prior to the end of timber operations. The RPF may implement alternative treatments that will achieve the same level of erosion control and sediment discharge prevention.
- Where the undisturbed natural ground cover cannot effectively protect beneficial uses of water from timber operations, the ground will be treated by measures including, but not limited to, seeding, mulching, or replanting, in order to retain and improve its natural ability to filter sediment, minimize soil erosion, and stabilize banks of watercourses and lakes.

- Where seeding, is the method chosen for stabilization, an herbaceous cover crop of grasses will be applied to exposed mineral soil at rates of 100 pounds/acre, or as needed to insure full coverage. Seed selected shall be weed free. Straw mulch will be applied to a depth of at least two inches and with 90% surface coverage.

Roads

Practices related to the construction and maintenance of truck roads are key factors in the control of sediment that could be produced from timber harvesting operations. To address this concern, JDSF has focused considerable effort on the proper design and construction of forest roads. The road construction program is geared toward developing mid-slope and ridge top transportation networks that avoid steep slopes and unstable areas. In circumstances where it has been necessary to construct roads on steep slopes, full bench and minimum width roads have been built using end-haul equipment and state of the art construction techniques. JDSF has also emphasized the use of cable yarding to avoid constructing roads near watercourses, thereby reducing the risk of sediment entering streams.

JDSF rod construction and maintenance standards and techniques have been developed in conjunction with the Handbook for Forest, Ranch, & Rural Roads (Weaver, Weppner, and Hagans), and Designing Watercourse Crossings for Passage of 100-year Flood Flows, Wood and Sediment (Cafferata, et.al.).

Maintenance

JDSF compliments proper road design and construction with a strong program to ensure that roads are adequately maintained, particularly regarding drainage structures and erosion control. JDSF implements the following road maintenance program in its operating areas to ensure that potentially significant impacts from erosion processes related to road maintenance are avoided:

- Roads not surfaced for winter use will be gated or otherwise blocked during the winter period to prevent unauthorized vehicular access and damage to drainage structures. Access on these roads during the winter period will be limited to that necessary for timber falling, or hazard abatement burning, road maintenance inspections, reforestation, wildlife surveys, botanical surveys, and/or timber harvest plan layout. Where appropriate, such access will be restricted to the use of low ground pressure all-terrain vehicles.
- Throughout the year, and prior to the onset of the winter period, JDSF forestry staff and road construction foremen will inspect all roads appurtenant to timber harvest plans operated that year. The inspection will assess the effectiveness and quality of all newly installed and existing erosion control structures, and will identify areas needing additional maintenance prior to the winter period. A list will be prepared of those areas identified as needing additional work or repair. Items to be assessed as part of the road inspection program include the following:
    - Waterbars will be inspected to insure proper spacing, depth, interception of the ditch line, and complete diversion of water flow from the road surface.
    - Ditches will be inspected to insure that they are properly functioning and free of debris that could plug the ditch or a culvert and cause diversion of water onto the road surface.
    - The road prism will be inspected to identify areas exhibiting ponding, inadequately breached outside berms, unprotected fresh fill slopes, or other sites that exhibit a potential for cut bank or fill failure.
    - All newly constructed roads will be inspected prior to the winter period to insure that mitigation measures that were included in THPs were properly applied.
- After the pre-winter inspection is completed, a detailed list of maintenance requirements will be given to the JDSF road construction and maintenance supervisors to ensure that all observed problems are corrected prior to the winter period.
- Newly constructed roads will be inspected during the winter period. Special attention will be given to road conditions during and after significant storm events so that problems can be promptly identified and corrected. Repairs will be made at the time of inspection is possible. If a larger crew or heavy equipment is necessary to repair a problem, the location will be noted and the repair will be carried out as soon as possible.

Yarding

JDSF emphasizes the use of low impact yarding system. Cable yarding, which achieves the least amount of ground disturbance, is used to the maximum extent feasible. In order to reduce sediment input, no winter yarding is proposed for this THP.

Log Hauling

Log hauling will only occur on haul roads that have a stable operating surface. Log hauling will be suspended if a significant storm event occurs that would cause saturated soil conditions on haul roads regardless of time of year. Hauling will not be resumed until it is determined that the road surface can withstand truck traffic without causing significant rutting of the road surface, loss of surface material, or generate waterborne sediment in amounts sufficient to cause visible turbidity increase in downstream Class I, II, III or IV waters.

Winter Operations

"Winter period" means the period between November 15 and April 1.

- All waterbreaks will be installed no later than the beginning of the winter period of the current year of timber operations.
- Installation of drainage facilities and structures is required from October 15 to November 15 and April 1 to May 1 on all constructed skid trails and tractor roads prior to sunset if the National Weather Service forecast is a "chance" (30% or more) of rain within the next 24 hours.

- Timber felling, administrative access and maintenance of roads are the possible activities that may occur during the winter period.
- When appropriate, only low ground pressure all terrain vehicles will be used during the winter period when traveling over seasonal or temporary roads to access the harvest area.
- Yarding, log hauling and construction of logging roads, tractor roads, or landings will not take place during the winter period as part of this THP.

Inspection Plan
Inspections conducted prior to the winter period shall be designed to assure that management measures are properly installed and maintained; winter period inspections should be designed to assure and assess management performance and determine if new controllable sediment discharge sources developed; post-winter period inspections should be designed to assure that the management measures have functioned adequately and whether any new controllable sediment discharge sources have developed. Management measures shall be evaluated for adequacy and proper implementation and whether additional management measures are required in accordance with the terms of the order.

Qualified professionals shall conduct all specified inspections of the project site to identify areas causing or contributing to a violation of applicable water quality requirements or other provisions of the general WDRs. The following persons may be conducting the inspections (all reached at 707-964-5674):

Jason Serna
Tori Norville
Erik Wahl
Robert Horvat

The following inspection requirement shall begin once the startup of timber harvest activities begin within Project areas:

At a minimum, conduct inspections each year and throughout the duration of the project while Timber Harvest Activities occur and the project is covered under general WDRs as follows:

1. Before November 15 to assure project areas are secure for the winter.
2. After April 1 and before June 15 to assess the effectiveness of management measures designed to address controllable sediment discharges and to determine if any new controllable sediment discharges sources have developed.
3. Inspection must be conducted each year according to the schedule specified above until a final completion report for each Notice of Timber Operations (NTO)

The only winter operations proposed in this plan are timber falling, potentially pile burning, and maintenance of erosion control structures. Access on non-rocked surfaces will be limited to walking or ATV use, unless dry periods result in dry soil conditions.

The discharger shall submit a summary report to the Executive Officer by June 30 for each year of coverage under the General WDRs or upon termination of coverage. The summary report shall at minimum include:

- The date of each inspection
- The inspector's name
- The location of each inspection
- The title and name of the person submitting the summary report
- A brief narrative description of observed conditions
- A description of any new controllable sediment discharge sources identified during inspections or throughout the course of routine timber harvest activities
- A description of any corrective action taken to prevent and minimize sediment discharge as a result of observations made during the inspections, as well as the date the corrective action was taken
- A description of prevention and minimization measures contained in the ECP implemented up to the date of submission of the report, the date those measures were implemented and an evaluation of the effectiveness of those measures
- A description of where management measures have been ineffective and when the Discharger will implement repairs or design changes to correct management measure failures

A final inspection summary report shall be submitted with the final Certification Notice.

MAP POINT (MP) Identifier	SITE DESCRIPTION (SD) (See Key)	Watercourse CLASS (WC) or feature	EXISTING Culvert Diameter Size (EC)	PROPOSED Culvert Diameter Size (PC)	Geologist used? Yes or No	1600? Yes or No	Potential Sediment Discharge (PSD) in cu. yds. (See Key)	Implementation Priority (IP) (See Key)
	MITIGATION AND/OR MANAGEMENT MEASURES: If needed, provide additional details of site; and/or describe proposed treatment							

*NOTE: Write "NA" or "---" if a box is not applicable to the map point.

ECP:1	SD: CR	WC: Class II	EC: NA	PC: NA	Geo Used? No	1600? Yes	PSD: 5 cu yards	IP: Low
	Description: Undrained minor Class II watercourse with existing trail along inboard of road. The outside 2/3 of road prism below the trail has slumped approximately 4-feet. The watercourse along the trail is composed of 2 channels, both approximately 1-foot wide and 9-10' apart. Each channel has a 5-6' low lying "user built" bridge composed of local wood material. The abutments of these bridges are within or near the stream channel. The bridges have potential to wash out during high flows. Down the road ~ 100 feet from the crossings, there is fill erosion from the road. It appears that in past large storm events, the Class II watercourse breached its banks, flowed down the road and eroded the fill in two separate places. The current Class II watercourse has a substantial bank and these sites do not appear to be eroding currently. However, a large storm event has the potential to repeat past events. **Mitigation/Management Measures**: Replace bridges. Utilizing hand tools, lay back stream banks and install armored rocked rolling dip trail crossings for each channel. Armor dip crossings with 4-12-inch rock. Smaller rock maybe used for trail surface through crossings. Each crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the nearby road surface and away from the watercourse.							

ECP:2	SD: CR	WC: Class II	EC: NA	PC: NA	Geo Used? No	1600? Yes	PSD: 5-10 cu yards	IP: Low
	Description: Undrained minor Class II watercourse with existing trail along inboard of road. The watercourse is composed of a perineal channel 4-5' wide. Another channel lies just east and appears to receive drainage only during very high flows. Both channels have a low lying "user built" bridge composed of local wood material. The abutments of these bridges are within or near the stream channel. The bridges have potential to wash out during high flows. **Mitigation/Management Measures**: Replace bridges. Utilizing hand tools, lay back stream banks and install armored rocked rolling dip trail crossing for each channel. Armor dip crossing with 4-12-inch rock. Smaller rock maybe used for trail surface through crossings. Each crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the traveled road surface and away from the watercourse.							

ECP:3	SD: CR, WCD	WC: Class III	EC: NA	PC: NA, Ford	Geo Used? Yes	1600? Yes	PSD: 5-10 cu yards	IP: Low

Description: Map Point 3 is part of road abandonment activities, while maintaining a trail through a minor Class III crossing. The Class III watercourse has been diverted. Drainage from diversion is traveling down road, delivering sediment to the Class III described in Map Point 4. The treatment described below will correct diverted watercourse.

Mitigation/Management Measures: Design criteria shall be consistent with the diagram at the end of Section II. Install a rocked in-stream crossing excavation with a trail located along the inboard of road. Fill shall be excavated through the crossing, establishing the stream channel to the natural grade and alignment to the extent feasible. Class III centerline flagging indicates the location of original watercourse orientation. Excavate channel approximately 4-feet wide and lay back banks no steeper than a 1:5/1 (horizontal to vertical) ratio. Excavated material shall be stock piled along the road cutbank, each side of the work site and outsloped to allow for immediate drainage.

The excavated in stream crossing shall be rock armored with a combination of ¼ ton rip-rap and 4-12" cobble. Rock armor the excavated stream channel and side slopes with ¼ ton rip-rap. 4-12" cobble will be used through the trail crossing. The trail surface will be capped with smaller rock. Install oversized waterbar above approach to crossing at orange/black stripe flagging.

ECP:4	SD: CR, CF	WC: Class III	EC: 12"	PC: NA, Ford	Geo Used? Yes	1600? Yes	PSD: 5-10 cu yards	IP: Low

Description: Map Point 4 is part of road abandonment activities, while maintaining a trail surface through a minor Class III crossing. The Class III watercourse is drained by a rusted 12-inch culvert. Immediately above the crossing, the fill slope had eroded, likely due to diversion of Class III described in Map Point 3. The eroded fill slope is not delivering sediment, appears stable and is well vegetated with ferns.

Mitigation/Management Measures: Design criteria shall be consistent with the diagram at the end of Section II. Remove culvert and install a rocked in-stream crossing excavation with a trail located along the inboard of road. Fill shall be excavated through the crossing, establishing the stream channel to the natural grade and alignment to the extent feasible. Class III centerline flagging indicates the location of original watercourse orientation. Excavate channel approximately 4-feet wide and lay back banks no steeper than a 1:5/1 (horizontal to vertical) ratio. Avoid placement of spoils within eroded fill slope. Excavated material shall be stock piled along the road cutbank below/south of the work site and outsloped to allow for immediate drainage.

The excavated in stream crossing shall be rock armored with a combination of ¼ ton rip-rap and 4-12" cobble. Rock armor the excavated stream channel and side slopes with ¼ ton rip-rap. 4-12" cobble will be used through the trail crossing. The trail surface will be capped with smaller rock. Install oversized waterbar above approach to crossing at orange/black striped flagging.

ECP:5	SD: CR, B,	WC: Class I	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 10-15 cu yards	IP: Low
	Description: Undrained Class I watercourse crosses road. The watercourse channel is 4-6 foot wide. An existing trail approaches the watercourse, where a 7-foot "user built" bridge spans across the watercourse. The bridge is at the same level of existing road surface with abutments located at edge of road fill, immediately above the active stream channel and within the channel migration zone. The bridge is likely to collapse as the channel continues to headcut upstream. Note: The existing bridge poses a threat to public safety **Mitigation/Management Measures**: Replace "user built" bridge by hand with new bridge. Abutments shall be placed at the same level or higher than the adjacent road surface and outside of the channel migration zone (approximately 10-feet each side of Class I channel centerline). Note: The freeboard distance between the calculated 100-year flow level and bottom of proposed bridge is 1.5 feet.							
ECP:6	SD: CR, B	WC: Class II	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 0-5 cu yards	IP: Low
	Description: Undrained minor Class II watercourse crosses road. The watercourse channel is 1.5-2 feet wide. A "user built" bridge is composed of an approximately 4-foot long redwood slab crossing the watercourse. The bridge is at the same level of existing road surface and the abutments are at or near the edge of the stream channel. **Mitigation/Management Measures**: Replace bridge. Utilizing hand tools, lay back stream banks and install an armored rocked rolling dip trail crossing. Armor dip crossing with 4-12-inch rock. Smaller rock maybe used for trail surface through crossing. The crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the traveled road surface and away from the watercourse.							
ECP:7	SD: RC	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0 cu yards	IP: Low
	Description: A small swale that has a high-water table. There is potential for a soil pipe to be exposed once the road grade is built. **Mitigation/Management Measures:** When building the road, install a critical dip and outslope the road so that water does not pool.							
ECP:8	SD: OK, CDR	WC: NA	EC: NA	PC: 18"	Geo Used? No	1600? Yes	PSD: 0 cu yards	IP: Low
	Description: A Class II watercourse to the west is not hydrologically disconnected and a Class I watercourse is approximately 50 below the road. The inside ditch is moderately vegetated which currently acts as a filter strip.							

