



Humboldt Redwood
COMPANY, LLC

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March 25, 2009

Ms. Catherine Kuhlman
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Blvd, Suite A
Santa Rosa, CA 95403

Subject: Enrollment of THP 1-07-183HUM (Unit 4) in the Elk River WWDR, "Tier II"

Dear Ms. Kuhlman:

HRC is requesting Tier II enrollment under Watershed-Wide Waste Discharge Requirement (WWDR) Order No. R1-2006-0039 for unit 4 of THP 1-07-183HUM. This unit is comprised of 17.9 acres of Selection (9.0 clear-cut equivalent acres). Total acres currently enrolled or proposed for enrollment under Order No. R1-2006-0039 Tier II is shown in the Attached Pre-Harvest Planning Report provided by Forester, Mr. Wayne Rice. The Erosion Control Plan (ECP), Form 200 and an annual waste discharge enrollment fee have already been submitted for this THP.

Landslide risks associated with this plan were evaluated in compliance with the Freshwater Creek and Elk River WWDR Permit Acreage Enrollment and Compliance Monitoring Program Quality Assurance Project Plan (Version 2.0, September 1, 2006) approved by the Executive Officer of the North Coast Regional Water Quality Control Board. This approach uses commonly accepted standards for geologic practices in forest management (Sidle et al. 1985, Soeters and Van Western 1996, and Sidle and Ochiai 2006) to assess factors known to contribute to landslides, such as steepness of slope, slope convergence, hydrology, geologic features, and visibly unstable areas. Overlapping and complementary scientific techniques combining state-of-the-art digital elevation model (DEM) slope stability models, field investigation, and terrain analysis were used in this assessment.

In summary the unit is mapped to be underlain by Wildcat Group sediments. The sediments are composed of silts, sands, clays, and occasional gravels that are moderate to well consolidated. The unit has been mapped to be underlain by large landslides, dormant mature, and debris slide slope source areas. These areas and others were reviewed by a CLG and an accompanying geology report is located in section V of the THP. Unstable areas were identified and mitigated by inclusion within no harvest zones. Where delivery potential was considered minimal, the proposed harvest (clearcut) was allowed. New ownership and shift to uneven-aged management has resulted in a silviculture amendment to the unit. The new silviculture is group selection with a target retention of 90 ft² of basal area per acre. The silviculture change, the RMZ, the appropriate yarding methods and the avoidance of unstable areas that have a high potential for delivery to a watercourse meet the requirements for Tier II enrollment.

The THP proposes an uneven-age silviculture retaining 90 sqft of basal area. Sub-merchantable trees and those with specific wildlife value characteristics (e.g., cavities, large limbs, broken tops, snags, etc.) will be retained within the harvest area to the extent feasible. Cable and ground based yarding is approved for the unit. Post-harvest no site preparation will occur.

Greater detail regarding this landslide hazard assessment is provided in the attached *THP Unit Review for Tier 2 Enrollment*. The licensed geologist involved with the Tier 2 landslide risk evaluation has concluded the proposed harvest operation, if implemented as planned and approved, will result in a negligible increase in potential for post-harvest landsliding; and thereby meets the applicable Zero Delivery of landslide related sediment performance standards of NCRWQCB Orders R1-2006-0039 and R1-2008-0071.

Please do not hesitate to contact me should you have any questions or comments regarding this application for enrollment into WWDR (Order No. R1-2006-0039).

Respectfully,

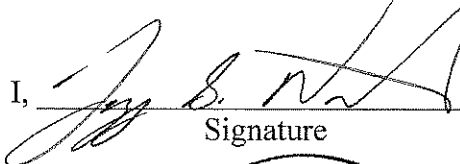


Wayne D. Rice,
RPF
Humboldt Redwood Company, LLC

Attachments:

Professional Certification of Design
THP Unit Review for Tier II enrollment
Pre-harvest Planning Report
Maps

Professional Certification of Design

I, , P.G. 7950, 3/25/09,
Signature license # Date



Place licensed seal here

hereby certify, in accordance with North Coast Regional Water Quality Control Board (NCRWQCB) Order Nos. R1-2006-0039 and R1-2006-0041, that the attached application and the description of THP modifications, and the materials submitted along with:

THP No. 1-07-183 HUM (South Lake View) Unit # 4

- a. are in accordance with accepted practices, and recognized professional standards;
- b. comply with the requirements of the Monitoring and Reporting Program No. R1-2006-0103, approved by the Executive Officer of the North Coast Regional Water Quality Control Board; and
- c. provided that the THP is properly implemented, operated, and maintained, are adequate for the THP to meet the applicable Zero Net Delivery performance standards of NCRWQCB Orders R1-2006-0039, R1-2006-0041, and R1-2006-0103, insofar as such performance can reasonably be predicted by accepted engineering geologic practices.

The opinions presented in the subject THP have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

THP: South Lake View THP 07-183 Unit # 4 3-23-09

Tools Used in This Assessment	Figure Number
Elevation Map with 10 ft Contours (HRC LiDAR)	1
SHALSTAB (Montgomery and Dietrich, 1994 and Palco, 2006) / Slope Class / Hillshade Maps	2
CGS Geology and Geomorphic Features (CGS, 2005)	3
Mass Wasting Potential Map (HRC, 1999)	4
Aerial Photo Map (HRC, 2007)	5
HRC Elk River and Salmon Creek WA deep-seated LS inventory (HRC, 2004)	6
Road Condition Map	7

Please see back of enrollment for references

Summary of Changes to THP Prescriptions Based on Tier II Analysis in this Unit:

Geologic Review	Forestry Silviculture/Site Prep Plan	Operational Design Plan
4-1	For reasons other than slope stability hazard, silviculture is now group selection with a minimum retention of 90 ft ² basal area per acre. No site preparation will occur due to partial harvesting.	No change to approved yarding methods.

Geological Summary (information presented from existing bodies of work):

The harvest unit occupies a broad descending northeast trending ridge upslope of the North Fork of Elk River. The underlying geology is undifferentiated Wildcat Group sediments composed of silts, sands, and infrequent gravels. The bedrock is compact and predominantly held together by consolidation. The unit is mapped by CGS (2005) to be underlain by a large dormant rock slide (Figure 3). Additionally, debris slide slope/source areas are mapped within a prominent Class II channel in the eastern portion of the unit and on moderately inclined slopes in the northern portion of the unit.

One rotational / translational / earthflow is mapped in the southwestern corner of the unit. This area is within a no harvest zone (Figure 6).

Review of Figure 2 (Hillslope Shade) shows no correlation between surface morphology and the Figure 3, unit wide deep seated landslide. At best, the northeastern facing slopes directly upslope of the north fork of elk river slightly resemble morphology consistent with very old and weathered mass wasting. The Figure 6 landslide located in the southwestern corner of the unit is somewhat visible. Its weathered expression suggests that the landslide is very old. The hillslope shade shows the prominent watercourses to be well entrenched with moderate to steeply inclined flanking slopes.

Mass Wasting Potential (MWP) (Figure 4) is modeled as regionally low throughout the unit. Areas of moderate occur where the slopes adjacent the watercourses are steeply inclined. One area of high MWP is modeled where Figure 3 debris slide slopes occur.

Unstable areas were identified in the harvest unit by the RPF and CLG. These areas were reviewed and mitigations developed to limit the potential for sediment delivery (SGD, 2007). The THP was reviewed by various agencies during PHI and found to be compliant with the Forest Practice Rules with respect to the disclosure of all known unstable areas and the mitigations.

The harvest unit was evaluated at the THP level with respect to clearcut silviculture. As mandated by new management, the silviculture has changed to group selection with a target retention of 90 ft² basal area. This change is not in response to perceived high slope stability hazard, however, the retention of timber on the slopes further reduces the potential for harvest related mass wasting.

A significant portion of the unit, including a four identified landslides has been removed from harvest due to the placement of a Habitat Retention Area (HRA).

The unit has been evaluated as a single polygon.

THP Unit: # 4
Polygon: 4-1

A) General Observations

The unit is bound by a Class I watercourse to the northeast, and Class II watercourses to the northwest and southeast. The southern boundary is at Forester's dissection and is located in the upper slope positions of the drainage.

The polygon occupies predominantly convex and concave slope forms but localized areas of planar and irregular slopes occur. Slope inclinations vary from flat to over 60%.

Two Class III watercourses extend approximately 150 feet in the operational portion of the unit. The watercourses drain slopes leading to the North Fork Elk River. The channels are poorly defined.

The western Class II watercourse is flanked by predominantly 40 to 60% inclined, concave to planar hill slopes. The slopes appear smooth with a well entrenched Class II tributary extending into the upper elevations of the unit. Four landslides were identified by a licensed geologist on slopes leading to the western Class II watercourse. All slopes leading to the western Class II watercourse, including the landslides, have been excluded from harvest due to wildlife requirements (HRA) within the HCP.

The Class II watercourse defining the eastern boundary of the harvest unit is flanked by similar planar to concave, moderate to steeply inclined slopes. No Class III tributaries drain from the unit to the watercourse. Three landslides were identified on the slopes that drain to the watercourse. Two of the landslides are located within the no harvest RMZ for the Class II watercourse. The remaining landslide is road related, near the ridgetop, and has been assessed by a CLG as having a low potential for delivery to the downslope watercourse.

Several areas of elevated SHALSTAB (Value 2) are located within the unit. These areas tend to occur in groups of 2 to 3 pixels and are located throughout the lower elevations of the unit. Some are concentrated along, parallel with and straddle the no harvest RMZ of the eastern Class II watercourse. The remaining value 2 areas are located on north-facing slopes that drain to the north fork of Elk river. No protection was afforded the areas of elevated SHALSTAB that lie outside the harvest exclusion zones during THP development. This is due to an absence of indicators that correspond to potentially unstable areas.

A) General Observations

Typical Riparian Management Zones for the Class I include a 50-foot no harvest inner band and an outerband that extends to 150 feet. Harvest is permissible in the outerband provided that the canopy closure is not reduced below 50% post harvest. For this harvest unit, the entire RMZ for the Class I watercourse has been established as a no harvest.

Typical Riparian Management Zones for the Class II watercourses includes a 30-foot no harvest inner band and a selection buffer that extends the RMZ out to between 75 and 100 feet. The outerband may be harvested but must retain a minimum of 60% canopy closure. For this unit, the entire Class II RMZ has been established as a no harvest and expanded in one location to include an unstable area.

The implemented THP mitigation for the Class III watercourses includes the retention of all trees growing within the active channel and all trees 8 inches and less within 15 feet of the channel. The new silviculture has bolstered Class III mitigations to include a 50' RMZ where side slopes greater than 50% exist and maintaining 75 sq. ft evenly distributed in the buffer. Where side slopes are less than 50% employ a 25' RMZ that maintains 75 sq. ft evenly distributed in the buffer and no group opening greater than ¼ acre immediately above the terminus of class III with slopes greater than 40% or immediately above a headwall swale. Additionally sub-merchantable trees and those with specific wildlife value characteristics (e.g., cavities, large limbs, broken tops, snags, etc.) will be retained within the harvest area to the extent feasible.

Numerous landslides were recorded in the THP during development and agency review. The landslides assessed as having delivery potential to waters of the state have been mitigated with no harvest flagging. See the geology report in section V of the THP.

