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April 11th, 2011

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 1-08-072 HUM Unit 2 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 THP 1-08-072 HUM Unit #2. The Tier II portion of the plan proposed for enrollment is comprised of 13.5 acres of group selection (6.8 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. The Erosion Control Plan (ECP), Form 200 and an waste discharge enrollment fee have been included in previous enrollments for this plan. No new ECP sites have been found.

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.

Unit 2 essentially occupies a very gently inclined old terrace surface of Elk River. The steep slopes occurring within the unit (<50%) result from Elk River downcutting. The inherent mass wasting potential of the very gently inclined unit is very low. Coupled with extensive Class I and Class II watercourse protection zones, it is very unlikely that should a landslide develop, it would travel to a watercourse. This unit, as a product of location and proposed harvest activities, represents an insignificant increase in the potential for mass wasting, as such, it is our opinion that the unit meets the requirements for Tier II enrollment.

The THP proposes an uneven-age silviculture retaining 90 sq.ft. of basal area, except for group openings. 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 tractor yarding is approved for the entire unit. Post-harvest no site preparation will occur.

...the proposed harvest operations, as 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,



Jon Woessner,
Area Forester, RPF 2571
Humboldt Redwood Company, LLC

Attachments:

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

Table 1. Proposed 2010 Harvest in North Fork Elk River.

THP Name	THP Number	Unit Number	Silviculture				Hazard			
			CC	ROW	CT	SHR	SEL	CC Equivalent	Low	High*
Moss Elk	08-072	1				4.1	10	8.1	11.9	28.2
Moss Elk	08-072	2				0	13.5	6.8	10.5	38.4
LNFE/Lake tier 1	10-070	tier 1		3.1	0		79.1	42.7	71.7	135.4
LNFE/Lake tier 2	10-070	tier 2		1.5			374.8	188.9	236.7	1799.6
							Total	246.4		

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

THP Name	THP Number	Unit Number	Ground Based	Yarding System		Site
				Harvester	Helicopter	
Moss Elk	08-072	1	14.1	0		
Moss Elk	08-072	2	13.5	0		
LNFE/Lake tier 1	10-070	tier 1				
LNFE/Lake tier 2	10-070	tier 2				

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 COMPANY, LLC

THP Unit Review for Tier 2 Enrollment

: Moss Elk THP 08-072 Unit # 2 March 2, 2011

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

see back of enrollment for references

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

ecologic Review	Forestry Silviculture/Site Prep Plan	Operational Design Plan
2-1	THP approved silviculture is group selection. No site preparation will occur due to partial harvesting.	The approved THP proposes ground based yarding on the gently inclined slopes within the unit. No change to approved yarding methods.

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

THP included a Note 45 Geology report to address potentially unstable areas within Units 1, 3, and 4 of the THP. For a more comprehensive review of the geology associated with this harvest plan, please see the geology report in Section 5 of the THP. This review of summary of the geology and geomorphology of Unit 2. No landslides were found in Unit 2.

Unit is located on gently inclined south facing slopes adjacent Elk River. Slope forms within the operational portion of the unit are : One well developed Class II watercourses extend into the unit. The Forester has expanded all Class I and Class II harvest ion zones to the outer band of the RMZ. The harvest exclusion on the Class I watercourse is 200 feet and the harvest exclusion zone Class II watercourse is 100 feet. The harvest exclusion zone exceeds 200 feet in some locations.

: 3 shows the unit to be underlain by the Undifferentiated Wildcat Group sediments and quaternary alluvial deposits adjacent Elk The Undifferentiated Wildcat Group sediments are composed of silts, sands, clays, and infrequent gravels that are moderately lidated. Quaternary alluvium is composed of sands, silt, clays, and gravel along major stream channels. Because of the location of aterial mass wasting is typically not an issue, but in certain locations, in stream alluvium can be incorporated into debris torrents ing the channel. No landslides or landforms are mapped within the Tier II acres on Figure 3.

: 6 shows no areas of deep-seated mass wasting within the proposed Tier II acres. No evidence of deep-seated mass wasting was red in these areas during field review.

: 2 (Hillslope shade) reveals shadows indicative of consistent and even weathering of the slopes within the unit. Truck roads and ents of skid trails can be observed adjacent the unit.

Area has been previously clearcut and ground-based logged with steam donkeys and bulldozers. Ground disturbance is observable in ns of the unit in response to past harvest practices. The most recent harvesting occurred under the Forest Practice Rules and ted of ground based and cable yarded clear cuts and selection harvests. The landscape mass wasting response to this harvest entry rs to be significantly reduced by harvest methods regulations of the Forest Practice Rules and significant areas of concentrated d disturbance are localized on landings and skid trails.

THP Unit Review for Tier 2 Enrollment

Unit: # 2
Enrollment: 2-1

General Observations

Unit 2 is proposed for Tier II acres.

I watercourse Riparian Management Zones include a 50 foot no harvest inner band and an outer band that extends to 150 feet. Harvest is permitted in the outer band provided that 50% canopy closure is retained post harvest. No harvesting is proposed in the outer band within Unit 2.

Riparian Management Zones for the Class II watercourses includes a 30-foot no harvest inner band and a selection buffer that is the RMZ out to between 75 and 100 feet. The outer band may be harvested but must retain a minimum of 60% canopy closure. Harvesting is proposed in the outer band within Unit 2.

