Humboldt Redwood™

NCRWQCB

MAY 02 2013

EO ☐ AEO ☐ Reg/NPS ☐ WMgmt ☐ Timber ☑ Cleanups ☐ Admin ☑ Legal ☐ Date

April 28th, 2013

Mr. Matthias St. John
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Blvd, Suite A
Santa Rosa, CA 95403

Subject: Enrollment of portions of THP 1-12-110 HUM in the General WDR,

Dear Mr St. John:

HRC is requesting enrollment under General Waste Discharge Requirement (GWDR) Order No. R1-2004-030 for portions of THP 1-12-110HUM. The Plan is mainly on land owned by HRC in the south fork and mainstem Elk River Watersheds. Also, road construction and upgrading is proposed on three addtional land owners. Because there is overlap between watersheds and owners, HRC consulted with Water Board staff and received the following guidance in an email from Fred Blatt on 11/13/2012

> *After consultation the Regional Water Board, Humboldt Redwood Company (HRC) will seek Regional Board permitting coverage for the McCloud Shaw THP under the General WDR for timber (Order R1-2004-0030). In addition to complying with the terms and conditions of Order R1-2004-0030, as a condition of enrollment of the McCloud Shaw THP under R1-2004-0030, HRC will also comply with all the general terms and conditions of Order R1-2006-0039 (as amended by R1-2008-0100), and specifically the terms, conditions, and limits for the South Fork Elk River. Regional Water Board staff will determine THP permitting eligibility following plan approval and review of the application for permit coverage.*

The 2013 enrollment is comprised of 1.0 acres of right of way, Total acres currently enrolled or proposed for enrollment under Order No. R1-2006-0041 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 are included in this enrollment. No changes to the ECP have been documented since the Pre-harvest inspection was conducted.

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, as part of THP preparation. The Licensed Geologist performed this analysis in the Geology report included in the plan. 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.

The plan occupies multiple aspect slopes in and adjacent to the Shaw Gulch and Railroad Gulch basins, as well as a portion of the southern valley wall of the South Fork Elk River upstream of Tom Gulch. These drainages are characterized by incised, moderate to steep sided, v-shaped draws/valleys that contain well-developed dendritic drainage systems. A majority of the slopes within the plan area have roughly planar/ concave profiles with surface gradients of 5% to 50%. Steeper pitches (65% +) are also present, but are generally confined to areas that flank Class I and II watercourses. In most instances, these steeper areas are encompassed by riparian management zones (RMZ) and CLG limited harvest areas.

Regional geologic maps indicate that the plan occupies slopes underlain by Quaternary to Tertiary aged Undifferentiated Wildcat Group sediments and materials associated with the Quaternary aged Hookton Formation. Previous regional geomorphic mapping exercises (HartCrowser, 2000; Marshall and Mendes, 2005) identified a large number of landslides/ landslide-related landforms on slopes currently within the operational limits of this THP. Close examination of these pre-identified features reveal an abundance of active to dormant-young landslides and landslide-related landforms.

Those failures within the operational limits of the THP and outside the RMZs, that could feasibly discharge sediment into down slope watercourses were surrounded/buffered by CLG limited harvest areas with specific retention standards. Landslides that have not directly delivered sediment to a watercourse by means of landslide processes, nor are likely to do so in the future, will undergo group selection. In essence, restricted partial cut activities have been applied to slopes within or above those areas of instability that could have an adverse impact on water quality, while areas of concern that are not actively contributing sediment to local watercourses and are not likely to do so in the near future will be subject to standard uneven aged practices.

The services of a California State licensed Professional Geologist were retained during the layout of this THP. A letter report titled 'Reviewed Geologic Information and Disclosure of Known Unstable Areas' that documents the Project Geologist observations and conclusions is attached to Section 5 of the THP. The THP was also reviewed by California Geologic Survey (CGS) staff, which is documented in a Pre-Harvest Investigation (PHI) report found on the CALFIRE web site. Based on the level of review provided in the letter report, CGS PHI report, consulting licensed professional geologist and the HRC GeoScience Departments recent evaluation, it is our opinion that McClound Shaw THP meets the requirements for Tier II enrollment.

The THP proposes an uneven-age silviculture retaining 75 sqft of basal area and construction of roads (ROW). 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 R1-2006-0041 and R1-2008-0071. Water Board staff reviewed the THP prior to submittal and fully participated in the review process. There were no non-concurrences from Water Board Staff.

Humboldt Redwood™

NCRWQCB

MAY 02 2013

☐ EO ☐ WMgmt ☐ Admin
☐ AEO ☑ Timber ☐ Legal
☐ Reg/NPS ☐ Cleanups ☐
☐ Date

April 28th, 2013

Mr. Matthias St. John
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Blvd, Suite A
Santa Rosa, CA 95403

Subject: Enrollment of portions of THP 1-12-110 HUM in the General WDR,

Dear Mr St. John:

HRC is requesting enrollment under General Waste Discharge Requirement (GWDR) Order No. R1-2004-030 for portions of THP 1-12-110HUM. The Plan is mainly on land owned by HRC in the south fork and mainstem Elk River Watersheds. Also, road construction and upgrading is proposed on three addtional land owners. Because there is overlap between watersheds and owners, HRC consulted with Water Board staff and received the following guidance in an email from Fred Blatt on 11/13/2012

> *After consultation the Regional Water Board, Humboldt Redwood Company (HRC) will seek Regional Board permitting coverage for the McCloud Shaw THP under the General WDR for timber (Order R1-2004-0030). In addition to complying with the terms and conditions of Order R1-2004-0030, as a condition of enrollment of the McCloud Shaw THP under R1-2004-0030, HRC will also comply with all the general terms and conditions of Order R1-2006-0039 (as amended by R1-2008-0100), and specifically the terms, conditions, and limits for the South Fork Elk River. Regional Water Board staff will determine THP permitting eligibility following plan approval and review of the application for permit coverage.*

The 2013 enrollment is comprised of 1.0 acres of right of way, Total acres currently enrolled or proposed for enrollment under Order No. R1-2006-0041 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 are included in this enrollment. No changes to the ECP have been documented since the Pre-harvest inspection was conducted.

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, as part of THP preparation. The Licensed Geologist performed this analysis in the Geology report included in the plan. 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.

The plan occupies multiple aspect slopes in and adjacent to the Shaw Gulch and Railroad Gulch basins, as well as a portion of the southern valley wall of the South Fork Elk River upstream of Tom Gulch. These drainages are characterized by incised, moderate to steep sided, v-shaped draws/valleys that contain well-developed dendritic drainage systems. A majority of the slopes within the plan area have roughly planar/ concave profiles with surface gradients of 5% to 50%. Steeper pitches (65% +) are also present, but are generally confined to areas that flank Class I and II watercourses. In most instances, these steeper areas are encompassed by riparian management zones (RMZ) and CLG limited harvest areas.

Regional geologic maps indicate that the plan occupies slopes underlain by Quaternary to Tertiary aged Undifferentiated Wildcat Group sediments and materials associated with the Quaternary aged Hookton Formation. Previous regional geomorphic mapping exercises (HartCrowser, 2000; Marshall and Mendes, 2005) identified a large number of landslides/ landslide-related landforms on slopes currently within the operational limits of this THP. Close examination of these pre-identified features reveal an abundance of active to dormant-young landslides and landslide-related landforms.

Those failures within the operational limits of the THP and outside the RMZs, that could feasibly discharge sediment into down slope watercourses were surrounded/buffered by CLG limited harvest areas with specific retention standards. Landslides that have not directly delivered sediment to a watercourse by means of landslide processes, nor are likely to do so in the future, will undergo group selection. In essence, restricted partial cut activities have been applied to slopes within or above those areas of instability that could have an adverse impact on water quality, while areas of concern that are not actively contributing sediment to local watercourses and are not likely to do so in the near future will be subject to standard uneven aged practices.

The services of a California State licensed Professional Geologist were retained during the layout of this THP. A letter report titled 'Reviewed Geologic Information and Disclosure of Known Unstable Areas' that documents the Project Geologist observations and conclusions is attached to Section 5 of the THP. The THP was also reviewed by California Geologic Survey (CGS) staff, which is documented in a Pre-Harvest Investigation (PHI) report found on the CALFIRE web site. Based on the level of review provided in the letter report, CGS PHI report, consulting licensed professional geologist and the HRC GeoScience Departments recent evaluation, it is our opinion that McClound Shaw THP meets the requirements for Tier II enrollment.

The THP proposes an uneven-age silviculture retaining 75 sqft of basal area and construction of roads (ROW). 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 R1-2006-0041 and R1-2008-0071. Water Board staff reviewed the THP prior to submittal and fully participated in the review process. There were no non-concurrences from Water Board Staff.

Please do not hesitate to contact me should you have any questions or comments regarding this application for enrollment into GWDR.

Respectfully,

Jon Woessner,
Area Manager RPF #2571
Humboldt Redwood Company, LLC

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

Humboldt Redwood Company,, LLC
6500 Durable Mill Rd. P.O. Box 390
Calpella, CA 95418

4521 North Coast Regional Water

4/26/13

INVOICE NO.	INVOICE DATE	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
042213 112	4/22/13	1-12-110	$ 760.50	$ 0.00	$ 760.50
CHECK NO.	48865	TOTALS	$ 760.50	$ 0.00	$ 760.50

NCRWQCB

MAY 02 2013

☐ EO _____ ☐ W/Mgmt _____ ☐ Admin _____
☐ AEO _____ ☐ Timber _____ ☐ Legal _____
☐ Lic/APS _____ ☐ Steams _____ ☐ _____
_____ _____ _____ _____

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board
APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

NCRWQCB
MAY 02 2013

A. Facility: I. FACILITY INFORMATION

Name: THP 1-**12-110- HUM McCloud Shaw**			
Address:			
City:	County:	State:	Zip Code:
Contact Person: Jon Woessner		Telephone Number: 707-764-4376	

EO / AEO / Reg/NPS / WMgmt / Timber / Chemicals / Admin / Legal / Date

B1. Facility Owner: (timber owner)

Name: Humboldt Redwood Company LLC			Owner Type (Check One): 1. ☐ Individual 2. ☒ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other
Address: P.O. Box 712			
City: Scotia	State: CA	Zip: 95565	
Contact Person: Jon Woessner		Telephone Number: 707-764-4376	Federal Tax ID:

B2. Facility Owner: (timber owner)

Name: Andrew and Sandralin Westfall			Owner Type (Check One): 1. ☐ Individual 2. ☒ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other
Address: P.O. Box 1440			
City: Ferndale	State: CA	Zip: 95536	
Contact Person: Jon Woessner		Telephone Number: 707-764-4376	Federal Tax ID:

C. Facility Operator (The agency or business, not the person): (plan submitter)

Name: Humboldt Redwood Company LLC			Owner Type (Check One): 1. ☐ Individual 2. ☒ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other
Address: P.O. Box 712			
City: Scotia	State: CA	Zip: 95565	
Contact Person: Jon Woessner		Telephone Number: 707-764-4376	Federal Tax ID:

D1. Owner of the Land:

Name: Humboldt Redwood Company LLC			Owner Type (Check One): 1. ☐ Individual 2. ☒ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership
Address: P.O. Box 712			
City: Scotia	State: CA	City: Scotia	State: CA
Contact Person: Andrew Westfall		Telephone Number: 707-786-4659	Federal tax ID:

D2. Owner of the Land:

Name: Andrew and Sandralin Westfall			Owner Type (Check One): 1. ☒ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership
Address: P.O. Box 1440			
City: Ferndale	State: CA	City: Ferndale	State: CA

Contact Person: Jon Woessner	Telephone Number: 707-764-4376	Federal tax ID:

D2. Owner of the Land:

Name: Andrew and Sandralin Westfall			Owner Type (Check One): 1. ☒ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership
Address: P.O. Box 1440			
City: Ferndale	State: CA	City: Ferndale	State: CA
Contact Person: Andrew Westfall		Telephone Number: 707-786-4659	Federal tax ID:

D3. Owner of the Land:

Name: Green Diamond Resource Company			Owner Type (Check One): 1. ☐ Individual 2. ☒ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership
Address: P.O. Box 68			
City: Korbel	State: CA	City: Korbel	State: CA
Contact Person: Nick Deseau		Telephone Number: 707-668-4400	Federal tax ID:

D4. Owner of the Land:

Name: Kristi Wrigley			Owner Type (Check One): 1. ☒ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership
Address: 2550 Wrigley Road			
City: Eureka	State: CA	City: Eurkea	State: CA
Contact Person: Kristi Wrigley		Telephone Number: 443-1496	Federal tax ID:

E. Address Where Legal Notice May Be Served:

Address: 125 Main Street		
City: Scotia	State: CA	Zip: 95565
Contact Person: Mike Jani		Telephone Number: 707-764-4403

F. Billing Address:

Address: P.O. Box 712		
City: Scotia	State: CA	Zip: 95565
Contact Person: Jon Woessner		Telephone Number: 707-764-4376

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board
APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☒ **A. WASTE DISCHARGE TO LAND** ☐ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

☐ Domestic/Municipal Wastewater Treatment and Disposal	☐ Animal Waste Solids	☐ Animal or Aquacultural Wastewater
☐ Cooling Water	☐ Land Treatment Unit	☐ Biosolids/Residual
☐ Mining	☐ Dredge Material Disposal	☐ Hazardous Waste (see instructions)
☐ Waste Pile	☐ Surface Impoundment	☐ Landfill (see instructions)
☐ Wastewater Reclamation	☐ Industrial Process Wastewater	☐ Storm Water
☒ Other, please describe: Timber harvest activities		

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility:	**Facility:**	**Facility:**
Discharge Point:	**Discharge Point:**	**Discharge Point:**

IV. REASON FOR FILING

☒ New Discharge or Facility	☐ Changes in Ownership/Operator (see instructions)
☐ Change in Design or Operation	☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
☐ Change in Quantity/Type of Discharge	☐ Other:

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: California Department of Forestry and Fire Protection

Has a public agency determined that the proposed project is exempt from CEQA? ☐ **Yes** ☒ **No**

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency:

Has a "Notice of Determination" been filed under CEQA? ☐ **Yes** ☒ **No**

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ **EIR** ☐ **Negative Declaration** **Expected CEQA Completion Date:**

CALIFORNIA ENVIRONMENTAL
PROTECTION AGENCY

State of California
Regional Water Quality Control Board
APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

_____

_____

_____

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: Jon Woessner	Title: Northern Area Manager
Signature:	Date: 4/22/13

