Humboldt Redwood
COMPANY, LLC

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March 3, 2010

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 1-09-018 HUM (Unit2) 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 2 of THP 1-09-018 HUM. This Tier II portion of the unit proposed for enrollment is comprised of 21.6 acres of group selection (10.8 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 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.

Unit 2 of the North Ridge THP is a north-facing, low relief ridgetop flanked by steep to very steep slopes. The unit is underlain by undifferentiated Wildcat group sediments and drains through Class II and III watercourses to North Fork Elk River. Unstable areas were identified in the unit and mitigated with single tree selection where timber was of merchantable age. HCP prescriptions also require a retention standard of 50% canopy closure in the southeastern portion of the unit where atop steeply inclined slope adjacent a watercourse and extensive legacy earthworks. As approved in the THP, the proposed group and single tree selection, the implemented watercourse protection zones, the recognition and adjustment of low impact silviculture where atop unstable areas, and cable yarding is anticipated to result in a low mass wasting potential harvest. Following this level of mitigation, it is our opinion that Unit 2 meets the requirements for tier 2 enrollment.

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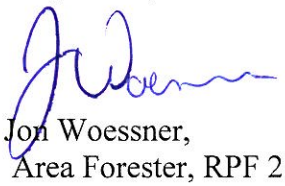
The THP proposes an uneven-age silviculture retaining 150 sq.ft. of basal area. Sub-merchantable trees and those with specific wildlife value characteristics (e.g., cavities, large limbs, broken tops, snags, etc.) will be retained within the harvest area to the extent feasible. Cable yarding is approved for the entire 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,



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

THP: North Ridge THP 09-018 Unit # 2 March 1, 2010

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
2-1	THP approved silviculture is group selection with single tree selection within identified unstable areas and watercourse protection zones. No site preparation will occur due to partial harvesting.	The approved unit is to be cable yarded from existing roads. No change to approved yarding methods.

Geology and Plan Summary (information presented from existing bodies of work):

Unit 2 is sharply defined northwest trending low relief trending ridge adjacent the North Fork of Elk River. Figure 3 shows the unit to be underlain by undifferentiated Wildcat Group sediments. These sediments are composed of silts, sands, clays, and infrequent gravels that are moderately to well consolidated. The slopes are typically steeply inclined and include moderate to poorly defined watercourse channels. Figure 3 maps debris slide / source areas atop both of the flanking slopes to the ridge.

No mass wasting is mapped within the unit from Figure 6.

Figure 2 review (Hillslope shade) shows regionally uniformly weathered slopes throughout the unit. The surface texture of the unit resembles weathering consistent with soft, moderately consolidated sediments. The prominent watercourse channels are visible and terminate low in the slopes.

Figure 4, Mass Wasting Potential Modeling, shows the unit to be underlain by high to extreme potential. This is a modeled projection and does not necessarily reflect true conditions as depicted on the ground.

The THP included a Note 45 Geology report to address several unstable areas. For a more comprehensive review of the geology associated with this harvest unit, please see the report in Section 5 of the THP. The approved silviculture is group selection with single tree selection within unstable areas and watercourse protection zones. The yarding is high lead cable throughout the unit. Existing roads will be used to access the unit.

The area has been previously clearcut and ground-based logged with bulldozers. Significant ground disturbance is observable throughout the unit in response to past harvest practices.

The unit has been addressed as one polygon.

THP Unit: # 2
Polygon: 2-1

A) General Observations

The polygon is essentially north-facing. The polygon includes two Class II and two Class III watercourses. The watercourses are all within protection zones (HCP RMZ for Cl II and Forester imposed RMZ for Cl III).

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 zone.

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. Where channel sideslopes are greater than 50%, a 50' RMZ has been established and maintaining 75 sq. ft (or the unit wide retention standard if greater) evenly distributed in the buffer. Where side slopes are less than 50% employ a 25' RMZ that maintains 75 sq. ft (or the unit wide retention standard if greater) 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. The Class III watercourses in this unit are short extensions of the Class II watercourse and often fall with the Class II RMZ. The southern Class III has been treated with a Class II RMZ.

SHALSTAB modeling (Figure 2) identifies two areas of extreme convergence and therefore potential for shallow failure. Both are located within the headwalls of watercourses that are encompassed within the no harvest portion of the RMZs. Value two and three SHALSTAB modeling blankets the remainder of the unit and is likely in representation of the typically steep ridgetop flanking slopes.

A series of small landslides were identified in the geology report along the northeast facing side of the unit. All but one of the failures was recorded as road related (skid road). One is a true shallow debris slide. In response to this review, the forester has appropriately implemented single tree selection within these and additional areas. The western edge of the unit includes retention standards of 50% canopy closure.

B) Harvest Related Impacts and Hillslope Sensitivity
Significant surface disturbance has occurred within the unit in response to past logging activites. The disturbance is the culmination of road and layout construction. Following that impact, the area appears to have adjusted through minor slumping, settling and the infrequent failure of stresses slopes. The degree of mass wasting placed sediment within the watercourses appears insignificant when compared to the construction of roads and crossings within the channels. Current planned operations will result in less ground disturbance than previous operations and are unlikely to increase potential for mass wasting-related discharge. As part of the HCP prescriptions, the legacy earthworks are to be assesses with respect to mitigation (digging) and or the potential for failure following harvesting atop them. 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. Overall hillslope sensitivity to harvest activities appears minimal with respect to mass wasting. Please see the THP geology report for a more comprehensive assessment of the role that timber harvesting has on slope stability.

C) Forestry / Silviculture Plan
We have not changed the silviculture in response to this evaluation.

D) Operational Design Plan
THP approved yarding method is both cable and ground based. As delineated, the proposed yarding methods appear appropriate.

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, 2008, Geologic Evaluation of the Moss Elk THP, Humboldt County, California, unpublished report to Wayne Rice RPF, Scotia Pacific Company LLC, dated April 30, 2008. Included within section V of the THP 1-08-072.

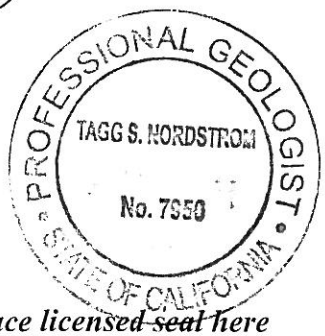
Brief descriptions of the models used in this evaluation:

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 models 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.

Professional Certification of Design

I, _____, P.G. 7950, 3/4/10,
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. 1-09-018 HUM (North Ridge) 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. R1-2006-0103, 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.