Implemented THP mitigation for the Class III watercourses includes the retention of all trees growing within the active channel and all trees 3 inches and less within 15 feet of the channel. Where channel side-slopes are greater than 50%, a 100' RMZ has been established maintaining 75 sq. ft (or the adjacent retention standard if greater) evenly distributed in the buffer. Where side slopes are less than 50% employ a 50' RMZ that maintains 75 sq. ft (or the adjacent harvest retention standard if greater) evenly distributed in the buffer and a rip opening greater than 1/4 acre immediately above the terminus of class III with slopes greater than 40% or immediately above a fall swale. Additionally sub-merchantable trees and those with specific wildlife value characteristics (e.g., cavities, large limbs, snags, etc.) will be retained within the harvest area to the extent feasible.

STAB modeling (Figure 2) highlights zero Value 1, Value 2, or Value 3 areas within the operational portions of the unit proposed for Tier II acres.

Figure 4 shows Mass Wasting Potential (MWP) modeling for the unit varies from very low to moderate. A small area of moderate MWP is delineated in the northeastern portion of the unit. Low and very low MWP is modeled throughout the majority of the unit.

Rock slides or landforms identified in the Note 45 geology report are within areas proposed for Tier II acres.

THP Unit Review for Tier 2 Enrollment

Invest Related Impacts and Hillslope Sensitivity

ive ground disturbance and clear cut harvesting appears to be the most significant component to develop a landslide atop the soils in the plan area. Those activities are not proposed in this plan. The current planned selection harvest will result in retention of canopy not strength reinforcement and significantly reduce the potential for mass wasting. Coupled with increased harvest exclusion zones in Class I and Class II watercourses, the mass wasting potential is reduced even more.

icant surface disturbance has occurred within the unit in response to past logging activities. The disturbance is the culmination of and layout construction. Following that impact, the area appears to have vigorously reforested.

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

II hillslope sensitivity with respect to the proposed selection harvest appears minimal with respect to mass wasting.

: see the THP geology report for a more comprehensive assessment of the role that timber harvesting has on slope stability.

Forestry / Silviculture Plan

ive not changed the silviculture in response to this evaluation.

Operational Design Plan

approved yarding method is ground based with tractors on the gently inclined slopes present throughout the unit. As proposed, the logging methods appear appropriate.

THP Unit Review for Tier 2 Enrollment

ences:

- 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
- merly, 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>
007. Ortho-photo rectified aerial photographs flown by 3Di West, Eugene Oregon.
008. 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.
004. 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.
005. (Policy Acquired from The Pacific Lumber Company (PALCO)) Prescriptions Based on Watershed Analysis for Freshwater Creek, California. August 15, 2002.
999. The Pacific Lumber Company's Habitat Conservation Plan, Vol. 2 Part D, Landscape Assessment of Geomorphic Sensitivity. Public Review Draft.

descriptions of the models used in this evaluation:

STAB was first described in Dietrich and Montgomery (1994). SHALSTAB is a simple, physically-based model based on the Coulomb failure law that can be used to map shallow landslide potential. The model calculates the potential for failure using digital elevation data. The simplicity of the model lies in the formulation of slope stability parameters that allow the model to parameter-free using default values suggested by the authors or determined by local measurement. Because the model uses no 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 and applied the parameters as suggested by the model authors. HRC's application of the method and parameters is described in (2008).

THP Unit Review for Tier 2 Enrollment

Wasting Potential (MWP) modeling is a cursory regional assessment that numerically values soil, slope inclination, geology and geomorphology with respect to past mass wasting (HRC, 1999). The sums of the values specific to an area are measured in a set ranking system that extends from very low to extreme. The model's intent is to highlight areas of high potential for erosion at the planning level. The model's use at the site specific level is limited in that pedogenic soil types are used, not textures, and 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.