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:
5/2/13	—	$380.25	048865

McCloud Shaw

N *Silviculture Map*

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

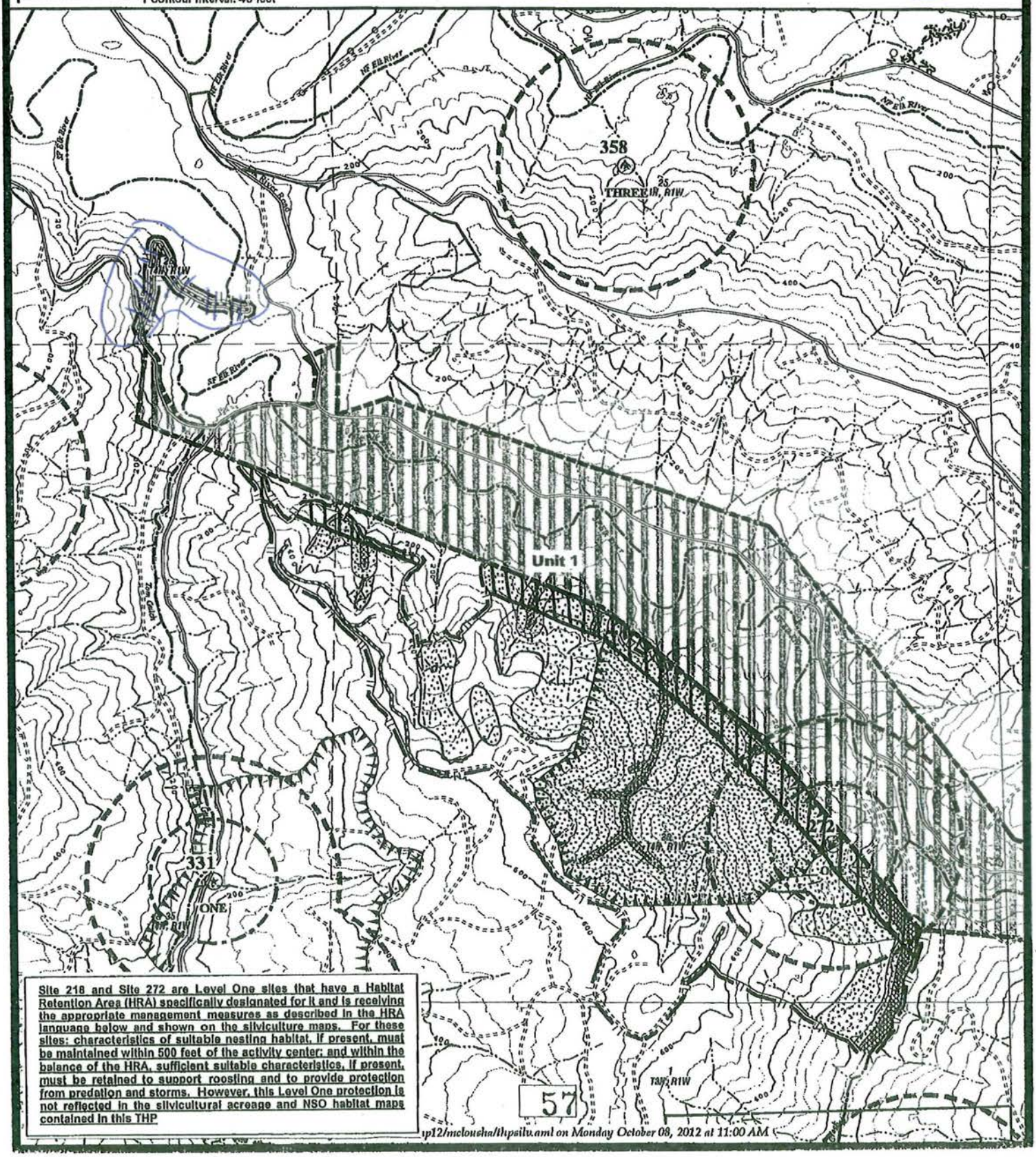
USGS Quad (s): FIELDS LANDING, MCKINNEY CREEK

Map Scale: 1 inch = 1000 feet

Contour Interval: 40 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
Class II Waters
Power Line
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
Group Selection
Selection
No Harvest
Special Treatment Area
Federal, State and County Parks

2013 Enrollment Area



Site 216 and Site 272 are Level One sites that have a Habitat Retention Area (HRA) specifically designated for it and is receiving the appropriate management measures as described in the HRA language below and shown on the silviculture maps. For these sites: characteristics of suitable nesting habitat, if present, must be maintained within 500 feet of the activity center; and within the balance of the HRA, sufficient suitable characteristics, if present, must be retained to support roosting and to provide protection from predation and storms. However, this Level One protection is not reflected in the silvicultural acreage and NSO habitat maps contained in this THP

tp12/mclousha/thpsilu.aml on Monday October 08, 2012 at 11:00 AM

Table 1. Proposed 2013 Harvest in South Fork Elk River.

THP Name	THP Number	Unit Number	Silviculture					CC Equivalent	Hazard[2]	
			CC	ROW	Disp VR	SHR	SEL		Low	High
Mcloud shaw		ROW		1				1.0	1	
Hole	11-139	tier 1					114	57.0	104.2	9.8
Hole	11-139	tier 2		4			158.9	83.5	162.9	
								141.5		

[2]Hazard Acres are reported here to conform to the requirements of the Pre-Harvest Planning Report. The Staff Landslide Model in South Fork Elk River allows up to 114 Acres irrespective of Hazard Class. Acres reported are true acres

*Does not include 18 acre no-harvest area

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 114 Acres in South 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 enforcable Zero Discharge Monitoring Plan (Tier II).

Total Clear Cut Equivilant Acres enrolled or submitted for enrollment	141.5

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

THP Name	THP Number	Unit Number	Yarding System			Site Preparation	
			Ground Based	Yarder	Helicopter	Mechanical	Broadcast
Mcloud shaw		ROW	1				
hole	11-139	tier1	63	51			
hole	11-139	tier 2	162.9				

Professional Certification of Design

I SHANE M. BEACH, No 7396, 4/23/13
Name License # Date

REGISTERED GEOLOGIST
SHANE M.
BEACH
No. 7396
STATE OF CALIFORNIA

Signature

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. 1-12-110 HUM (McCloud Shaw) Unit # 1, 2, and 3

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 R1-2008-0100, 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.

McCloud Shaw
THP 1-12-110 HUM
Units 1 through 3

Tools Used in This Assessment	Figure Number
Elevation Map with 10 ft Contours (Humboldt Redwood Company [HRC] LiDAR*)	1
SHALSTAB / Slope Class / Hillshade Maps (Montgomery and Dietrich, 1994; Palco, 2006)	2
California Geologic Survey (CGS) Geology and Geomorphic Features (Marshall and Mendes, 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 Map (HRC, 2004)	6
Road Condition Map	7

* Refer to back of enrollment package for referenced maps

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

Geologic Review Units 1 through 3	Forestry Silviculture/Site Prep Plan Units 1 through 3	Operational Design Plan Units 1 through 3
➢ Oswald Geologic (2012) ➢ CGS (2012) ➢ HRC (2012)	➢ Silviculture practices/ site preparation activities identified in the approved THP have been not modified. ➢ Group selection and single tree selection are the approved silviculturial practices. ➢ Site preparation is not proposed within the approved THP.	➢ Yarding methods in the approved THP have not been adjusted or modified. ➢ Ground-based and cable yarding techniques are the approved methods for timber removal.

Executive Summary

The plan is located in the Elk River watershed and occupies multiple aspect slopes in and adjacent to Shaw Gulch, Railroad Gulch, and the South Fork Elk River in addition to several of their unnamed tributaries. These drainages are characterized by incised, moderate to steep sided, v-shaped draws/valleys that contain well-developed dendritic drainage systems. The upland portions of these drainages consist of broad, well-rounded ridges, and moderate- to steep-gradient (40% to 60%) midslopes. Shallow colluvial hollows of variable width are present in the steeper areas of the plan. Typically, the upland slopes retain convex to semi-planar profiles and in some instances have developed into low-gradient (10% to 40%) topographic benches. Many of the lower-gradient slopes have rolling profiles composed of localized topographic bulges and depressions.

Regional geologic maps indicate that the plan occupies slopes underlain by Quaternary to Tertiary aged Undifferentiated Wildcat Group sediments and materials associated with the Quaternary aged Hookton Formation. No active faults are mapped passing through the project area, and no part of the plan lies within and/or adjacent to an Alquist-Priolo Earthquake Fault Zone. The nearest fault zoned by the State of California as active is the Little Salmon fault (Hart and Bryant, 1997).

A geologic evaluation was conducted for the THP using guidelines established under Note 50 (CGS, 1997), Note 45 (CGS, 1999), and Tier 2 enrollment. To evaluate slope stability in the plan area the project geologist used high-resluton,10-foot LIDAR contour map, SHALSTAB model results, historical aerial photographs, Mass Wasting Potential (MWP) maps, the Geologic and Geomorphic Features Related to Landsliding, Elk River Creek Map (Marshall and Mendes, 2005), onsite investigations, and THP Operational maps with unit boundaries, creeks, and roads. A discussion of the findings, conclusions, and recommendations associated with this assessment is contained in a geologic report that is attached to Section 5 of the THP titled 'Engineering Geologic Evaluation of the McCloud-Shaw THP, Humboldt Co., California'. This is a public document and can be found at ftp://thp.fire.ca.gov/THPLibrary/North_Coast_Region/THPs2012/1-12-110HUM/.

A large number of unstable areas were identified within the operational portions of each proposed harvest unit. A set of 1:750 scale maps (Figure 3a through 3c) are attached to the geologic report that show the position of the identified unstable area as they relate to roads, watercourses, and timber harvest boundaries. Detailed characterizations of the slide areas and justification for operations on and around them are provided in the reference geologic report.

The THP pre-harvest investigation (PHI) was attended by staff from several state agencies. PHI reports found the THP was compliant with the California Forest Practice Rules and HCP prescriptions (HRC, 2005) with respect to disclosure of all known unstable areas. These PHI reports are also available for review at the above listed website.

The following sections were taken directly from the geologic report attached to Section 5 and contain site-specific discussions relating to Tier 2 attributes for each of the three proposed harvest units.

For permit enrollment purposes, the harvest units have each been reviewed as one polygon. We validate this decision based on the slope morphology, consistent slope inclination with respect elevation, and slope performance in response to the previous harvest entry.

SUMMARY OF OBSERVATIONS AND MITIGATIONS FOR EACH PROPOSED HARVEST UNIT:

THP Unit: # 1

A) General Observations

General: Unit 1 is about 197 acres in size and is laid out on a northwest trending ridgeline on slopes facing predominantly northeast (Figure 3a). The Class I South Fork Elk River defines the lower extent of the harvest unit and three Class II/III tributaries extend upslope into the unit. Slopes within the harvest unit average about 35-50% with steep, incised, 60%+ slopes adjacent to the incised watercourses in the northern portion of Unit 1 and adjacent to the deeply incised central Class II watercourse. The Class III watercourses extend upslope into moderately inclined broadly convergent slopes that do not appear to meet HCP headwall swale slope criteria.

Management History: Unit 1 was recently harvested in the late 1980's using predominantly ground-based overstory removal. No harvest operations were observed between the harvest entry observed in the 1987 aerial photography and the oldest photo set reviewed, the 1940 aerial photographs. The harvest history map indicated the initial harvest occurred in the 1860-1870 decade using railroad, livestock, and stem donkey harvest operations. The unit appears to have performed adequately in response to the previous harvest entries with some exceptions on skid trails noted below and possibly exacerbating natural unstable areas or landslides that initiated following the first harvest entry.

Previous Mapping: Geomorphic mapping by CGS (2005) maps: 1) four dormant deep-seated rockslides and earthflows, 2) one large dormant debris slide, 3) one small landslides observed in the 1984 aerial photography, and 4) debris slide amphitheater slopes within operational portions of the plan area (Figure 2b). The mapping by CGS (2005) does not accurately match the locations of the unstable areas within the proposed harvest units. Mapping by CGS was conducted using standard USGS topographic products with a 10- to 30-meter resolution. However, while the locations are slightly off, mapping by CGS (2005) is consistent with mapping for this investigation and is modified on the approximately 3-meter resolution LiDAR topography available for the landowner's property holdings.

Shallow Landslide Modeling: Areas predicted as less stable by the SHALSTAB model (Value 1 and 2) are concentrated adjacent to the steep slopes in the northern corner of the THP, along steep streamside slopes of the Class II/III watercourses that extend upslope in to the harvest unit, and in the eastern portion of the unit adjacent the poorly incised Class III watercourses incised into steep to moderately inclined slopes (Figure 4a). Areas predicted as less stable by SHALSTAB modeling are roughly coincident with LS 1-1, 1-2, 1-3, and 1-4 and help delineate steeply inclined swales that

310

A) General Observations

appear susceptible to shallow landsliding.

Mass Wasting Potential (MWP) modeled for the unit shows moderate to high MWP adjacent to steep streamside slopes of Class II/III watercourses that extend upslope in to the harvest unit (Figure 4b).

Debris slide slopes mapped for this investigation (Figure 3a) are evaluated based on SHALSTAB modeling, previous mapping, and the site investigation. These areas are interpreted as potential source areas since few historically active debris slides were identified during THP layout within the area mapped as debris slide slopes. The areas mapped as debris slide slopes are generally steep and convergent.

B) Harvest Related Impacts and Hillslope Sensitivity

Site Investigation: Six large earthflow and translational rockslide complexes are mapped initiating from the ridgeline in the central portion of Unit 1 (Figure 3a). LS 1-5, 1-6, 1-7a-c, 1-8, 1-9 and 1-10 have relatively fresh appearing vertical scarps that show a few feet of historic offset. Old growth stumps within the margins of the landslides are deformed. Second growth timber within the slides are either slightly deformed or undeformed. The majority of the historically active unstable areas have predominantly hardwoods and brush with few merchantable trees. The proposed harvest within those stand types is limited and is often an effective no harvest because of the existing stand density and species distribution coupled with the CLG Limited Harvest recommendations and retention standards of selection silviculture.

Nine landslides interpreted to be management related were mapped in Unit 1 **(1-1, 1-2, 1-3, 1-4, 1-8b, 1-9, 1-10, 1-11, 1-15)**(Figure 3a). LS 1-2, 1-3, 1-4, 1-11, and 1-15 probably occurred following the 1987 harvest entry and are shallow debris slides that are generally related to skid trail construction and ground-based yarding. The larger translational failures, LS 1-8b, 1-9, and 1-10 were likely caused by yarding disturbance during the initial harvest entry in the 1860's. The remaining landslides are interpreted as existing unstable areas that were probably exacerbated by the initial two harvest entries that occurred in in the 1860's and 1980's.

Three recent landslides interpreted to be management related were observed in aerial photography taken after the 2002-2003 and 2005-2006 storm season (LS 1-2, 1-3, 1-4). They occurred on a steep bluff or steep streamside slopes. The last harvest entry prior to their observation was in the 1987 photographs, about 25 years ago. LS 1-2 is located in an area proposed for CLG Limited Harvest. LS 1-3 and 1-4 are located within the RMZ selection band and are considered adequately mitigated by the HCP prescribed reduced harvest levels, HCP retention requirements, and HRC land management objectives.

The remaining Six management related landslides mapped for the site investigation are related to skid trail construction and large-diameter log skidding on steep slopes (1-1, 1-8b, 1-9, 1-10, 1-11, and 1-15). LS 1-15 does not deliver to a watercourse and does not have a significant potential to deliver to a watercourse based on the distance to the nearest watercourse and the low gradient intervening slopes.