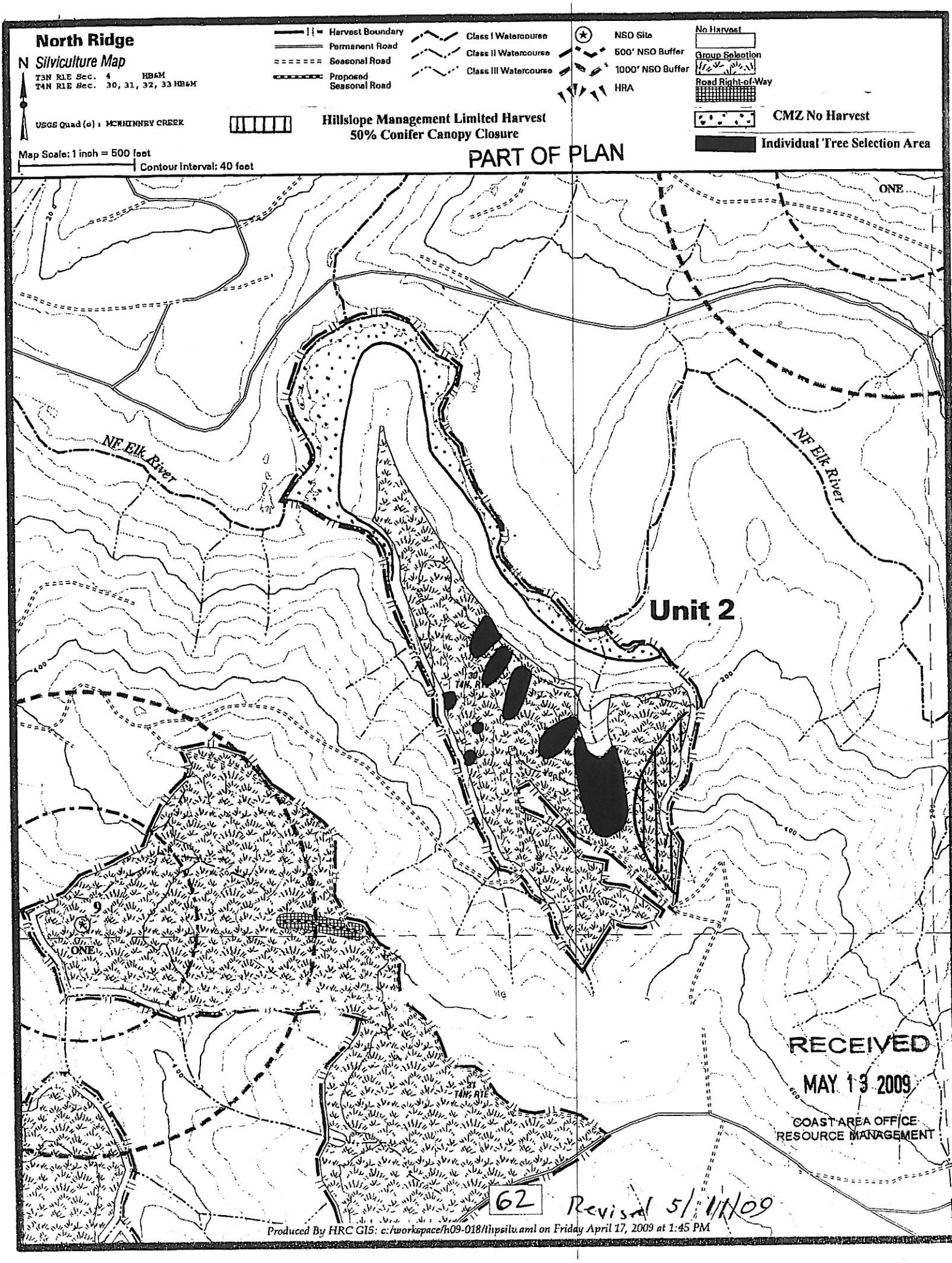
The opinions presented in the subject THP have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice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

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*
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		0.3			17.6	9.1	13	62.8
Moss Elk	08-072	4		0.3			18.2	9.4	10.9	97.3
North Ridge***	09-018	1					36.5	18.3	30.3	79.4
North Ridge	09-018	2					21.6	10.8	6.6	192.1
North Ridge	09-018	3		1.8			83.1	43.4	53.5	402.2
North Ridge	09-018	4		7			72.5	43.3	62.9	212.6
								0.0		0.0
North Ridge	09-018	1a		1.8			10.2	6.9	10.7	16.7
North Ridge	09-018	3a		3.4			26.7	16.8	24.4	73.0
Top Lake	09-051	All acres		1.3			114.9	58.8	102.1	180.6
								0.0		
							Total	262.6		

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
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			
North Ridge	09-018	1	23	17.9			
North Ridge	09-018	2		21.5			
North Ridge	09-018	3	8.3	76.6			
North Ridge	09-018	4	30.7	48.8			
North Ridge	09-018	1a	6.2	5.8			
North Ridge	09-018	3a	5.4	24.7			
Top Lake	09-051	all					


North Ridge
N Silviculture Map
T3N R1E Sec. 4 HB&M
T4N R1E Sec. 30, 31, 32, 33 HB&M
USGS Quad (s) : MCKINNEY CREEK
Map Scale: 1 inch = 500 feet
Contour Interval: 40 feet
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
No Harvest
Group Selection
Road Right-of-Way
CMZ No Harvest
Individual Tree Selection Area
Hillslope Management Limited Harvest
50% Conifer Canopy Closure
PART OF PLAN
NF Elk River
NF Elk River
Unit 2
ONE
ONE
RECEIVED
MAY 13 2009
COAST AREA OFFICE
RESOURCE MANAGEMENT
62
Revised 5/11/09
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North Ridge