I, Tagg Nordstrom, P.G. 7950, 4/24/11,
Name license # Date




Signature

Place licensed seal here

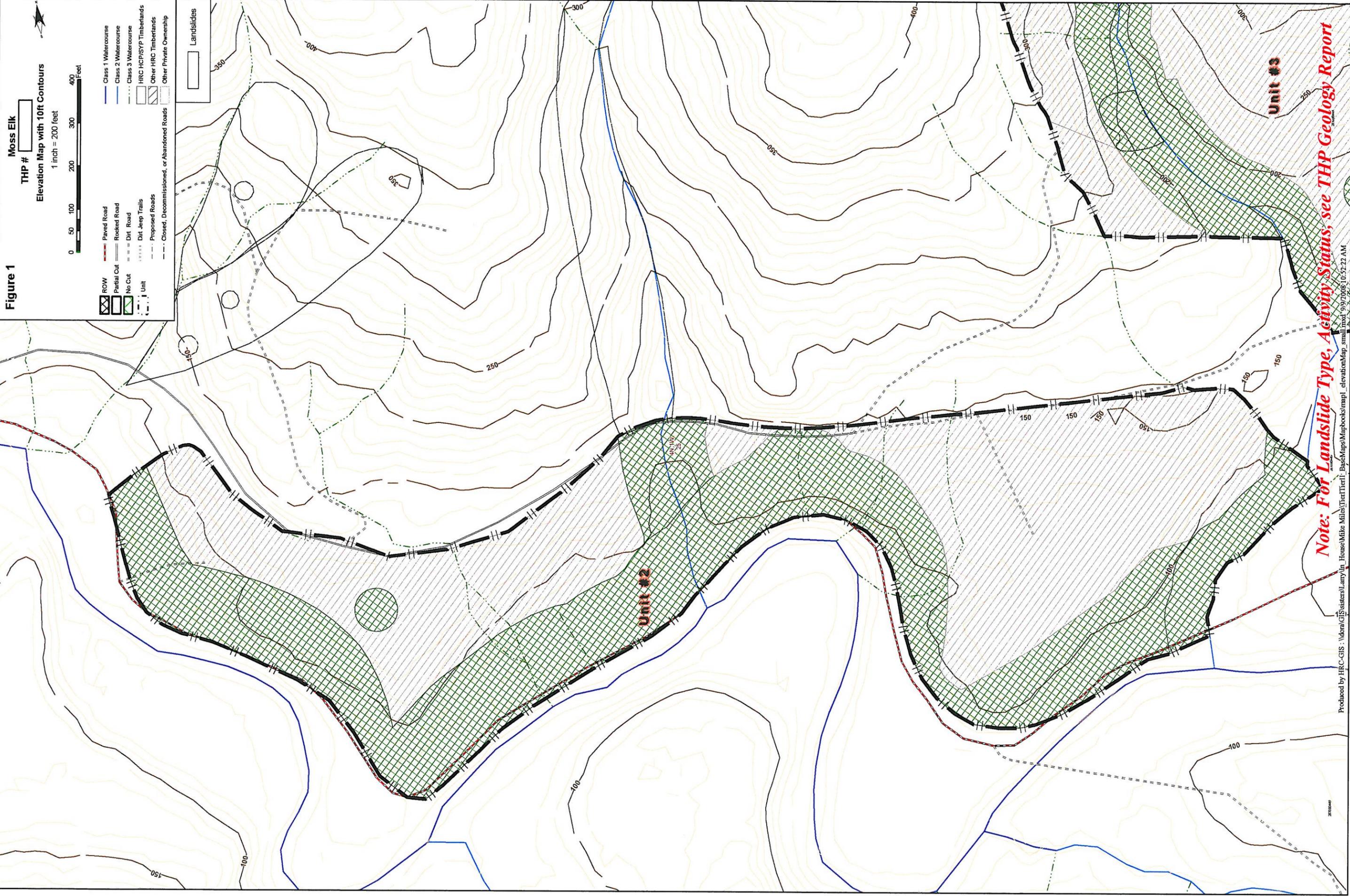
hereby certify, in accordance with North Coast Regional Water Quality Control Board (NCRWQCB) Order Nos. R1-2006-0039 and R1-2006-0041, that the attached application and the description of THP modifications, and the materials submitted along with:

THP No. 1-08-072 HUM (Moss Elk) Unit # 2

- a. are in accordance with accepted practices, and recognized professional standards;
- b. comply with the requirements of the Monitoring and Reporting Program No. R1-2008-0071, 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.