	Mitigation/Management Measures: Install a 18" Ditch Relief Culvert with the outlet into the large (38 inch) redwood tree. Rock disturbed part of road after installation of culvert.							
ECP:9	**SD**: C, CD	**WC**: NA	**EC**: 18"	**PC**: 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: A damaged ditch relief culvert. The outlet is crushed. **Mitigation/Management Measures**: Replace with 18" culvert. Rock disturbed portion of road after culvert installation.							
ECP:10	**SD**: OK, O – downspout removal	**WC**: Class III	**EC**: NA	**PC**: NA	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated Class III watercourse crossing from a 2014 THP with a rusted through downspout approximately 50 feet from a Class I watercourse. **Mitigation/Management Measures**: Remove the downspout. Install large rip rap as an energy dissipater in place of the downspout. Key in the rip rap so that it is stable.							
ECP:11	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 0 cu yards	**IP:** Low
	Description: A Class I watercourse (Blue Gum Creek) to the north is hydrologically connected to the road. The road is approximately 60 feet above a second Class I watercourse (Caspar Creek). The ditch is heavily vegetated and has currently been acting as a filter strip. **Mitigation/Management Measures**: Install a 18" ditch relief culvert with the outlet aimed at the clump of redwoods below the road. Rock disturbed portion of road after culvert installation.							
ECP:12	**SD**: OK, FP	**WC**: Class II	**EC**: NA	**PC**: NA	**Geo Used?** No	**1600?** Yes	**PSD:** 1 cu yards	**IP:** Low
	Description: An updated Class II watercourse crossing from a 2014 THP with a small amount of perched fill above the culvert. Rip rap was installed as an energy dissipater during time of updated culvert, however some settling has occurred and more rip rap is needed. **Mitigation/Management Measures**: Pull the perched fill back and move to a hydrologically disconnected location designated by the RPF or his designee. Add in additional rip rap for the energy dissipater. Hay or mulch any exposed soil prior to the wet weather period.							
ECP:13	**SD**: OK, O – downspout removal	**WC**: NA	**EC**: NA	**PC**: NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through.							

	Mitigation/Management Measures: Remove downspout and replace with large woody debris or rip rap.							
ECP:14	**SD**: OK, O – downspout removal	**WC**: NA	**EC**: NA	**PC**: NA	**Geo Used**? No	**1600**? No	**PSD**: 0 cu yards	**IP**: Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures**: Remove downspout and replace with large woody debris or rip rap.							
ECP:15	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used**? No	**1600**? Yes	**PSD**: 0 cu yards	**IP**: Low
	Description: A Class II watercourse is hydrologically connected to the road. The inside ditch is vegetated and currently acting as a filter strip. **Mitigation/Management Measures:** Install a 18" ditch relief culvert. Install large woody debris or rip rap as an energy dissipater. Rock the disturbed portion of road.							
ECP:16	**SD**: OK, O – downspout removal	**WC**: NA	**EC**: NA	**PC**: NA	**Geo Used**? No	**1600**? No	**PSD**: 0 cu yards	**IP**: Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures**: Remove downspout and replace with large woody debris or rip rap.							
ECP:17	**SD**: OK, O – downspout removal	**WC**: Class III	**EC**: NA	**PC**: NA	**Geo Used**? No	**1600**? No	**PSD**: 10 cu yards	**IP**: Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures**: Remove downspout and replace with large woody debris or rip rap.							

ECP:18	SD: WCD	WC: Class II	EC: NA	PC: 24"	Geo Used? No	1600? Yes	PSD: 5-10 cu yards	IP: Low
	Description: An un-drained minor Class II watercourse is diverted by the inside ditch of Road 600. Drainage travels within the inside ditch to the culvert just down the road. The natural drainage pattern below the road was observed with the centerline identified with Class II flagging. **Mitigation/Management Measures:** Install a new 24" culvert to the natural stream gradient and align with Class II flagging. Excavate inlet slightly. Install large woody debris or rip rap at outlet. Rock disturbed portion of road after culvert installation.							
ECP:19	**SD:** OK, C – downspout removal	**WC:** NA	**EC:** NA	**PC:** NA	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: Updated ditch relief culvert from a 2014 THP with a downspout that is rusted through. **Mitigation/Management Measures:** Remove downspout and replace with large woody debris or rip rap.							
ECP:20	**SD:** WCD	**WC:** Class II	**EC:** NA	**PC:** 24"	**Geo Used?** No	**1600?** Yes	**PSD:** 5-10 cu yards	**IP:** Low
	Description: An un-drained minor Class II watercourse is diverted by the inside ditch of Road 600. Drainage travels within the inside ditch to the culvert just down the road. The natural drainage pattern below the road was observed with the centerline identified with Class II flagging. **Mitigation/Management Measures:** Install a new 24" culvert to the natural stream gradient and align with Class II flagging. Excavate inlet slightly. Install large woody debris or rip rap at outlet. Rock disturbed portion of road after culvert installation.							
ECP:21	**SD:** C, CDR	**WC:** NA	**EC:** NA	**PC:** 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A Class II watercourse is hydrologically connected to the road. The inside ditch is vegetated and currently acting as a filter strip. **Mitigation/Management Measures:** Install a 18" ditch relief culvert. Install large woody debris or rip rap as an energy dissipater. Rock the disturbed portion of road.							
ECP:22	**SD:** C, CDR	**WC:** NA	**EC:** NA	**PC:** 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: The top of a Class III watercourse is at the outlet of a ditch relief culvert on Road 500 to the west. To reduce the amount of water entering the Class III, a second ditch relief culvert is needed. **Mitigation/Management Measures:** Install a 18" ditch relief culvert. Rock the disturbed portion of the road.							

ECP:23	**SD**: C, CDR	**WC**: NA	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A ditch relief culvert was installed in 2019 and the outlet empties within 40 feet of the top of a Class III. There is a redwood stump that is used as an energy dissipater/ block to direct access to the Class III. **Mitigation/Management Measures**: Install a 18" ditch relief culvert. Rock the disturbed portion of the road.							
ECP:24	**SD**: C, CP	**WC**: NA	**EC**: 18"	**PC**: 18"	**Geo Used?** No	**1600?** No	**PSD:** 0 cu yards	**IP:** Low
	Description: A ditch relief culvert with a plugged inlet. **Mitigation/Management Measures**: Replace ditch relieve culvert with an 18" culvert in same location.							
ECP:25	**SD**: CR	**WC**: Class III	**EC**: NA	**PC**: 18"	**Geo Used?** No	**1600?** Yes	**PSD:** 2-3 cu yards	**IP:** Low
	Description: A Class III crossing that is pulled **Mitigation/Management Measures:** Install temporary crossing with a 18" culvert. Pull crossing by October 15th of the year used in operations. Lay back fill and mulch or slash pack.							
ECP:26	**SD**: C, CR, CRT	**WC**: Class II	**EC**: 18"	**PC**: NA	**Geo Used?** No	**1600?** Yes	**PSD:** 3-5 cu yards	**IP:** Low
	Description: A Class II crossing with a 18" culvert. **Mitigation/Management Measures**: Use as is. Pull crossing by October 15th of the 1st year used in operations. Lay back fill and mulch or slash pack.							

ECP:27	SD: C, B, WCD	WC: Class II	EC: B	PC: B	Geo Used? No	1600? Yes	PSD: 5 cu yards	IP: Low

Description: Undrained minor Class II is diverted where the channel intersects inboard of road. Drainage travels along inboard of road and into the Class II watercourse described in Map Point 1. The stream channel is 1-1.5 feet wide. A low lying "user built" bridge spans across the diverted channel, just above Map Point 1. The treatment below includes installing a rocked rolling dip trail crossing where the corrected channel intersects the existing trail.

Mitigation/Management Measures: Utilizing hand tools, correct diversion by installing a channel across road into the natural drainage area. Create a berm at least 1-foot high on the downhill side of excavated channel. Place outfall of channel in line with Class II centerline/message flagging.

Where the existing trail crosses corrected channel, lay back stream banks and install an armored rocked rolling dip trail crossing. Armor dip crossing with 4-12 inch rock. Smaller rock maybe used for trail surface through crossing. The crossing shall be wide and deep enough to pass 100-year flows. Spoils removed with hand tools shall be deposited in a stable location within the traveled road surface and away from the watercourse.

ECP:28	SD: RC	WC: NA	EC: NA	PC: NA	Geo Used? Yes	1600? No	PSD: NA	IP: Low

Description: Currently a proposed road that is above an unstable area.

Mitigation/Management Measures: The geologist recommended no fill is put below the tractor/ cable break (designated by red and white striped falling) and that after completion of road use, waterbar spacing for extreme erosion hazard rating be utilized.

ECP:29	SD: RA	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0-5 cu yards	IP: Low

Description: An existing road with a slope of 0-3% grade leading to an existing WLPZ landing. 985 feet of road will be abandoned.

Mitigation/Management Measures: Abandon 985 feet of the existing Road 668A. Install oversized waterbars to ensure drainage. The entrance shall be blocked to vehicle traffic using methods including but not limited to slash packing and logs.

ECP: 30	SD: C, CP	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0-5 cu yards	IP: Low

Description: An existing Ditch Relief Culvert is completely buried on the inlet side. Currently not functioning.

Mitigation/Management Measures: Pull culvert and layback fill. Rock the channel area.

ECP: 31	SD: C, CP	WC: NA	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 0-5 cu yards	IP: Low
	Description: A minor Class II watercourse that starts from a skid trail above JDSF Road 669. The Class II watercourse is undrained and eroding away the fill of the road prism. **Mitigation/Management Measures:** Due to the unstable areas, access is not feasible and therefore the Class II watercourse will remain as is and no mitigation measures are proposed.							
ECP: 32	SD: CR	WC: Class III	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 3-5 cu yards	IP: Low
	Description: A minor Class III watercourse that is undrained is eroding away the fill on the prism of JDSF Road 669. **Mitigation/Management Measures:** Due to the unstable areas, access is not feasible and therefore the Class III watercourse will remain as is and no mitigation measures are proposed.							
ECP: 33	SD: CR	WC: Class I	EC: NA	PC: NA	Geo Used? No	1600? No	PSD: 5-10 cu yards	IP: Low
	Description: A restorable Class I watercourse that is undrained on JDSF Road 669 **Mitigation/Management Measures:** Due to the unstable areas, access is not feasible and therefore the Class I watercourse will remain as is and no mitigation measures are proposed.							

INSTRUCTIONS FOR FILLING OUT MAP REFERENCE TABLE FOR PLANNED WORK AND MITIGATION

The Map Reference/Work Order Table is designed to be used in Timber Harvesting Plans (THPs), Nonindustrial Timber Management Plans (NTMPs), and Notices of Timber Operations (NTOs). It has been designed to eliminate the need to repeatedly provide the same information separately for THPs/NTMPs, Erosion Control Plans, and 1600 applications. Instead, the table can be referenced under appropriate THP/NTMP item numbers, RWQCB Erosion Control Plans (ECP)'s, and/or 1600 permit applications included in the THP/NTMP.

All map points (e.g. unstable areas, exception and in lieu points, watercourse crossings, mitigation sites, etc.) can be identified in the table. Acronyms from the "Map Key" (see below) can be utilized for the "Site Description" and "Implementation Priority" found on the table. It is suggested that you include the Map Key, Map Reference Table, and associated map together in Section II of the Plan.

To add additional rows in the Map Reference Table: copy the full row which is established for each map point (composed of two lines); and add to the bottom of your table.

If you are submitting an NTO, please update your Map Reference Table to reflect current information. If a map point has been addressed under a previous NTO, indicate that (e.g. "Addressed under previous NTO") and include any additional maintenance information, if applicable, for that map point. If you add new map points to the NTO table, they must have been amended to the NTMP first, UNLESS they are maintenance points only.

MAP POINT / WORK ORDER TABLE KEY			
SITE DESCRIPTION			
OK	Functional Site	**CROSSING TYPES**	
CSDS	Controllable Sediment Discharge Site	**B**	Bridge
UA	Unstable Area	**CR**	Crossing site
O	Other descriptions than below (describe under "Measures" on table)	**CRF**	Crossing failure
		CRP	Crossing- EXISTING permanent
ROAD / SKID TRAILS		**CRT**	Crossing- EXISTING temporary
CRN	Critical dip needed	**C**	Culvert (also see below)
CUTF	Cutbank failure	**F**	Ford
FF	Fill failure	**HCR**	Humboldt crossing
FP	Fill perched	**LSB**	Log stringer bridge
G	Gully	**RRD**	Rocked Rolling Dip
L	Landing	**SCR**	Spitler crossing
IDE	inside ditch eroding		
RA	Road abandonment	**CULVERT CONDITIONS**	
RC	Road construction	**CAM**	Culvert attachments missing (e.g. trash racks, downspouts, etc.)
RR	Road Reconstruction	**CD**	Damaged inlet or outlet
RD	Rolling dip	**CDR**	Ditch relief needed
SK	Skid trail	**CF**	Failed / failing
WB	Waterbar	**CFB**	Fish barrier
		CFD	French Drain
WLPZ and WATERCOURSES		**CNA**	Culvert not aligned
AP	Alternative practice	**CNG**	Culvert not installed to grade
FB	Fish barrier	**CE**	Outlet erosion
HE	Habitat enhancement	**CS**	Outlet shotgunned
IL	In lieu practice	**CP**	Culvert plugged
WD	Water drafting	**CU**	Culver undersized
WCD	Watercourse diversion		
WDP	Woody debris project		
IMPLEMENTATION PRIORITY (IP)			
HIGH	Mitigation applied in: 1st year after Harvest Document approval.		
MED.	Mitigation applied concurrent with operations affecting site.		
LOW	Mitigations applied prior to Harvest Document completion.		
POTENTIAL SEDIMENT DISCHARGE			
If located in the Region of the North Coast Regional Water Quality Control Board, provide the following information in the associated table for each Controllable Sediment Discharge Source (CSDS) map point			
• Potential Sediment Discharge (PSD): expressed in total cubic yards			

Caspar 500

Caspar 500 THP

Erosion Control Plan Map

Sections 3, 5, 8, 9, & 10 T17N, R17W MDB&M
USGS 7.5 min Quadrangle:
Mendocino and Mathison Peak