Yarding System Map

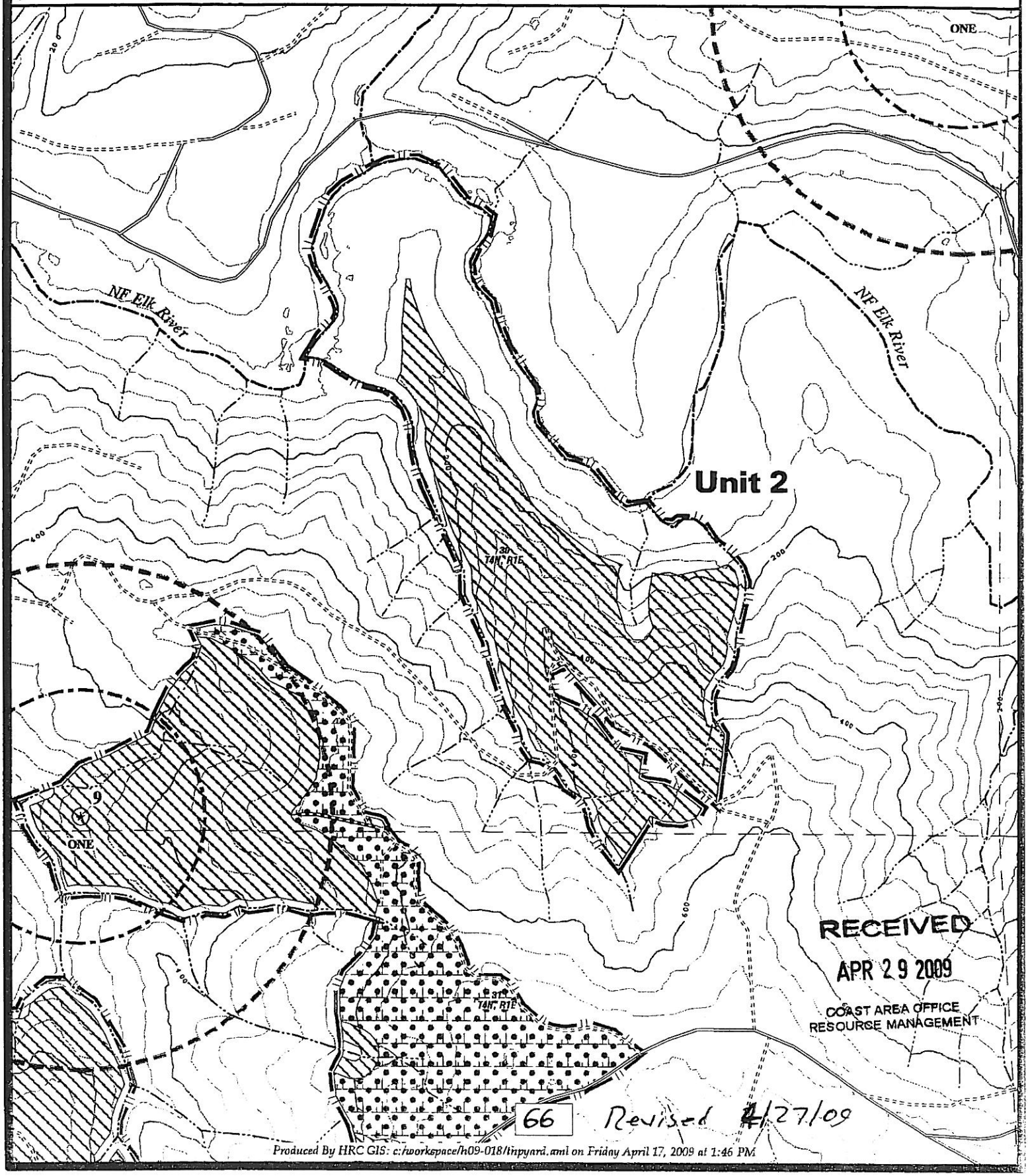
T3N R1E Sec. 4 HB&M
T4N R1E Sec. 30, 31, 32, 33 HB&M

USGS Quad (s) : MCMINNEY CREEK

Map Scale: 1 inch = 500 feet
Contour Interval: 40 feet

Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
No Harvest
Cable Yarding (Opt. Tractor Long Line)
Tractor Yarding (Opt. Cable Yarding)