Figure 1



Moss Elk
THP #

Elevation Map with 10ft Contours

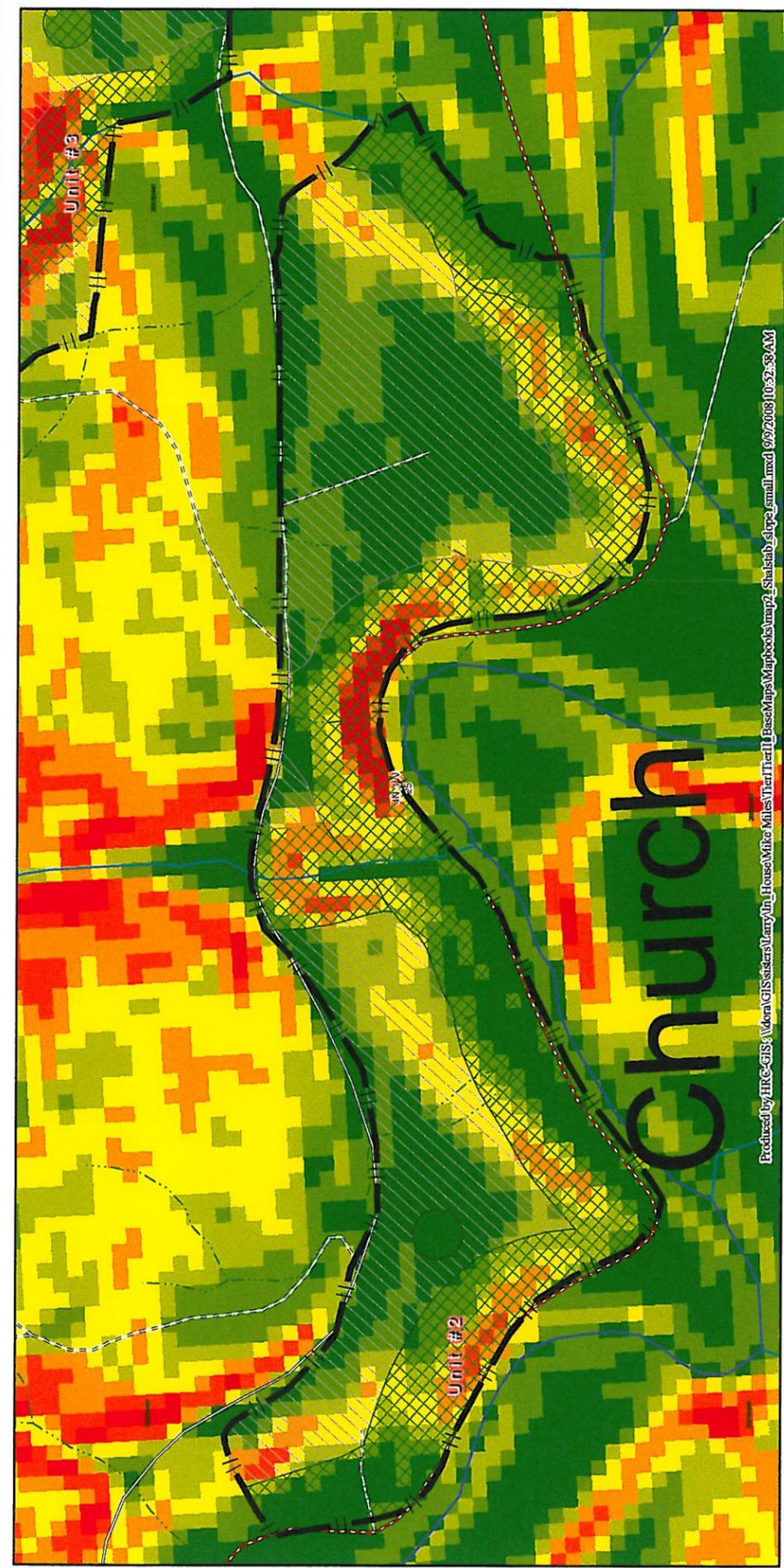