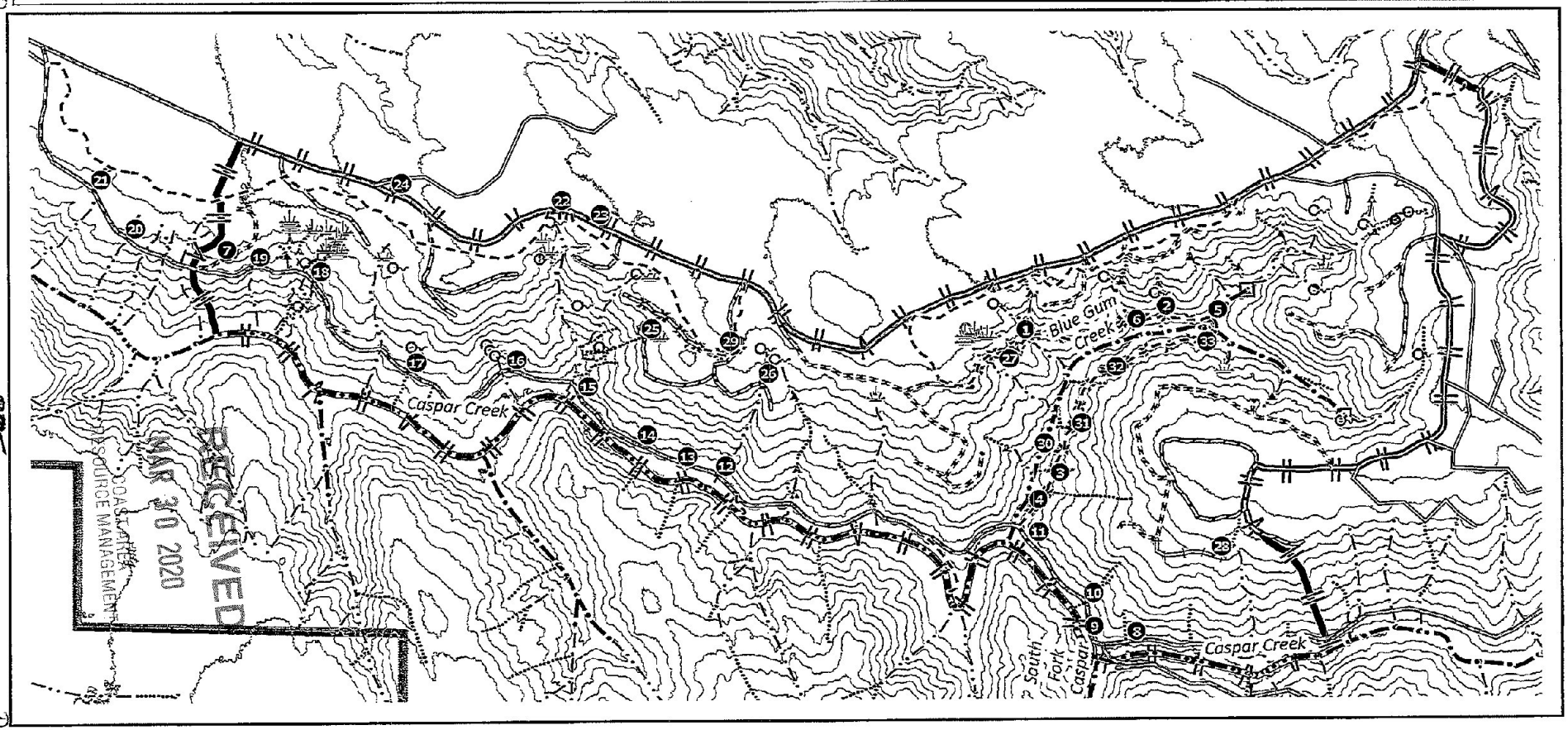
Contour Interval = 40'

1 inch = 1,250 feet

0 700 1,400 2,800 4,200 Feet

JACKSON DEMONSTRATION STATE FOREST

3/30/2020 TN



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RESOURCE MANAGEMENT

235

THP Boundary

JDSF Property Line

Trail Network

Erosion Control Point

Road Classification
(permanent and seasonal roads considered "public")

Existing Permanent Road

Existing Seasonal Road

Existing Temporary Road

Proposed Temporary Road

Proposed Road Decommission

Reconstructed Road

Watercourse Classification

Class I
(salmonid spawning & rearing habitat)

Class II-S

Class III

Spring

Wet Area

Pond

Class I/Class II Stream Change

Stream Class Change

PART OF PLAN

Runway 3/30/2020 Section II

CASPAR 500 THP

Section V

Additional Information Regarding Northern Spotted Owl

Northern Spotted Owl Package

1. General Information
2. NSO Calling Stations Within 0.7 miles of the THP Boundary
3. NSO Activity Centers Within 0.7 miles of the THP Boundary (MEN 659 and MEN 585)
4. NSO Habitat (Pre-harvest) Within 0.7 miles of the THP Boundary
5. Aerial photo of the THP area and out 0.7 miles
6. MEN 659 – NSO habitat: Pre- and Post-harvest maps and acreage table
7. MEN 659 – 2016 NAIP Aerial photo
8. MEN 585 – NSO habitat: Pre- and Post-harvest maps and acreage table
9. MEN 585 – 2016 NAIP Aerial photo
10. Recent CDFW Spotted Owl database printout (ie CNDDB NSO database) Reports 1 and 2 (multiple pages)

Northern Spotted Owl – General Information

DEFINITIONS

The following definitions are taken from the USFWS Attachment A (March 15, 2011) Take Avoidance Analysis and Guidance for California Coast Forest District.

Activity Center (AC): Area of concentrated activity of either a pair of NSO or a single territorial NSO, represented by a mapped location (e.g., usually a nest tree) that occurs within, but not necessarily in the exact center of, the "Core Area."

Core Area: 100 acres of the 200 acres of Nesting/Roosting habitat retained within a 0.7 mile radius contiguous with the Activity Center. If 100 acres of contiguous Nesting/Roosting is not available, then the highest quality habitat available shall be included.

Foraging Habitat: Habitat that contains ≥40% canopy cover of trees that are ≥11" DBH (diameter at breast height), and have a basal area ≥75 square feet per acre of trees ≥11" DBH. Trees may be conifer or hardwood.

Nesting/Roosting Habitat: Forested habitat that supports successful nesting and associated roosting behavior by NSO. Habitat with ≥60% canopy cover of trees that are ≥11" DBH, and have a basal area ≥100 square feet per acre of trees ≥11" DBH. Trees may be conifer or hardwood.

Nesting Roosting Polygon: All Nesting/Roosting habitat which is contiguous with an NSO Activity Center.

NSO Breeding Season: February 1 to July 31 within the coast redwood ecotype found in the Coast District of CA.

NSO Home Range: A 0.7 mile radius circle centered on the AC for the coast redwood ecotype found in the Coast District.

Suitable or Functional Habitat: Habitat that meets either Nesting/Roosting or Foraging definitions, or a combination of Nesting/Roosting and Foraging habitat.

Survey Area: All Suitable/Functional NSO habitat within 0.7 mile from the project boundaries; or for disturbance only activities, a 0.25 mile area outside the edge of the project should be surveyed.

Survey-Start Date: In the coast redwood ecotype, Coast District, NSO Surveys should start on or after March 1.

Survey-Last Survey Dates: For years 1 and 2 of the 2012 NSO Survey Protocol, the last survey visit should occur on or after May 15. For "Activity Center Searches" and Spot Check Surveys no fixed date is set, but the 2012 NSO Survey Protocols should be followed.

Activity Center (AC) Habitat Protection – Core Area

- A 100-acre Core Area polygon must be identified that contains the highest quality habitat (typically Nesting/Roosting (N/R)) located contiguous with the AC.
- When an AC is closer than 500 feet to the outside edge of the N/R polygon, the acres of non-N/R habitat within 500 feet of the AC are included, but should be augmented with additional N/R habitat elsewhere in the Core Area polygon to make a total of 100 acres of the highest quality habitat.
- When the AC is closer than 1,000 feet to, but not within 500 feet of, the outside edge of the N/R polygon, the protected Core Area should extend to that most distant edge of the N/R habitat but shall not be less than a 500-foot radius.
- Operations conducted outside the Core Area, but within 1,000 feet of an AC should retain the functionality of any NSO habitat present pre-harvest within this area, i.e., operations do not downgrade habitat.
- If a contiguous N/R polygon is 200 acres or greater, and operations in the N/R polygon outside the Core Area have retained functional N/R habitat (i.e., no more than 33% of the basal area removed retaining a minimum of 100 sq. ft. of basal area per acre of trees greater than 11" DBH), then the 100-acre core area can be redrawn in subsequent entries. However, the 500-foot radius should remain unchanged, and the redrawn core area should not include any acres harvested within the previous 5 years.

THP/NSO Calling Data and Activity Center Survey Status

The THP project area has not been surveyed for Northern Spotted Owls. Calling will begin in 2020. There are two known NSO Activity Centers within 0.7 miles of the THP boundary; MEN 659 and MEN 585.

Activity Center(s) Within 0.7 miles of the THP Boundary: Historic and Recent Detections

MEN 585 – located at the 2004 nest location – approximately 0.5 miles from the THP boundary
2019 Status – not surveyed
This site center was first established in 1991 as MEN 091. It was called MEN 091 until 1993 when MEN 091 was moved upstream. Then in 2004 owls were detected here again and a possible nest was found. A pair was found in 2005, 2006 and 2007 nearby and upstream but no evidence of nesting was detected. During 2008, 2009, 2012, 2013, 2014, 2015, 2016, 2017, and 2018, no owls have been detected. The Core Area encompasses the nest location from 2004, the CNDDB AC, and several years of pair locations. Barred owls began to be heard in the Caspar Creek drainages in 2005 and have probably taken over the whole Caspar watershed.

MEN 659– just outside JDSF – approximately 0.3 miles from the THP boundary
2019 Status – not surveyed
According to the CNDDB database (see page 268-269 of this THP) this Activity Center was established during NSO calling for an NTMP adjacent to JDSF in 2016. The AC was created at the location where an adult female NSO and a sub-adult female were found on June 24, 2016. No nest was found. Previously, in 2013, JDSF had picked up a single female detection in the Caspar Creek drainage, but no owls were heard or found during daytime follow-ups, and none were detected in 2014.

Support Documentation for Exceptions Requested to the March 15, 2011 Attachment A – Coast.
THP Review under 14 CCR §919.9(e) – Northern Spotted Owl
Take Avoidance Using Scenario 4 and March 15, 2011 Attachment A – Coast.

ROAD USE
"Road use" is defined as the use of heavy equipment (ex: logging trucks, bulldozers, backhoes, loaders).
Proposed exceptions to allow road use on the following existing permanent roads during the breeding season are as follows: **Road 500.**

Road use by heavy equipment on existing permanent roads shall likely avoid take of NSO due to the following:

1. Use of existing permanent haul roads was considered likely to not take NSO by the U.S. Fish and Wildlife Service (FWS) during several years of recent technical assistance (TA) requests by JDSF and many other landowners during the last decade. The FWS determined that use of existing permanent haul roads for THP operations would not likely result in take of NSO for JDSF's 2010 "Spotted Owl Management Plan" (TA #8-14-2010-TA-3734). (This SOMP is not currently being used.) Additional examples on JDSF include technical assistance received for THP #1-09-033 MEN (TA #AFWO-11B0115-11TA0120) (MEN 91).

2. Of the twenty (20) currently known NSO historical Activity Centers on JDSF, long-term owl monitoring (over 20 years for >50% of the current ACs) has demonstrated that owls that establish Activity Centers within 0.25 miles of permanent roads continue to occupy those Activity Centers at rates similar to other locations.

3. The current guideline in the March 15, 2011 Attachment A prohibiting road use within 0.25 miles of an NSO Activity Center apparently utilizes the FWS 2006 document "Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California." The guideline has chosen to impose the largest estimated disturbance distance (0.25 miles) to apply to THP projects. This requires at least a 30dB difference between pre-project, and project-generated noise levels. Previous on-site noise monitoring by a 2008 Campbell Timberland field study has shown that often this is not the case; the differences being only 10 dB in their field situation. On JDSF, the permanent roads listed above have year-round traffic noise (e.g. pre-project noise levels) that includes use by cars, pickups, buses, commercial truck traffic, CAL FIRE inmate crew buses, use by heavy equipment to adjacent properties, and off-road recreational vehicle use. This year-round use raises the ambient noise level above that of a natural landscape, such that a 30dB difference would not occur.

PART OF PLAN
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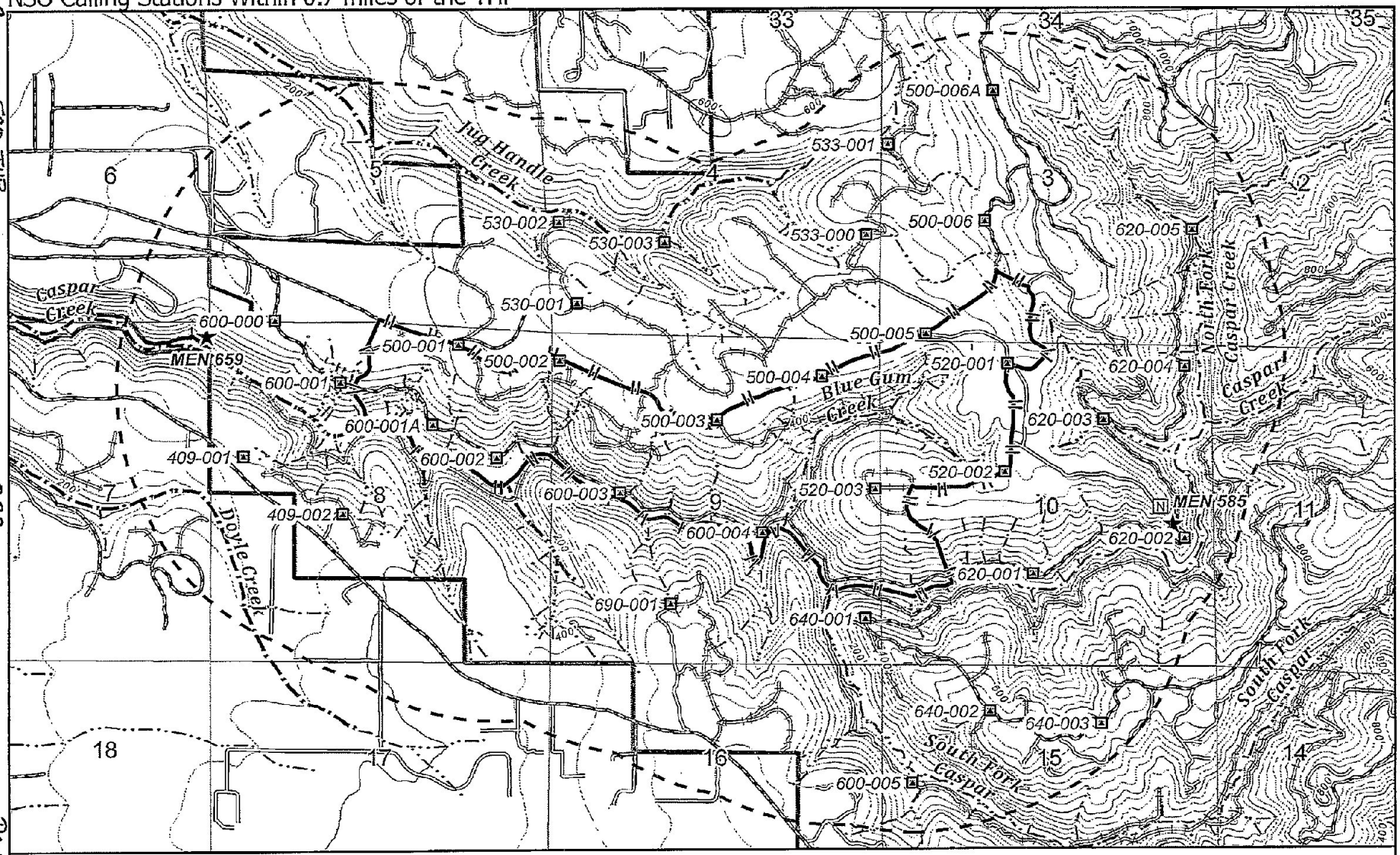
COAST AREA
RESOURCE MANAGEMENT

Caspar 500 THP

2.39

Revised 4/2/19 Section 11

NSO Calling Stations Within 0.7 miles of the THP



THP Name:
Caspar 500
Sections 3, 5, 8, 9, 10
T17N R17W
USGS 7.5 min Quandrangle:
Mendocino and Mathison Peak