PART OF PLAN



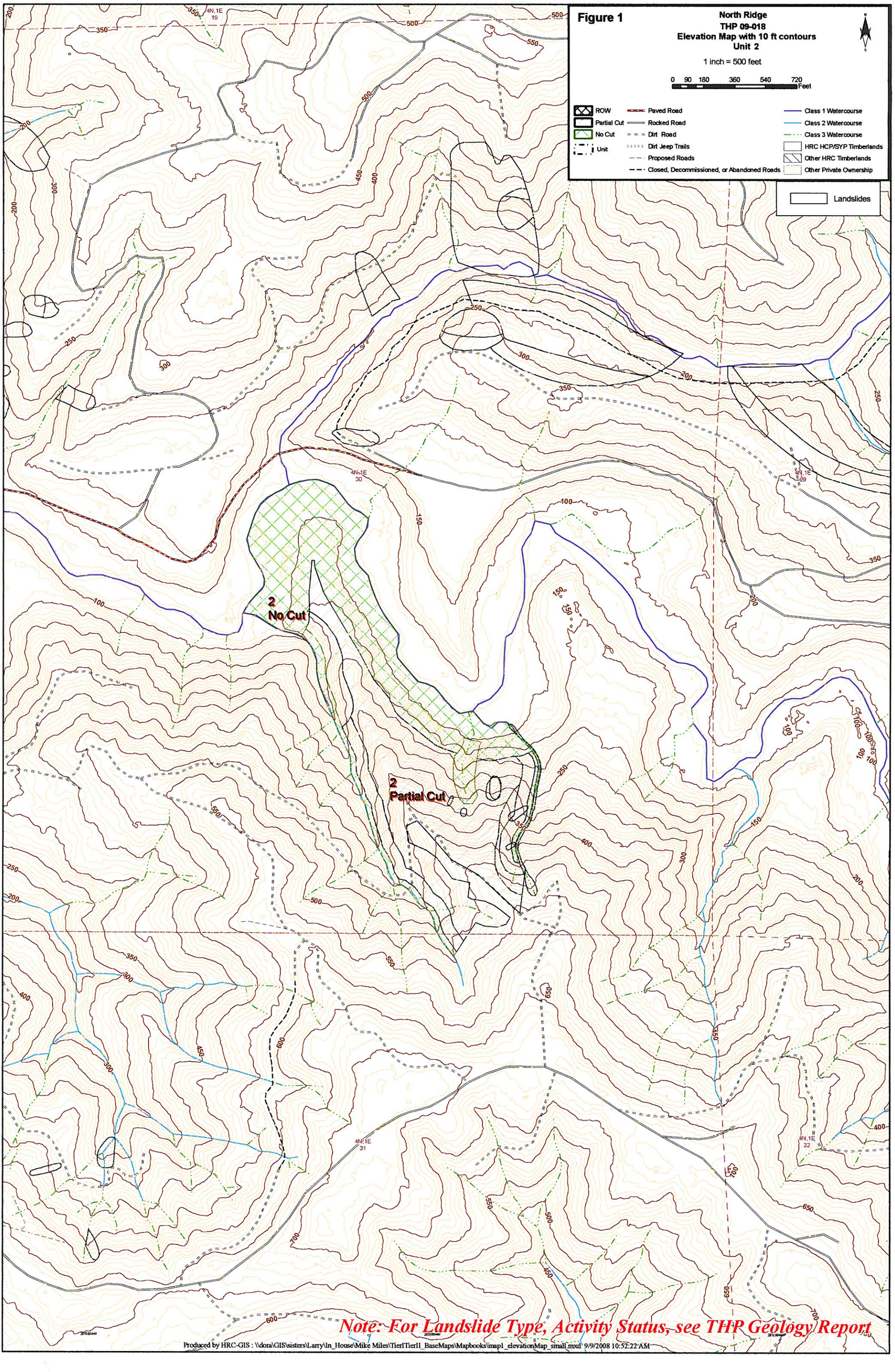


Figure 1
North Ridge
THP 09-018
Elevation Map with 10 ft contours
Unit 2
1 inch = 500 feet
0 90 180 360 540 720
Feet
ROW
Partial Cut
No Cut
Unit
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
Landslides
2
No Cut
2
Partial Cut