The stand appears to have been commercially thinned within the last 15 to 20 years. The stand is predominantly redwood (80%).

B) Harvest Related Impacts and Hillslope Sensitivity

Landslides were observed within the harvest. The landslides are predominantly associated with legacy roads. Current planned operations will result in less ground disturbance than previous operations and are unlikely to increase potential for mass wasting-related discharge.

The extensive RMZs were designed to provide sediment filtration bands adjacent the watercourses should extensive sediment be generated from the clearcut harvesting. The current level of harvest will retain both canopy closure and slash from the harvested trees potentially increasing the effectiveness of the sediment filtration band.

B) Harvest Related Impacts and Hillslope Sensitivity

As learned from the geology report, activities that could potentially increase the likelihood of mass wasting would be significant road building that undercuts or significantly fill loads more steeply inclined areas with the unit. New roads skid roads may be constructed but they are constrained to the gently inclined ridgetop.

C) Forestry / Silviculture Plan

The silviculture for the unit has been recently amended to group selection (previously clear cut). The retention standard will be minimum 90 square feet basal area per acre.

Site preparation has been changed to none.

D) Operational Design Plan

THP approved yarding method is both ground based and cable. The yarding methods were developed utilizing on-the-ground evaluation of potential impact, feasibility of efficient yarding, and the Forest Practice Rules. As approved, the yarding methods appear appropriate for the given site conditions and locations.

No site preparation will occur due to partial harvesting.

References:

- CGS, 2005, Geologic and Geomorphic Features Related to Landsliding, Elk River Watershed, Humboldt County, California. Department of Conservation, now California Geological Survey (CGS) Watershed Mapping Series, Mapset 4, Plate 1. Available via the web at ftp://ftp.consrv.ca.gov/pub/dmg/thp/maps/elk/elk_color.pdf
- Montgomery, D.R. and W.E. Dietrich, 1994. A physically based model for the topographic control on shallow landsliding. *Wat. Resour. Res.* 30: 1153-1171. For specific details regarding the model used in this evaluation, please see Palco, 2006. Additional information from the model authors is available at the following website: <http://socrates.berkeley.edu/~geomorph/shalstab>
- HRC, 2007, Ortho-photo rectified aerial photographs flown by 3Di West, Eugene Oregon,
- HRC, 2008, Freshwater Creek and Elk River WDR Permit Acreage Enrollment and Compliant Monitoring Program, NCRWQCB R1-2006—0039 and R1-2006-0041, Quality Assurance Project Plan, Version 3.0. Policy document submitted to NCRWQCB dated June 7, 2006.
- HRC, 2004, Elk River / Salmon Creek Watershed Analysis, Scotia, California, prepared for Pacific Lumber Company (PALCO) dated 2004?, and acquired by Humboldt/Redwood Company, LLC in 2008.
- HRC, 2005, (Policy Acquired from The Pacific Lumber Company (PALCO)) Prescriptions Based on Watershed Analysis for Freshwater Creek, California, August 15, 2002.
- HRC, 1999, The Pacific Lumber Company's Habitat Conservation Plan, Vol. 2 Part D, Landscape Assessment of Geomorphic Sensitivity, Public Review Draft.
- SGD, 2007, Engineering Geologic Evaluation of the South Lake View THP, Humboldt County, California, unpublished consultants reports to Mr. Deakon Ducey, RPF, Scotia Pacific Company, LLC, dated November 20, 2007. The report can be found in Section V of Timber Harvest Plan 1-07-183.

Brief descriptions of the models used in this evaluation:

SHALSTAB was first described in Dietrich and Montgomery (1994). SHALSTAB is a simple, physically-based model based on the Mohr-Coulomb failure law that can be used to map shallow landslide potential. The model calculates the potential for failure using gridded digital elevation data. The simplicity of the model lies in the formulation of slope stability parameters that allow the model to be run parameter-free using default values suggested by the authors or determined by local measurement. Because the model uses no field measurements of critical characteristics that determine slope stability, the evaluation of potential instability is only an approximation. In applying SHALSTAB for Tier 2 enrollment, HRC has run the model on a 10-m spatial grid using LiDAR elevation data and applied the parameters as suggested by the model authors. HRC's application of the method and parameters is described in HRC (2008).

Mass Wasting Potential (MWP) modeling is a cursory regional assessment that numerically values soil, slope inclination, geology type, and geomorphology with respect to past mass wasting (HRC, 1999). The sums of the values specific to an area are measured against a set ranking system that extends from very low to extreme. The model's intent is to highlight areas of high potential for instability at the planning level. The model's use at the site specific level is limited in that pedogenic soil types are used, not textures, the geologic formations utilized provide one value for all of the incorporated facies, and the model is heavily biased if past mass wasting has occurred or has been mapped as occurring in the area.

Table 1. Proposed 2009 Harvest in North Fork Elk River. Revised 3/25/09

THP Name	THP Number	Unit Number	Silviculture				SEL	CC Equivalent	Hazard	
			CC	ROW	CT	SHR			Low	High*
Bridgehead	06-202	6				19.5	9.8	13.2	80.6	
Bridgehead	06-202	8				23.9	12.0	12.1	151.1	
Bridgehead	06-202	9		2.6		27.9	16.6	14.9	199.7	
Brown Bridge	08-026	4				23	11.5	14.3	111.4	
Brown Bridge	08-026	5				32.7	16.4	23.9	112.7	
S. Lake View	07-183	1				7.7	3.9	5.7	25.6	
S. Lake View	07-183	2				13.7	6.9	11.6	26.9	
S. Lake View	07-183	3				32.9	16.5	27.6	67.9	
S. Lake View	07-183	4				17.9	9.0	11.7	79.4	
Moss Elk	08-072	1				14.1	7.1	11.9	28.2	
Moss Elk	08-072	2				13.5	6.8	10.5	38.4	
Moss Elk	08-072	3				17.6	8.8	13	62.8	
Moss Elk	08-072	4				18.2	9.1	10.9	97.3	
South Lake	08-084	3				11	5.5	10.5	1.8	
South Lake	08-084	1				1.1	0.6	1.1	0.0	
**South Lake	08-084	1				Total	140.0			

*The acres represented here have been converted to High Hazard Acres by multiplying by 12.807.

** This unit is mostly in South Fork Elk total for the unit is 30.2

Highlight indicates a THP and Specific Unit to be enrolled prior to establishing an enforceable Zero Discharge Monitoring Plan. Weighted Acreage Totals are listed below to demonstrate compliance with the Staff Landslide Model limit of 266 Harvest Acres in North Fork Elk River. Other THP Units will be enrolled after approval of the aforementioned Monitoring Plan

No Highlight Indicates a THP and Specific Unit to be enrolled after establishment of an enforceable Zero Discharge Monitoring Plan (Tier II).

Total Clear Cut Equivalent Acres enrolled or submitted for enrollment	140.0
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Table 2. Summary of THPs to enrolled prior to establishment of Zero Discharge Monitoring Plan for North Fork Elk River.

THP Number	Unit Number	Harvest Acres	Hazard	
			Low	High*
06-202	6	19.6	13.2	80.6
07-183	1	7.7	5.7	25.6
07-183	2	13.7	11.6	26.9
08-072	1	14.1	11.9	28.2
08-072	2	13.5	10.5	38.4
08-084	3	11	10.5	1.8
08-084	1	1.1	1.1	0.0
Totals		80.7	266.0	

Table 3. Summary of THPs by Yarding System and Site Preparation for North Fork Elk River.

THP Name	THP Number	Unit Number	Yarding System		Site Preparation	
			Ground Based	Yarder	Helicopter	Mechanical Broadcast
Bridgehead	06-202	6	3.5	16		
Bridgehead	06-202	8	0	23.9		
Bridgehead	06-202	9	2.6	27.9		
Brown Bridge	08-026	4	1.7	21.3		
Brown Bridge	08-026	5	17.6	15.1		
S. Lake View	07-183	1	7.7	0		
S. Lake View	07-183	2	0	13.7		
S. Lake View	07-183	3	8.1	24.8		
S. Lake View	07-183	4	1.8	16.1		
Moss Elk	08-072	1	14.1	0		
Moss Elk	08-072	2	13.5	0		
Moss Elk	08-072	3	15	2.6		
Moss Elk	08-072	4	1.9	16.3		
South Lake	08-084	3	8.1			
South Lake	08-084	1	1.1	2.9		

Humboldt Redwood Company LLC

Erosion Control Plan (ECP) for South Lake View THP 1-07-183HUM

Updated ECP – for purpose of identifying **Tier 2** erosion control sites specific to units 3 and 4 (2009 enrollment requests); Unit 3 has sites 425 (U08.4780), 750 (U08.4780), 870 (U08.4780), 950 (U08.4780), 120 (U46.121485) and 500 (U46.121485). Unit 4 has sites 610 (U08.31), 1020 (U08.31), 1870 (U08.31), 2010(U08.31) , 2615 (U08.31), 2815 (U08.31) and 5093 (U08.31). erosion control sites located on the spur road system leading specifically to these units or in the units.

This plan is being included in the THP to partially meet the requirements of the North Coast Regional Water Quality Control Board Watershed-wide Waste Discharge Requirements. (WWDRs)

All operational portions of this ECP that are to be enforced through the Forest Practice Rules have been included in Section II of the THP.

Version 20080930

Humboldt Redwood Company LLC Erosion Control Plan (ECP)

This document addresses the requirements of the California Regional Water Quality Control Board, North Coast Region Order No. R1-2006-0039 (Elk River) for an Erosion Control Plan (ECP) related to timber harvest activities on Non-Federal lands in the North Coast Region (Sec. III D2 and D3). The responsible party for this ECP is Humboldt Redwood Company LLC, P.O. Box 712 Scotia, CA 95565 (707) 764-2330.

This ECP is submitted for: THP Name: South Lake View 1-07-183HUM
Contact Person: Jon Woessner Phone: (707) 764-4376

The landowner is committed to a wide variety of measures to prevent and minimize the discharge or threatened discharge of sediment from controllable sediment discharge sources as part of this project into the waters of the state in violation of applicable water quality requirements. Prevention and Minimization of Controllable Sediment Discharge Sources associated with this project are identified in the *Controllable Sediment Sources* table. The specific conditions of sediment discharge sources and a summary of prevention and minimization measures (Section I) are identified in the table. General prevention and minimization measures for the project (Section II) are incorporated in the ECP by reference.

The RPF and/or the RPF Designee have conducted an inventory of potential "controllable sediment discharge sources" within the project area. As defined in California Regional Water Quality Control Board Order No. R1-2006-0039 (Elk River).

"Controllable sediment discharge source" means sites or locations, both existing and those created by proposed timber harvest activities, within the Project area that meet all 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 these WWDRs,
2. was caused or affected by human activity, and
3. may feasibly and reasonably respond to prevention."

Upon guidance of the North Coast Regional Water Quality Control Board (NCRWQCB) staff, discharge from the source must be likely to occur during the life of the Timber Harvesting Plan (THP) and WWDR. (Holly Lundborg, personal communication)

The inventory method consisted of an appurtenant road survey, aerial photos and ground assessments of the harvest units, and a complete ground assessment of all watercourses and associated stream protection zones.