NSO Calling Station
THP Boundary
0.7 mile THP buffer
JDSF Property Line

0 0.25 0.5 0.75 1 1.25 Miles

1 inch = 0.42 miles
1:26,308

JACKSON DEMONSTRATION STATE FOREST

4-2-2020 TF

PART OF PLAN

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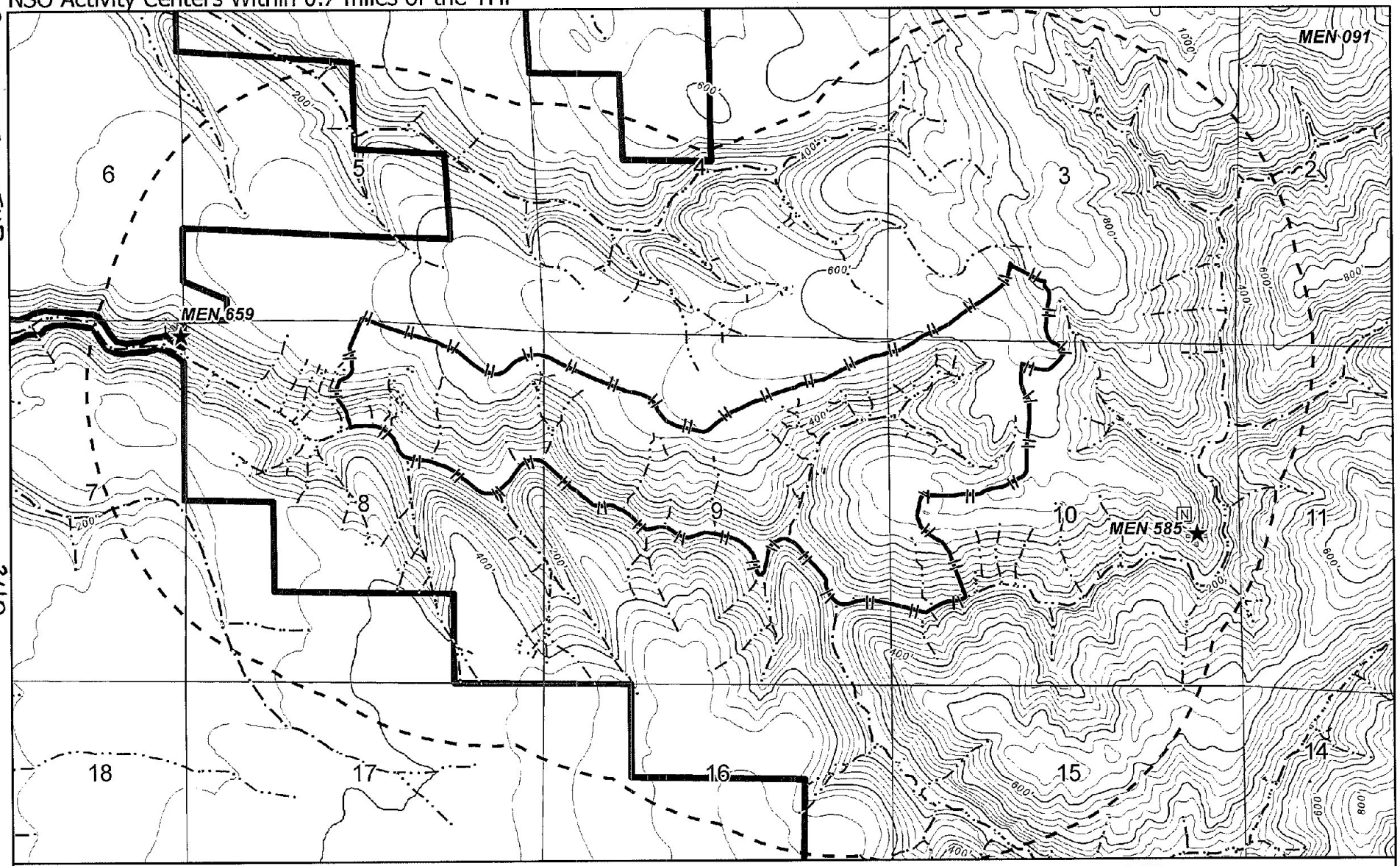
COAST AREA
RESOURCE MANAGEMENT

NSO Activity Centers Within 0.7 miles of the THP

Caspar 500 THP

2240

Section V



THP Name:
Caspar 500
Sections 3, 5, 8, 9, 10
T17N R17W
USGS 7.5 min Quandrangle:
Mendocino and Mathison Peak

THP Boundary

0.7 mile THP buffer

JDSF Property Line

★ Activity Center

[N] Historic Nest

0 0.25 0.5 0.75 1 1.25 Miles

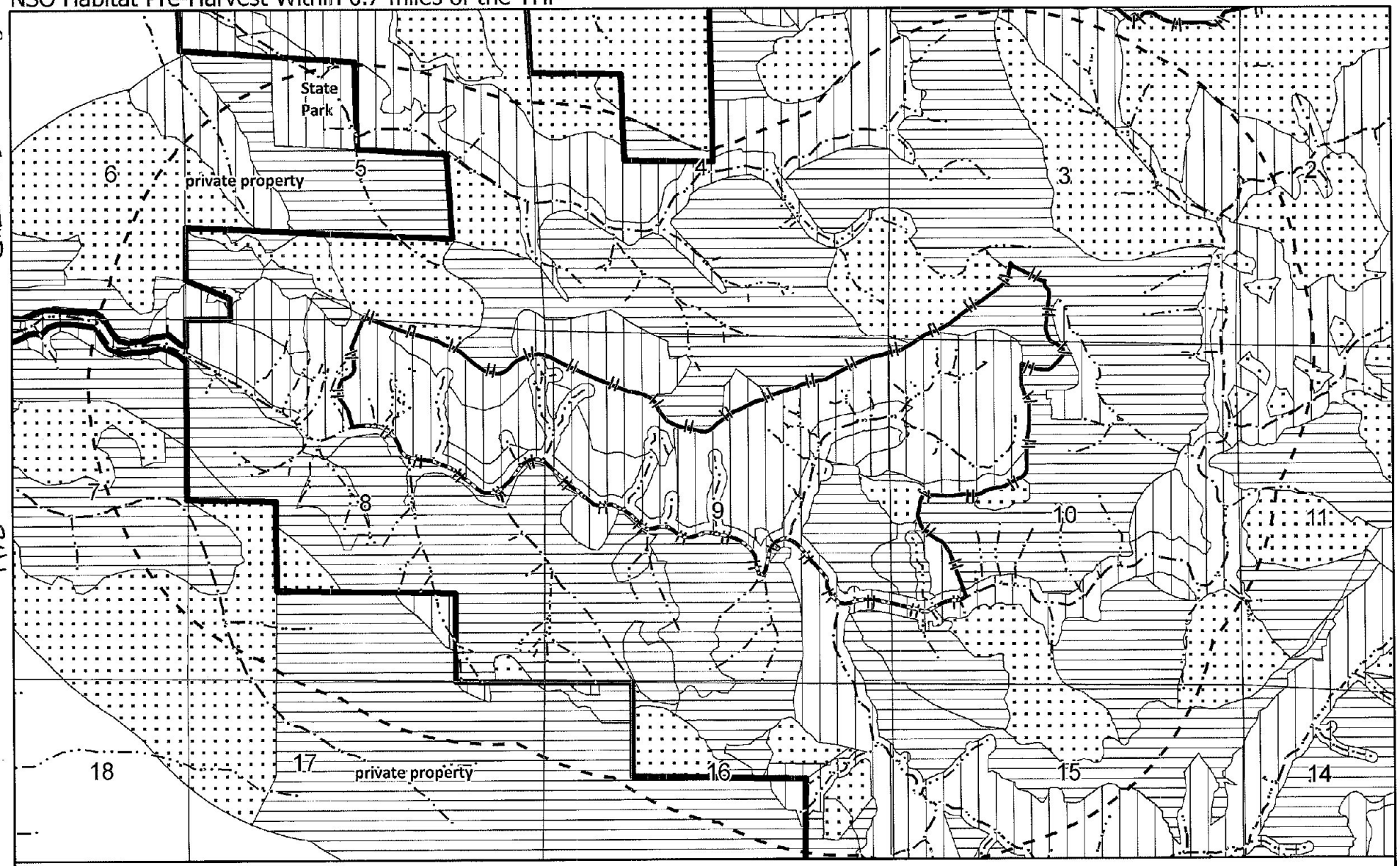
1 inch = 0.39 miles

1:25,000

JACKSON DEMONSTRATION STATE FOREST

1-28-2020 TF

NSO Habitat Pre-Harvest Within 0.7 miles of the THP



THP Name:
Caspar 500
Sections 3, 5, 8, 9, 10
T17N R17W
USGS 7.5 min Quandrangle:
Mendocino and Mathison Peak

THP Boundary
0.7 mi THP buffer
JDSF Property Line

0 0.25 0.5 0.75 1 1.25 Miles
1 inch = 0.39 miles
1:25,000

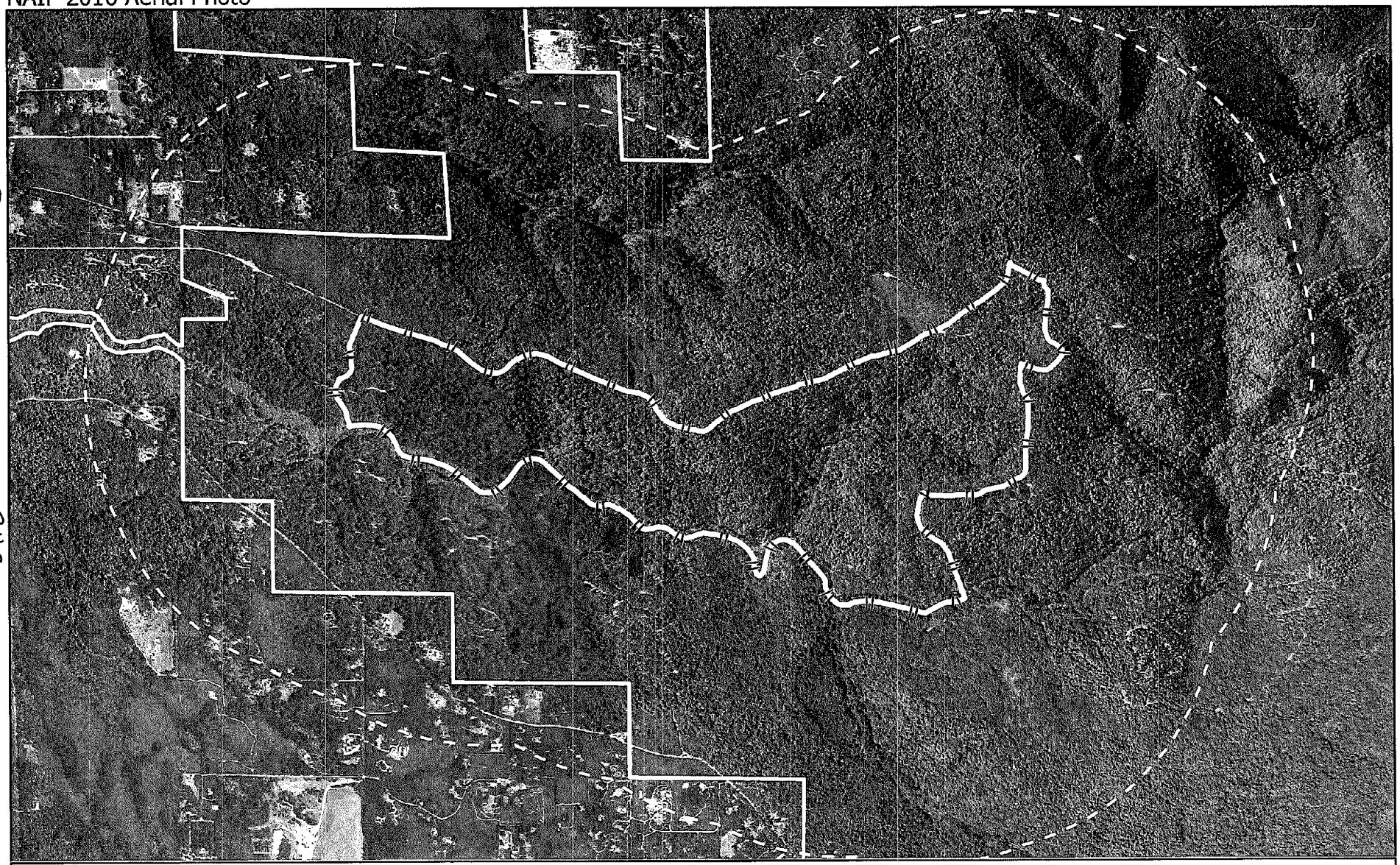
NSO Habitat Type
Foraging
Nest/Roost
Unsuitable

CAL FIRE
JACKSON DEMONSTRATION STATE FOREST

N W E S

1-28-2020 TF

NAIP 2016 Aerial Photo



Caspar 500 THP

242

Section V

THP Name:
Caspar 500

Sections 3, 5, 8, 9, 10
T17N R17W
USGS 7.5 min Quandrangle:
Mendocino and Mathison Peak