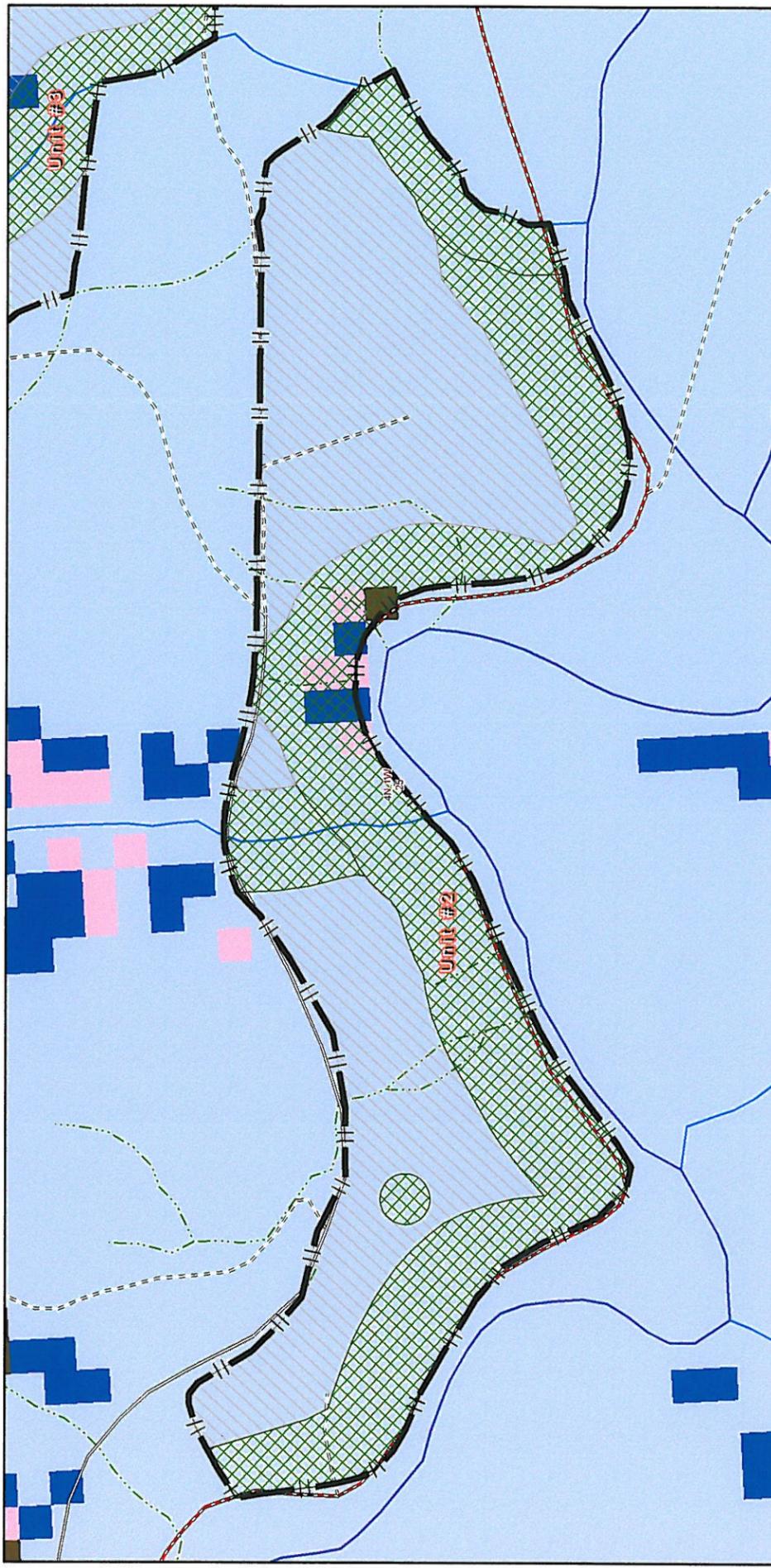
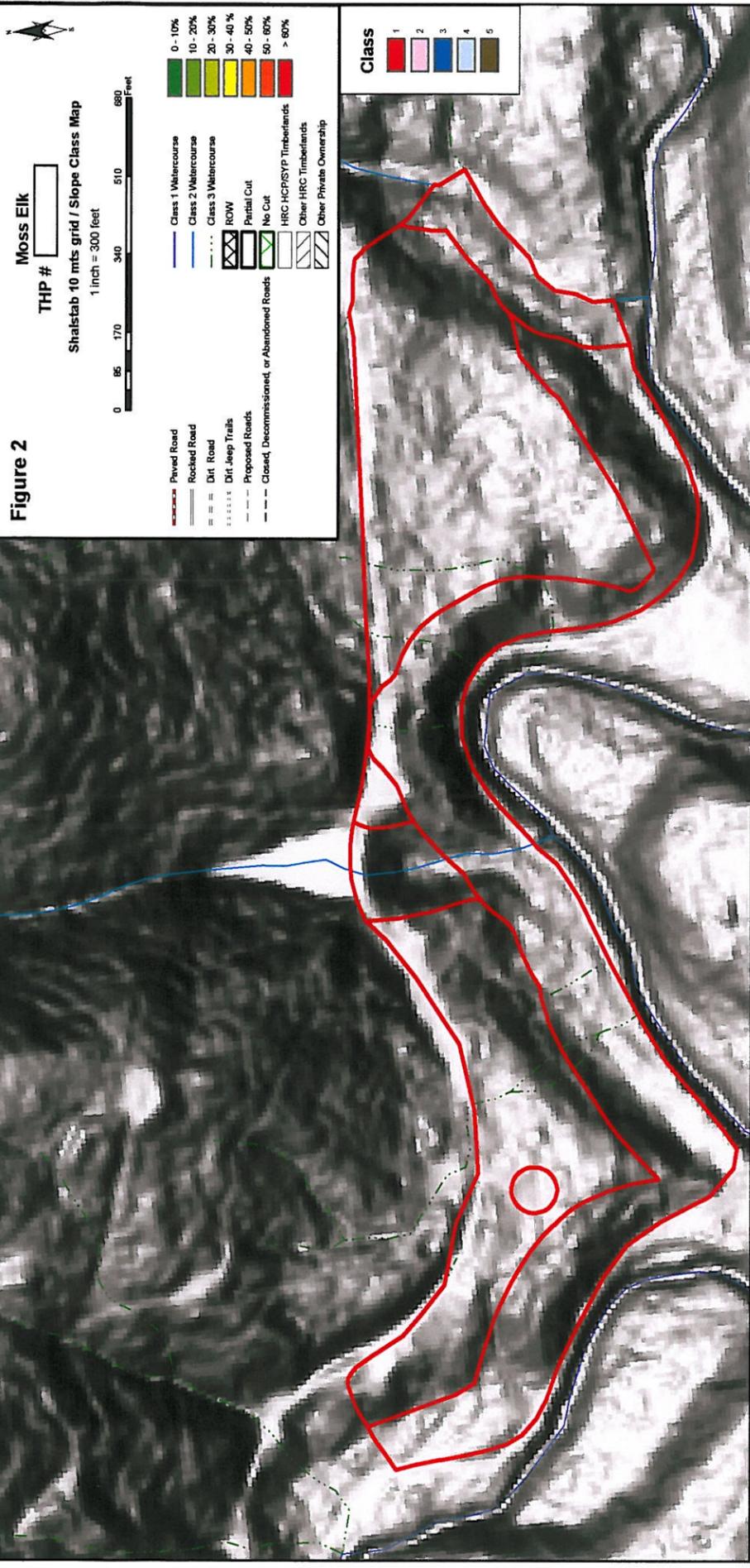
1 inch = 200 feet