The schedule for implementing the prevention and minimization management measures for the controllable sediment sources will be consistent with the duration of the THP. These measures will be implemented in accordance with the priority level assigned to each site. High priority sites will be addressed first with low priority sites to follow. Work at all sites will be accomplished prior to THP expiration. The general prevention and minimization measures will be implemented concurrent with operations.

I. Inventory and Treatment of Controllable Sediment Sources

All controllable sediment sources are listed in the attached "Erosion Control Plan" table. These sources have been assigned a treatment priority of low, medium or high based on: 1) potential for significant sediment delivery to a Class I, II or III channel; 2) treatment immediacy (a subjective combination of event probability and sediment delivery); and 3) treatment cost-effectiveness.

The Prioritization for implementing prevention and minimization measures for road-related and non road-related controllable sediment sources is based upon guidance provided in Order No. R1-2006-0039 (Elk River). Highest priority is assigned to the largest sediment discharge sources that discharge to waters that support domestic water supplies or fish. The landowner's prioritization method considers this guidance, and combines it with consideration for accessibility and level of imminent risk of significant sediment discharge. Sources that receive a high priority rating will be treated by a date certain as noted in the Controllable Sediment Sources table. Sources that receive a low or medium rating are determined to have a low to moderate risk of imminent discharge and will be treated prior to completion of the THP, or as otherwise indicated.

Non-road related controllable sediment sources can include skid road crossings, yarding furrow, skid road in watercourse, perched skid road fill, skid road rutting, landslide, layouts, railroad grade, incline, etc.

Information specific to Controllable Sediment Discharge Sources is listed in the Controllable Sediment Sources Table, below. An explanation of information provided in that table is provided below.

II. 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 Humboldt Redwood Company policy, will prevent or minimize future sediment delivery. These measures include, but are not limited to measures incorporated in the THP Section Items as follows:

THP Section II:

- Item 14 – Describes silvicultural prescriptions
 - (i) Site Preparation – Disclosure of selected site preparation treatments and mitigation measures
- Item 16 – Harvesting Practices – Describes yarding systems, equipment utilized, equipment limitations, and drainage facility installation timing
 - Inclusive through (m) – equipment use limitations and mitigation
- Item 18 – Soil Stabilization – waterbreak requirements, mitigation to minimize soil disturbance and sediment transport
- Item 20 – Ground Based Equipment Use Location
- Item 21 – Ground Based Equipment Use in Sensitive Areas – locations, descriptions of operations, limitations and mitigation measures
- Item 22 – Alternative Practices to Harvesting and Erosion Control
- Item 23 – Winter Operations – Provides descriptions of limitations and mitigation measures required during winter period operations and Winter Operating Plan
- Item 24 – Roads and Landings – Describes road and landing construction and re-construction operations, limitations, drainage relief structure installation, mitigation measures, road maintenance, inspections and wet weather road use restrictions
- Item 25 – Site Specific Measures to Reduce Adverse Impacts and Special Instructions to the LTO
- Item 26 – Watercourse and Lake Protection (WLPZ)
- Item 27 – "In Lieu" WLPZ Practice(s)
- Item 28 – Downstream Water Users Notification and Domestic Water Supply Protection Description of protection measures
- Item 29 – Sensitive Watershed – Identifies whether the plan is located in a designated sensitive watershed and mitigation measures
- Item 29 – 1 Hillslope Management (HCP 6.3.3.7) – Describes HCP hillslope management measures required as per watershed analysis

THP Section V:

- Sediment Reduction from Roads and THP Sediment Production--Including Table 1 – "Sediment Delivery for Units and Roads for this THP," references, letter regarding Road related sediment assessment for this THP with the calculations of deliverable net cubic yards of sediment, calculations and PWA information related to the THP project area when available

Maps attached:

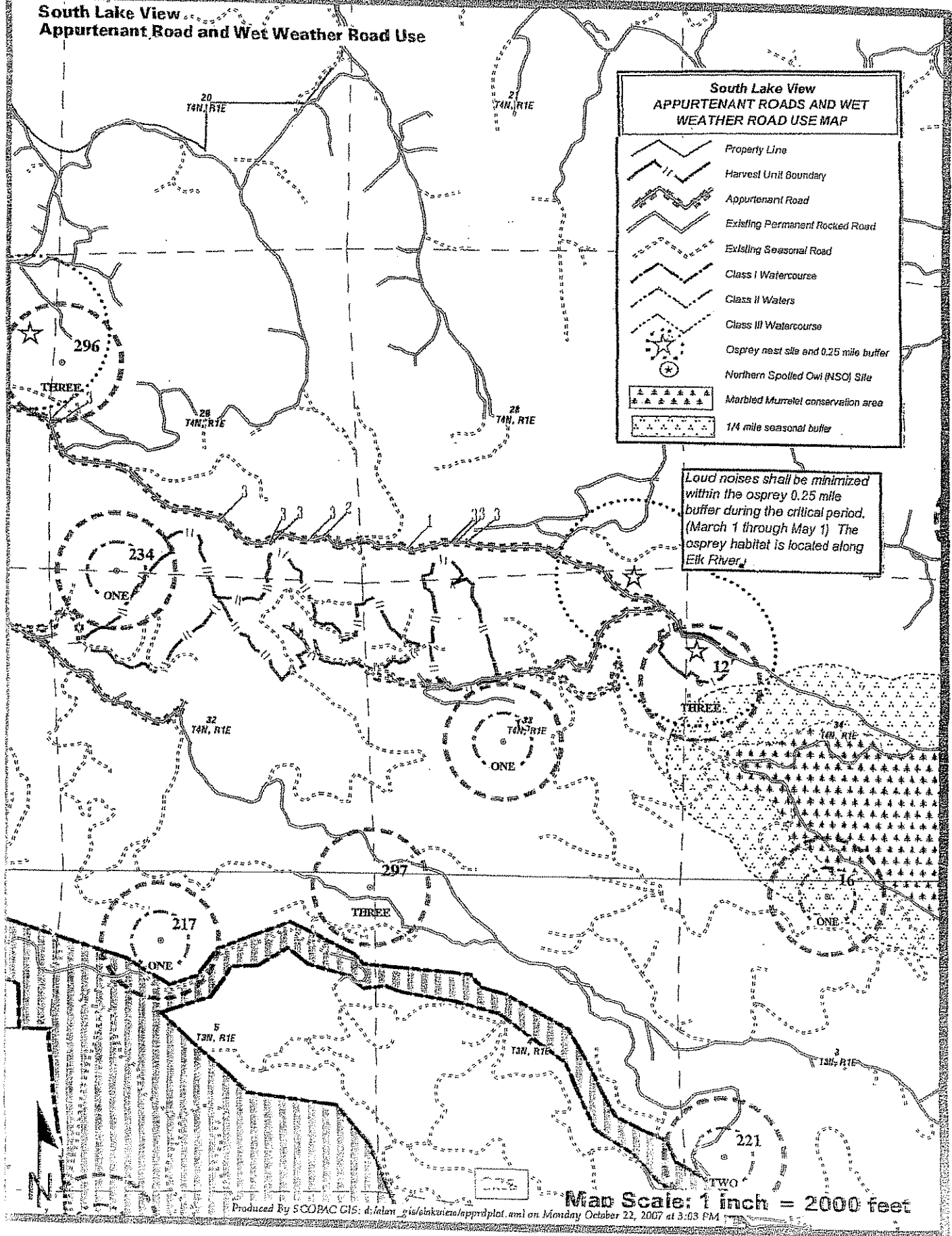
- Appurtenant Road and Wet Weather Road Use map
- Road Construction Locations/ECP Site Locator Map

**South Lake View
Appurtenant Road and Wet Weather Road Use**

**South Lake View
APPURTENANT ROADS AND WET
WEATHER ROAD USE MAP**

- Property Line
- Harvest Unit Boundary
- Appurtenant Road
- Existing Permanent Rocked Road
- Existing Seasonal Road
- Class I Watercourse
- Class II Waters
- Class III Watercourse
- Osprey nest site and 0.25 mile buffer
- Northern Spotted Owl (NSO) Site
- Marbled Murrelet conservation area
- 1/4 mile seasonal buffer

Low noises shall be minimized within the osprey 0.25 mile buffer during the critical period. (March 1 through May 1) The osprey habitat is located along Elk River.

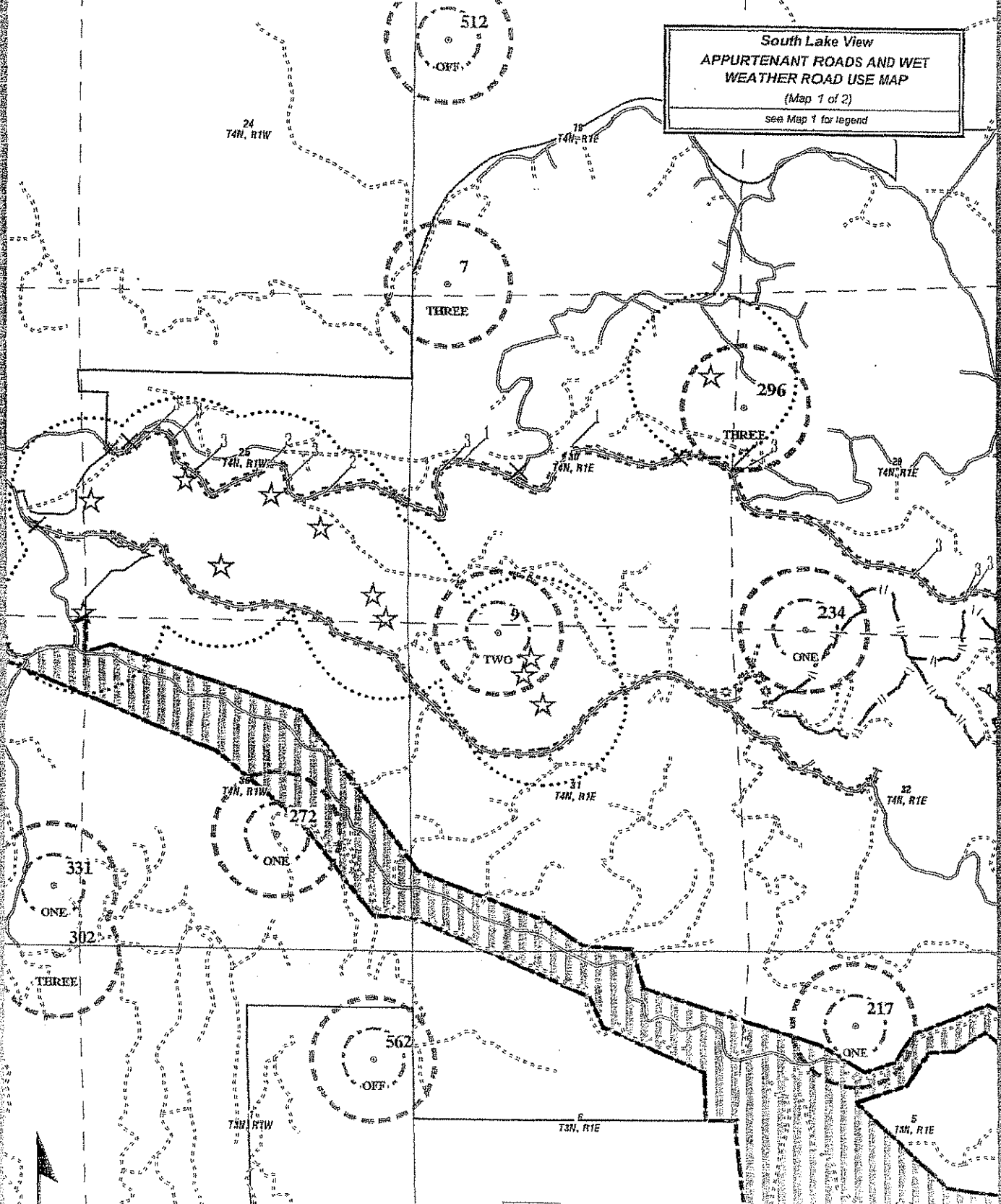


Map Scale: 1 inch = 2000 feet

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**South Lake View
Appurtenant Road and Wet Weather Road Use**