311

B) Harvest Related Impacts and Hillslope Sensitivity

Five of the remaining six landslides (1-1, 1-8b, 1-9, 1-10, and 1-11) are within areas proposed for CLG Limited Harvest. LS 15 is not placed within an area proposed for harvest restriction because it does not pose a threat of sediment delivery to a watercourse.

LS 1-5, 1-6, 1-7a-c, 1-8a-b, 1-12, 1-13, 1-14a-c are dormant-historic and dormant-young rockslide and earthflow complexes that initiate from the central ridgeline around the three more deeply dissected Class II/III watercourses. They are interpreted to be natural unstable areas that have been exacerbated by previous harvest entries. The larger landslide complexes appear more active in the northern portions of Unit 1 and five of the landslide complexes are placed within areas proposed for CLG Limited Harvest (LS 1-5, 1-6, 1-7a-c, 1-8a-b, and 1-12). The remaining four translational rockslide complexes appear more subdued in morphologic expression with no geomorphic indicators of historical landslide movement. The dormant landslides 1-13 and 1-14 were not placed in an area proposed for CLG Limited Harvest because the proposed harvest is not expected to adversely affect the stability of the landslide.

Harvest Limitations: All recent landslides initiated from within or adjacent to areas mapped as debris slide slopes by this investigation, and also predicted as less stable by SHALSTAB modeling. These areas are largely within the RMZ selective entry bands for the Class I and Class II watercourses. An arcuate area predicted as less stable by SHALSTAB modeling is located upslope of the Class III watercourse in the northeastern portion of the proposed harvest unit. All mapped unstable areas and debris slide slopes except 1-14a-c, 1-15, and debris slide slopes adjacent to 1-15 are placed within areas of CLG limited harvest (Figure 5).

312

C) Forestry / Silviculture Plan

The geologic investigation recommends an area of no group selection of unstable areas mapped for the unit (Figure 5).

D) Operational Design Plan

THP proposed yarding method considered appropriate.

THP Unit: # 2

A) General Observations

General: Unit 2 is about 149.5 acres in size and is laid out within the southern tributary of Railroad Gulch (Figure 3b). A Class I/II watercourse runs through the center of the harvest unit and has short linear Class II/III tributaries extending upslope into the left bank of the main creek, and longer, more curving Class II/III tributaries extending upslope into the right bank of the main creek. Slopes within the harvest unit average about 35-50% with steep, streamside, 60%+ slopes adjacent to the left bank of the main channel in the western portion of Unit 2, in the upper headwaters of the watershed, and in the upper elevation slopes that form landslide source areas along the eastern portions of the harvest unit. The Class II/III watercourses extend upslope into moderately inclined broadly convergent slopes or steep bluffs that do not appear to meet HCP headwall swale slope criteria.

A) General Observations

Management History: Unit 2 was recently harvested in the late 1980's to early 1990's using predominantly ground-based overstory removal. Prior to the harvest entry observed in the 1987 aerial photography no operations were observed following the 1940 aerial photographs. The harvest history map indicated the initial harvest occurred in the 1860-1870 decade using railroad and steam donkey harvest operations. Portions of the unit have performed adequately in response to the previous harvest entries with some exceptions on skid trails noted below and large, natural unstable areas that appear to have been exacerbated following the initial harvest entries in the late 1800's.

Previous Mapping: Geomorphic mapping by CGS (2005) maps: 1) two dormant deep-seated rockslides, 2) six large, dormant debris slides, 3) one historically active debris flow, and 4) four small landslides observed in the 1984 aerial photography. Debris slide amphitheater slopes are mapped on steep streamside slopes on the left bank of the main channel within the central portions of the plan area (Figure 2b). The mapping by CGS (2005) does not accurately match the locations of the unstable areas within the proposed harvest units. Mapping by CGS was conducted using standard USGS topographic products with a 10- to 30-meter resolution. However, while the locations are slightly off, mapping by CGS (2005) is consistent with mapping for this investigation and is modified on the approximately 3-meter resolution LiDAR topography available for the landowner's property holdings.

The landslide inventory for the Elk River Watershed Analysis is shown in Figure 3d. The mapping is similar to CGS mapping and shows four deep-seated landslides and ten small landslides in the proposed harvest unit. The small landslides initiate from steep streamside slopes in the western half of the proposed unit and on steep, convergent slopes in the upper elevations of the eastern portions of the proposed unit.

Shallow Landslide Modeling: Areas modeled as less stable by SHALSTAB (Value 1 and 2) are concentrated on steep, streamside slopes adjacent to the left bank of the main channel, in the upper headwaters of the watershed, and in the upper elevation slopes of the eastern portions of the harvest unit (Figure 4a). Areas predicted as less stable by SHALSTAB modeling are roughly coincident with mapped unstable areas 2-5, 2-6, 2-7a, 2-8, 2-11, 2-13, 2-14, 2-15, 2-16, and 2-19. An area predicted as moderately less stable by the SHALSTAB model runs along almost the entire western half of the proposed harvest unit and corresponds to steep streamside slopes along the left bank of Railroad Gulch.

Mass Wasting Potential (MWP) modeled for the unit shows high MWP adjacent to the steep left bank of the central Class I watercourse (Figure 4b). There is no very high or extreme mass wasting potential mapped.

Debris slide slopes mapped for this investigation (Figure 3b) are evaluated based on SHALSTAB, previous mapping, and the site investigation. These areas are interpreted as potential source areas since only a few historically active debris slides were identified during THP layout within the area mapped as debris slide slopes. The areas mapped as debris slide slopes are, in general, steep and convergent.

B) Harvest Related Impacts and Hillslope Sensitivity

Site Investigation: Six large, historically active earthflow complexes and one large, historically active rockslide are mapped within proposed harvest Unit 2, LS 2-1a, 2-2, 2-4, 2-20a-b, 2-21 2-22, and rockslide 2-6 (Figure 3b). The earthflows have relatively fresh appearing vertical

313

B) Harvest Related Impacts and Hillslope Sensitivity

scarps that show a few feet up to about 15-feet of historic offset. Old growth stumps within the margins of the landslides are deformed. The timber stand composition within the historically active earthflows is noticeably different than the stand composition on adjacent slopes outside of the unstable area and generally has a less dense conifer stand. Second growth timber within the active earthflows is commonly undeformed or slightly deformed. Rockslide 2-6 is persistently active in the aerial photographic review and a 30-foot tall, un-vegetated bluff forms the main scarp of the failure. A mass of tilted redwood clumps, downed timber, and landslide debris is located at the base of the bluff. The majority of the historically active unstable areas have predominantly hardwoods and brush with few merchantable trees. The proposed harvest within those stand types is limited and is often an effective no harvest because of the existing stand density and species distribution coupled with the CLG Limited Harvest recommendations and retention standards of selection silviculture.

17 of the 23 landslides mapped in the proposed unit are interpreted to be management related **(2-1a-b, 2-5, 2-7a-b, 2-8, 2-9, 2-10, 2-11, 2-12, 2-14a-b, 2-15, 2-16, 2-17, 2-19, 2-23)**(Figure 3a). Unstable areas: 2-1a-b, 2-5, 2-7a-b, 2-8, 2-10, 2-11, 2-12, 214, 2-15, 2-16, 2-17, 2-19, and 2-23 occurred following the 1980's harvest entry and are mostly shallow debris slides that are generally related to skid trail construction and ground-based yarding.

Unstable Area 2-14b is a management related landing failure that was observed in aerial photography taken after the 2002-2003-storm season. The outboard edge of a landing on the secondary haul road failed and delivered to a low gradient bench downslope of the road. There was no sediment delivery to a watercourse observed. 2-14b does not have a significant potential to deliver to a watercourse based on the distance to the nearest watercourse and the low gradient intervening slopes and is not included in an area of CLG Limited Harvest.

The remaining management related landslides mapped for the site investigation are related to skid trail construction and large-diameter log skidding on steep slopes and are within areas proposed for CLG Limited Harvest.

Two large rockslides (2-6 and 2-21) are interpreted as existing unstable areas that were reactivated following the initial two harvest entries that occurred in in the 1860's and 1980's.

Unstable areas 2-1a, 2-2, 2-4, 2-20a-c, 2-21, and 2-22 are recently active earthflow complexes that initiate from convergent topography near the ridgeline on slopes south of Railroad Gulch. They are interpreted to be natural unstable areas that have been exacerbated by previous harvest entries. The landslide complexes occur as coherent translational-rotational failures in the upper extents of the earthflow and become more hummocky and disrupted downslope. Much of the second growth timber appears relatively undeformed in the upper portions of the complexes, even though there is a fresh looking, un-vegetated, 3-6 foot tall scarp upslope of the timber. The landslide complexes are placed within areas proposed for CLG Limited Harvest (2-1a, 2-2, 2-4, 2-20a-c, 2-21, and 2-22).

Harvest Limitations: All recently active shallow landslides initiated from within or adjacent to areas mapped as debris slide slopes by this investigation, and modeled with SHALSTAB stability class values 1 through 3. These areas are largely within the RMZ selective entry bands for the Class I and Class II watercourses. Areas of elevated SHALSTAB stability class values are located in the upper elevations of the eastern portions of the

B) Harvest Related Impacts and Hillslope Sensitivity
unit. All mapped unstable areas and debris slide slopes except 1-14b are placed within areas of CLG limited harvest (Figure 5).

C) Forestry / Silviculture Plan
The geologic investigation recommends an area of no group selection of unstable areas mapped for the unit (Figure 5).

D) Operational Design Plan
THP proposed yarding method is considered appropriate.

THP Unit: # 3

A) General Observations

General: Unit 3 is about 245.5 acres in size and is laid out on a northwest trending interfluve ridgeline on slopes facing predominantly northwest and southeast. The Class II tributaries to the mainstem Elk River extends upslope into northern and central portions of the proposed harvest unit. Slopes within the harvest unit average about 25-40% with a steep, incised slopes 60%+ slopes adjacent to the deeply incised Class II watercourses in the northern and central portions of the proposed harvest unit. The Class III watercourses extend upslope into moderately inclined broadly convergent slopes that do not appear to meet HCP headwall swale slope criteria.

Management History: Unit 3 was recently harvested in the late 1980's using predominantly ground-based overstory removal. Prior to the harvest entry observed in the 1987 aerial photography no operations were observed following the 1940 aerial photographs. The harvest history map indicated the initial harvest occurred in the 1860-1870 decade using railroad and stem donkey harvest operations. The unit appears to have performed adequately in response to the previous harvest entries with some exceptions on skid trails noted below and operations on steep streamside slopes. Landslides mapped within the propose harvest unit are all located on steep streamside slopes and predominantly initiate from the skid trail and road network.

Shallow Landslide Modeling: Areas predicted as less stable by SHALSTAB modeling (Value 1 and 2) are concentrated adjacent the steep streamside slopes in the northern and central portions of the THP (Figure 4a). All of the unstable areas mapped for this investigation are roughly coincident with areas predicted as more unstable by SHALSTAB. Debris slide slopes mapped for this investigation were evaluated using SHALSTAB modeling, previous mapping, and the site investigation (Figure 3a).

Mass Wasting Potential (MWP) modeled for the unit (Figure 4b) shows moderate to high MWP on steep streamside slopes in the northern and central portions of the unit. Areas of high MWP are roughly coincident with mapped areas of elevated SHALSTAB values. MWP modeling was conducted using standard USGS topographic products with a likely maximum 10- to 30-meter resolution and is considered less accurate than the SHALSTAB modeling run with high resolution LiDAR topography.

315

B) Harvest Related Impacts and Hillslope Sensitivity

Site Investigation: All mapped landslides in the proposed harvest unit are interpreted to be management related (Figure 3a). Many probably occurred following the 1980's harvest entry and are generally related to skid trail construction and ground-based yarding of large diameter timber on steep slopes. The larger translational failures, 3-16 and 3-17 were likely caused by yarding disturbance during the initial harvest entry in the 1860's, as are likely many of the steep streamside failures in the north-central portion of the proposed harvest unit. The majority of the historically active unstable areas have predominantly hardwoods and brush with few merchantable trees. The proposed harvest within those stand types is limited and is often an effective no harvest because of the existing stand density and species distribution coupled with the CLG Limited Harvest recommendations and retention standards of selection silviculture.

Landslide 3-1 is a 1997 landing failure that continued to ravel in the 2003, 2006, and 2010 storm season. They landing failure extends downslope to the Class II watercourse. The last harvest entry prior to its observation was the ground-based harvest that occurred in the late 1980's. 3-1 is outside of the proposed harvest boundary.

All mapped unstable areas are within HCP stream buffers or are placed within areas proposed for CLG Limited Harvest.

Three road related landslides (LS 3-20, 3-21, and 3-22) is on a road that is outside of the proposed harvest boundaries and maintained by HRC under HCP requirements and is considered mitigated through regulated road management activities conducted on HRC HCP properties.

The three mapped landslides initiated from within or adjacent to areas mapped as debris slide slopes by this investigation, and modeled with class 1 to 3 SHALSTAB stability class values. These areas are largely within the RMZ selective entry bands for the Class II watercourses.

C) Forestry / Silviculture Plan

The geologic investigation recommends an area of no group selection of unstable areas mapped for the unit (Figure 5).

D) Operational Design Plan

THP proposed yarding method is considered appropriate.

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.

References:

California Geologic Survey (CGS), 2005, *Geologic and Geomorphic Features Related to Landsliding, Elk River Watershed, Humboldt County, California.* Department of Conservation, now California Geological Survey Watershed Mapping Series, Map set 4, Plate 1. Available via the web at ftp://ftp.consrv.ca.gov/pub/dmg/thp/maps/elk/elk_color.pdf

---, 2012, *Engineering Geologic Review of Timber Harvesting Plan 1-12-110 HUM (McCloud Shaw).* unpublished memorandum to William Snyder, Deputy Director, Resource Management California Department of Forestry and Fire Protection. NR:NR.

---. (1997). *Note 50: Factors Affecting Landslides In Forested Terrain.* Sacramento: CDMG.

---. (September 1999). *Note 45, Guidelines for Engineering Geologic Reports for Timber Harvesting Plans.* Sacramento: CDMG.

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

Oswald Geologic (OG), 2012. *Engineering Geologic Evaluation of the McCloud Shaw THP, Humboldt Co., California.* Unpublished Consultants Report Prepared for HRC. 48 pgs.,

Humboldt Redwood Company (HRC), 1999, The Pacific Lumber Company's Habitat Conservation Plan, Vol. 2 Part D, Landscape Assessment of Geomorphic Sensitivity, Public Review Draft.

---, 2004, Elk River / Salmon Creek Watershed Analysis, Scotia, California, prepared for Pacific Lumber Company (PALCO), 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, 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.

Humboldt Redwood Company LLC

Erosion Control Plan (ECP) for The "McCloud Shaw" THP

After consultation the Regional Water Board, Humboldt Redwood Company (HRC) will seek Regional Board permitting coverage for the McCloud Shaw THP under the General WDR for timber (Order R1-2004-0030). In addition to complying with the terms and conditions of Order R1-2004-0030, as a condition of enrollment of the McCloud Shaw THP under R1-2004-0030, HRC will also comply with all the general terms and conditions of Order R1-2006-0039 (as amended by R1-2008-0100), and specifically the terms, conditions, and limits for the South Fork Elk River. Regional Water Board staff will determine THP permitting eligibility following plan approval and review of the application for permit coverage.