= THP Boundary

0.7 mile THP buffer

JDSF Property Line

0 0.25 0.5 0.75 1 1.25 Miles

1 inch = 0.39 miles

1:25,000

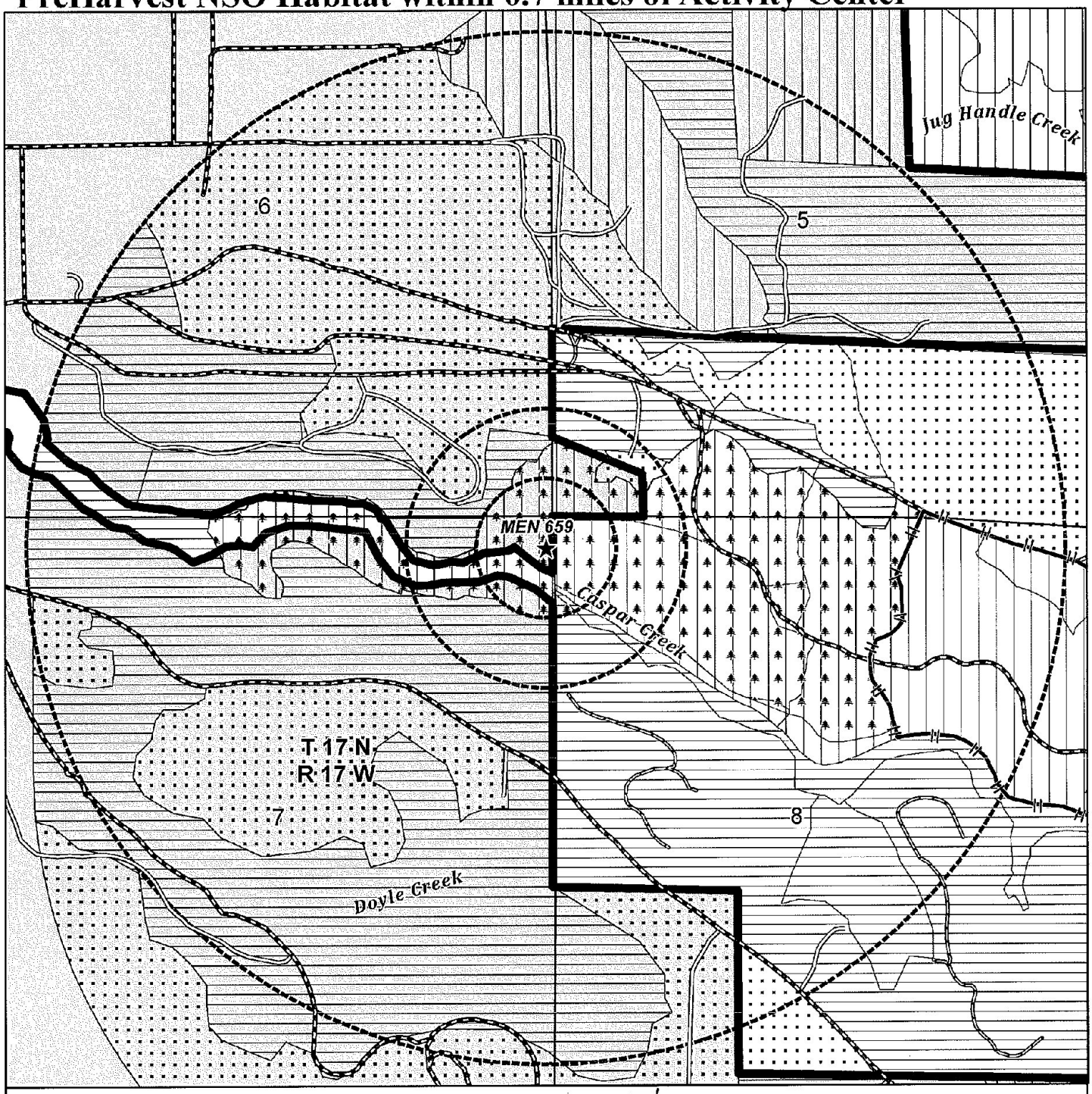
CAL FIRE

JACKSON DEMONSTRATION STATE FOREST

N W E S

1-28-2020 TF

PreHarvest NSO Habitat within 0.7 miles of Activity Center



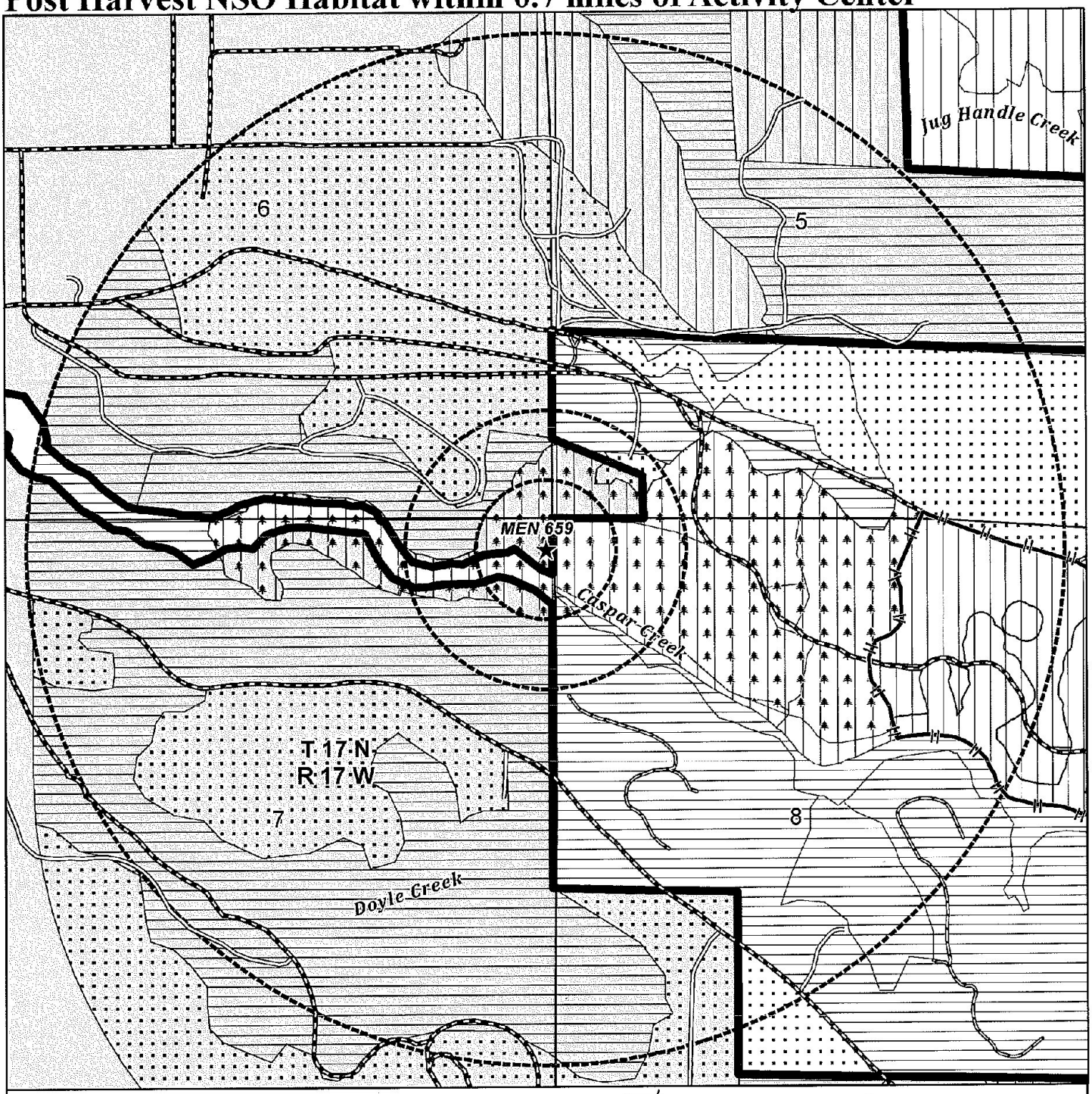
MEN 659
Year: 2016
THP Name:
Caspar 500
Print Date: 1/28/2020
Contour Interval = 40ft

- ★ NSO Activity Centers
- N Previous Nest Site
- Buffers (500ft, 1000ft, & 0.7 mi)
- Permanent Road
- Seasonal Road
- Temporary Road
- Class I Watercourse
- Class II Watercourse
- Class III Watercourse
- THP Boundary
- JDSF Boundary
- Off Property
- NSO Core Habitat
- Foraging
- Nest/Roost
- Unsuitable

1:12,000
1 inch = 1,000 ft
0 250 500 1,000 ft

JACKSON DEMONSTRATION STATE FOREST

Post Harvest NSO Habitat within 0.7 miles of Activity Center



MEN 659
Year: 2016
THP Name:
Caspar 500
Print Date: 1/28/2020
Contour Interval = 40ft

- ★ NSO Activity Centers
- N Previous Nest Site
- Buffers (500ft, 1000ft, & 0.7 mi)
- Permanent Road
- Seasonal Road
- Temporary Road
- Class I Watercourse
- Class II Watercourse
- Class III Watercourse
- THP Boundary
- JDSF Boundary
- Off Property
- NSO Core Habitat
- Foraging
- Nest/Roost
- Unsuitable

1:12,000
1 inch = 1,000 ft
0 250 500 1,000 ft

JACKSON DEMONSTRATION STATE FOREST

Pre and Post Harvest NSO Habitat Acres within 0.7 Miles of Activity Centers

JACKSON DEMONSTRATION STATE FOREST

THP: Caspar 500

Pre Harvest Summary

MEN 659

2016	Hab Type	Acres	Acre Change
	Foraging		
	JDSF	139.5	0.0
	Non-JDSF	338.7	
	Nest/Roost		
	JDSF	133.0	0.0
	Non-JDSF	80.3	
	Total Suitable	691.5	
	Unsuitable		
	JDSF	58.3	0.0
	Non-JDSF	235.4	
	Total acres, 0.7 mile circle	985.2	

Post Harvest Summary

MEN 659

2016	Hab Type	Acres
	Foraging	
	JDSF	139.5
	Non-JDSF	338.7
	Nest/Roost (min. 200 acres)	
	JDSF	133.0
	Non-JDSF	80.3
	Total Suitable (min. 500 acres)	691.5
	Unsuitable	
	JDSF	58.3
	Non-JDSF	235.4
	Total acres, 0.7 mile circle	985.2

2016 NAIP Aerial Photo



No. Spotted Owl
MEN 659

Section 7
T17N R17W MDB&M
USGS 7.5 min Quadrangle:
Mendocino

★ Activity Center
1000 ft. buffer
0.7 mile NSO AC buffer
THP Area
JDSF Property Line

1 inch = 1,000 ft 1:12,000

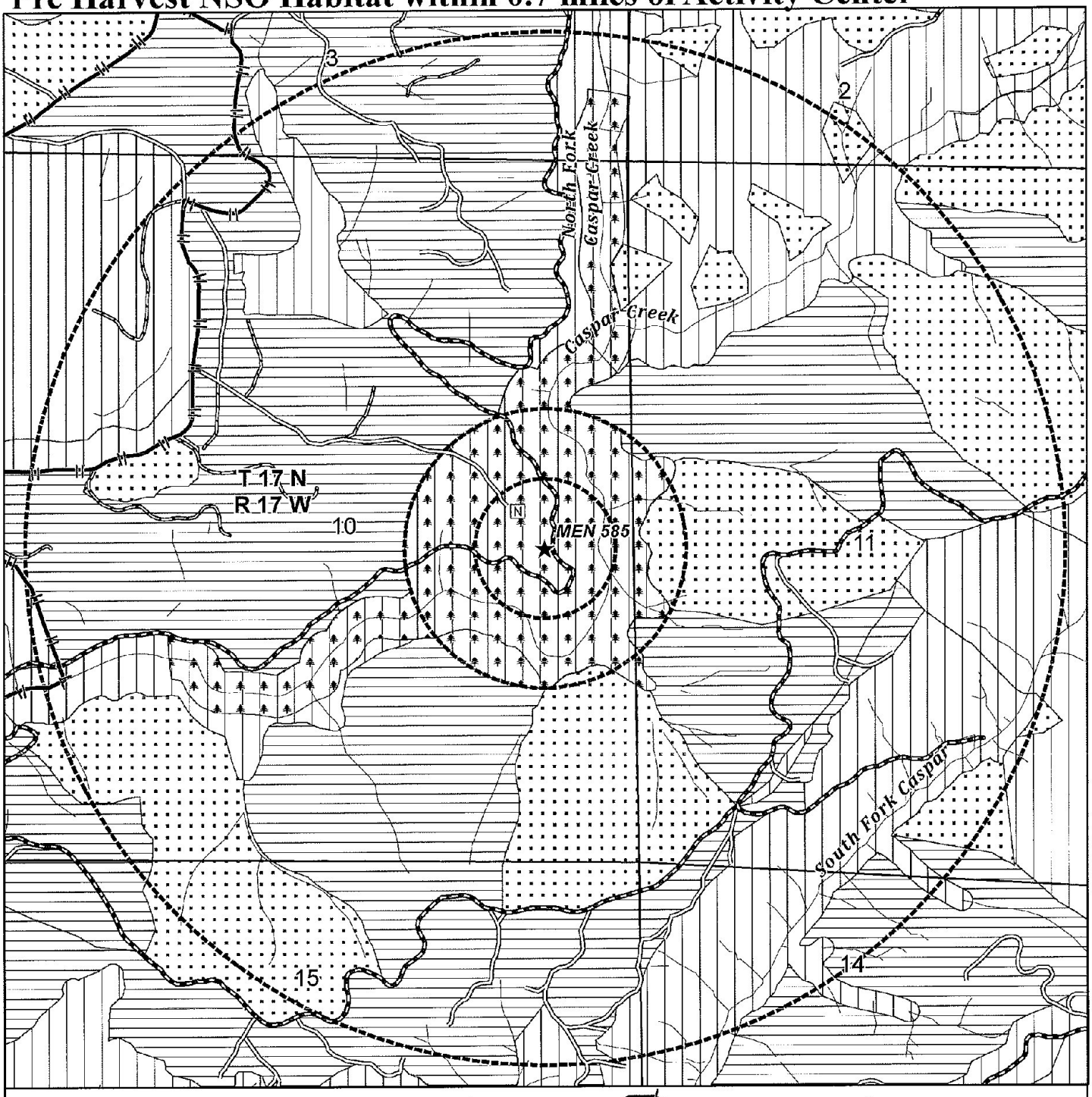
0 0.05 0.1 0.2 0.3 0.4 Miles

JACKSON DEMONSTRATION STATE FOREST

N W E S

1-28-2020 TF

Pre Harvest NSO Habitat within 0.7 miles of Activity Center



MEN 585
Year: 2003
THP Name:
Caspar 500
Print Date: 12/6/2019
Contour Interval = 40ft

- ★ NSO Activity Centers
- [N] Previous Nest Site
- Buffers (500ft, 1000ft, & 0.7 mi)
- Permanent Road
- Seasonal Road
- Temporary Road
- Class I Watercourse
- Class II Watercourse
- Class III Watercourse

- THP Boundary
- JDSF Boundary
- Off Property
- NSO Core Habitat
- Foraging
- Nest/Roost
- Unsuitable

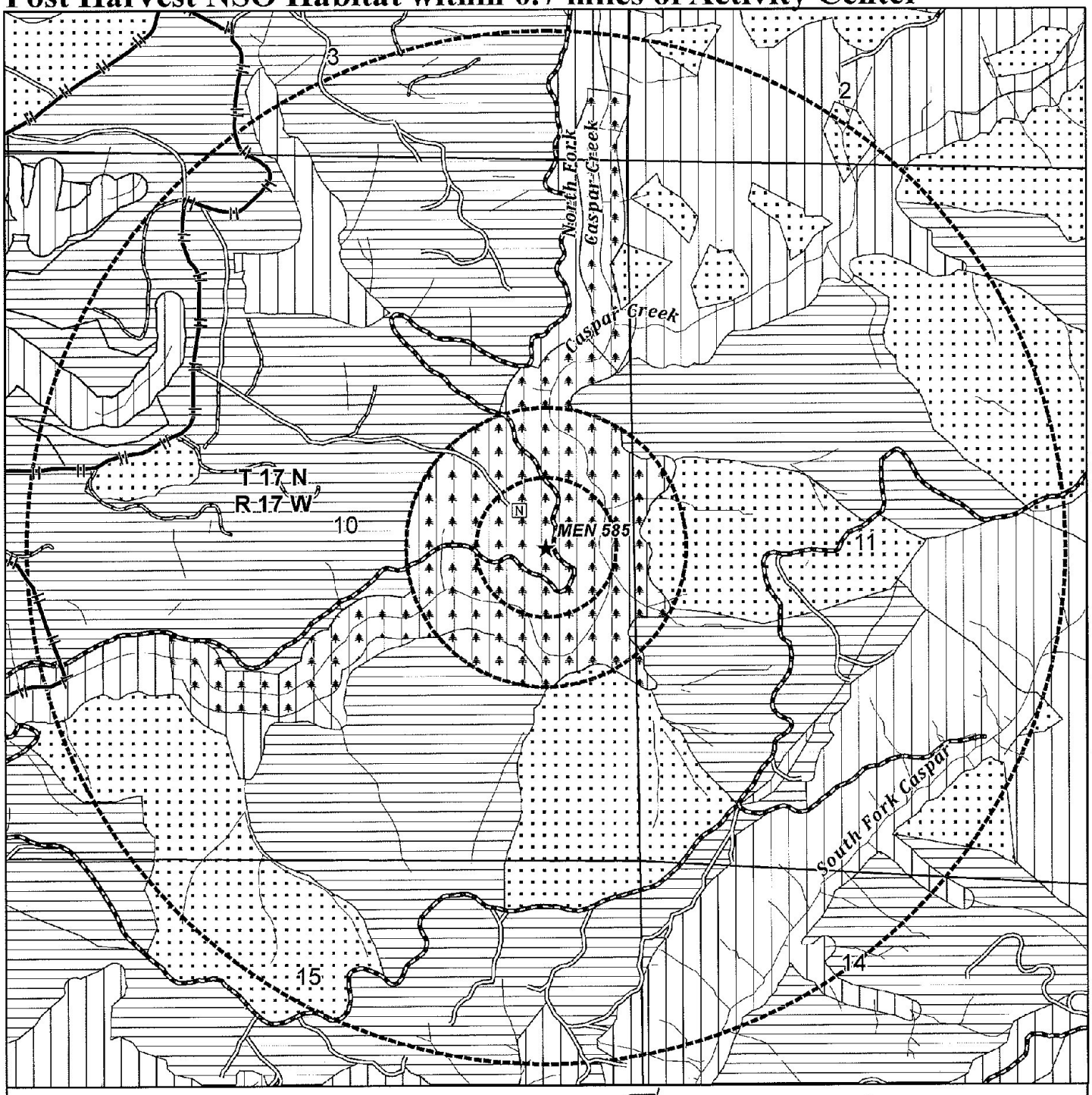
N W E S

1:12,000
1 inch = 1,000 ft
0 250 500 1,000 ft

CAL FIRE

JACKSON DEMONSTRATION STATE FOREST

Post Harvest NSO Habitat within 0.7 miles of Activity Center



MEN 585
Year: 2003
THP Name:
Caspar 500
Print Date: 12/6/2019
Contour Interval = 40ft