**South Lake View
APPURTENANT ROADS AND WET
WEATHER ROAD USE MAP**
(Map 1 of 2)
see Map 1 for legend



Map Scale: 1 inch = 2000 feet

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South Lake View
Road Construction Specifications Map

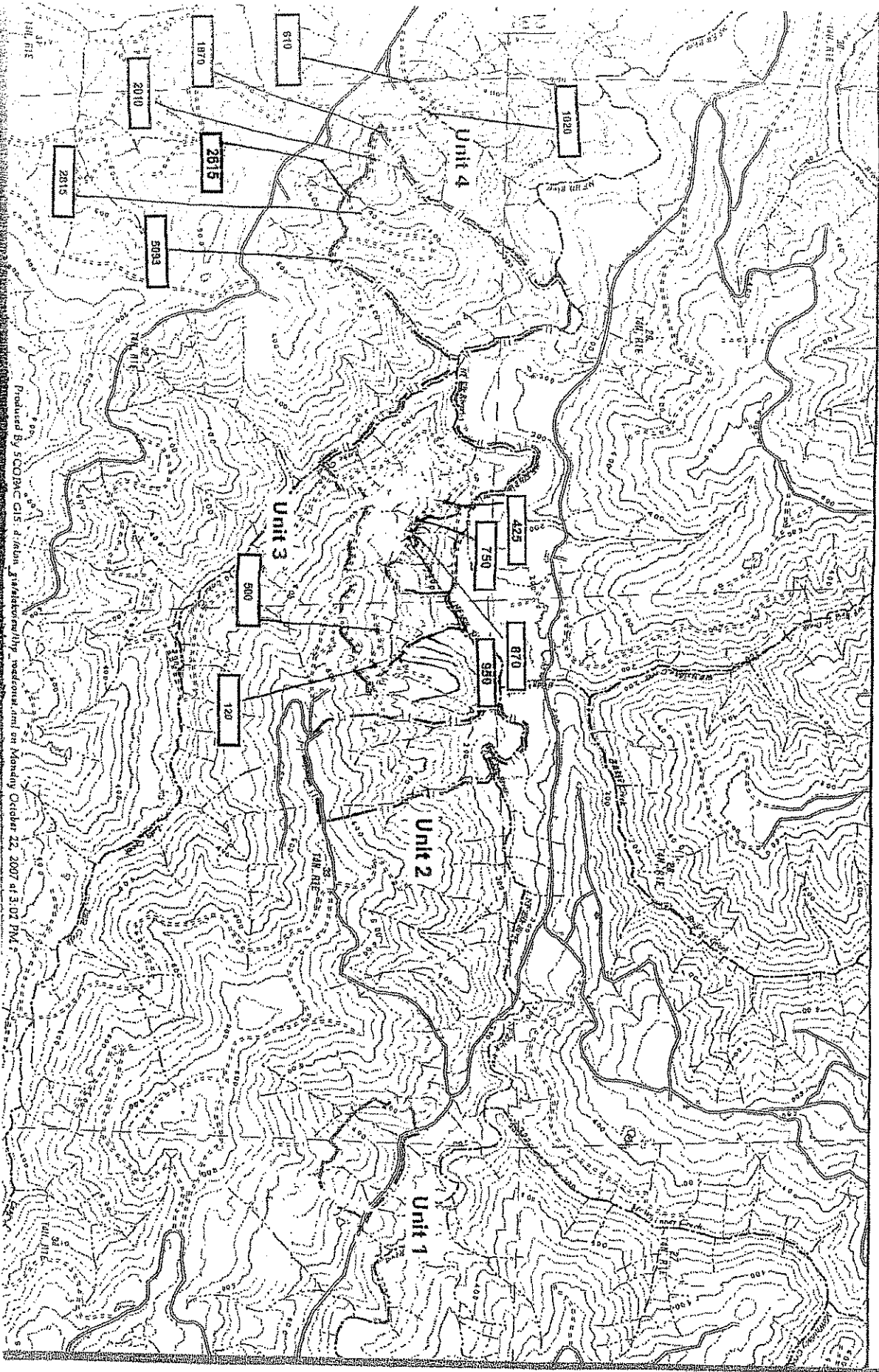
1:50,000 Scale - 30', 45', 50', 55', 57.50'