4N,1E
19
4N,1E
30
4N,1E
29
4N,1E
31
4N,1E
32
Note: For Landslide Type, Activity Status, see THP Geology Report
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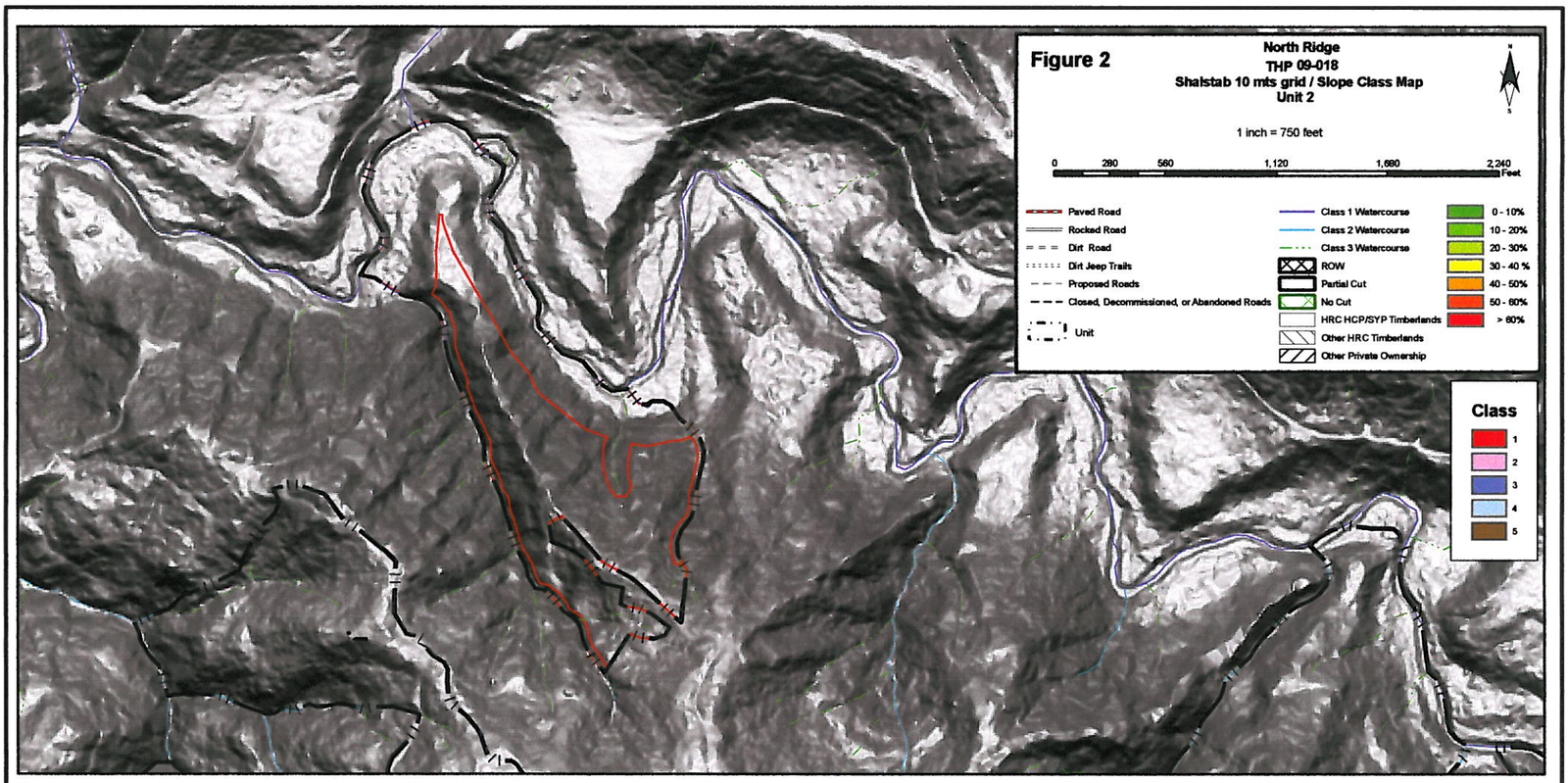
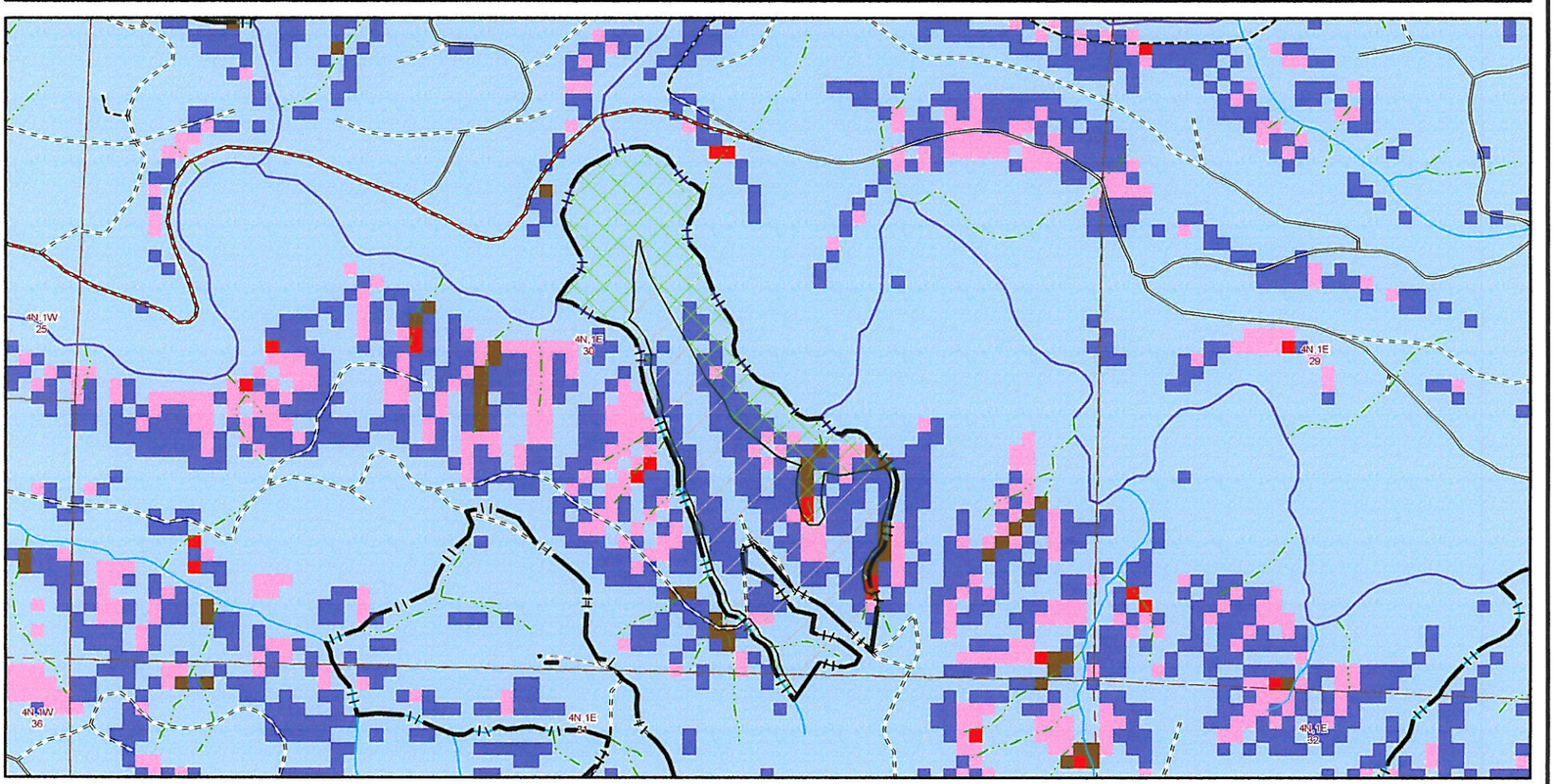
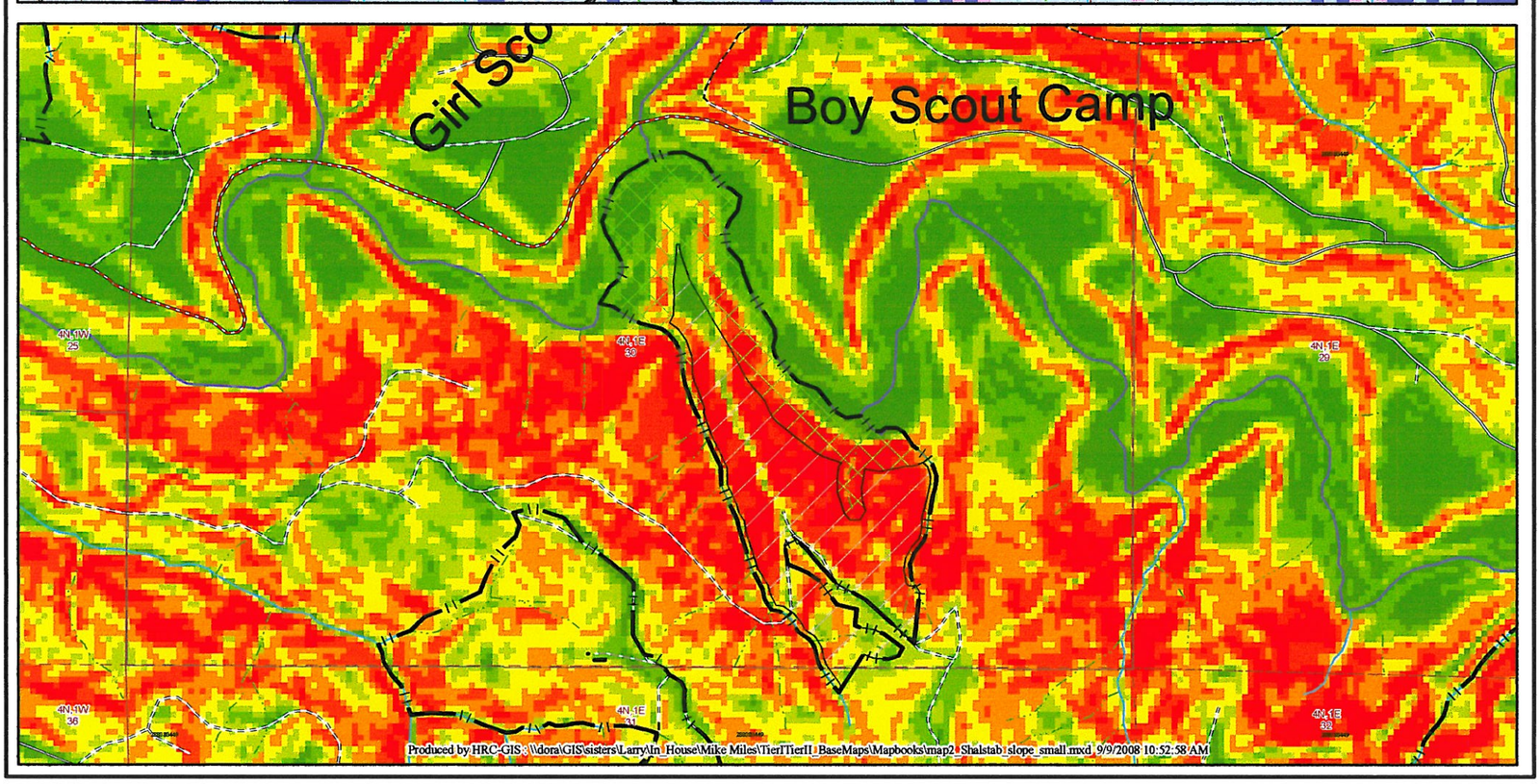