This plan is being included in the THP to partially meet the requirements
of the North Coast Regional Water Quality Control Board
Watershed-wide 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 **20080819**

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: **McCloud Shaw THP**
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:

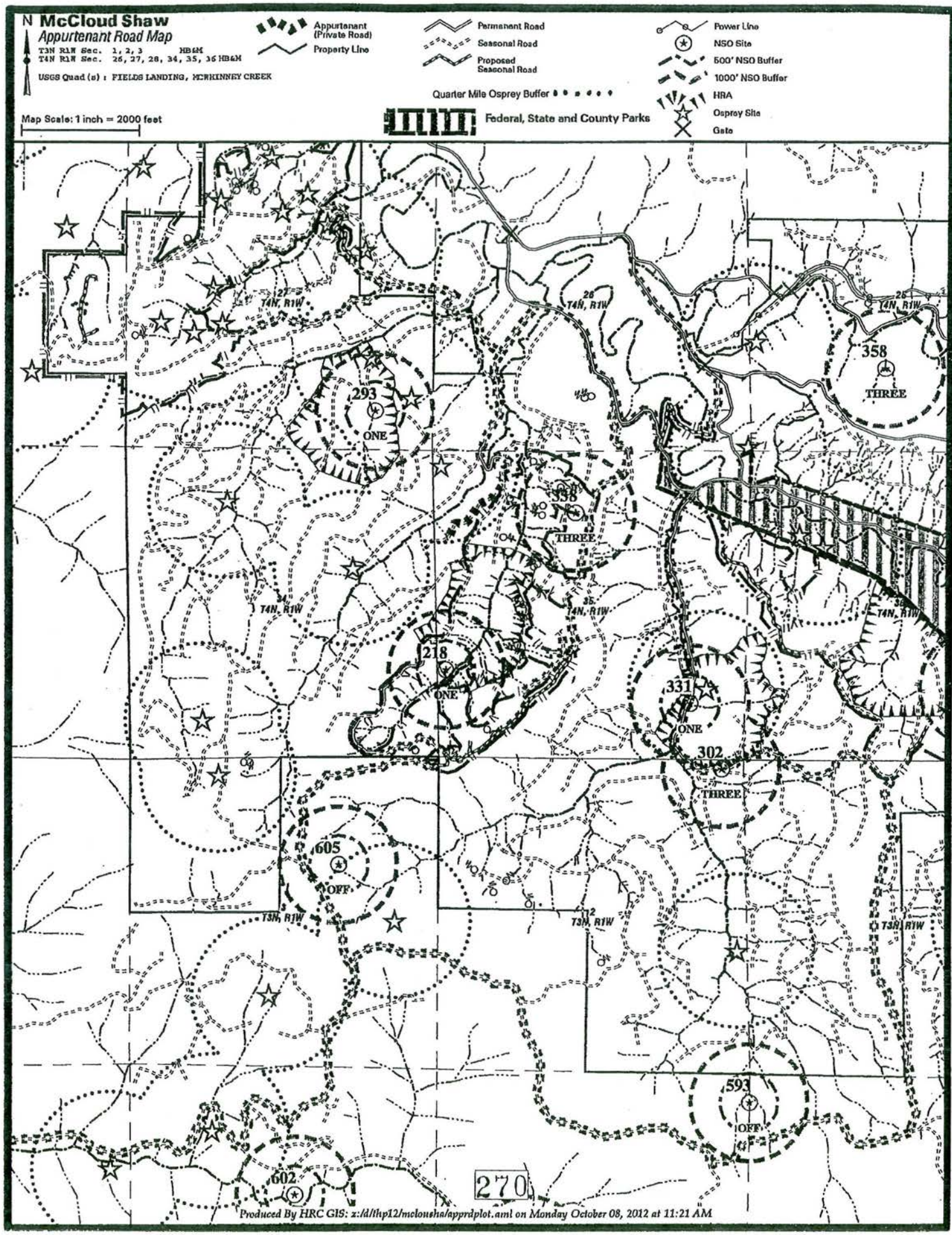
- Item 14 – Describes silvicultural prescriptions
  - (i) Site Preparation – Disclosure of selected site preparation treatments and mitigation measures
- Item 16 – Harvesting Practices – Describes yarding systems, equipment utilized, equipment limitations, and drainage facility installation timing
  - 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
- 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 Map**
- **ECP Site Locator Map**


N
McCloud Shaw
Appurtenant Road Map
T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M
USGS Quad (s) : FIELDS LANDING, MERRINNEY CREEK
Map Scale: 1 inch = 2000 feet
Appurtenant (Private Road)
Property Line
Permanent Road
Seasonal Road
Proposed Seasonal Road
Quarter Mile Osprey Buffer
Federal, State and County Parks
Power Line
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
Osprey Site
Gate
T4N, R1W
T3N, R1W
293
ONE
358
THREE
338
THREE
218
ONE
331
ONE
302
THREE
605
OFF
593
OFF
602
270
Produced By HRC GIS: z:/d/thp12/mclousha/apprdplot.aml on Monday October 08, 2012 at 11:21 AM

N **McCloud Shaw**

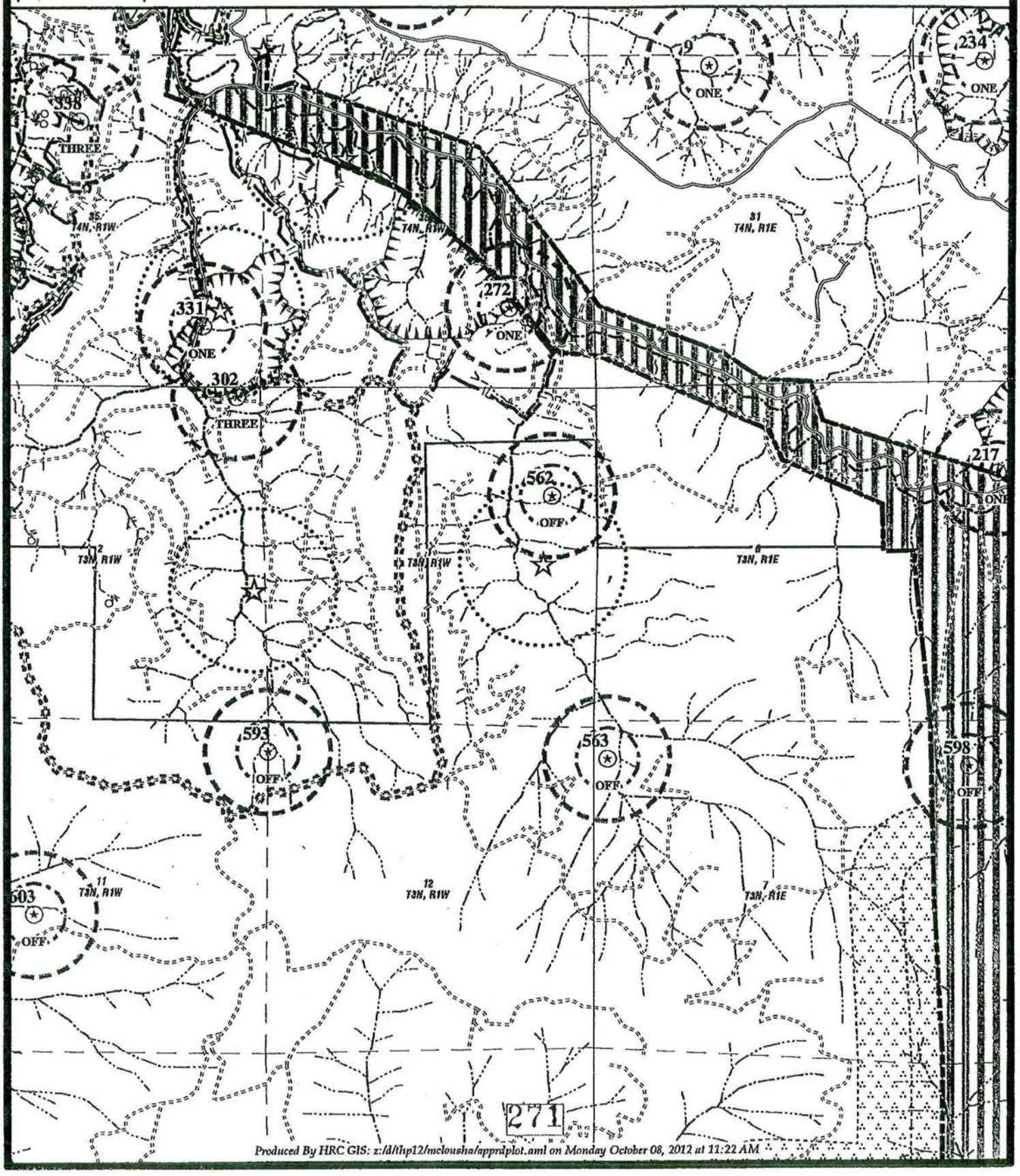
Appurtenant Road Map

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

USGS Quad (s) : FIELDS LANDING, MCKINNEY CREEK

Appurtenant (Private Road)
Property Line
Permanent Road
Seasonal Road
Proposed Seasonal Road
Federal, State and County Parks
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
Osprey Site

Map Scale: 1 inch = 2000 feet



Produced By HRC GIS: z:/d/thp12/mcloushs/appnplot.aml on Monday October 08, 2012 at 11:22 AM

McCloud Shaw

Road Construction Location Map

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

ECP Site Locator Map 1 of 3

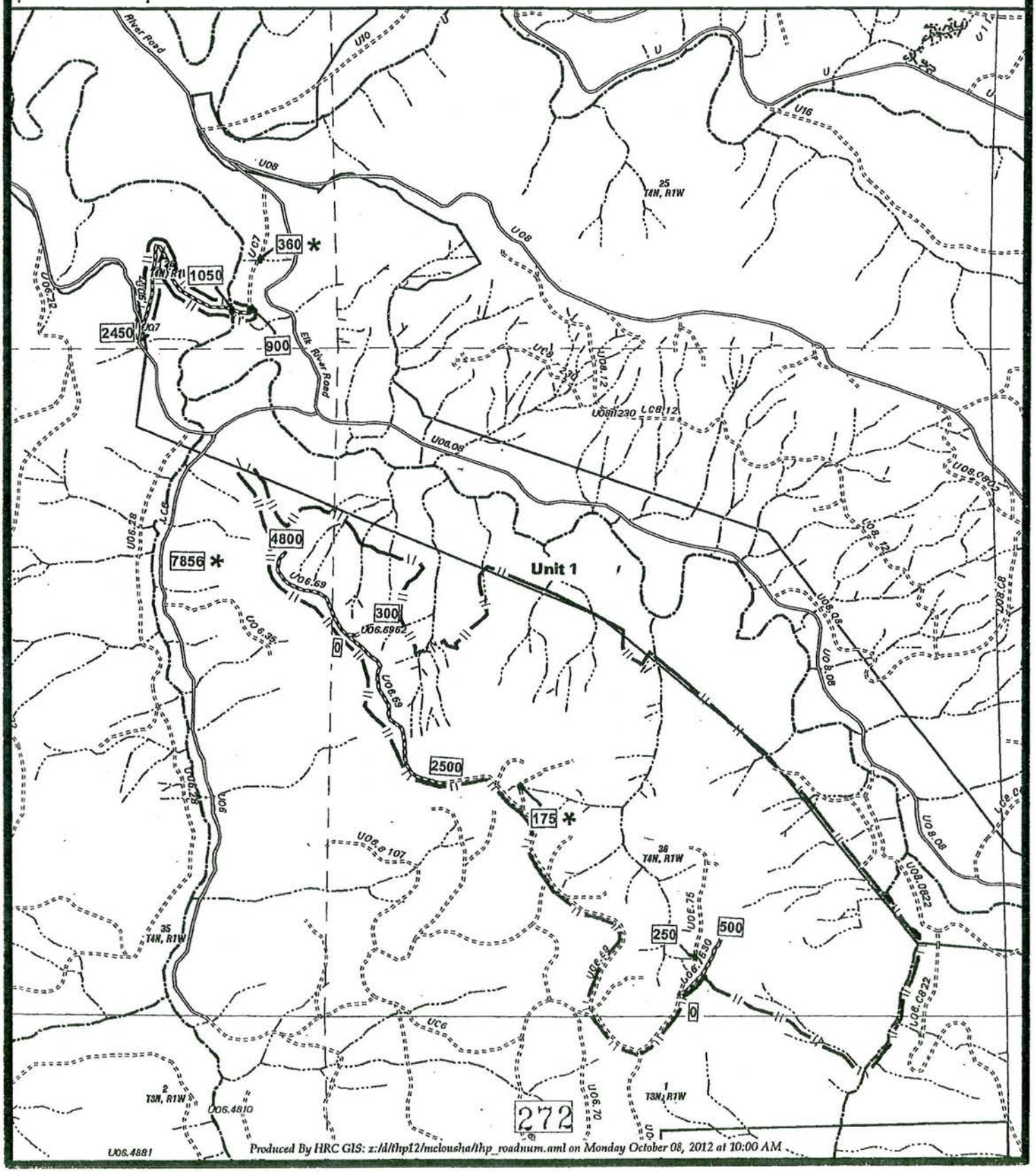
USGS Quad (s) : FIELDS LANDING, MCKINNEY CREEK