- ★ NSO Activity Centers
- [N] Previous Nest Site
- Buffers (500ft, 1000ft, & 0.7 mi)
- Permanent Road
- Seasonal Road
- Temporary Road
- Class I Watercourse
- Class II Watercourse
- Class III Watercourse
- THP Boundary
- JDSF Boundary
- Off Property
- NSO Core Habitat
- Foraging
- Nest/Roost
- Unsuitable

1:12,000
1 inch = 1,000 ft
0 250 500 1,000 ft

JACKSON DEMONSTRATION STATE FOREST

Pre and Post Harvest NSO Habitat Acres within 0.7 Miles of Activity Centers

JACKSON DEMONSTRATION STATE FOREST

THP: Caspar 500

Pre Harvest Summary

MEN 585

2004	Hab Type	Acres	Acre Change
	Foraging		
	JDSF	453.1	26.3
	Non-JDSF	0.0	
	Nest/Roost		
	JDSF	343.4	-26.3
	Non-JDSF	0.0	
	Total Suitable	796.5	
	Unsuitable		
	JDSF	188.6	0.0
	Non-JDSF	0.0	
Total acres, 0.7 mile circle		985.1	

Post Harvest Summary

MEN 585

2004	Hab Type	Acres
	Foraging	
	JDSF	479.4
	Non-JDSF	0.0
	Nest/Roost (min. 200 acres)	
	JDSF	317.1
	Non-JDSF	0.0
	Total Suitable (min. 500 acres)	796.5
	Unsuitable	
	JDSF	188.6
	Non-JDSF	0.0
Total acres, 0.7 mile circle		985.1

2016 NAIP Aerial Photo



No. Spotted Owl
MEN 585

Section 10
T17N R17W MDB&M
USGS 7.5 min Quadrangle:
Mathison Peak

- Activity Center
- Previous Nest Site
- 1000 ft. buffer
- 0.7 mile NSO AC buffer
- THP Area
- JDSF Property Line

1 inch = 1,000 ft 1:12,000

0 0.05 0.1 0.2 0.3 0.4 Miles

JACKSON DEMONSTRATION STATE FOREST

12-4-2019 TF

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Data Version Date:
10/28/2019

Report Generation Date:
11/12/2019

Report #1 - Spotted Owl Sites Found

Known Spotted Owl sites having observations within the search area.

Meridian, Township, Range, Section (MTRS) searched:

M_17N_17W Sections(02,03,04,05,06,07,08,09,10,11,14,15,16,17,18);

					Source
MEN0001	NORTHERN	39.326649	-123.768804	M 17N 17W 21	Contributor
MEN0091	NORTHERN	39.372501	-123.723972	M 18N 17W 35	Contributor
MEN0585	NORTHERN	39.349137	-123.736765	M 17N 17W 10	Contributor
MEN0659	NORTHERN	39.357190	-123.789900	M 17N 17W 07	Contributor

Caspar 500 THP

Data Version Date:
10/28/2019

Report Generation Date:
11/12/2019

Report #2 - Observations Reported

List of observations reported by site.

Meridian, Township, Range, Section (MTRS) searched:

M_17N_17W Sections(02,03,04,05,06,07,08,09,10,11,14,15,16,17,18);

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Section V

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
Masterowl: MEN0001 Subspecies: NORTHERN											
AC	1974-03-05		2	UUUU				39.326649	-123.768804	M 17N 17W 21	Contributor
POS	1974-03-05	1940	1	UM				39.331997	-123.756935	M 17N 17W 16	Quarter-section centroid
NEG	1982-06-19		0					39.326649	-123.768804	M 17N 17W 21	Activity center
NEG	2015-04-15	2112-2250	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2015-05-13	1944-2155	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2015-05-29	2054-2305	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2015-07-03	2015-2210	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2015-07-15	2000-2140	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2015-08-04	2025-2235	0					39.332185	-123.780023	M 17N 17W 17	Half-section centroid
NEG	2016-03-14	2031-2307	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2016-04-13	1930-2134	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2016-05-13	2018-2215	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2016-06-03	2031-2209	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2016-07-28	2011-2214	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2016-08-24	1950-2202	0					39.332034	-123.761538	M 17N 17W 16	Half-section centroid
NEG	2019	2400	0					39.330452	-123.775148	M 17N 17W 17	Contributor

Section V

Caspar 600 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	2019	2400	0					39.332068	-123.766136	M 17N 17W 16	Quarter-section centroid
NEG	2019	2400	0					39.327078	-123.771433	M 17N 17W 20	Contributor
Masterowl: MEN0091 Subspecies: NORTHERN											
POS	1989-05-08	2037	2	UMUF				39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
NEG	1990-07-12		0					39.363687	-123.725646	M 17N 17W 02	Section centroid
POS	1991-02-17		1	UM				39.353118	-123.730063	M 17N 17W 11	Quarter-section centroid
POS	1991-02-17	1932	2	UMUF	Y			39.353277	-123.739129	M 17N 17W 10	Quarter-section centroid
POS	1991-03-05	2107	1	UF				39.353277	-123.739129	M 17N 17W 10	Quarter-section centroid
POS	1991-03-22		1	UM				39.357782	-123.733396	M 17N 17W 02	Contributor
POS	1991-03-22	0538	1	UF				39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
NEG	1991-03-26	1910	0					39.377694	-123.707250	M 18N 17W 36	Section centroid
POS	1991-04-11	0503	2	UMUF	Y			39.357782	-123.733396	M 17N 17W 02	Contributor
POS	1991-04-21	2045	1	UF				39.381782	-123.720957	M 18N 17W 35	Quarter-section centroid
POS	1991-04-22	1930	1	UF				39.374425	-123.723238	M 18N 17W 35	Contributor
POS	1991-05-02	1906	2	UMUF	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
NEG	1991-05-06	2224	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1991-05-08	1947	1	UF				39.381192	-123.702478	M 18N 17W 36	Quarter-section centroid

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Section V

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	1991-05-14	0547	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1991-05-28	2029	1	UF				39.381450	-123.711862	M 18N 17W 36	Quarter-section centroid
POS	1991-05-31	0509	1	UF				39.374161	-123.711916	M 18N 17W 36	Quarter-section centroid
POS	1991-05-31	9999	1	UF				39.374375	-123.721043	M 18N 17W 35	Quarter-section centroid
NEG	1991-06-14	2136	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1991-06-27	0610	1	UF				39.357782	-123.733396	M 17N 17W 02	Contributor
POS	1991-06-27		1	AF	Y			39.363687	-123.725646	M 17N 17W 02	Section centroid
POS	1991-07-18	0514	1	UF				39.381192	-123.702478	M 18N 17W 36	Quarter-section centroid
NEG	1991-07-28	2327	0					39.363687	-123.725646	M 17N 17W 02	Section centroid
POS	1991-08-02	0002	1	UM				39.360341	-123.739145	M 17N 17W 03	Quarter-section centroid
POS	1991-08-08	0536	1	UF				39.381192	-123.702478	M 18N 17W 36	Quarter-section centroid
NEG	1992-03-02	1834	0					39.377694	-123.707250	M 18N 17W 36	Section centroid
POS	1992-03-03	2202	2	UMUF				39.353277	-123.739129	M 17N 17W 10	Quarter-section centroid
POS	1992-03-22	1808	2	UMUF	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
POS	1992-04-06	0515	2	UMUF	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
POS	1992-04-19	1700	2	UMUF	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
NEG	1992-04-28	2149	0					39.377694	-123.707250	M 18N 17W 36	Section centroid

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Section V

Caspar Spp THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	1992-05-14	2303	0					39.381192	-123.702478	M 18N 17W 36	Quarter-section centroid
NEG	1992-05-30	2219	0					39.381782	-123.720957	M 18N 17W 35	Quarter-section centroid
NEG	1992-06-12	2119	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
NEG	1993-05-01	2105	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1993-05-04	2028	2	UMUF	Y			39.355567	-123.727454	M 17N 17W 11	Contributor
POS	1993-05-09	1935	1	UM	Y			39.345885	-123.720959	M 17N 17W 11	Quarter-section centroid
POS	1993-05-09	1925	1	UF	Y			39.346144	-123.729944	M 17N 17W 11	Quarter-section centroid
NEG	1993-05-09	2201	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
NEG	1993-07-16	2110	0					39.378425	-123.743399	M 18N 17W 34	Section centroid
NEG	1993-07-23	2108	0					39.378425	-123.743399	M 18N 17W 34	Section centroid
NEG	1993-08-06	2030	0					39.378425	-123.743399	M 18N 17W 34	Section centroid
NEG	1993-08-16	2143	0					39.378425	-123.743399	M 18N 17W 34	Section centroid
NEG	1994		0					39.381782	-123.720957	M 18N 17W 35	Quarter-section centroid
NEG	1994-01-18		0					39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
NEG	1994-04-12		0					39.352887	-123.711874	M 17N 17W 12	Quarter-section centroid
NEG	1994-05-26		0					39.359960	-123.711899	M 17N 17W 01	Quarter-section centroid
POS	1994-06-21	2025	2	SMUF	Y			39.363687	-123.725646	M 17N 17W 02	Section centroid

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Section V

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	1994-06-23	2005	1	SM	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
POS	1994-07-13	1715	1	AF	Y			39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
POS	1995-03-26		1	UM				39.367265	-123.725602	M 17N 17W 02	Half-section centroid
NEG	1995-04-19	2351	0					39.367265	-123.725602	M 17N 17W 02	Half-section centroid
NEG	1995-04-23	0240	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1995-05-24	2115	1	UM				39.367265	-123.725602	M 17N 17W 02	Half-section centroid
NEG	1995-05-25	1256	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
NEG	1995-06-20	1201	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1995-06-20	2129	1	UF		N		39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1995-06-21	0830	1	UF				39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1995-07-12	0129	1	UM				39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
POS	1996-03-13	1942	1	UM				39.367139	-123.721096	M 17N 17W 02	Quarter-section centroid
NEG	1996-03-14	1525	0					39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
NEG	1996-03-22	1735	0					39.372501	-123.723972	M 18N 17W 35	Activity center
NEG	1996-04-09	2238	0					39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
NEG	1996-04-19		0					39.377694	-123.707250	M 18N 17W 36	Section centroid
NEG	1996-04-19	1948	0					39.381450	-123.711862	M 18N 17W 36	Quarter-section centroid

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section v

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	1996-04-19	1948	0					39.381782	-123.720957	M 18N 17W 35	Quarter-section centroid
POS	1996-04-19	1834	2	UMUF	Y			39.370540	-123.724939	M 17N 17W 02	Contributor
POS	1996-04-24	2005	2	UMUF	Y			39.370540	-123.724939	M 17N 17W 02	Contributor
POS	1996-05-20	2304	2	UMUF				39.367139	-123.721096	M 17N 17W 02	Quarter-section centroid
NEG	1996-05-23	1735	0					39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
NEG	1996-06-17	2000	0					39.381962	-123.725382	M 18N 17W 35	Half-section centroid
POS	1996-06-19	2140	1	UU				39.367139	-123.721096	M 17N 17W 02	Quarter-section centroid
POS	1996-06-24	2100	1	UU				39.367265	-123.725602	M 17N 17W 02	Half-section centroid
NEG	1996-06-24	2030	0					39.381782	-123.720957	M 18N 17W 35	Quarter-section centroid
POS	1996-06-28	1100	2	UMUF	Y			39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1996-07-02	9999	1	UU				39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1996-07-02	2200	1	UU				39.370540	-123.724939	M 17N 17W 02	Contributor
POS	1997-04-16	2340	2	UMUF	Y			39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
NEG	1997-04-23	1200	0					39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
NEG	1997-04-25	1600	0					39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
NEG	1997-04-26	1100	0					39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1997-05-06	2016	2	UMUF	Y	N		39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid

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Section V

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	1997-05-06	2016	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
NEG	1997-05-14	1825	0					39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
NEG	1997-05-15	2127	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
NEG	1997-05-19	2000	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	1997-06-29	1300	2	UMUF	Y	N		39.368698	-123.731305	M 17N 17W 02	Contributor
POS	1998-03-17	2123	1	UU				39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1998-05-10	2031	2	UMUF	Y			39.367139	-123.721096	M 17N 17W 02	Quarter-section centroid
NEG	1998-05-20	1700	0					39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	1998-07-23	0831	2	UMUF	Y			39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
NEG	1999-04-09	2340	0					39.363687	-123.725646	M 17N 17W 02	Section centroid
NEG	1999-05-14	2245	0					39.363687	-123.725646	M 17N 17W 02	Section centroid
POS	1999-06-17	1620	1	UF		Y	1	39.375960	-123.722673	M 18N 17W 35	Contributor
NEG	1999-08-19	2307	0					39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	2000-05-31	1457	1	AM				39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	2000-06-01	1703	1	UM				39.367390	-123.730107	M 17N 17W 02	Quarter-section centroid
POS	2000-06-02	2118	1	UF				39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
POS	2000-06-13	1648	1	UM				39.367139	-123.721096	M 17N 17W 02	Quarter-section centroid