- ROW: 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
- HRC HCP/ISYP Timberlands, Other HRC Timberlands, Other Private Ownership
- Landslides

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

Figure 2



Geologic Units

Q (Qal of McLaughlin and others, 2000) Alluvium consisting of sands, silt, clays, and gravel along major stream channels. Because of the location of this material mass wasting is typically not an issue, but in certain locations, in streams alluvium can be incorporated into debris torrents traveling the channel.

Qt (included in Qt of McLaughlin and others, 2000) Quaternary river terrace deposits. Unconsolidated generally poorly sorted pebble sands and sandy pebble-to boulder-conglomerates with silt interbeds. Generally flat-lying but can be susceptible to debris sliding on steep slopes and small-scale rotational landsliding where adjacent to streams.

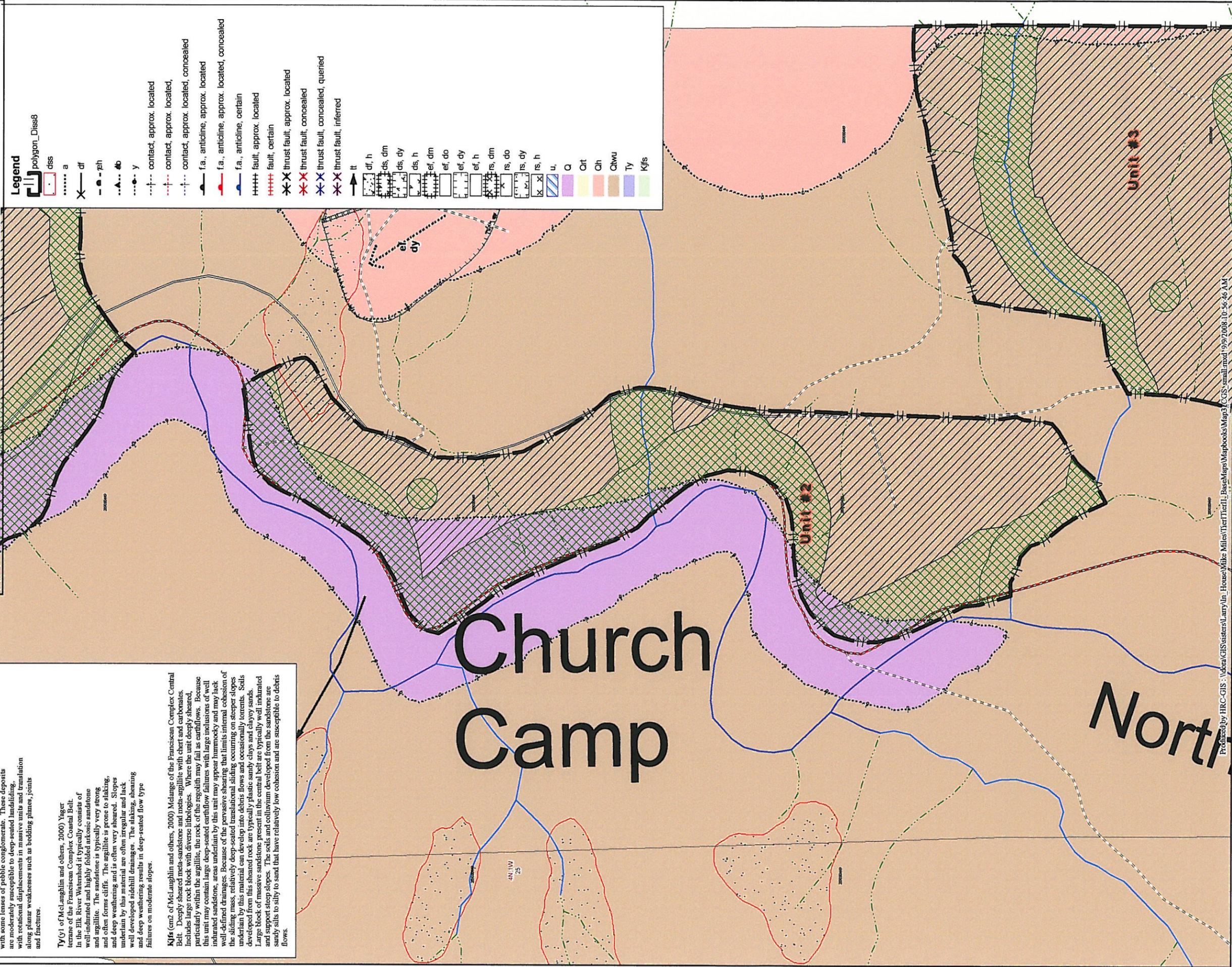
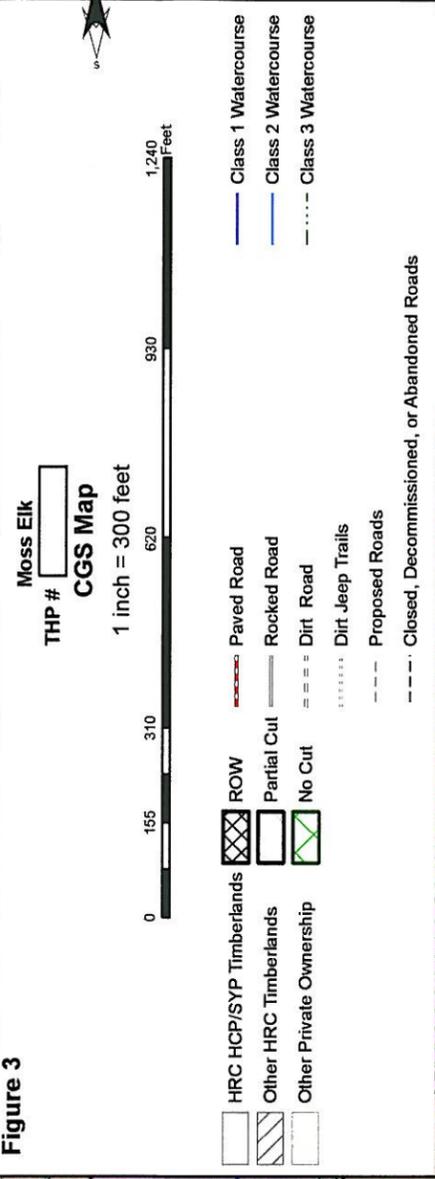
Qh (included in Qt of McLaughlin and others, 2000) Hookton Formation. Wrapped and folded unconsolidated marine and non-marine sands, gravel and silt. Fossiliferous. Contains rare thin beds of volcanic ash. This formation is prone to erosion and debris sliding. Can be subject to shallow and deep-seated bedding-plane failures resulting in translation and earthflow landslides where out of slope bedding occurs.

Qhw1 (included in Qw of McLaughlin and others, 2000) Marine and non-marine sedimentary rocks of the Wildcat Group. Typically consists of poorly to moderately consolidated siltstone and fine-grained silty sandstone with some lenses of pebble conglomerate. These deposits are moderately susceptible to deep-seated landsliding, with rotational displacements in massive units and translation along planar weaknesses such as bedding planes, joints and fractures.