N

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse

* Indicates ECP Site



McCloud Shaw

Road Construction Location Map

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

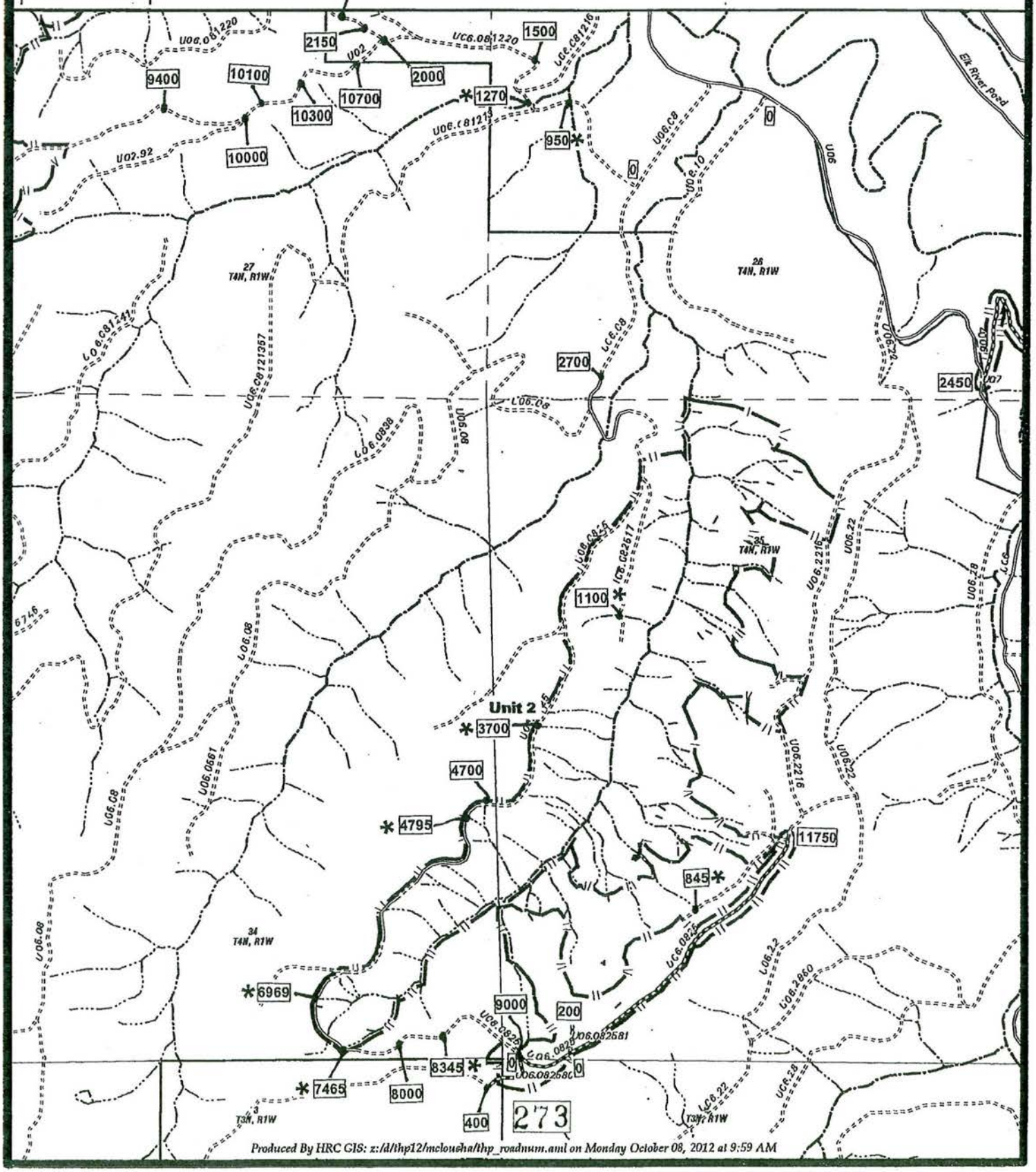
ECP Site Locator Map 2 of 3

USGS Quad (s) : FIELDS LANDING, MCWHINNEY CREEK

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse

* Indicates ECP Site



Produced By HRC GIS: z:/d/thp12/mclousha/thp_roadnum.aml on Monday October 08, 2012 at 9:59 AM

McCloud Shaw

Road Construction Location Map

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

ECP Site Locator Map 3 of 3

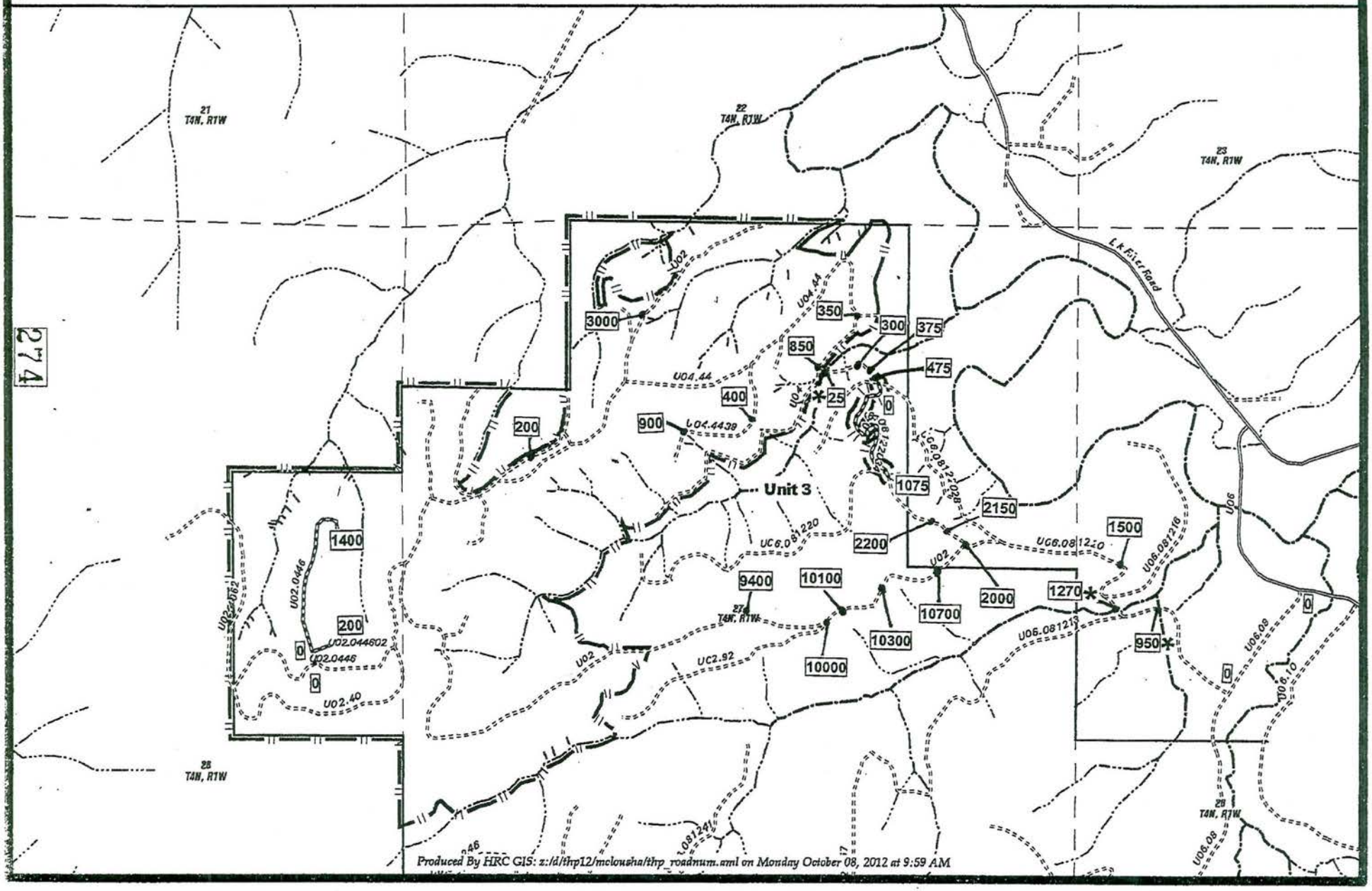
USGS Quad (s) : FIELDS LANDING, MCWHINNEY CREEK

N

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse

* Indicates ECP Site



Produced By HRC GIS: z:/d/thp12/mclousha/thp_roadnum.aml on Monday October 08, 2012 at 9:59 AM

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) 764-376.**

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 indicted 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**
- **Skid Trail Inventory Summary**
- **Skid Trail Inventory Map**

Erosion Control Plan

Site	Site Type	Est. Potential Erosion (Cu.Yards)	Est. Potential Delivery (Cu.Yards & %)	Priority for Treatment	Implementation Schedule	Site Description	Treatment
Project McCloud Shaw							
RD: U06 STATION: 7856 SITE: WOID: -237534371 SEDID: 11716 REPAIRED: NO	Failing Fill	12	12 100%	Med	Prior to Oct 15; FIRST year of operations.	Outside edge of road has slumped 2-3', adjacent to a class I	Outside edge of road has slumped 2-3'. Base of the slump is a redwood clump. Road is currently wide enough for pick up traffic. The road may be retreated into the cutslope up to 6 feet without additional review. Perched fills shall be pulled back from the outboard edge and incorporated into the re-graded road surface or end-hauled to an appropriate spoils location. The road shall be re-graded and the vertical outboard edge removed by lowering the grade and/or by compacting clean native fills against the vertical outboard edge of the fillslope. Disconnect any surface drainage that is concentrated on to the site as feasible. Refer to Geo report for further description.
RD: U06.0812 STATION: 950 SITE: C1 WOID: 1659629691 SEDID: 11711 REPAIRED: NO	Crossing	20	20 100%	Med	Prior to THP Final Completion.	Replace exisitng culvert on a class I with a bridge.	Watercourse with minimal fish habitat, other than at high flows it could serve as refguia for salmonids. Replace exisiting culvert with a bridge. Ensure base of bridge is higher than exisiting road grade elevation. Refer to skectch map page 82.2
RD: U06.0812 STATION: 1270 SITE: C2 WOID: 783837346 SEDID: 11710 REPAIRED: NO	Crossing	40	40 100%	Med	Prior to THP Final Completion.	Culvert on class I has rusted through and may be a partial barrier to fish migragtion.	Exisitng 54" culvert on a class I watercourse. Culvert has rusted through and may be a partial barrier to fish migragtion. No recent signs of culvert overtopping. Replace culvert with a bridge. Ensure the base of the bridge is higher in elevation than current road grade. This should be sufficient to pass any sediment and debris. 100 yr culvert size (96") is larger than exisiting channel and at a hundred year event the site would be flooded by mainstem of elk river. Refer to skectch onpage 82.3
RD: U06.08122028 STATION: 25 SITE: C1 WOID: -384774712 SEDID: 11712 REPAIRED: NO	Crossing	75	75 100%	High	Prior to Oct 15; FIRST year of operations.	Undersized culvert on a class I watercouse.	currently undersize 30" culvert on a class I watercouse. The culvert is serving as grade control and causing aggradation above the watercousre. The crossing is a barrier to fish migration. Replace culvert with a permenant bridge. Ensure grade controls above and below crossing are installed with either rip rap or large wood. RPF or Geologist to be on site during grade control construction to ensure controls are built to prevent headcutting and are passable to fish. Refer to sketch map page 82.1
RD: U06.08122028 STATION: 200 SITE: WOID: 307896081 SEDID: 11976 REPAIRED: NO	Crossing	25	25 100%	Med	Prior to THP Final Completion.	Exisiting culvert with a shotgun outlet.	Exisiting class II 24" culvert with a shoutgun out. Replace with new 24" culvert. If crossing at 25' is to be abandoned than shall site shall be adandoned by pulling the exinsting corssing, excavating fill and slash packing channel.

RECEIVED
MAR 14 2013
COAST AREA OFFICE
RESOURCE MANAGEMENT

277

PART OF PLAN

Site	Site Type	Est. Potential Erosion (Cu.Yards)	Est. Potential Delivery (Cu.Yards & %)		Priority for Treatment	Implementation Schedule	Site Description	Treatment
RD: U06.0825 STATION: 3700 SITE: S1 WOID: -405886763 SEDID: 11714 REPAIRED: NO	Crossing	5	5	100%	Med	Prior to THP Final Completion.	Small sinkhole developing above class III.	Rolling dip above class III watercourse. The outlet of the dip has a small sinkhole developing. Excavate sinkhole and back fill with a mix of rock sizes.
RD: U06.0825 STATION: 4700 SITE: S2 WOID: 927140722 SEDID: 11717 REPAIRED: NO	Rocked Dip	5	5	100%	Med	Prior to THP Final Completion.	Failing fill above class III	Existing truck road above Class III watercourse. Install a rocked rolling dip.
RD: U06.0825 STATION: 4795 SITE: SFE806.1 WOID: 1182108339 SEDID: 15242 REPAIRED: NO	Surface Drainage	13	13	100%	Med	Prior to THP Final Completion.	This segment of road above a class III, show signs of poor drainage. The rocked rolling dip will be installed at a low point in the road to aid in maintaining a dry road surface. The rock surfacing will also aid in maintaining a dry road surface.	Existing seasonal road above a class III watercourse. Install a rocked rolling dip. Rock surface the road back to Road Point 4700.
RD: U06.0825 STATION: 5300 SITE: WOID: 1362408171 SEDID: 15243 REPAIRED: NO	Surface Drainage	5	5	100%	Med	Prior to THP Final Completion.	springs/bank flow not disconnected from water course	Install cross drain (dip or drc) to drain springs along bank and road surface.
RD: U06.0825 STATION: 5400 SITE: WOID: 46306640 SEDID: 11977 REPAIRED: NO	Surface Drainage	5	5	100%	Med	Prior to THP Final Completion.	Spring/bank flow not disconnected from watercouse	Install cross drain (dip or drc) to drain springs along bank and road surface .
RD: U06.0825 STATION: 7465 SITE: SFE807.3 WOID: 368796655 SEDID: 15248 REPAIRED: NO	Crossing	120	120	100%	High	Prior to Oct 15; FIRST year of operations.	The crossing is located near the top of the class III. The crossing was not completely pulled following past operations.	Install a rock ford
RD: U06.0825 STATION: 8345 SITE: SFE809.1 WOID: 1236880132 SEDID: 15249 REPAIRED: NO	Crossing	6	6	100%	Med	Prior to THP Final Completion.	The road crosses a class II spring. Perched fill is located at the outlet of the crossing.	Exisiting temporary crossing on a class II spring. Remove perched fill and install rocked ford
RD: U06.082517 STATION: 1100 SITE: SFE803.5 WOID: -1057662685 SEDID: 15240 REPAIRED: NO	Crossing	1796	1796	100%	High	Prior to Oct 15; FIRST year of operations.	Failing humboldt on a class II	Failing humboldt. Excavated soil to LWD. Leave LWD in place, backfill with 6" minus rock to necessary road grade, creating a rocked ford.

PART OF PLAN

RECEIVED
MAR 14 2013
COAST AREA OFFICE
RESOURCE MANAGEMENT

Site	Site Type	Est. Potential Erosion (Cu.Yards)	Est. Potential Delivery (Cu.Yards & %)	Priority for Treatment	Implementation Schedule	Site Description	Treatment
RD: U06.221689 STATION: 845 SITE: C1 WOID: 1075078896 SEDID: 11715 REPAIRED: NO	Crossing	5	5 100%	Med	Prior to THP Final Completion.	Sink holes are evident in the crossing on class III.	Existing crossing near the top of a class III watercourse. Sink holes are evident in the crossing. Excavate crossing to sinkhole depth, back fill with a mix of rock sizes to regain road grade and surface with road rock.
RD: U07 STATION: 360 SITE: C1 WOID: -1358500653 SEDID: 11713 REPAIRED: NO	Crossing	10	10 100%	Low	Prior to THP Final Completion.	Partially pulled crossing on class III.	Existing partially pulled crossing. Install a permenant 24" culvert
Total Estimated Yards		2142	2142				

RECEIVED
MAR 14 2013
COAST AREA OFFICE
RESOURCE MANAGEMENT

278.1

PART OF PLAN

Crossing Inventory Summary

A crossing inventory was updated and revised for Units 1 and 3. A crossing inventory was conducted on Unit 2. The crossing inventory includes *all* previously unidentified skid trail crossings located within the THP area. The sites were evaluated to determine if they meet the definition of Controllable Sediment Discharge Source. See the summary of inventoried sites below.