North Arrow
 UTM Grid: 18N UTM Zone 18N
 Contour Interval: 40 feet

Map Scale: 1 inch = 1320 feet

- Hatched Boundary
- ==== Permanent Road
- Seasonal Road
- ~~~~~ Class I Watercourse
- ~~~~~ Class II Watercourse
- ~~~~~ Class III Watercourse
- Class II Waters

||||| Cut and Fill Construction
 1/2 Cut and 1/2 Fill



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III Inspection Plan and Reporting Requirements

A. Inspection Plan

The Inspection Plan is designed to ensure that all required management measures are installed and functioning prior to rainfall events; that the management measures are effective in controlling sediment discharge sources throughout the winter period; and that no new controllable sediment discharge sources developed.

- B. Qualified and trained professionals will conduct all specified inspections of the project site to identify areas causing or contributing to a violation of the applicable water quality requirements or other provisions of these WWDRs. The responsible party for inspection and reporting is **Jon Woessner (707) 764-4376**.
- C. No inspections are required in Project Areas where Timber Harvest Activities have not yet commenced.
- D. Project Areas where Timber Harvest Activities have commenced and no winter period Timber Harvest Activities have occurred inspections will be conducted each year and throughout the duration of the Project while Timber Harvest Activities occur.
- a. The Project is covered under WWDRs and the following inspection requirements will begin at the startup of timber harvest activities within the Project area:
 - i. By November 15 to assure Project Areas are secure for the winter period;
 - ii. Once following ten (10) inches of cumulative rainfall commencing on November 15 and prior to March 1, as worker safety and access allows; and
 - iii. 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.
 - b. Project Areas with Winter Period Timber Harvest Activities will conduct inspections of such Project Areas while Timber Harvesting Activities occur and the Project is covered under the WWDRs as follows:
 - i. Immediately following cessation of winter period Timber Harvest Activities to assure areas with winter Timber Harvest Activities are secure for the winter;
 - ii. Once following ten (10) inches of cumulative rainfall commencing on November 15 and prior to March 1, as worker safety and access allows; and
 - iii. 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.
 - c. Inspection reports will identify where management measures have been ineffective and when repairs and design changes will be implemented to correct management measure failures.
 - d. After completing the required inspections, and when it has been determined new controllable sediment discharges sources have developed, the ECP, implementation schedule, and inspection plan will be updated, if required, consistent with the WWDRs and submit the updated documents to the Regional Water Board to maintain coverage under the WWDRs. If the approved amendment is found to be out of compliance with the WWDRs, the Project will be amended to be consistent with the provisions of the WWDR within 30 days, or coverage under the WWDRs will be terminated. The Project will then be required to seek Project coverage under an individual WDR.
 - e. Equipment, materials, and workers will be available for rapid response to failures and emergencies, implement, as feasible, emergency management measures depending upon field conditions and worker safety for access.
- D. If during the inspection or during the course of conducting timber harvest activities, a violation of an applicable water quality requirement or conditions of WWDRs is discovered, the following procedures will be followed:
- a. When it has been determined that discharges are causing or contributing to a violation or an exceedence of an applicable water quality requirement or a violation of a WWDR prohibition:

- i. Corrective measures will be implemented immediately following the discovery that applicable water quality requirements were exceeded or a prohibition violated, followed by notification to the Regional Board by telephone as soon as possible but no later than 48 hours after the discharge has been discovered. The notification will be followed by a report within 14 days to the Regional Board, unless otherwise directed by the Executive Officer, that includes:
 1. the date the violation was discovered;
 2. the name and title of the person(s) discovering the violation;
 3. a map showing the location of the violation site;
 4. a description of recent weather conditions prior to discovering the violation;
 5. the nature and cause of the water quality requirement violation or exceedence or WWDR prohibition violation;
 6. photos of the site characterizing the violation;
 7. the management measure(s) currently being implemented;
 8. any maintenance or repair of management measures;
 9. any additional management measures which will be implemented to prevent or reduce discharges that are causing or contributing to the violation or exceedence of applicable water quality requirements or WWDR prohibition violation; and,
 10. the signature and title of the person preparing the report.
 11. the report will include an implementation schedule for corrective actions and describe the actions taken to reduce the discharges causing or contributing to violation or exceedence of applicable water quality requirements or WWDR prohibition violation.

- E. For other inspections conducted where violations are not discovered, a summary report will be submitted to Executive Officer by June 30th for each year of coverage under the WWDRs or upon termination of coverage. The summary report, at a minimum will include the date of inspections, the inspector's name, the location of each inspection, and the title and name of the person submitting the summary report.

If helicopter operations are proposed for this project, please find attached a Columbia Helicopters, Inc. (CHI) Fuel Spill Prevention and Cleanup Plan For Columbia Helicopters Field Operations.

Explanation of Information Included in the Controllable Sediment Sources Table

Column Heading	Explanation
Site No.	Site identification unique to project area
Site Type	A description of the existing site. Example: Humboldt Crossing; Culvert Crossing; Unstable Fill; Unstable Cut Slope; Diversion Potential.
Estimate of Potential Erosion	A quantitative estimate of the volume, in cubic yards, of the total amount of potential erosion/displacement of soil that will occur should the site entirely fail. The landowner often uses a methodology developed by Pacific Watershed Associates to estimate erosion, which assumes 100% delivery of calculated volume—use of this method for individual sites is noted in Site Description.
Potential Sediment Delivery Percent	An estimate of the relative potential for sediment delivery expressed as a percent of the total amount of Potential Erosion that will be discharged to waters of the State should the site fail.
Sediment Prevention Volume	The volume, in cubic yards, of sediment discharge estimated to be prevented by implementation of the prescribed treatment. Volume represents the Estimate of Potential Erosion multiplied by the Potential Sediment Delivery Percent.