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Section Y

Caspar 500 THP

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Section V

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	2000-09-05	2133	1	UF				39.360057	-123.721082	M 17N 17W 02	Quarter-section centroid
POS	2000-10-06	1803	1	UM				39.374375	-123.721043	M 18N 17W 35	Quarter-section centroid
POS	2002-04-22	1900	2	UMUF	Y	Y		39.372685	-123.723394	M 18N 17W 35	Contributor
POS	2002-06-20	1820	2	UMUF	Y		1	39.373773	-123.723730	M 18N 17W 35	Contributor
POS	2002-07-05	1813	1	UF			1	39.373475	-123.723866	M 18N 17W 35	Contributor
POS	2002-09-16	2114	1	UF				39.376117	-123.726332	M 18N 17W 35	Contributor
POS	2002-09-20	1901	1	UF				39.368375	-123.725230	M 17N 17W 02	Contributor
POS	2002-09-23	1847	1	UF				39.364753	-123.732413	M 17N 17W 02	Contributor
POS	2002-10-29	1734	1	UM				39.378131	-123.721233	M 18N 17W 35	Contributor
POS	2002-11-02	1738	1	UM				39.381076	-123.722900	M 18N 17W 35	Contributor
POS	2002-11-03	1916	2	UMUF	Y			39.376113	-123.725589	M 18N 17W 35	Contributor
NEG	2003-03-18	1006	0					39.381962	-123.725382	M 18N 17W 35	Half-section centroid
POS	2003-03-18	1941	1	UU				39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	2003-03-18	1949	1	UU				39.378240	-123.725460	M 18N 17W 35	Section centroid
POS	2003-05-13	1948	2	UMUF	Y			39.375218	-123.723118	M 18N 17W 35	Contributor
POS	2003-05-15	1918	2	UMUF	Y	N		39.374525	-123.721613	M 18N 17W 35	Contributor
POS	2003-06-16	2114	1	UM		N		39.376126	-123.707361	M 18N 17W 36	Contributor

Caspar 500 THP

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	2003-10-10	1726	1	UM				39.387394	-123.716834	M 18N 17W 26	Contributor
POS	2003-10-12	2146	1	UF				39.368635	-123.726858	M 17N 17W 02	Contributor
POS	2003-10-13	1927	1	UF				39.369008	-123.726432	M 17N 17W 02	Contributor
POS	2003-10-15	1755	1	UM				39.358652	-123.706292	M 17N 17W 01	Contributor
POS	2003-10-22	1643	1	UM				39.385133	-123.722547	M 18N 17W 35	Contributor
AC	2005-04-15	1718	2	AMUF	Y	Y		39.372501	-123.723972	M 18N 17W 35	Contributor
POS	2005-05-30	2142	1	UM				39.378210	-123.723390	M 18N 17W 35	Contributor
POS	2005-06-21	1857	2	UMAF	Y	N		39.373325	-123.723342	M 18N 17W 35	Contributor
POS	2006-04-17	2005	1	UF				39.376293	-123.721260	M 18N 17W 35	Contributor
POS	2006-04-19	2012	1	UF		N		39.376293	-123.721260	M 18N 17W 35	Contributor
POS	2006-06-16	2348	1	UF				39.386329	-123.730246	M 18N 17W 26	Contributor
POS	2006-07-12	2134	1	UF		N		39.376293	-123.721260	M 18N 17W 35	Contributor
POS	2007-07-14	0409	1	UM				39.371655	-123.723732	M 18N 17W 35	Contributor
POS	2008-07-18	2220	1	UM				39.369985	-123.724237	M 17N 17W 02	Contributor
POS	2008-07-18	2234	1	UM				39.369985	-123.724237	M 17N 17W 02	Contributor
POS	2009-08-20		1	UM				39.370035	-123.724301	M 17N 17W 02	Contributor
POS	2010-05-23		1	UF				39.368889	-123.729542	M 17N 17W 02	Contributor

Section V

Cuspar 560 THP

2016

Section V

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	2012-04-27	0115	1	UM				39.368020	-123.736950	M 17N 17W 03	Contributor
POS	2012-05-23	2400	1	UM				39.360706	-123.735852	M 17N 17W 03	Contributor
POS	2012-06-26	2400	1	UM				39.348424	-123.736226	M 17N 17W 10	Contributor
POS	2013-05-16	2220	1	UF				39.360249	-123.736287	M 17N 17W 03	Contributor
Masterowl: MEN0585 Subspecies: NORTHERN											
POS	2002-04-03	1928	1	UU				39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-04-04	1716	0					39.353490	-123.748161	M 17N 17W 10	Quarter-section centroid
NEG	2002-04-17	2236	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-04-17	2220	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-05-01	2142	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-05-01	2158	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-05-28	2155	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2002-05-28	2143	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2003-03-18	1945	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2003-03-18	1957	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
POS	2003-03-24	1908	1	UU				39.346144	-123.729944	M 17N 17W 11	Quarter-section centroid
NEG	2003-03-26	1925	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid

Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	2003-03-26	1910	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2003-04-07	2040	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2003-04-07	2115	0					39.353612	-123.757180	M 17N 17W 09	Quarter-section centroid
NEG	2004-04-07	1953	0					39.349542	-123.725453	M 17N 17W 11	Section centroid
POS	2004-05-03	2038	2	UMUF	Y			39.346144	-123.729944	M 17N 17W 11	Quarter-section centroid
NEG	2004-05-03	2005	0					39.352985	-123.721021	M 17N 17W 11	Quarter-section centroid
POS	2004-05-03	2054	1	UM				39.339196	-123.738830	M 17N 17W 15	Quarter-section centroid
POS	2004-05-04	1847	2	AMAF	Y	Y		39.350008	-123.737377	M 17N 17W 10	Contributor
POS	2004-05-12	1805	2	AMAF	Y	N	0	39.350008	-123.737377	M 17N 17W 10	Contributor
NEG	2004-05-26	2030	0					39.335554	-123.743305	M 17N 17W 15	Section centroid
POS	2004-05-26	2145	1	UM				39.352985	-123.721021	M 17N 17W 11	Quarter-section centroid
POS	2004-05-26	2128	1	UU				39.353118	-123.730063	M 17N 17W 11	Quarter-section centroid
POS	2005-03-09	1853	1	UU				39.353118	-123.730063	M 17N 17W 11	Quarter-section centroid
NEG	2005-03-10	1528	0					39.349915	-123.743585	M 17N 17W 10	Section centroid
POS	2005-03-31	2300	1	UU				39.336026	-123.758232	M 17N 17W 16	Contributor
NEG	2005-04-01	1455	0					39.335716	-123.761536	M 17N 17W 16	Section centroid
NEG	2005-04-05	1925	0					39.335716	-123.761536	M 17N 17W 16	Section centroid

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Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	2005-04-11	2024	1	UM				39.360190	-123.730137	M 17N 17W 02	Quarter-section centroid
POS	2005-04-20	2348	1	UM				39.346597	-123.735275	M 17N 17W 10	Contributor
AC	2005-04-21	1718	2	AMUF	Y	N		39.349137	-123.736765	M 17N 17W 10	Contributor
POS	2005-04-25	1719	2	AMUF	Y	N		39.346358	-123.738986	M 17N 17W 10	Quarter-section centroid
POS	2005-06-21	2123	2	UMUF	Y			39.354272	-123.737015	M 17N 17W 10	Contributor
POS	2006-04-17	2230	1	UF				39.349656	-123.733218	M 17N 17W 11	Contributor
POS	2006-04-19	1811	2	UMUF	Y	N		39.349820	-123.737247	M 17N 17W 10	Contributor
POS	2006-05-10	2217	1	UM				39.346010	-123.735536	M 17N 17W 10	Contributor
POS	2006-06-28	2006	1	UF		N		39.352937	-123.737280	M 17N 17W 10	Contributor
POS	2007-07-05	2057	2	UMUF	Y			39.353764	-123.734724	M 17N 17W 10	Contributor
NEG	2008		0					39.350008	-123.737377	M 17N 17W 10	Activity center
NEG	2012-04-07	1200	0					39.349137	-123.736765	M 17N 17W 10	Activity center
NEG	2012-04-27	1200	0					39.349137	-123.736765	M 17N 17W 10	Activity center
NEG	2012-04-27	2400	0					39.357440	-123.750180	M 17N 17W 03	Contributor
Masterowl: MEN0659 Subspecies: NORTHERN											
NEG	2002-04-17	2322	0					39.353780	-123.775381	M 17N 17W 08	Quarter-section centroid
NEG	2002-05-01	2125	0					39.353780	-123.775381	M 17N 17W 08	Quarter-section centroid

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Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
POS	2013-05-16	0208	1	UF				39.355206	-123.782868	M 17N 17W 08	Contributor
POS	2013-05-24	0001-0010	1	UF				39.352258	-123.774758	M 17N 17W 08	Contributor
POS	2013-05-25	1454-1610	1	UF				39.351050	-123.780350	M 17N 17W 08	Contributor
NEG	2016	2400	0					39.360417	-123.794523	M 17N 17W 06	Contributor
NEG	2016	2400	0					39.361425	-123.802725	M 17N 17W 06	Contributor
NEG	2016-03-15	0228-0238	0					39.358929	-123.799489	M 17N 17W 06	Contributor
POS	2016-05-24	0017	1	UF				39.351836	-123.768496	M 17N 17W 09	Contributor
POS	2016-06-10	2122	1	UF				39.358020	-123.789410	M 17N 17W 05	Contributor
AC	2016-06-24	1904-1950	2	AFSF				39.357190	-123.789900	M 17N 17W 07	Contributor
POS	2016-07-21	2012	1	AF				39.357310	-123.788900	M 17N 17W 08	Contributor
Additional surveys within the search area with no Spotted Owls detected											
NEG	2002-04-17	2014	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid
NEG	2002-04-17	2040	0					39.367685	-123.757367	M 17N 17W 04	Quarter-section centroid
NEG	2002-04-17	2251	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2002-05-01	2100	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2002-05-01	2020	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid
NEG	2002-05-28	2110	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid

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Type	Date	Time	#Adults	Age/Sex	Pair	Nest	#Young	Latitude DD NAD83	Longitude DD NAD83	MTRS	Coordinate Source
NEG	2002-05-28	2240	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2003-03-18	1830	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid
NEG	2003-03-26	1830	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid
NEG	2003-03-26	2001	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2003-03-26	2015	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2003-04-07	2205	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2003-04-07	2150	0					39.360715	-123.766380	M 17N 17W 04	Quarter-section centroid
NEG	2003-04-07	1945	0					39.360648	-123.757256	M 17N 17W 04	Quarter-section centroid
NEG	2007-03-10	2211-2221	0					39.353975	-123.798711	M 17N 17W 07	Half-section centroid
NEG	2007-04-10	2247-2259	0					39.353975	-123.798711	M 17N 17W 07	Half-section centroid
NEG	2007-06-22	2109-2129	0					39.353975	-123.798711	M 17N 17W 07	Half-section centroid
NEG	2019	2400	0					39.331446	-123.781839	M 17N 17W 17	Contributor
NEG	2019	2400	0					39.330974	-123.795242	M 17N 17W 18	Contributor
NEG	2019	2400	0					39.331627	-123.788931	M 17N 17W 17	Contributor

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Sonoma Tree Vole Survey

On December 3rd, 2019, Tina Fabula, JDSF Wildlife Biologist, and Tori Norville, Forestry Assistant II, conducted a visual survey for Sonoma Tree Vole nests within the Caspar 500 THP. The survey location was along NF Caspar Creek in the area of the previous CNDDB tree vole nest report (Occ. No. 119) by M. Jameson. The 2019 survey occurred from the road junction of JDSF Road 600 and JDSF Road 620, east along Road 620 for approximately ¼ mile to the Caspar 500 THP boundary and ~300 feet past the harvest boundary. The survey location was based on the previous CNDDB nest report and habitat along the Class I watercourse. There was a lack of Douglas-fir trees (food source) near Road 600 which lead to the conclusion of the survey.

There were no nest found within the THP boundaries and only one probable nest was found in a larger Douglas-fir tree approximately 250 feet east of the harvest boundary.

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Project Carbon Accounting: Inventory, Growth, and Harvest

This worksheet addresses the sequestation and emissions associated with the project area's balance of harvest, inventory, and growth plus any emissions associated with site preparation. Complete the input for Steps 0- 8 on this worksheet.

Forest Type				Harvest Periods	Inventory		Growth Rates		Harvest Volume	
Multipliers to Estimate Carbon Tonnes per MBF (Sampson, 2002)				Time of Harvest (years from project approval)	Conifer Live Tree Volume (MBF/Acre) - Prior to Harvest	Hardwood Live Tree Volume (BA square feet/Acre) - Prior to Harvest	Conifer Growth Rate BF/Acre/Year	Hardwood Growth Rate BA/Acre/Year	Conifer Harvest Volume (MBF/acre)	Hardwood Harvested / Treated Basal Area (BA/Acre)
Forest Type	**Step 0.** Identify the approximate percentage of conifers by volume within the harvest plan. Must sum to 100%	Multiplier from Cubic Feet (merchantable) to Total Biomass	Pounds Carbon per Cubic Foot	**Step 1.** Enter the anticipated future harvest entries. The re-entry cycles should be supported by management plan, if available.	**Step 2.** Enter the estimated conifer inventory (mbf/acre) present in project area prior to harvest.	**Step 3.** Enter the estimated hardwood inventory (basal area per acre) present in project area prior to harvest.	**Step 4.** Enter the average annual periodic growth of conifers between harvests based on estimated growth in management plan, if available. Must be entered for each harvest cycle identified in Step 1.	**Step 5.** Insert average annual periodic growth of hardwoods between harvests based on estimated growth in management plan, if available.	**Step 6.** Enter the estimated conifer harvested per acre at current and future entries. The estimates should be based on projections from the management plan, if available.	**Step 7.** Enter estimated hardwood basal area harvested/treated per acre
Douglas-fir	21%	1.675	14.38		0	56.9	2	775	0.5	20	10
Redwood	62%	1.675	13.42		20	57.4	2	775	0.5	10	10
Pines	10%	2.254	12.14		40	57.9	2	775	0.5	10	0
True firs	3%	2.254	11.18		60	53.4	12	775	0.5	10	0
Hardwoods	3%	2.214	11.76	**User must enter harvest cycles to 100 years and/or at least three entry cycles.**	80	58.9	22	775	0.5	15	0
Conversion of Board Feet to Cubic Feet	0.165	Pounds per Metric Tonne	2,204		100	59.4	32	775	0.5	15	0
Multipliers to Estimate Total Carbon Tonnes per MBF	Conifer	1.68			0	0	0	0	0	0	0
	Hardwoods	1.95			0	0	0	0	0	0	0
Multipliers to Estimate Merchantable Carbon Tonnes per MBF	Conifer	0.96			0	0	0	0	0	0	0
	Hardwoods	0.88			0	0	0	0	0	0	0

Harvest Periods	Inventory Conversion to Carbon (prior to harvest)		Inventory Conversion to Carbon Dioxide Equivalent (prior to harvest)		Site Preparation	
	Conifer Live Tree Tonnes (C/acre)	Hardwood Live Trees Tonnes (C/acre)	Conifer Live Tree Tonnes (CO_2 equivalent/acre)	Hardwood Live Tree Tonnes (CO_2 equivalent/acre)	Step 8. Enter the value (in bold) for each harvest cycel that best reflects the site preparation activities, as averaged across the project area:	
from above (Time of Harvest as years from project approval)	Computed: MBF * Conifer Multiplier from Step 0.	Computed: BA*Volume/Basal Area Ration (to convert to MBF) * Hardwood Multiplier from Step 0.	Computed: Conversion of carbon to CO_2 (3.67 tonnes CO2 per 1 tonne Carbon)	Computed: Conversion of carbon to CO_2 (3.67 tonnes CO2 per 1 tonne Carbon)	**Heavy**- 50% or more of the project area is covered with brush and removed as part of site preparation or stumps are removed (mobile emissions estimated at .429 metric tonnes CO2e per acre, biological emissions estimated at 2 metric tonnes CO2e per acre) **Medium** - >25% <50% of the project area is covered with brush and removed as part of site preparation (mobile emissions estimated at .202 metric tonnes CO2e per acre, biological emissions estimated at 1 metric tonne per acre). **Light** - 25% or less of the project area is covered with brush and is removed as part of site preparation (mobile emissions estimated at .09 metric tonnes CO2e per acre, biological emissions estimated at .5 metric tonnes per acre). **None** - No site preparation is conducted.	
0	96	0	352	1	Light	-0.59
20	88	0	324	1	Light	-0.59
40	97	0	358	1	None	0
60	107	2	392	6	None	0
80	116	3	426	12	None	0
100	117	5	429	17	None	0
0	0	0	0	0	None	0
0	0	0	0	0	None	0
0	0	0	0	0	None	0
	Difference between ending stocks and beginning stocks		77	16.10	Sum of emissions (Metric Tonnes CO2e) per acre	-1.18

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Project Carbon Accounting: Harvesting Emissions

This worksheet addresses the non-biological emissions associated with the project area's harvesting activities. Complete the input for Steps 9- 14 on this worksheet.