CROSSING INVENTORY - UNIT #1 (See Crossing Inventory Maps).
17 additional crossings were identified within Unit #1 (Sites A through Site P and Site T) All of these crossings are located within areas that were previously tractor yarded but are now proposed for cable yarding. The "Decision tree for road and off road sediment source site treatment" was reviewed and the sites are considered NO TREAT sites for the following reasons:

The sites will not be used for current or future timber operations. The amount of ground disturbance created by heavy equipment access is GREATER than the sediment saved from site remediation. Treatment may destabilize the adjacent hillslope. The majority of the sites have already delivered most of the volume originally stored in the site. The fills are stable with second and third growth trees and little evidence of active erosion. The sites are generally associated with watercourses with low stream power.

One previously identified NO TREAT site (Site U) will be treated due to its use as a truck road crossing for current and future Operations.

Three previously identified TREAT sites (Site Q, Site R, and Site S) have been reevaluated and based on the "Decision tree for road and off road sediment source site treatment" have been shifted to NO TREAT sites.

CROSSING INVENTORY - UNIT #2 (See Crossing Inventory Maps).
17 additional crossings were identified within Unit #2 (Sites A through Sites Q). All additional crossings are located within areas that were previously tractor yarded but are now proposed for cable yarding. The "Decision tree for road and off road sediment source site treatment" was reviewed and the sites are considered NO TREAT sites for the following reasons:

The sites will not be used for current or future timber operations. The amount of ground disturbance created by heavy equipment access is GREATER than the sediment saved from site remediation. Treatment may destabilize the adjacent hillslope. The majority of the sites have already delivered most of the volume originally stored in the site. The fills are stable with second and third growth trees and little evidence of active erosion. The sites are generally associated with watercourses with low stream power.

The remaining sites within Unit #2 that have been identified as TREAT SITES will be treated due their being along truck roads that will be used for current and future operations.

CROSSING INVENTORY - UNIT #3 (See Crossing Inventory Maps).
4 additional crossings were identified within Unit #3 (Sites A through Sites D). All additional crossings are located within areas that were previously tractor yarded but are now proposed for cable yarding. The "Decision tree for road and off road sediment source site treatment" was reviewed and the sites are considered NO TREAT sites for the following reasons:

The sites will not be used for current or future timber operations. The amount of ground disturbance created by heavy equipment access is GREATER than the sediment saved from site remediation. Treatment may destabilize the adjacent hillslope. The majority of the sites have already delivered most of the volume originally stored in the site. The fills are stable with second and third growth trees and little evidence of active erosion. The sites are generally associated with watercourses with low stream power.

Five previously identified TREAT sites (Site E through Site J) have been reevaluated and based on the "Decision tree for road and off road sediment source site treatment" have been shifted to NO TREAT sites. All sites are along an existing streamside truck road that is not proposed for use for current or future operations. The area was previously tractor logged and will no be yarded from the upper ridge top road using cable based systems.

McCloud Shaw

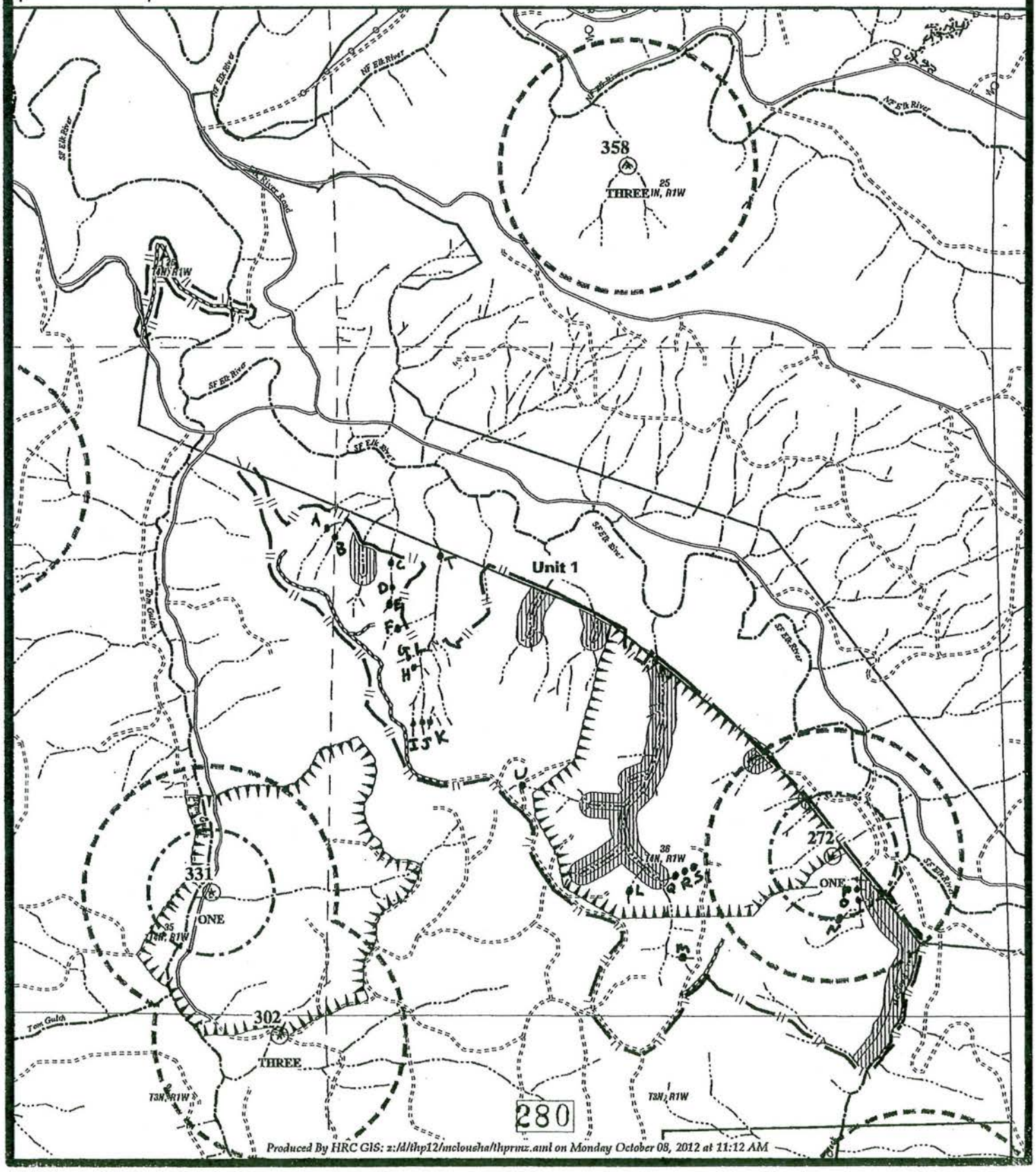
Crossing Inventory Map 1 of 3

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

USGS Quad(s): FIELDS LANDING, MCWHINNEY CREEK

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
Class II Waters
Power Line
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
RMZ or WLPZ Area



Produced By HRC GIS: z:/d/thp12/mclousha/thprmz.aml on Monday October 08, 2012 at 11:12 AM

McCloud Shaw

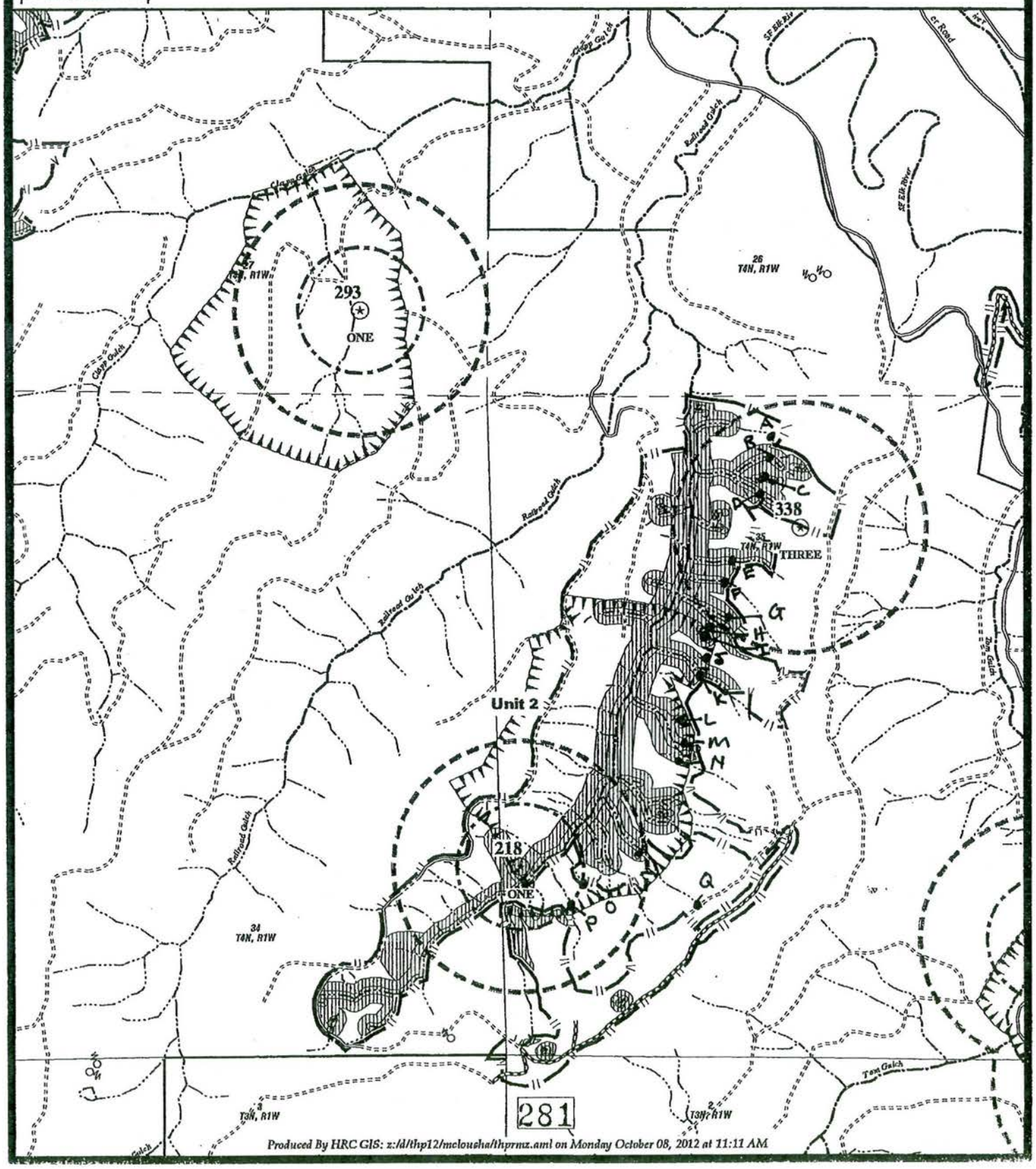
Crossing Inventory Map 2 of 3

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

USGS Quad (s): FIELDS LANDING, MCKINNEY CREEK

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
Class II Waters
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
RMZ or WLPZ Area



Produced By HRC GIS: z:/d/thp12/mcloushs/thprmz.aml on Monday October 08, 2012 at 11:11 AM

McCloud Shaw

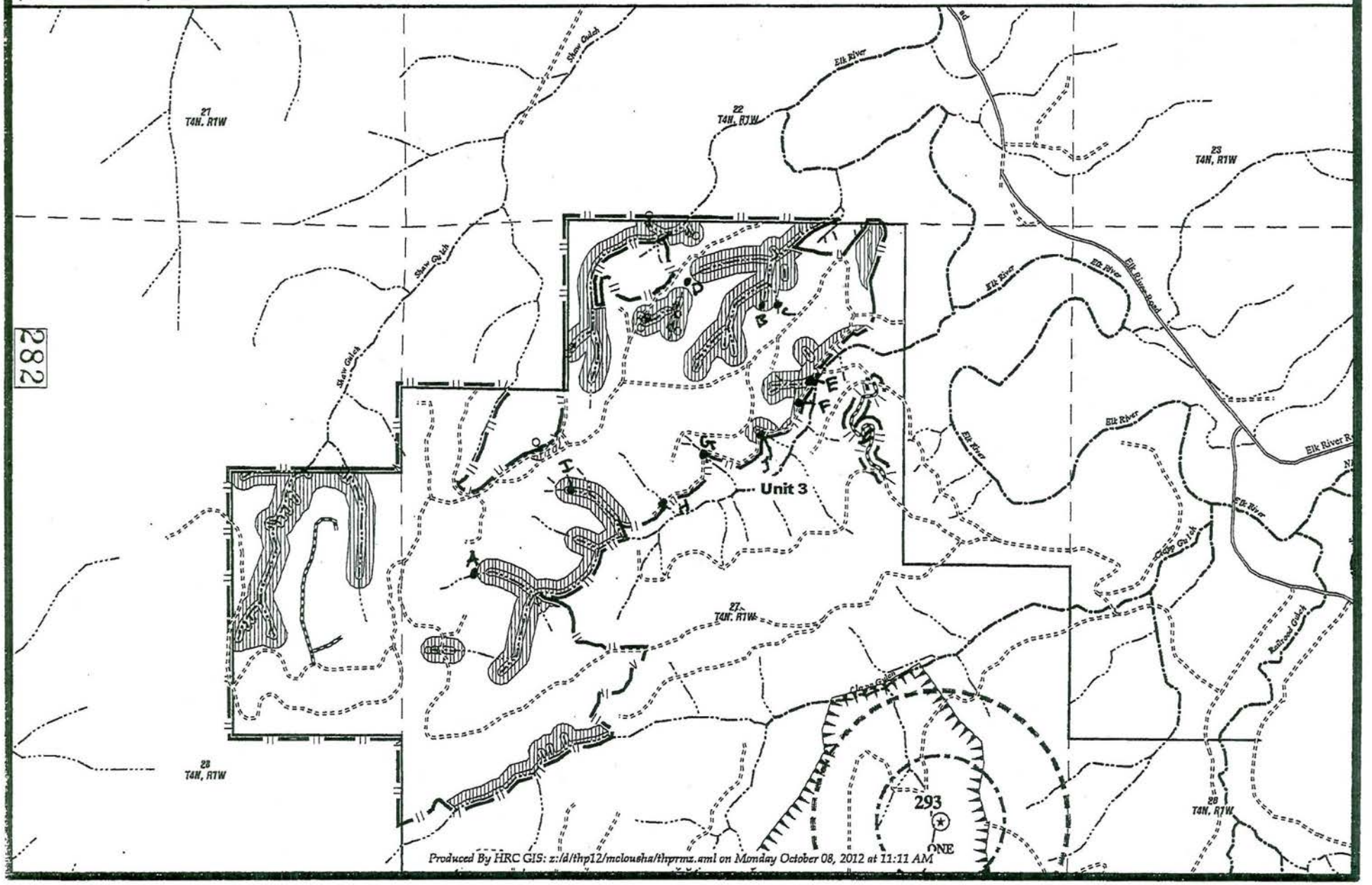
Crossing Inventory Map 3 of 3

T3N R1W Sec. 1, 2, 3 HB&M
T4N R1W Sec. 26, 27, 28, 34, 35, 36 HB&M

USGS Quad (s): FIELDS LANDING, MCWHINNEY CREEK

Map Scale: 1 inch = 1000 feet

Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Proposed Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
Class II Waters
NSO Site
600' NSO Buffer
1000' NSO Buffer
HRA
RMZ or WLPZ Area