Figure 2
North Ridge
THP 09-018
Shalstab 10 mts grid / Slope Class Map
Unit 2
1 inch = 750 feet
0 280 560 1,120 1,680 2,240 Feet
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Unit
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
ROW
Partial Cut
No Cut
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
0 - 10%
10 - 20%
20 - 30%
30 - 40 %
40 - 50%
50 - 60%
> 60%
Class
1
2
3
4
5


4N,1W 25
4N,1E 36
4N,1E 29
4N,1W 36
4N,1E 31
4N,1E 32


Girl Sco
Boy Scout Camp
4N,1W 25
4N,1E 30
4N,1E 29
4N,1W 36
4N,1E 31
4N,1E 32
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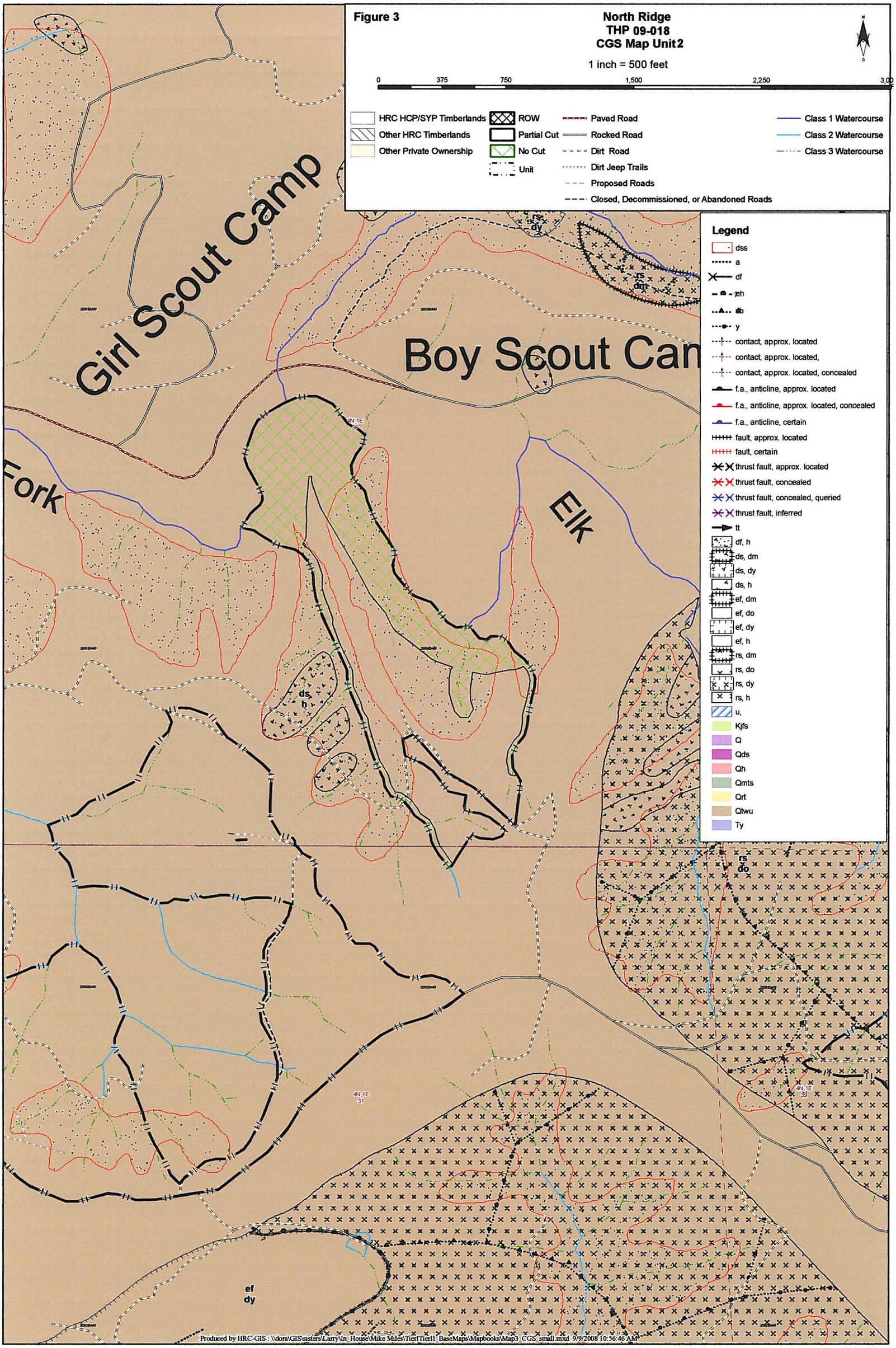
Figure 3
North Ridge
THP 09-018
CGS Map Unit2
1 inch = 500 feet
0
375
750
1,500
2,250
3,00
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Unit
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Girl Scout Camp
Boy Scout Can
Fork
Elk
Legend
dss
a
df
/eh
db
y
contact, approx. located
contact, approx. located,
contact, approx. located, concealed
f.a., anticline, approx. located
f.a., anticline, approx. located, concealed
f.a., anticline, certain
fault, approx. located
fault, certain
thrust fault, approx. located
thrust fault, concealed
thrust fault, concealed, queried
thrust fault, inferred