Ty1 (of McLaughlin and others, 2000) Yager terrane of the Franciscan Complex Coastal Belt. In the Elk River Watershed it typically consists of well-indurated and highly folded arkosic sandstone and argillite. The sandstone is typically very strong and often forms cliffs. The argillite is prone to slaking, and deep weathering and is often very sheared. Slopes underlain by this material are often irregular and lack well developed sidehill drainages. The slaking, shearing and deep weathering results in deep-seated flow type failures on moderate slopes.

Kjfs (cm2 of McLaughlin and others, 2000) Melange of the Franciscan Complex Central Belt. Deeply sheared meta-sandstone and meta-argillite with chert and carbonates. Includes large rock block with diverse lithologies. Where the unit deeply sheared, particularly within the argillite, the rock of the regolith may fail as earthflows. Because this unit may contain large deep-seated earthflow failures with large inclusions of well indurated sandstone, areas underlain by this unit may appear hummocky and may lack well-defined drainages. Because of the pervasive shearing that limits internal cohesion of the sliding mass, relatively deep-seated translational sliding occurring on steeper slopes underlain by this material can develop into debris flows and occasionally torrents. Sails developed from this sheared rock are typically plastic sandy clays and clayey sands. Large blocks of massive sandstone present in the central belt are typically well indurated and support steep slopes. The sails and colluvium developed from the sandstone are sandy silts to silty to sand that have relatively low cohesion and are susceptible to debris flows.