Produced By HRC GIS: z:/d/thp12/mclousha/thprmz.aml on Monday October 08, 2012 at 11:11 AM

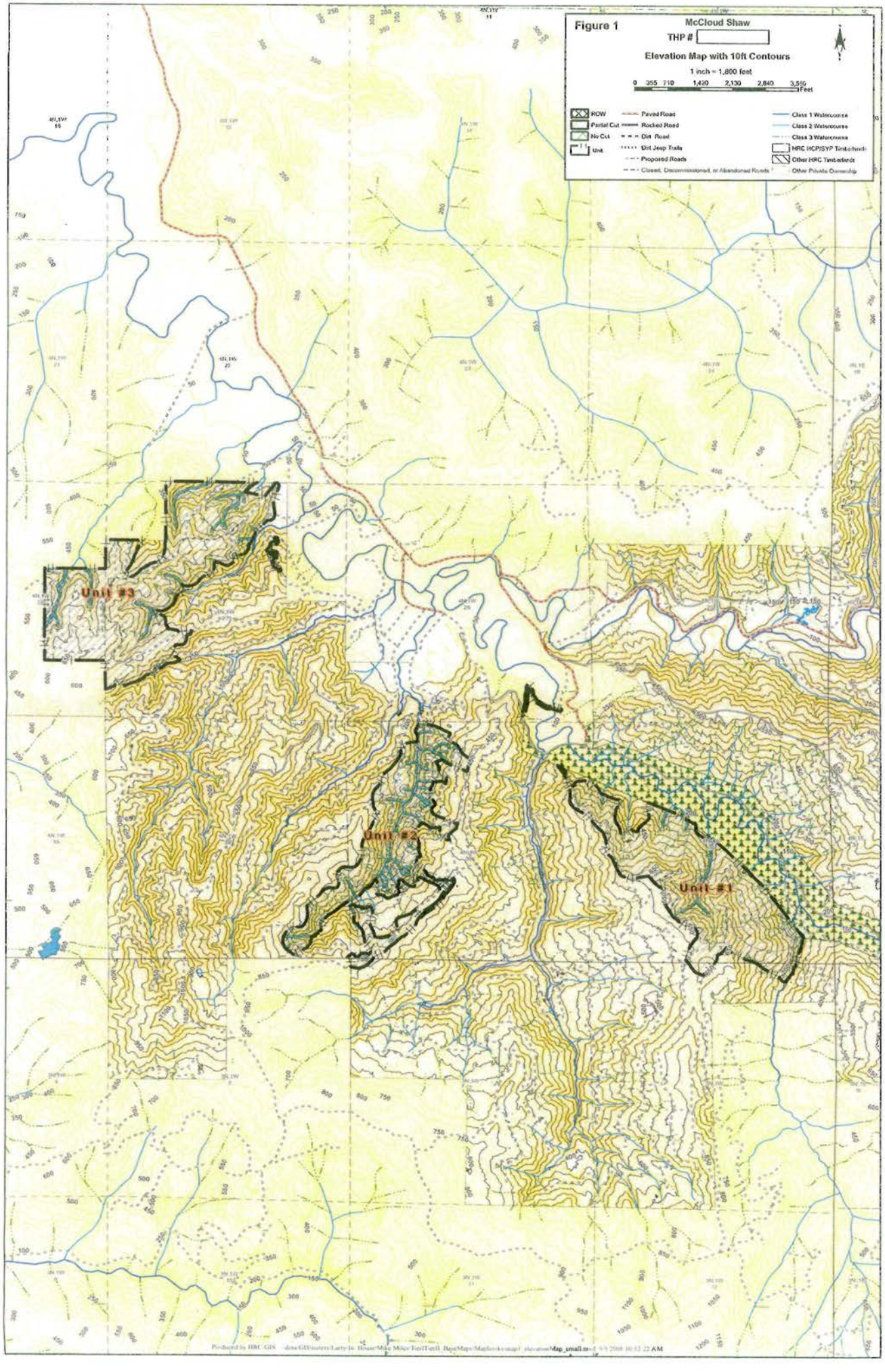


Figure 1
McCloud Shaw
THP #
Elevation Map with 10ft Contours
1 inch = 1,800 feet
0 355 710 1,420 2,130 2,840 3,550
Feet
ROW
Partial Cut
No Cut
Unit
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
Unit #3
Unit #2
Unit #1

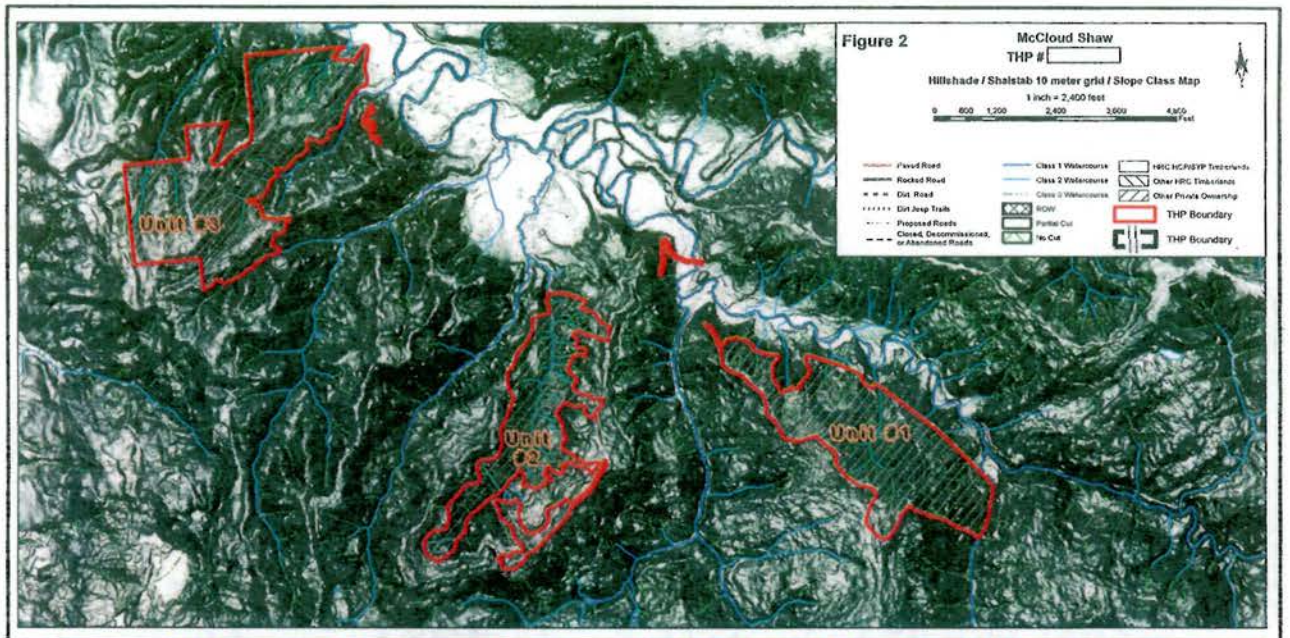
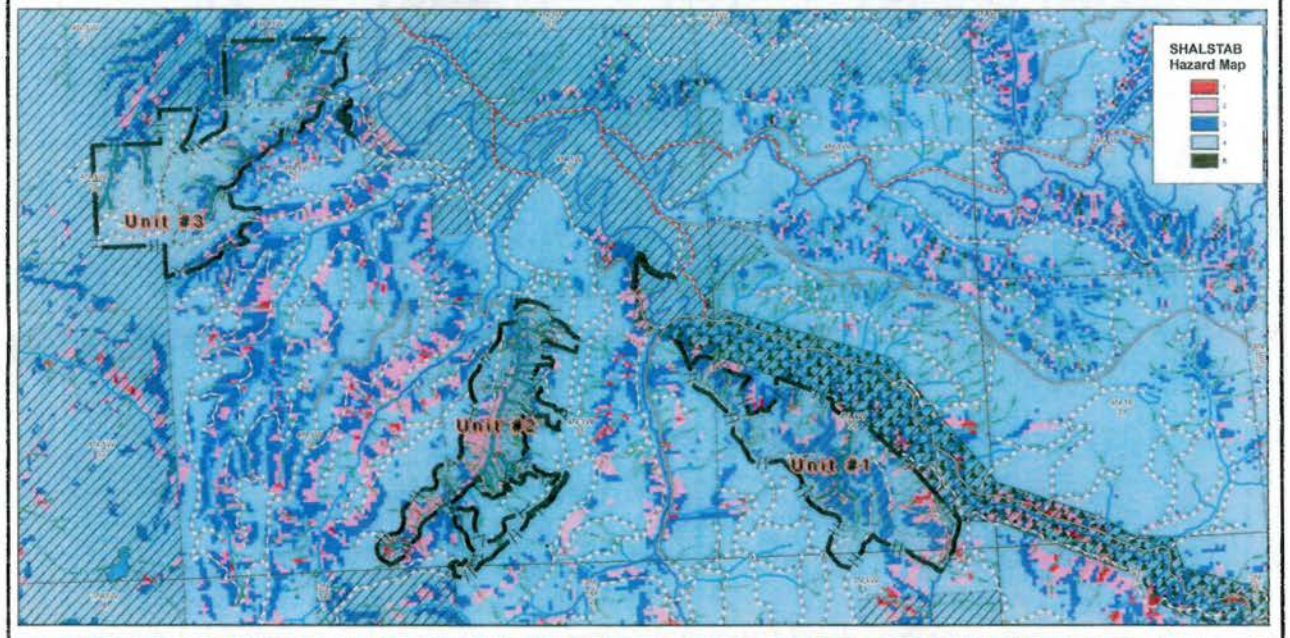
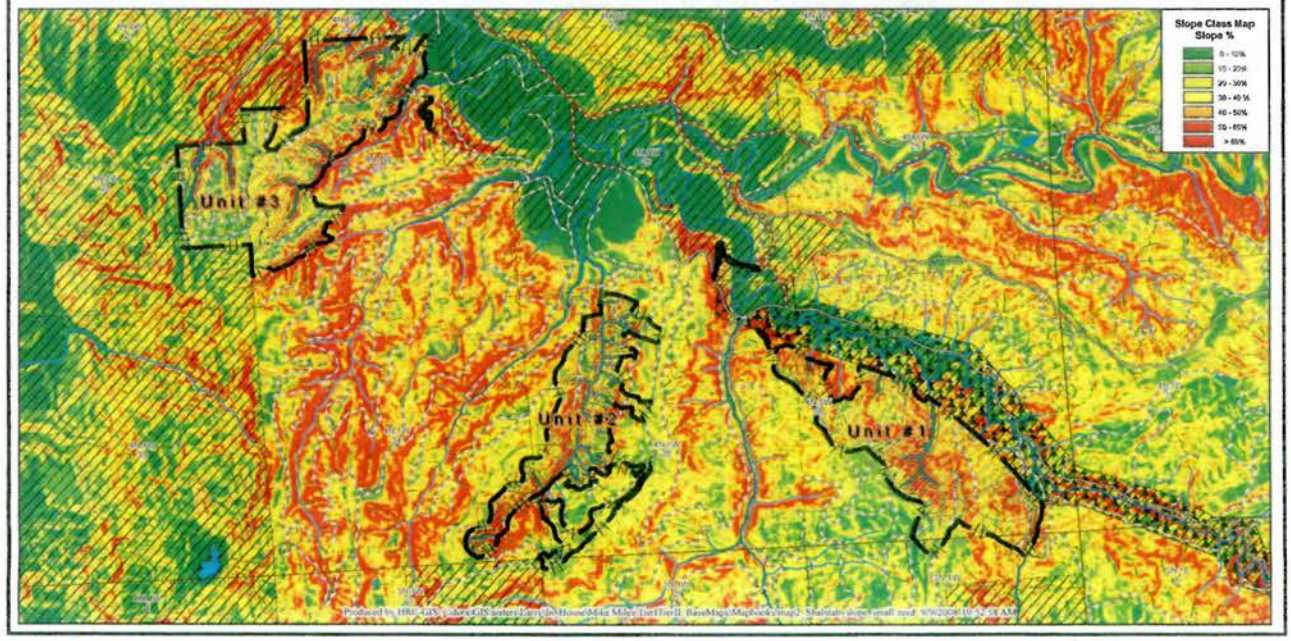


Figure 2
McCloud Shaw
THP #
Hillshade / Shalstab 10 meter grid / Slope Class Map
1 inch = 2,400 feet
0 600 1,200 2,400 3,600 4,800 Feet
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
ROW
Partial Cut
No Cut
HRC NC/PdSYP Timberlands
Other HRC Timberlands
Other Private Ownership
THP Boundary
THP Boundary
Unit #3
Unit #2
Unit #1


SHALSTAB
Hazard Map
Unit #3
Unit #2
Unit #1


Slope Class Map
Slope %
0 - 10%
10 - 20%
20 - 30%
30 - 40 %
40 - 50%
50 - 60%
> 60%
Unit #3
Unit #2
Unit #1