tt
df, h
ds, dm
ds, dy
ds, h
ef, dm
ef, do
ef, dy
ef, h
rs, dm
rs, do
rs, dy
rs, h
u,
Kjfs
Q
Qds
Qh
Qmts
Qrt
Qtwu
Ty
rs
dy
rs
dm
ds
h
rs
do
ef
dy
4N 1E
31
4N 1E
32
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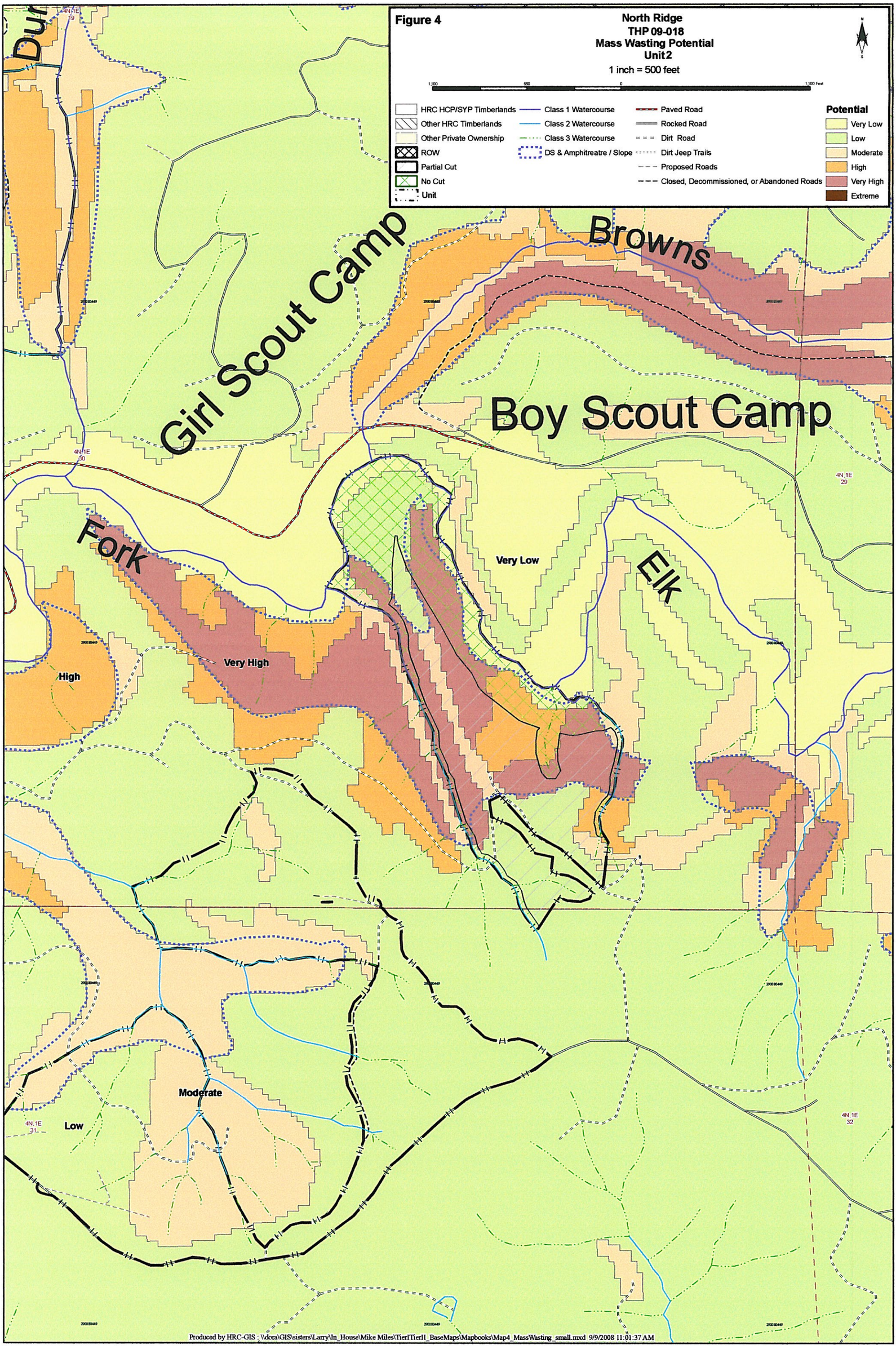
Figure 4
North Ridge
THP 09-018
Mass Wasting Potential
Unit 2
1 inch = 500 feet
1,000
500
0
1,000 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Unit
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
DS & Amphitreatre / Slope
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Potential
Very Low
Low
Moderate
High
Very High
Extreme
Girl Scout Camp
Browns
Boy Scout Camp
Fork
Elk
Very Low
Very High
High
Moderate
Low
4N,1E
19
4N,1E
30
4N,1E
29
4N,1E
31
4N,1E
32
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Figure 5
North Ridge
THP 09-018
Aerial Photo Map - Unit 2
1 inch = 500 feet
0
240
480
960
1,440
1,920
Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
Unit
ROW
Partial Cut
No Cut
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Girl Scout Camp
Browns
Boy Scout Camp
Fork
Elk
Produced by HRC-GIS: \\dora\GIS\sisters\Larry\In_House\Mike_Miles\Tier1Tier1_BaseMaps\Mapbooks\Map5_orthoMap_small.mxd 9/9/2008 11:05:49 AM