Figure 3



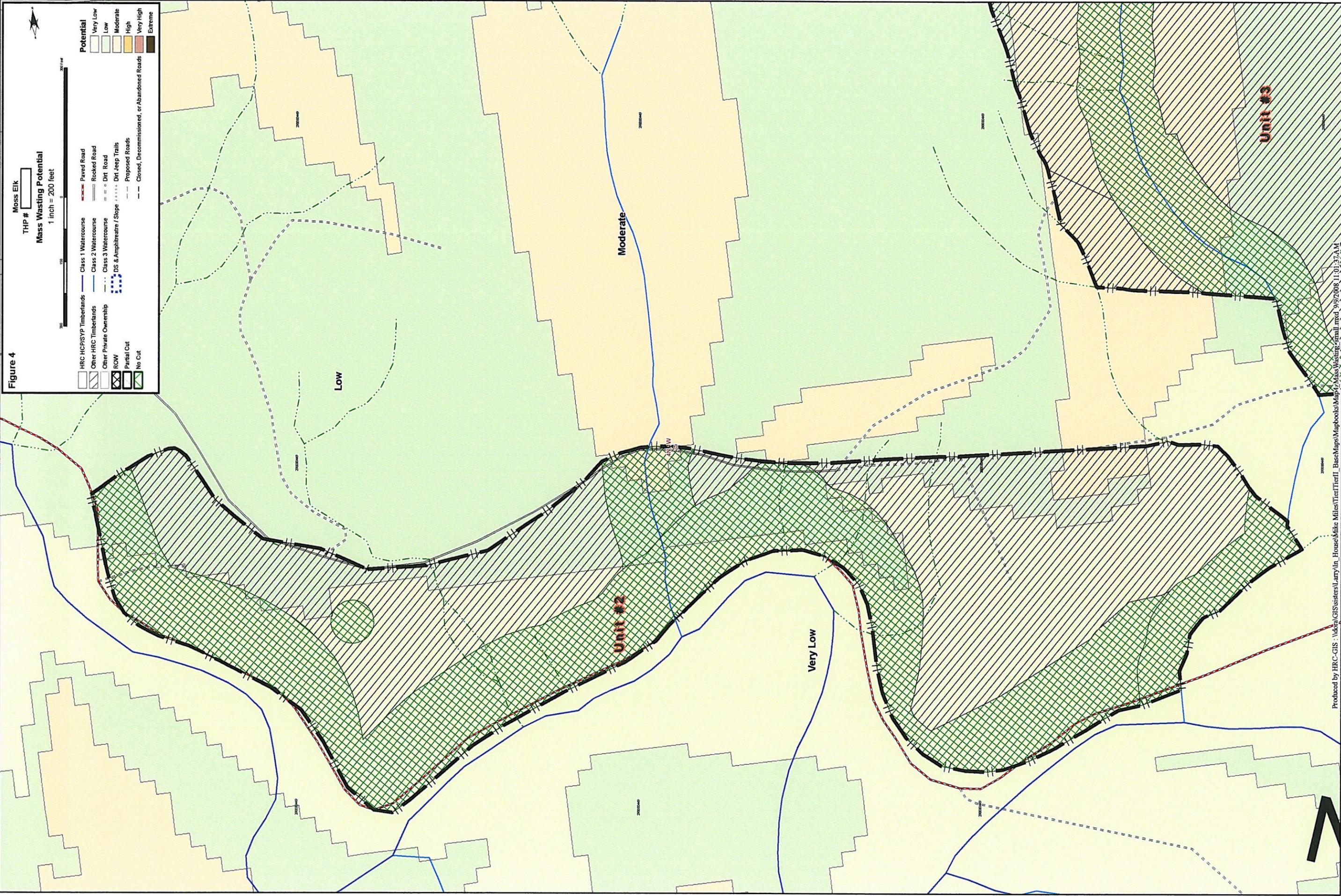


Figure 5

Moss Elk
THP # []
Aerial Photo Map
1 inch = 200 feet

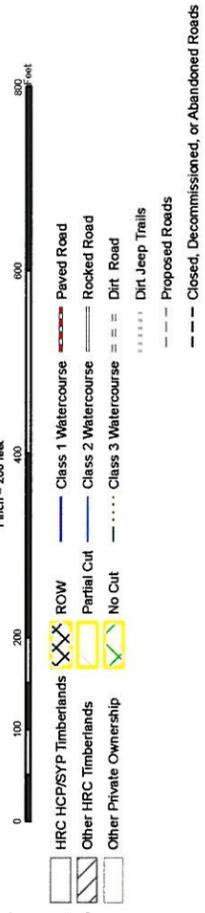


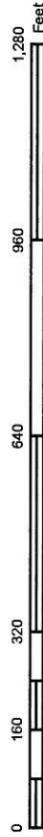
Figure 6

Moss Elk

THP # []

Watershed Analysis Deep-Seated Landslide

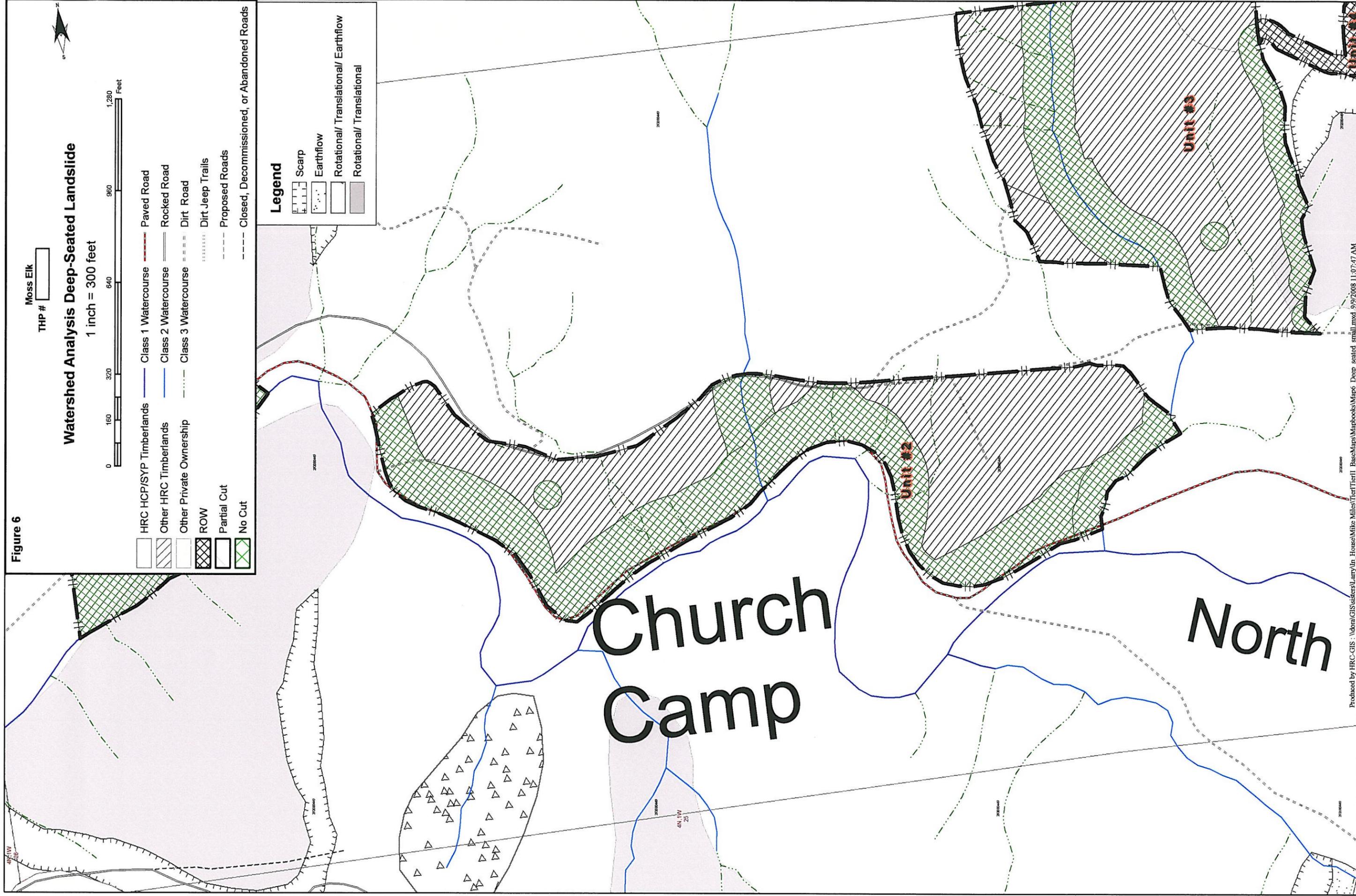
1 inch = 300 feet



- 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



Church Camp

North

Unit #2

Unit #3

Figure 7

Moss Elk
THP #

Road Map



- | | | | | | |
|--|-------------------------|--|---------------------|--|--|
| | 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 |
| | | | | | Stormproofed |
| | | | | | Upgraded |
| | | | | | Decommissioned |