Priority for Treatment	Treatment priority reflects the immediacy of sediment discharge and the relative risk to the receptor, should the site fail. Low priority sites are ones that will not likely deliver significant amounts of sediment during the life of the WWDR permit, and will be treated prior to filing of THP work completion report, which does not exceed 5-years following THP approval date. Medium or high priority sites indicate potentially imminent discharge, and the timing of treatment is indicated in Implementation Schedule column.
Implementation Schedule	Indicates the timing of implementing the prevention and minimization measures listed in the Treatment column.
Site Description	Provides sufficient information that describes the existing condition of the site and factors that inform the chosen treatment methods and implementation schedule. This information will include a description of how the existing condition of the site (ie. stable or unstable) will be affected by different storm events, and whether sediment discharge is imminent. For example, an unstable site could easily discharge significant amounts of sediment in a small storm, thus the treatment priority should be higher. Conversely, a stable site that may take one or more very large storms to trigger discharge could be lower treatment priority. If PWA method is used to calculate erosion/delivery volumes, it will noted here.
Treatment	Sediment discharge prevention and minimization measures that will be implemented at the site, including treatment specifications if necessary.

Attachments:

- ECP Table
- Columbia Fuel Spill Prevention and Cleanup Plan

Erosion Control Plan

Site	Site Type	Est. Potential Erosion (Cu.Yards)	Est. Potential Delivery (Cu.Yards & %)	Priority for Implementation	Schedule	Site Description	Treatment
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Project South Lake View

Rd U08.31 Station 610 Site s1	Crossing	60	5 8%	Low	Prior to THP Final	Class II spring located along inside cutbank, which flows down inside ditch and crosses the road at an existing dip.	Small class II spring is located along inside cutbank. Realign stream crossing with natural channel. Excavate channel down to natural gradient from top to bottom flag. Install 18" culvert with down spout.
Rd U08.31 Station 1020 Site s3	Crossing	4	1 25%	Low	Prior to THP Final	Pulled class III crossing.	Install 18" culvert. Point shall be repaired before October 15 first year of use.

Rd U08.31 Station 1870 Site s4 ID 1194988589	Humboldt	30	10 33%	Low	Prior to THP Final	This is a failing Humboldt crossing located on a class III stream, which is slowly bleeding sediment into the system.	This is a failing Humboldt crossing located on a class III stream. Excavate remaining fill from top to bottom flag and install a 24" culvert at natural channel gradient. Use excavated wood in crossing or rip rap to armor the head. Install down spout if necessary. This road point shall be repaired before October 15 first year of use.
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Rd U08.31 Station 2010 Site s5 ID -1651115542	Humboldt	250	130 52%	Low	Prior to THP Final	This is a failing Humboldt crossing located on a class III stream, which is slowly bleeding sediment into the system.	This is a failing Humboldt crossing located on a class III stream. Excavate remaining fill from top to bottom flag and install a 18" culvert at natural channel gradient. Use excavated wood in crossing or rip rap to armor the head. Install down spout if necessary. This road point shall be repaired before October 15 first year of use.
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Rd U08.31 Station 2615 Site c1 ID 1195339412	Crossing	200	100 50%	Low	Prior to THP Final	A class II crossing where water is flowing under the existing 24" culvert.	Water is flowing around the existing 24" culvert. Excavate crossing from top to bottom flag, down to natural channel gradient, and install new 36" culvert. Rock outlet if necessary to prevent down cutting.
Rd U08.31 Station 2815 Site s7 ID 1653933864	Crossing	60	30 50%	Low	Prior to THP Final	Class III stream where water is flowing around the existing 18" culvert.	Water is currently flowing around the existing 18" culvert. Excavate crossing from top to bottom flag and install a rocked ford. Rock armor the head and rock the channel at the outboard edge.

Rd U08.31 Station 5093 Site s10 ID -597487841	Culvert	5	1 20%	Low	Prior to THP Final	This is a class II crossing where major down cutting has occurred at the culvert outlet.	Major down cutting has occurred at the culvert outlet. Install downspout at culvert outlet to prevent further downcutting.
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Rd U08.4780 Station 425 Site s1 ID -919026773	Humboldt	200	150 75%	Low	Prior to THP Final	This site is a failing Humboldt crossing located on a class III stream, which is slowly bleeding sediment into the watercourse.	This site is a failing Humboldt crossing located on a class III stream. Excavate remaining Humboldt crossing down to natural grade, lay side slopes back 2:1, stock pile locally. Use LWD found in the Humboldt crossing to armor the head which will help prevent head cutting. Install waterbars on road segment leading to the stream crossing to Hydrologically disconnect road segment.
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Site	Site Type	Est. Potential Erosion (Cu. Yards)	Est. Potential Delivery (Cu. Yards & %)	Priority for Treatment	Implementation Schedule	Site Description	Treatment
Rd U08.4780 Station 750 Site s2 ID 1967666834	Humboldt	200	120 60%	Low	Prior to THP Final Completion.	This site is a falling Humboldt crossing, which is slowly bleeding sediment into the watercourse.	This site is a falling Humboldt Crossing located on a class III stream. Excavate remaining Humboldt crossing down to natural grade, lay side slopes back 2:1, stock pile locally. Use LWD found in the Humboldt crossing to armour the head which will help prevent head cutting.
Rd U08.4780 Station 870 Site s3 ID 115446901	Humboldt	130	100 77%	Low	Prior to THP Final Completion.	This site is a falling Humboldt crossing located on a class III stream, which is slowly bleeding sediment into the watercourse.	This site is a falling Humboldt Crossing located on a class III stream. Excavate remaining Humboldt crossing down to natural grade, lay side slopes back 2:1, stock pile locally. Use LWD found in the Humboldt crossing to armour the head which will help prevent head cutting.
Rd U08.4780 Station 950 Site s4 ID -2129067324	Humboldt	200	110 55%	Low	Prior to THP Final Completion.	This site is a falling Humboldt crossing located on a class III stream, which is slowly bleeding sediment into the watercourse.	This site is a falling Humboldt Crossing located on a class III stream. Excavate remaining Humboldt crossing down to natural grade, lay side slopes back 2:1, stock pile locally. Use LWD found in the Humboldt crossing to armour the head which will help prevent head cutting.
Rd U46.121485 Station 120 Site s1 ID -490934930	Temporary Crossing	6	2 33%	Low	Prior to THP Final Completion.	Partially pulled crossing located on a class III stream.	Install temporary crossing. Use minimum 6" culvert. This point is tied with PWA point NPE 803. Prior to plan completion this crossing shall be excavated to natural gradient. Lay back side slopes at 2:1 and stock pile locally.