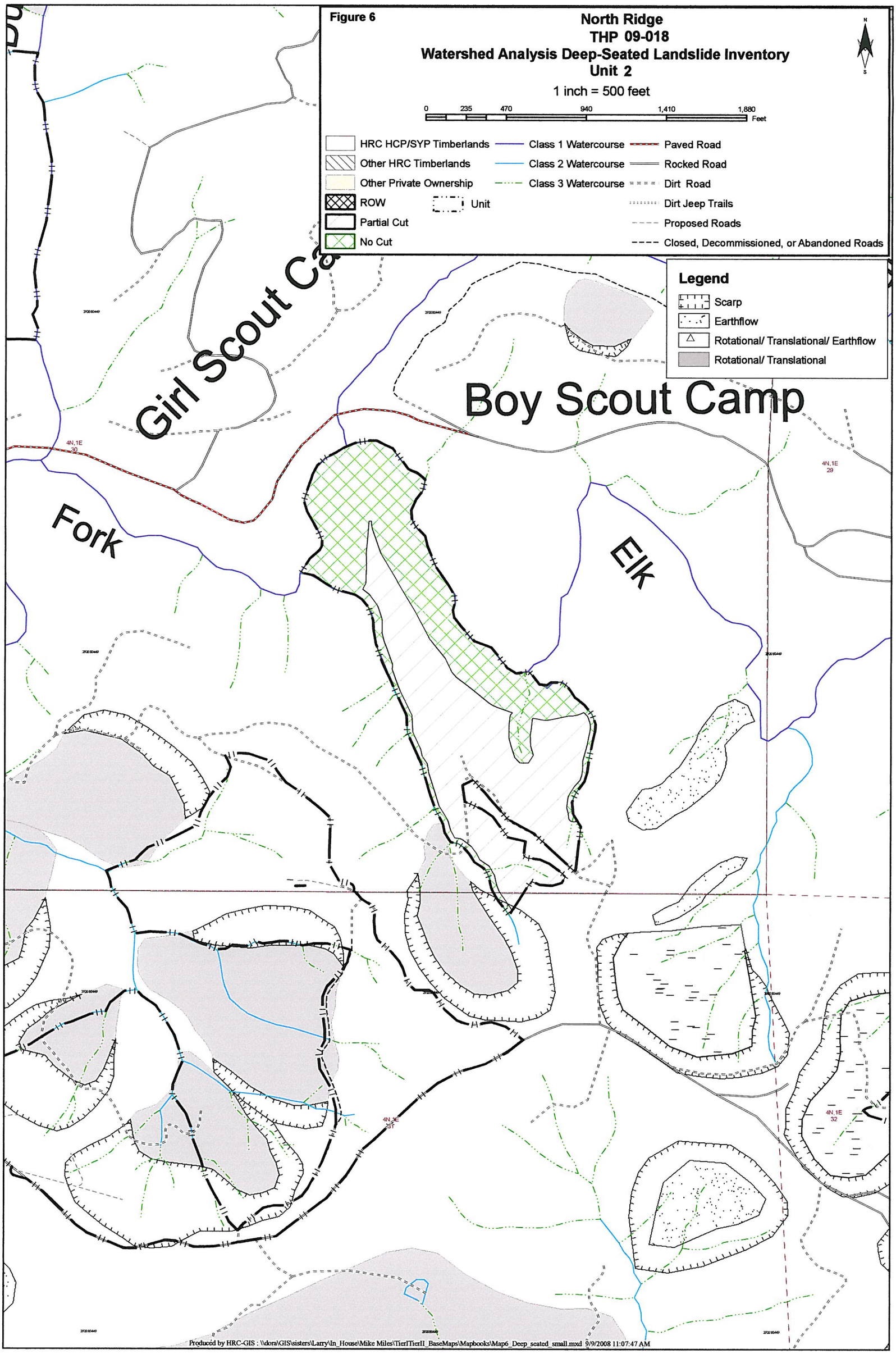
Figure 6
North Ridge
THP 09-018
Watershed Analysis Deep-Seated Landslide Inventory
Unit 2
1 inch = 500 feet
0 235 470 940 1,410 1,880
Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Unit
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Legend
Scarp
Earthflow
Rotational/ Translational/ Earthflow
Rotational/ Translational
Girl Scout Ca
Boy Scout Camp
Fork
Elk
4N,1E
30
4N,1E
29
4N,1E
32
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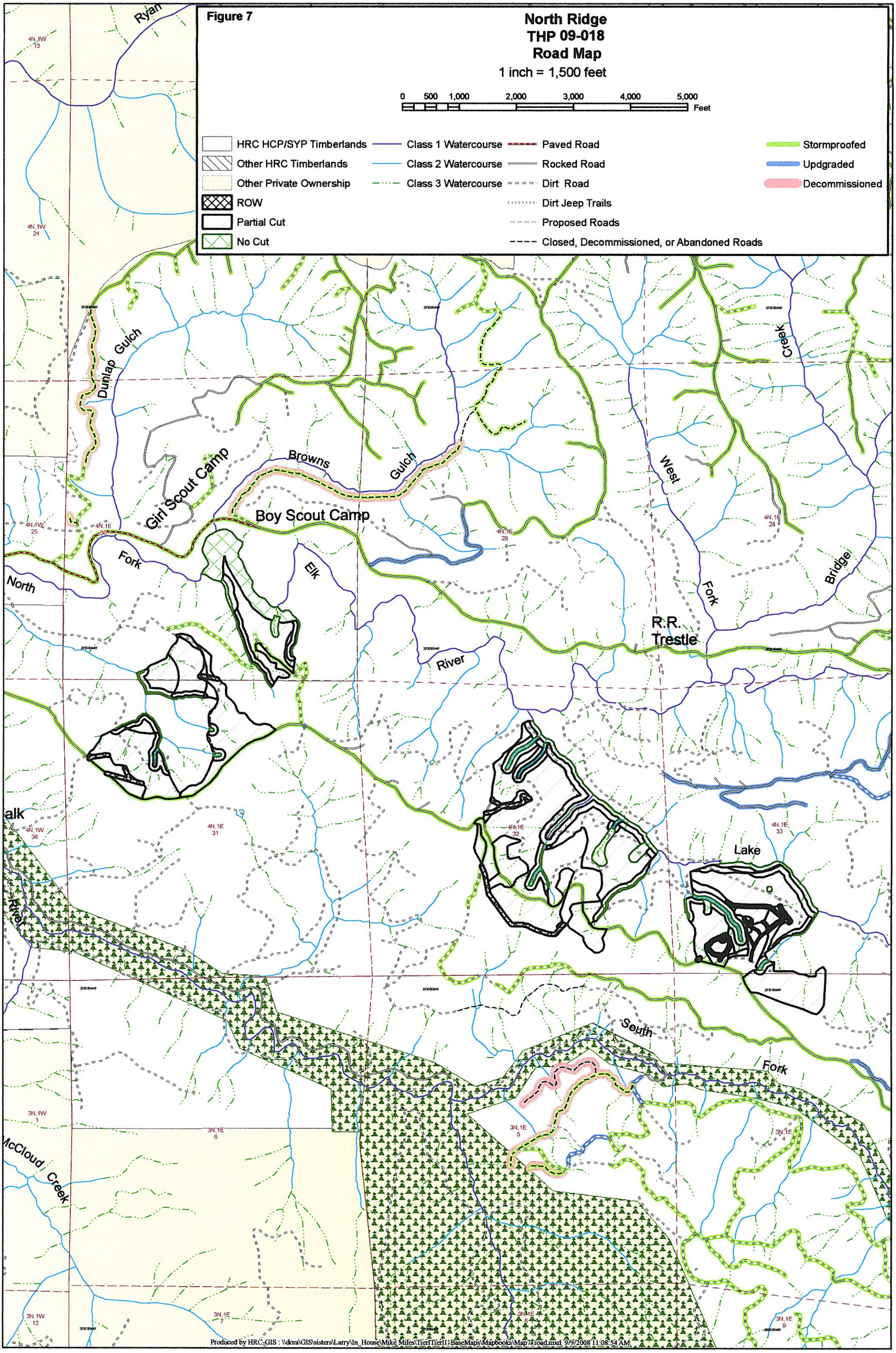
Figure 7
North Ridge
THP 09-018
Road Map
1 inch = 1,500 feet
0 500 1,000 2,000 3,000 4,000 5,000
Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Stormproofed
Updgraded
Decommissioned
Ryan
Dunlap Gulch
Girl Scout Camp
Browns
Gulch
Boy Scout Camp
North
Fork
Elk
River
West
Fork
Creek
Bridge
R.R.
Trestle
Lake
South
Fork
McCloud
Creek
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