Harvest Periods	Falling Operations	Production per Day	Emissions Associated with Yarders and Loaders			Emissions Associated with Tractors and Skidders			Emissions Associated with Helicopters			Landing Saws	Trucking Emissions		
from Inventory, Growth, and Harvest Page (Time of Harvest as years from project approval)	Assumption: ((.25 gallons gasoline per MBF harvested * 5.33 (pounds carbon per gallon))/2205(conversion to metric tonnes)* mbf per acre harvested	MBF (all species) Yarded Delivered to Landing	Assumption:(((35 gallons diesel per day per piece of equipment * 6.12 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			Assumption: (((55 gallons diesel per day per piece of equipment * 6.12 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			Assumption: (((200 gallons jet fuel per day per piece of equipment * 5 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			Assumption: (((.16 gallons gasoline per MBF * 5.33 (pounds carbon per gallon))/2205(conversion to metric tonnes)* 3.67 to convert to metric tonnes CO2 equivalent)/mbf per acre harvested. Applies to all species whether harvested or not.	Assumption: Round Trip Hours/Load average (from below, to compute the mbf/hour) /((8 gallons diesel/hour * 6.12 pounds carbon/gallon)/2205 (conversion to metric tonnes carbon))*3.67 (conversion to metric tonnes carbon dioxide equivalent)		
	Computed. Metric Tonnes CO2 equivalent per mbf harvested Applies to all species whether harvested or treated	Step 9. Enter the estimated volume delivered to the landing in a day.	Step 10. Enter number of pieces of equipment in use per day for each harvest entry	Computed. Yarders and Loaders CO2 equivalent/mbf (metric tonnes)	Computed. Yarders and Loaders CO2 equivalent per Acre Harvested (metric tonnes)	Step 11. Enter number of pieces of equipment in use per day for each harvest entry	Computed. Tractor and skidder CO2 equivalent/mbf (metric tonnes)	Computed. Tractors and Skidders CO2 equivalent per Acre Harvested (metric tonnes)	Step 12. Enter number of pieces of equipment in use per day for each harvest entry	Computed. Helicopter CO2 equivalent/mbf (metric tonnes)	Computed. Helicopters CO2 equivalent per Acre Harvested (metric tonnes)	Computed. Landing Saws CO2 equivalent per Acre Harvested (metric tonnes)	Steps 13 and 14 below		Computed. Estimated Metric Tonnes CO2e per harvested acre for each harvesting period.
0	(0.05)	35	2	-0.02	-0.41	2	-0.03	-0.64	0	0.00	0.00	-0.03	Step 13. Enter Estimated Load Average: MBF/Truck	4.5	-0.296054422
20	(0.02)	35	2	-0.02	-0.20	2	-0.03	-0.32	0	0.00	0.00	-0.02			-0.148027211
40	(0.02)	35	2	-0.02	-0.20	2	-0.03	-0.32	0	0.00	0.00	-0.01			-0.148027211
60	(0.02)	35	2	-0.02	-0.20	2	-0.03	-0.32	0	0.00	0.00	-0.01	Step 14. Enter Estimated Round Trip Haul in Hours	4	-0.148027211
80	(0.03)	35	2	-0.02	-0.31	2	-0.03	-0.48	0	0.00	0.00	-0.02			-0.222040816
100	(0.03)	35	0	0.00	0.00	2	-0.03	-0.48	0	0.00	0.00	-0.02			-0.222040816
0	-	0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
0	-	0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
0	-	0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
0	-	0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
Sum Emissions	**-0.18**				**-1.32**			**-2.56**			**0.00**	**-0.12**			**-1.18**

2.73

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Project Carbon Accounting: Harvested Wood Products and Processing Emissions

This worksheet addresses the non-biological emissions associated with the project area's harvesting activities. Complete the input for Steps 15- 16 on this worksheet.

Harvest Periods	Quantity of Forest Carbon Delivered to Mills				Non-Biological Emissions Associated with Mills	Quantity of Forest Carbon Remaining Immediately After Milling (Mill Efficiency)		Long-Term Sequestration in Wood Products	
	Conifer Percentage Delivered to Mills	Hardwood Percentage Delivered to Mills	Conifer CO2e Delivered to Mills / Acre	Hardwood CO2 equivalent Delivered to Mills / Acre	**Assumption.** 20 kw/hour (mill energy use) /(40mbf lumber processed/hour) *(.05 metric tonnes/kw hour) * mbf processed	**Computed.** Remaining CO2 equivalent after Milling Efficiency for Conifers	**Computed.** Remaining CO2 equivalent after Milling Efficiency for Hardwoods	**Computed.** CO2 Equivalent Tonnes in Conifer Wood Products in Use-100 Year Weighted Average / Acre and Landfill	**Computed.** CO2 Equivalent Tonnes in Hardwood Wood Products in Use-100 Year Weighted Average / Acre
from Inventory, Growth, and Harvest Page (Time of Harvest as years from project approval)	**Step 15.** Insert the percentage of conifer trees harvested that are subsequently delivered to sawmills	**Step 16.** Insert the percentage of hardwoods harvested or treated that are subsequently delivered to sawmills	**Computed:** The merchantable portion determined by the conversion factors (Sampson, 2002) on the Inventory, Growth, and Harvest worksheet. This is multiplied by the percent delivered to mills to reflect the carbon delivered to mills.	**Computed:** The merchantable portion determined by the conversion factors (Sampson, 2002) on the Inventory, Growth, and Harvest worksheet. This is multiplied by the percent delivered to mills to reflect the carbon delivered to mills.	**Calculated.** **The CO2e associated with processing the logs at the mill**	The difference between carbon delivered to mills and carbon remaining after milling is assumed to be emitted immediately		**Estimate.** The weighted average carbon remaining in use at year 100 is 46.3%	**Estimate.** The weighted average carbon remaining in use at year 100 is 23.0%
						The efficiency rating from mills in California is 0.67 (DOE 1605b) for conifers	The efficiency rating from mills in California is .5 (DOE 1605b) for hardwoods	**Estimate.** The carbon in landfills at year 100 is 29.8% of the initial carbon produced in wood products.	**Estimate.** The carbon in landfills at year 100 is 29.8% of the initial carbon produced in wood products.
0	100%	0%	70.83	0.00	-0.50	47.46	0.00	36.11	0.00
20	100%	0%	35.41	0.00	-0.25	23.73	0.00	18.06	0.00
40	100%	0%	35.41	0.00	-0.25	23.73	0.00	18.06	0.00
60	100%	0%	35.41	0.00	-0.25	23.73	0.00	18.06	0.00
80	100%	0%	53.12	0.00	-0.38	35.59	0.00	27.08	0.00
100	100%	0%	53.12	0.00	-0.38	35.59	0.00	27.08	0.00
0	100%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	100%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	100%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	100%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	100%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sum of emissions associate with processing of lumber			-2.00	Sum of CO2 equivalent in wood products		144.45	0.00

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Summary			Years until Carbon Stocks are Recouped from Initial Harvest (Includes Carbon in Live Trees, Harvested Wood Products, and Landfill)
	Beginning Stocks	Ending Stocks	
Emissions Source/Sink/Reservoir	Metric Tonnes CO2 Equivalent Per Acre Basis		18 Years
Live Trees (Conifers and Hardwoods)	352.62	445.95	
Wood Products		144.45	
Site Preparation Emissions		-1.18	
Non-biological emissions associated with harvesting		-5.37	
Non-biological emissions associated with milling		-2.00	
Sum of Net Emissions/Sequestration over Identified Harvest Cycles (CO2 metric tonnes)		229.23	
Project Summary			
Project Acres	Step 17- Insert the acres that are part of the harvest area.	555	
Total Project Sequestration over defined Harvesting Periods (CO2 metric tonnes)		127,224	

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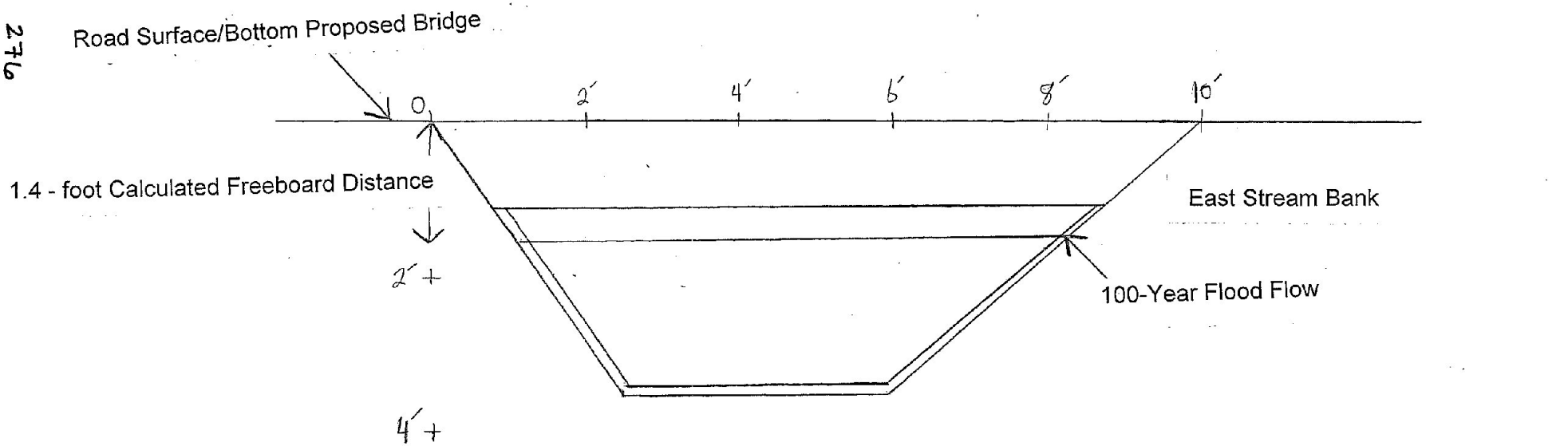
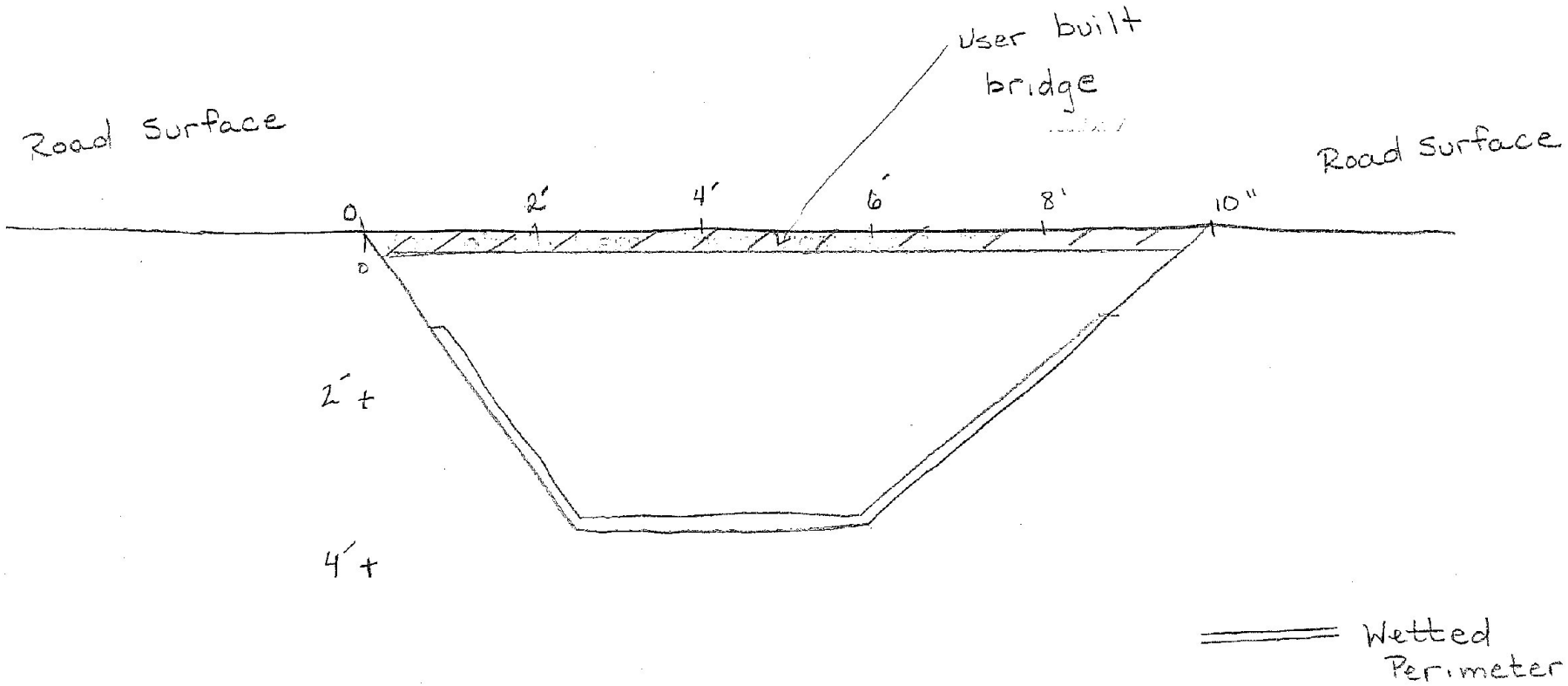
MAP POINT 5 – Class I Stream Cross Section & 100-Year Flood Flow



1 in = 2 feet

Section V

Map Point 5 – Class I Stream Cross Section for Current Bridge



Caspar 500 THP

Section VI

Confidential Archaeological Addendum

NOTE

Information concerning archaeological sites and surveys has been removed from **THP 1-20-00006-MEN** pursuant to California Government Code Section 6254.10 which exempts cultural resources site location information from the California Public Records Act and provides authority for widespread state policy (not just within the California Department of Forestry and Fire Protection) to keep archaeological site location information confidential. This exemption to the Public Records Act recognizes that providing site location information to the public may put such sites at risk from artifact hunting, excavations and/or vandalism.

Copies of the information have been sent to the following locations to facilitate review of the project:

1. CAL FIRE field unit - Willits

2. Reviewing Archaeologist, Santa Rosa (Region Office)

The original copy of this material is maintained in a confidential file at CAL FIRE Northern Region Headquarters, 135 Ridgway Avenue, Santa Rosa, CA 95401.

Pages 279-328 (Submitted January 10, 2020)