Rd U46.121485 Station 300 Site s2 ID 1309053015	Temporary Crossing	20	10 50%	Low	Prior to THP Final Completion.	Partially pulled class III crossing.	Install temporary crossing. If crossing is not required during timber operations then excavate channel to natural gradient, lay side slopes back 2:1 and stock pile locally.
Total Estimated Yards		1365	769				



FUEL SPILL PREVENTION AND CLEANUP PLAN FOR COLUMBIA HELICOPTERS FIELD OPERATIONS

Scope

This plan has been prepared by Columbia Helicopters, Inc. (CHI) to meet the requirements set forth by the Federal, State and Local rules that apply to fuel storage.

The procedures and/or plans have been designed to minimize the hazards to human health and the environment from fires, explosions, and hazardous spills. All affected CHI employees and our contractors are charged with the compliance of the provisions of this plan from a maintenance standpoint and whenever there is an emergency. All CHI field mechanics have been instructed and trained in carrying out the plan, and the appropriate techniques of fuel spill prevention and cleanup.

Preparedness and Prevention

CHI maintains and operates its job sites to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste/material or hazardous waste/material constituents to air, soil or surface water which could threaten human health or the environment.

Emergency Command Structure

CHI has a field emergency command structure on all of its job sites. The Primary Emergency Coordinator is the Project Manager, with the Crew Chief or Logging Trainer as alternates. See CHI form CHI-S-31A (enclosed) which is located in the maintenance van for a list of applicable personnel and emergency phone numbers. CHI Field Mechanics are responsible to act as initial responders.

Emergency Coordinators Duties

At all times, there is at least one employee either at the job site or on call with the responsibility for coordinating all emergency response measures. The Emergency Coordinator is thoroughly familiar with all aspects of CHI's Fuel Spill Prevention and Cleanup Plan, all aspects of operations and activities, location and usage of emergency equipment at the job site, and which persons or agencies to notify immediately in the event of an emergency. This person has the authority to commit the resources needed to carry out this Spill Prevention and Cleanup Plan.

Field Mechanics Duties

CHI Field Mechanics are responsible for contacting the Emergency Coordinator immediately and acting as initial responders in the event of a fuel spill. The primary objective of the initial response is to keep the fuel out of waterways, stabilize or contain the fuel to prevent further spillage, and begin the cleanup process.

2.35

Emergency Equipment

CHI maintains an adequate supply of absorbent pads, shovels, pumps and hoses, drums, visqueen, fire extinguishers, first aid equipment, etc. in the maintenance vans in the event of an emergency. The fueling area maintains a smaller supply of absorbent pads, shovels, fire extinguishers, first aid equipment and secondary containment around fuel tanks. Nurse trucks when used for remote fueling will also carry a fire extinguisher, first aid kit, and a small supply of absorbent pads. Absorbent pads may be wrung out and reused. See Spill Containment Plan for diagram of secondary containment system for fuel tanks. CHI is capable of obtaining other emergency equipment from a variety of other sources, such as: local fire and police departments and Riedel Environmental Services, Inc. or another private emergency response contractor.

Emergency Procedures

Whenever there is an imminent or actual emergency situation, the Emergency Coordinator must immediately notify all field maintenance personnel and/or visitors, contractors, CHI management, state and local agencies, and other necessary persons, if needed, then assess the incident, then control or contain the release, if possible, and then if necessary call the National Response Center, 1-800-424-8802. See CHI form CHI-S-31A in maintenance van for phone numbers. The National Response Center, State and Local agencies must be provided with the following information:

- Name and telephone number of the person making the report.
- Name and address or location of the job site.
- Time and type of the incident.
- Name and quantity of the material(s) involved to the extent possible.
- Extent of any injuries known.
- Possible hazards to human health and the environment, outside of job site.

Personnel who cause or observe a spill or release of hazardous materials must immediately call the Emergency Coordinator. If the material(s) come in contact with your skin, wash it off immediately with copious amounts water. If the material(s) come into contact with your clothes, remove the clothes at the best available time and then wash your skin off with copious amounts of water.

Personnel who cause or observe small localized fires or explosions may try to extinguish the fire by using one of the available extinguishers. As soon as the fire is extinguished, contact your supervisor and the Emergency Coordinator.

The Emergency Coordinator will do everything in their power to keep the release from entering surface or ground water. This may include diking or berming, or using absorbents. Once contained or controlled put the material(s) solids/semi solids into open top 17H DOT drums and liquids into closed top 17E metal or poly drums or other approved storage devices that are compatible with the spilled material(s). Immediately label the drums with the words "Hazardous Waste" or words describing the contents of the waste. Also put an

accumulation date on the label. Then contact CHI's Hazardous Materials Manager to arrange for proper waste disposal.

If the spill or release reaches a stream, river, lake or is greater than the Reportable Quantity listed in 40 CFR 302.4 (for non-petroleum products), then the National Response Center must be notified of the release/spill. See CHI form CHI-0-31 in the maintenance van for the telephone number of the National Response Center. If fuel/oil is spilled in quantities greater than 42 gallons, in Oregon only, the Oregon Emergency Response Service must be called at 1-800-452-0311.

If the spill/release is determined to be greater than CHI personnel are able to handle or cleanup, an environmental cleanup contractor will be called to handle that portion of the remediation activities. Foss Environmental Services, Inc. can be reached 24 hours a day at 1-800-337-7455 or 503-283-1150.

Immediately after the spill the Emergency Coordinator will provide for the treatment, storage or disposal of the recovered waste, contaminated soil, surface water or any other material that results from a release, fire or explosion at the job site.

Follow Up

The Emergency Coordinator will ensure that affected area(s) of the job site have no waste which is incompatible with the released material that is treated, stored or disposed of until cleanup procedures are completed, e.g. flammables and oxidizers, and acids and bases. All emergency equipment will be cleaned and fit for its intended use before operations will resume.

Required Reports

CHI will notify the EPA Regional Administrator and the state environmental agency that the job site is in compliance with 40 CFR 265.56 (h) before operations are resumed in the affected area(s) of the job site.

CHI will note in a memorandum the time, date and details of any incident that requires implementation of this plan. Also, CHI will, within 15 days after the incident, submit a written report on the incident to the Regional Administrator. The report will include the following:

- Name, address and telephone number of CHI.
- Date, time and type of incident.
- Name and quantity of the material(s) involved.
- The extent of the injuries, if any.
- An assessment of actual or potential hazards to human health and the environment, where this is applicable.
- Estimated quantity and disposition of the recovered material.

237

General Purpose Decontamination Solutions/Procedures

<u>Type of Hazard Suspected</u>	<u>Solution</u>	<u>Directions for Preparation</u>
1. Inorganic acids, metal processing wastes.	A	To 10 gallons of water add 4 lbs of sodium carbonate (soda lime) and 4 lbs of trisodium phosphate. Stir until evenly mixed.
2. Heavy metals: chrome, lead, cadmium, etc.	A	Same as item 1
3. Pesticides, fungicides, chlorinated phenols, and dioxins.	B	To 10 gallons of water add 8 lbs of calcium hypochlorite. Stir with wooden or plastic stirrer until evenly mixed.
4. Cyanides, ammonia, and other non-acidic inorganic wastes.	B	Same as item 3
5. Solvents and organic compound such as trichloroethane and toluene.	C or A	To 10 gallons of water add 4 lbs of trisodium phosphate. Stir until evenly mixed.
6. PCB's and oily, greasy wastes.	C or A	Same as item 5
7. Inorganic bases, alkali and caustic waste.	D	To 10 gallons of water add 1 pint of concentrated hydrochloric acid. Stir with a wooden or plastic stirrer.

CHI equipment that is contaminated will be thoroughly decontaminated with the above solutions for the appropriate contaminate. The rinse waters are to be captured to determine if they are hazardous or not. Personnel decontaminating equipment will wear the proper protective equipment such as goggles, face shield, rubber gloves and boots, a splash suit and air purifying respirator, if necessary.

Note: The decontamination chemicals listed above can be purchased at most feed and hardware stores.

Revisions

This plan will be amended or reviewed if applicable regulations change, the plan fails in an emergency, the job site changes in its design, construction, operation, maintenance, or other circumstances in a way that materially increases the potential for fires, explosions or releases of hazardous wastes or hazardous constituents, or changes in the response necessary in an emergency, the list of emergency coordinators changes or the list of emergency equipment changes.

**COLUMBIA HELICOPTERS, INC.
OIL SPILLAGE PROCEDURES**

*** POST IN SERVICE VAN ***

In the event of fuel or oil spillage, immediately contact the Aurora office.

1. Project Manager _____ or
2. Crew Chief _____ or
3. Logging Trainer _____
4. Aurora Office 503-678-1222
5. U.S. Coast Guard 1-800-242-8802
(National Response Center)
6. Oregon DEQ 1-800-452-0311
Washington DEQ 1-800-258-5990
California EPA 916-262-1621 or in-state 1-800-645-7911
Idaho DEQ 208-373-0502 or in-state 1-800-632-8000
Alaska DEQ (Juneau) 907-465-5340 or after hours 1-800-478-9300
7. Local Bulk Commodities Common Carrier: _____
8. Clean-up Services/Environmental Emergency Services
Foss Environmental Services 1-800-337-7455
9. If appropriate, use oil absorbent pads located at service van.

Figure 1

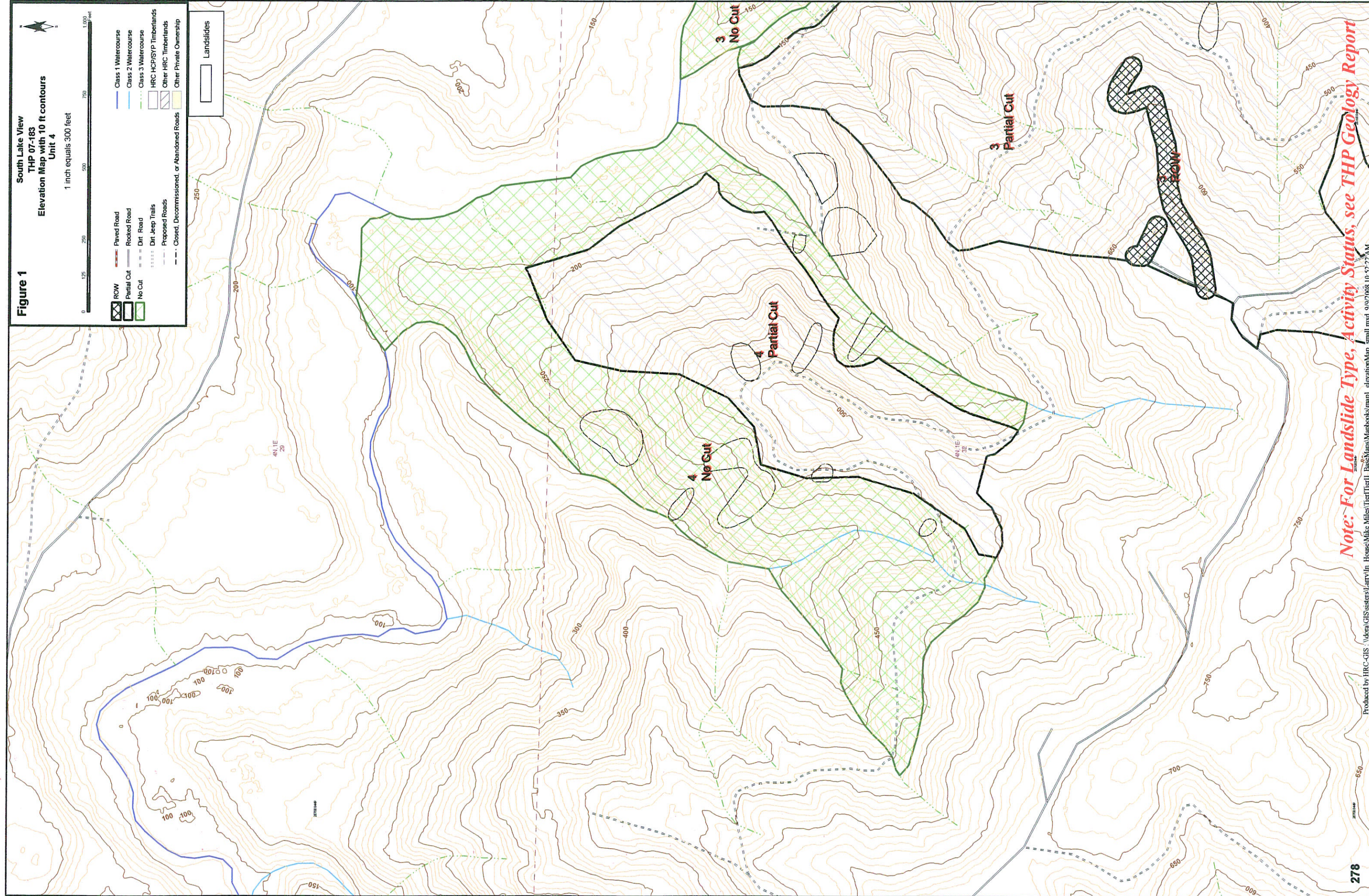
South Lake View
THP 07-183
Elevation Map with 10 ft contours
Unit 4

1 inch equals 300 feet



- | | | |
|-------------------------|--------------------------------------------|-------------------------|
| ROW | Paved Road | Class 1 Watercourse |
| Partial Cut | Routed Road | Class 2 Watercourse |
| No Cut | Dirt Road | Class 3 Watercourse |
| HRC HCP/STP Timberlands | Dirt Jeep Trails | HRC HCP/STP Timberlands |
| Other HRC Timberlands | Proposed Roads | Other HRC Timberlands |
| Other Private Ownership | Closed, Decommissioned, or Abandoned Roads | Other Private Ownership |

- | |
|------------|
| Landslides |
|------------|



Note: For Landslide Type, Activity Status, see THP Geology Report

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Figure 2
 South Lake View
 THP 07-183
 Shalstab 10 mnts grid / Slope Class Map
 Unit 4

1 inch equals 500 feet

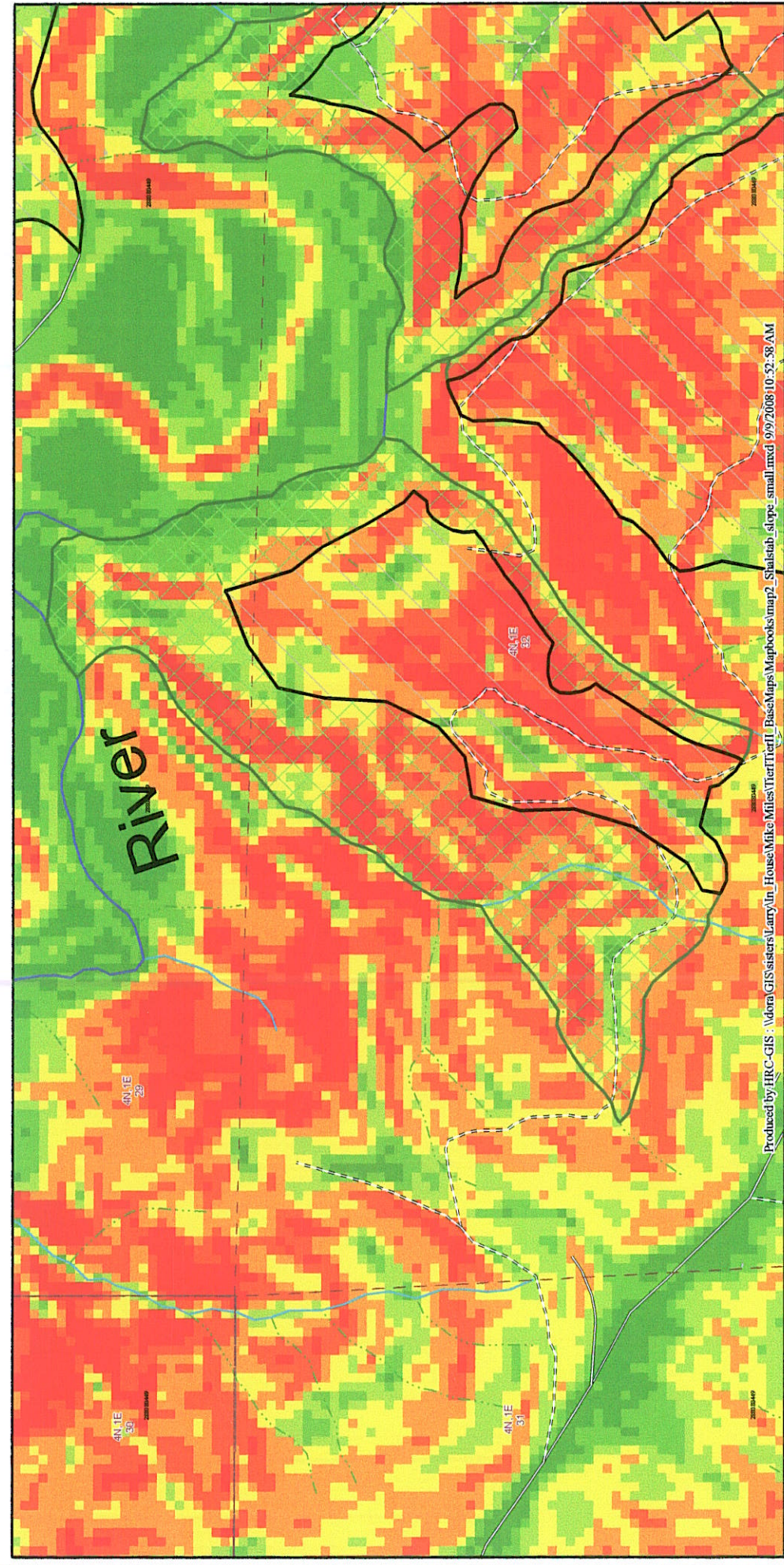
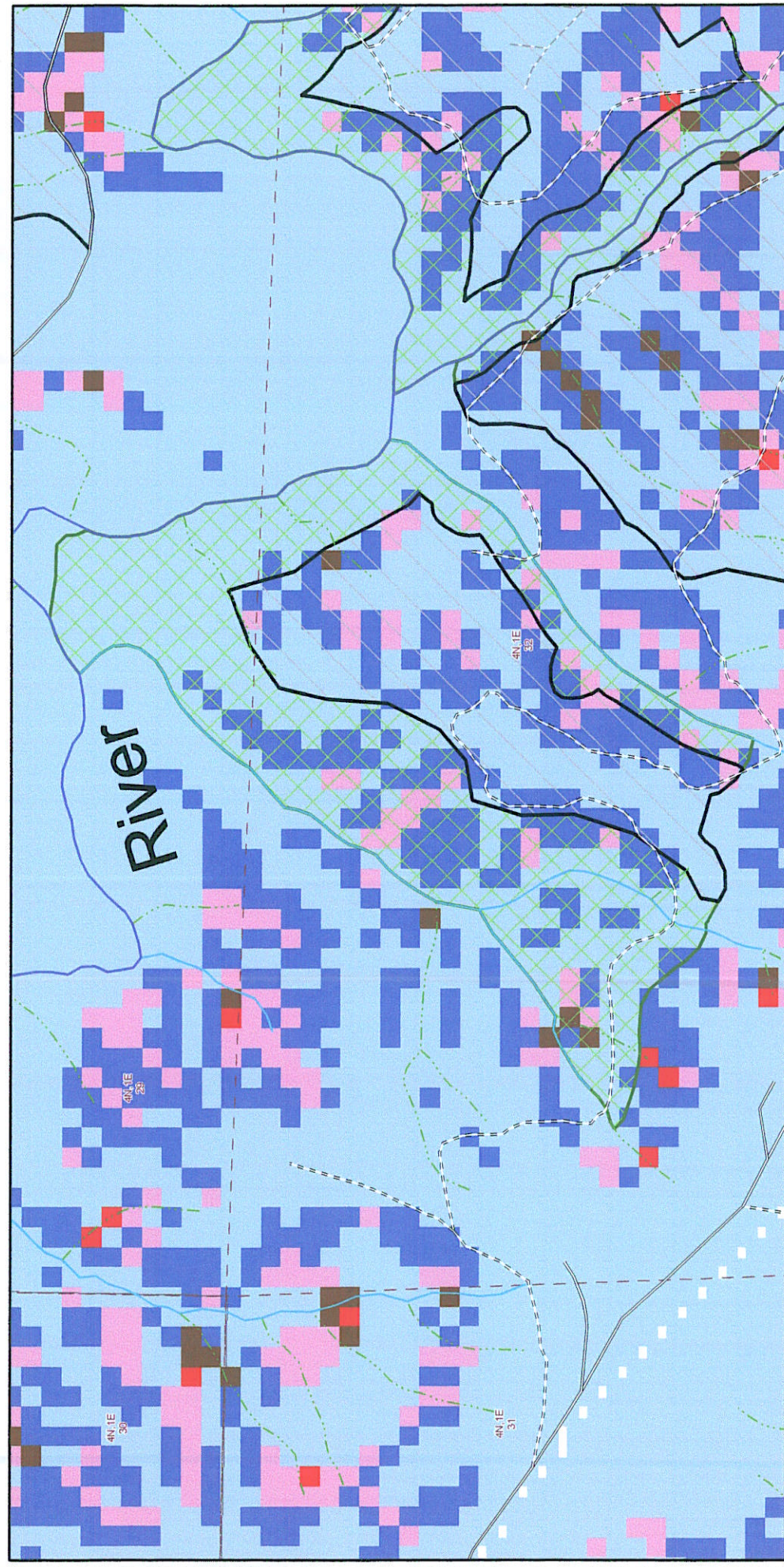
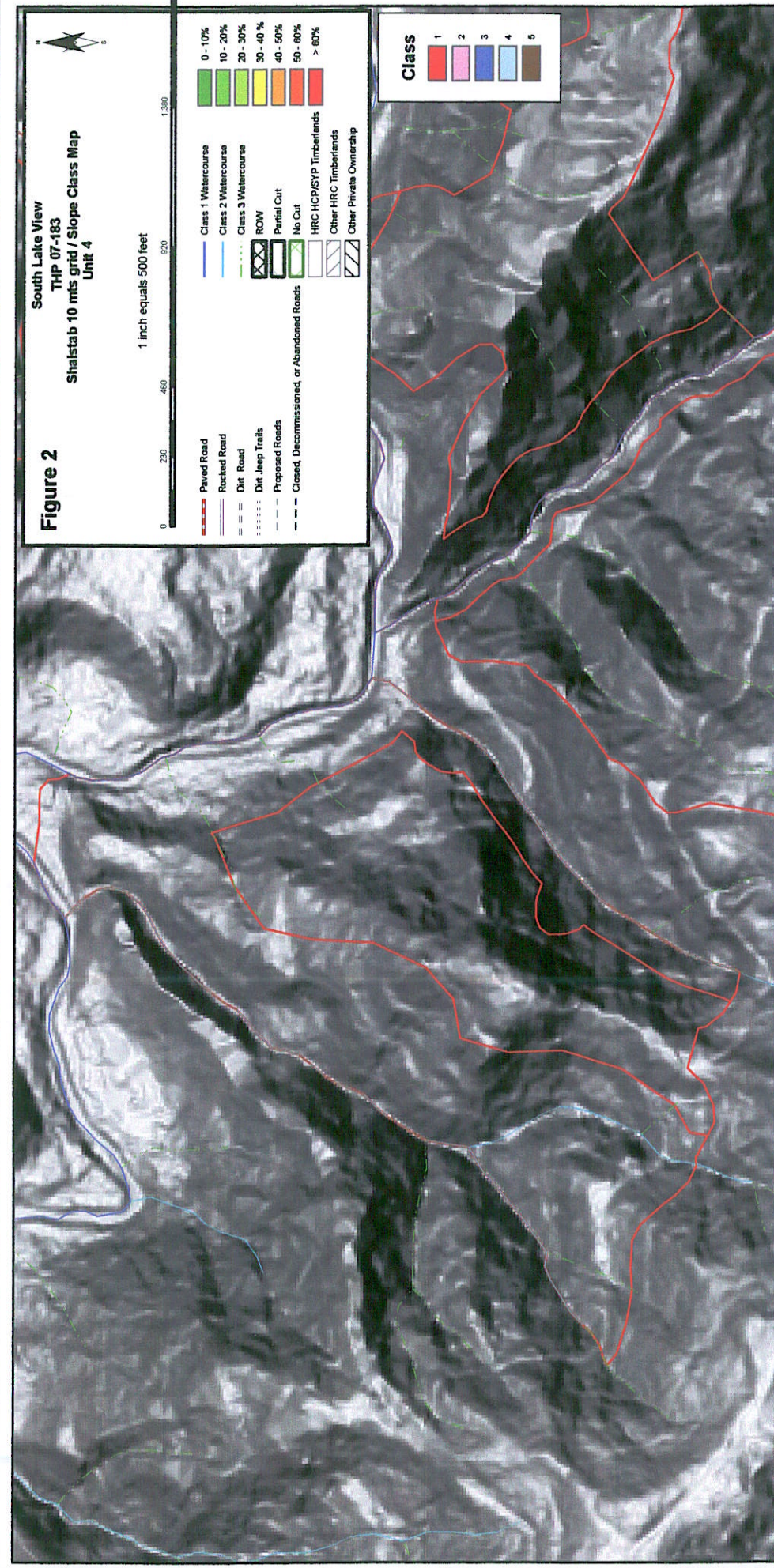
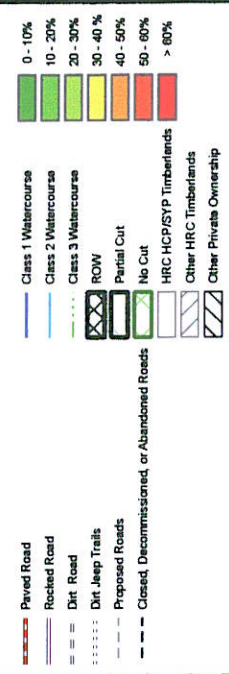


Figure 3

South Lake View
THP 07-183
CGS Map Unit 4

1 inch equals 300 feet



- HRC HCP/SYP Timberlands
- Other HRC Timberlands
- Other Private Ownership
- ROW
- Partial Cut
- No Cut
- Paved Road
- Rocked Road
- Dirt Road
- Dirt Jeep Trails
- Proposed Roads
- Closed, Decommissioned, or Abandoned Roads

- Class 1 Watercourse
- Class 2 Watercourse
- Class 3 Watercourse

Legend

CGS Freshwater structure

FEATURE

- anticline, approx. loc.
- fault, approx. loc.
- fault, concealed
- thrust fault, approx. loc.
- thrust fault, concealed
- trigast fault, queried
- lineament

CGS Freshwater lines

TYPE

- HHH lg
- it

CGS Freshwater LS

INIT_TYPE, ACTIVITY

- df, h
- ds, d
- ds, h
- ef, d
- ef, h
- rs, d
- rs, h
- cs, s

CGS Freshwater symbols

- <all other values>

ACTIVITY

- ah
- d

CGS Freshwater geology

UNIT

- Klfm
- Klfs
- Q
- Cr?
- Or?
- Tw?
- Tw?
- Twu
- Ty
- Ty?
- u

CGS Freshwater contacts

CONTACT

- approximately located
- certain location
- queried location

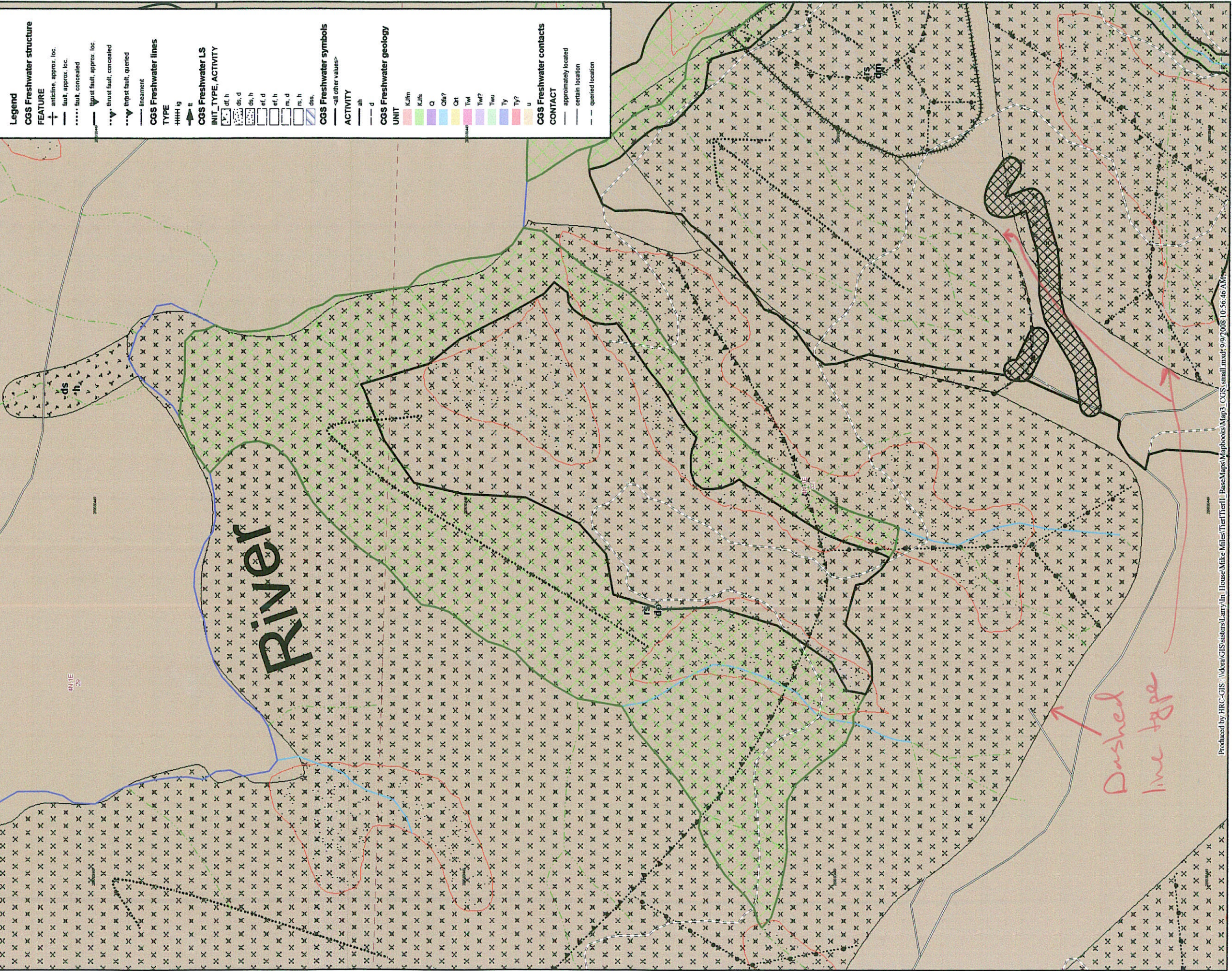


Figure 4

South Lake View
THP 07-183
Mass Wasting Potential
Unit 4

1 inch equals 300 feet

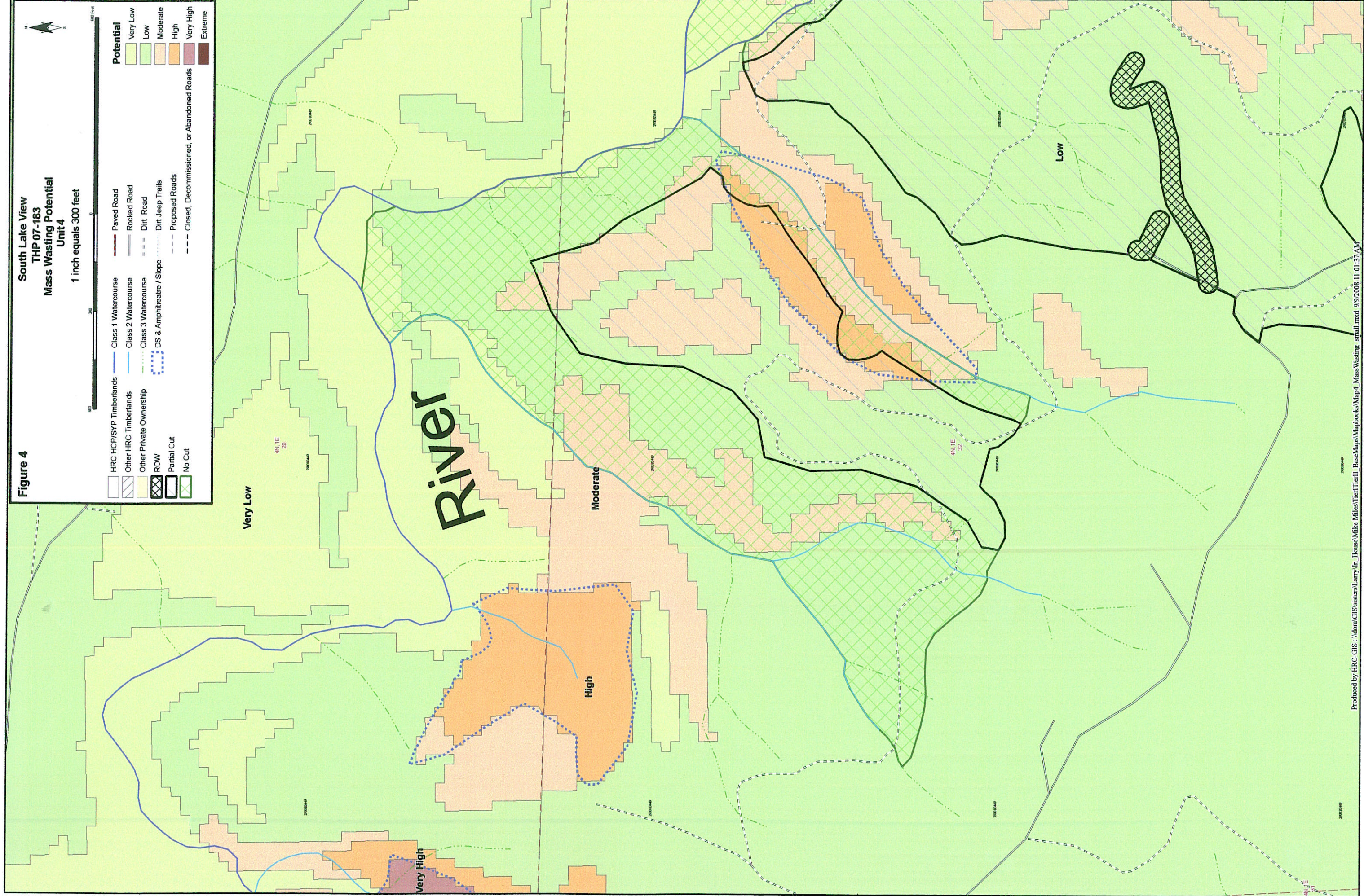
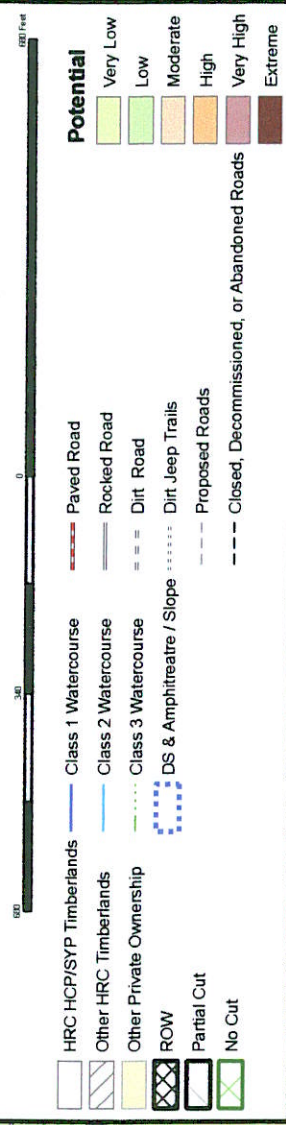







Figure 5

South Lake View
THP 07-183
Aerial Photo Map - Unit 4

1 inch equals 300 feet

0 100 200 300 400 500 600 700 800 900 1,000

- | | | | | | | | |
|-----------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------|--------------------------------------------|
|  | HRC HCPSP Timberlands |  | ROW |  | Class 1 Watercourse |  | Paved Road |
|  | Other HRC Timberlands |  | Partial Cut |  | Class 2 Watercourse |  | Rocked Road |
|  | Other Private Ownership |  | No Cut |  | Class 3 Watercourse |  | Dirt Road |
| | | | |  | |  | Dirt Jeep Trails |
| | | | |  | |  | Proposed Roads |
| | | | |  | |  | Closed, Decommissioned, or Abandoned Roads |

River

Figure 6

THP 07-183 Watershed Analysis Deep-Seated Landslide Inventory Unit 4

1 inch equals 300 feet
0 150 300 600 900 1,200 Feet

- HRC HCP/SYP Timberlands
- Class 1 Watercourse
- Paved Road
- Other HRC Timberlands
- Class 2 Watercourse
- Rocked Road
- Other Private Ownership
- Class 3 Watercourse
- Dirt Road
- ROW
- Dirt Jeep Trails
- Partial Cut
- Proposed Roads
- No Cut
- Closed, Decommissioned, or Abandoned Roads

- ### Legend
- Scarp
 - Earthflow
 - Rotational/ Translational/ Earthflow
 - Rotational/ Translational



Figure 7

South Lake View
THP 07-183
Road Map

1 inch equals 1,057.89265 feet



- HRC HCP/SYP Timberlands
- Other HRC Timberlands
- Other Private Ownership
- ROW
- Partial Cut
- No Cut
- Class 1 Watercourse
- Class 2 Watercourse
- Class 3 Watercourse
- Dirt Jeep Trails
- Proposed Roads
- Closed, Decommissioned, or Abandoned Roads
- Stormproofed
- Upgraded
- Decommissioned
- Paved Road
- Rocked Road
- Dirt Road