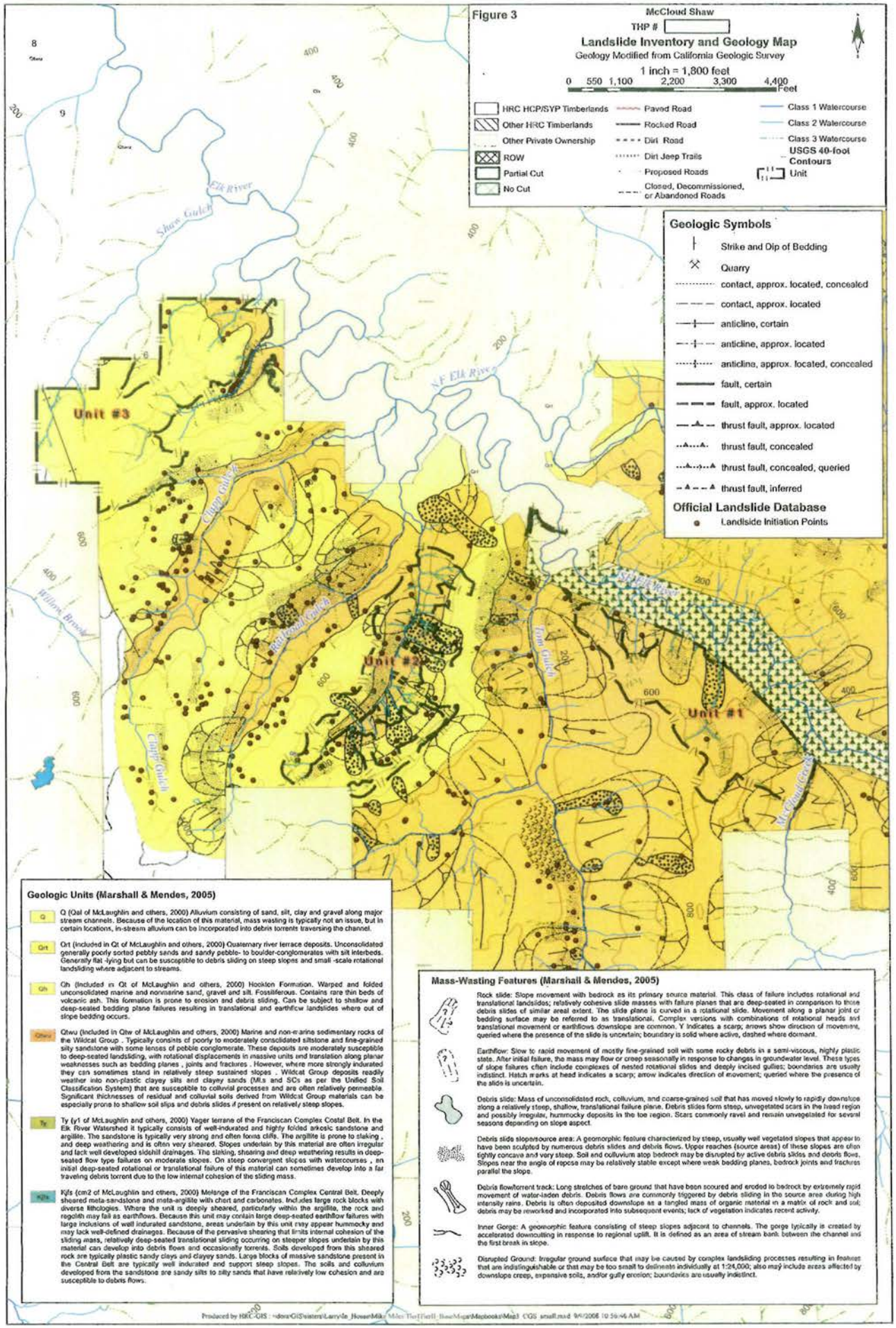


Figure 3
McCloud Shaw
THP #
Landslide Inventory and Geology Map
Geology Modified from California Geologic Survey
1 inch = 1,800 feet
0 550 1,100 2,200 3,300 4,400 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
USGS 40-foot Contours
Unit
Geologic Symbols
Strike and Dip of Bedding
Quarry
contact, approx. located, concealed
contact, approx. located
anticline, certain
anticline, approx. located
anticline, approx. located, concealed
fault, certain
fault, approx. located
thrust fault, approx. located
thrust fault, concealed
thrust fault, concealed, queried
thrust fault, inferred
Official Landslide Database
Landslide Initiation Points
Unit #3
Unit #2
Unit #1
Elk River
Shaw Gulch
NF Elk River
Clapp Gulch
Railroad Gulch
Willow Brook
Tom Gulch
McCloud Gulch
Geologic Units (Marshall & Mendes, 2005)
Q (Qal of McLaughlin and others, 2000) Alluvium consisting of sand, silt, clay 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-stream alluvium can be incorporated into debris torrents traversing the channel.
Qrt (included in Qt of McLaughlin and others, 2000) Quaternary river terrace deposits. Unconsolidated generally poorly sorted pebbly 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. Warped and folded unconsolidated marine and nonmarine sand, 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 translational and earthflow landslides where out of slope bedding occurs.
Qtwu (included in Qtw 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 . However, where more strongly indurated they can sometimes stand in relatively steep sustained slopes . Wildcat Group deposits readily weather into non-plastic clayey silts and clayey sands (MLs and SCs as per the Unified Soil Classification System) that are susceptible to colluvial processes and are often relatively permeable. Significant thicknesses of residual and colluvial soils derived from Wildcat Group materials can be especially prone to shallow soil slips and debris slides if present on relatively steep slopes.
Ty (y1 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. On steep convergent slopes with watercourses , an initial deep-seated rotational or translational failure of this material can sometimes develop into a far traveling debris torrent due to the low internal cohesion of the sliding mass.
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 blocks with diverse lithologies. Where the unit is deeply sheared, particularly within the argillite, the rock and 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. Soils 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 soils and colluvium developed from the sandstone are sandy silts to silty sands that have relatively low cohesion and are susceptible to debris flows.
Mass-Wasting Features (Marshall & Mendes, 2005)
Rock slide: Slope movement with bedrock as its primary source material. This class of failure includes rotational and translational landslides; relatively cohesive slide masses with failure planes that are deep-seated in comparison to those debris slides of similar areal extent. The slide plane is curved in a rotational slide. Movement along a planar joint or bedding surface may be referred to as translational. Complex versions with combinations of rotational heads and translational movement or earthflows downslope are common. Y indicates a scarp; arrows show direction of movement; queried where the presence of the slide is uncertain; boundary is solid where active, dashed where dormant.
Earthflow: Slow to rapid movement of mostly fine-grained soil with some rocky debris in a semi-viscous, highly plastic state. After initial failure, the mass may flow or creep seasonally in response to changes in groundwater level. These types of slope failures often include complexes of nested rotational slides and deeply incised gullies; boundaries are usually indistinct. Hatch marks at head indicates a scarp; arrow indicates direction of movement; queried where the presence of the slide is uncertain.
Debris slide: Mass of unconsolidated rock, colluvium, and coarse-grained soil that has moved slowly to rapidly downslope along a relatively steep, shallow, translational failure plane. Debris slides form steep, unvegetated scars in the head region and possibly irregular, hummocky deposits in the toe region. Scars commonly ravel and remain unvegetated for several seasons depending on slope aspect.
Debris slide slopesource area: A geomorphic feature characterized by steep, usually well vegetated slopes that appear to have been sculpted by numerous debris slides and debris flows. Upper reaches (source areas) of these slopes are often tightly concave and very steep. Soil and colluvium atop bedrock may be disrupted by active debris slides and debris flows. Slopes near the angle of repose may be relatively stable except where weak bedding planes, bedrock joints and fractures parallel the slope.
Debris flowtorrent track: Long stretches of bare ground that have been scoured and eroded to bedrock by extremely rapid movement of water-laden debris. Debris flows are commonly triggered by debris sliding in the source area during high intensity rains. Debris is often deposited downslope as a tangled mass of organic material in a matrix of rock and soil; debris may be reworked and incorporated into subsequent events; lack of vegetation indicates recent activity.
Inner Gorge: A geomorphic feature consisting of steep slopes adjacent to channels. The gorge typically is created by accelerated downcutting in response to regional uplift. It is defined as an area of stream bank between the channel and the first break in slope.
Disrupted Ground: Irregular ground surface that may be caused by complex landsliding processes resulting in features that are indistinguishable or that may be too small to delineate individually at 1:24,000; also may include areas affected by downslope creep, expansive soils, and/or gully erosion; boundaries are usually indistinct.
Produced by HRC-GIS

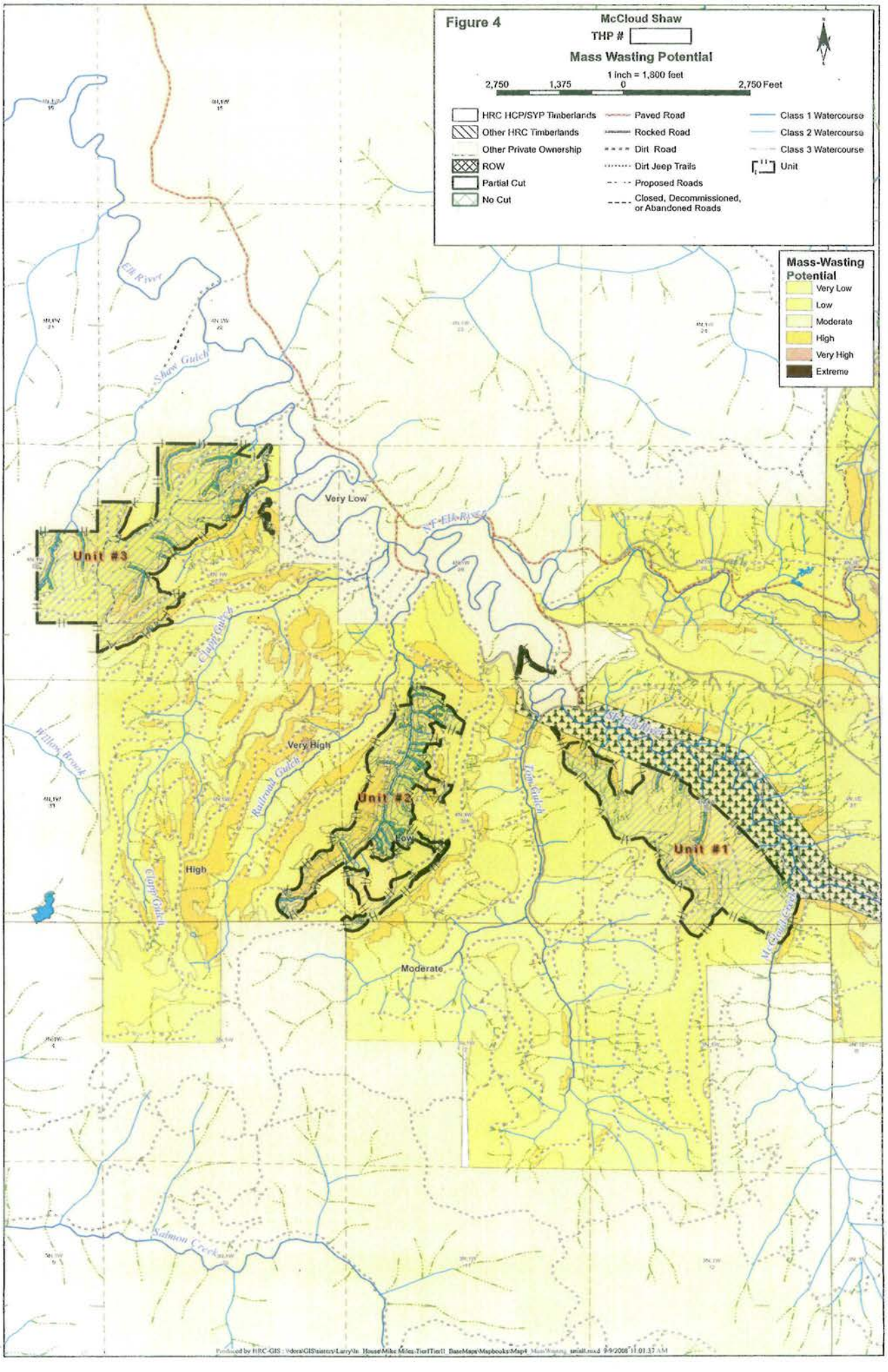


Figure 4
McCloud Shaw
THP #
Mass Wasting Potential
1 inch = 1,800 feet
2,750
1,375
0
2,750 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Unit
Mass-Wasting Potential
Very Low
Low
Moderate
High
Very High
Extreme
Elk River
Shaw Gulch
Very Low
SF Elk River
Unit #3
Clapp Gulch
Willow Brook
Very High
Railroad Gulch
Unit #2
Tom Gulch
Unit #1
High
Clapp Gulch
Moderate
Salmon Creek

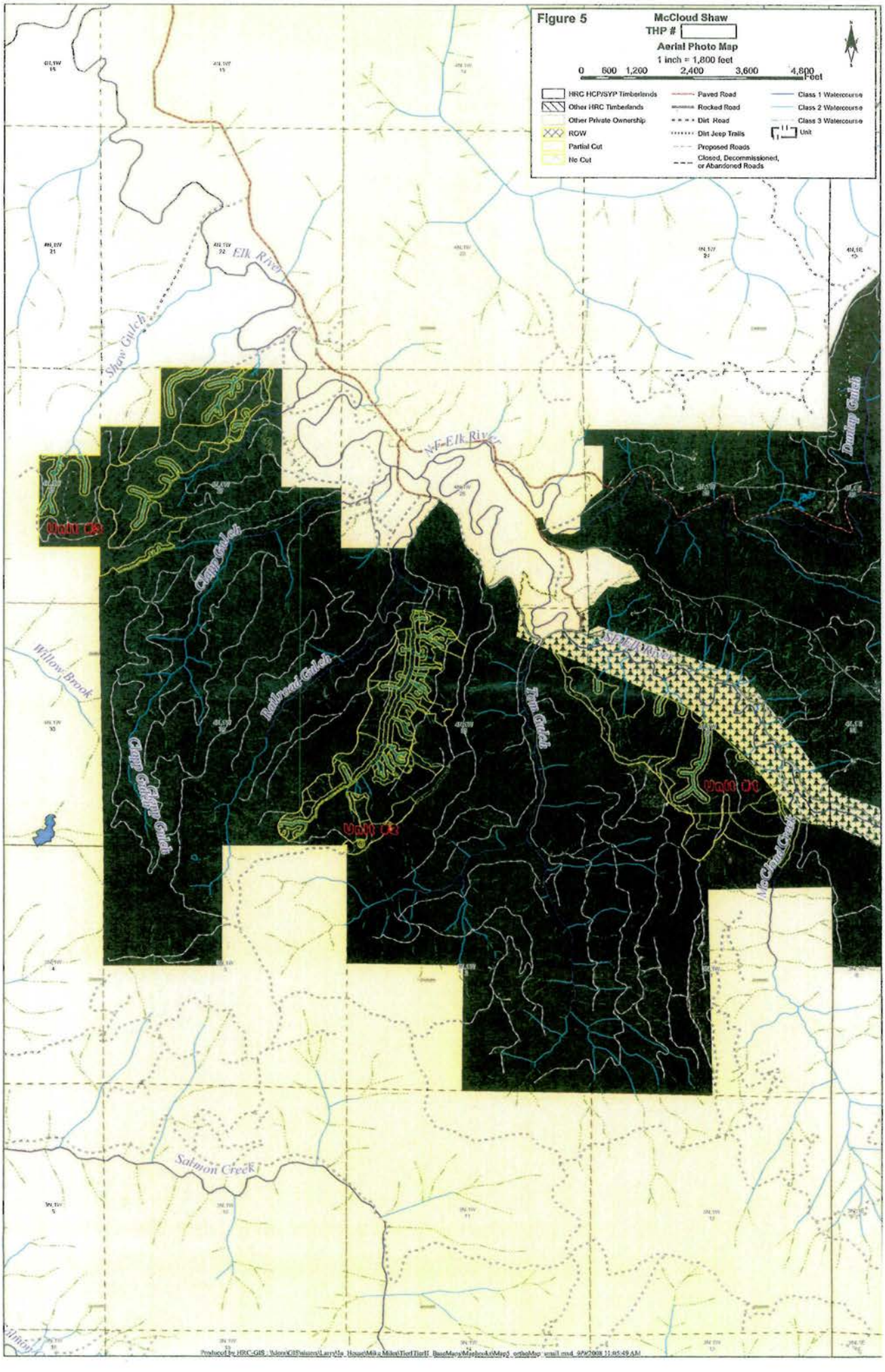


Figure 5
McCloud Shaw
THP #
Aerial Photo Map
1 inch = 1,800 feet
0 600 1,200 2,400 3,600 4,800 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Unit
Elk River
Shaw Gulch
NF Elk River
Dudley Gulch
Clamp Gulch
Railroad Gulch
Willow Brook
Clamp Gulch
Tom Gulch
SF Elk River
McCloud Creek
Salmon Creek
Produced by HRC-GIS

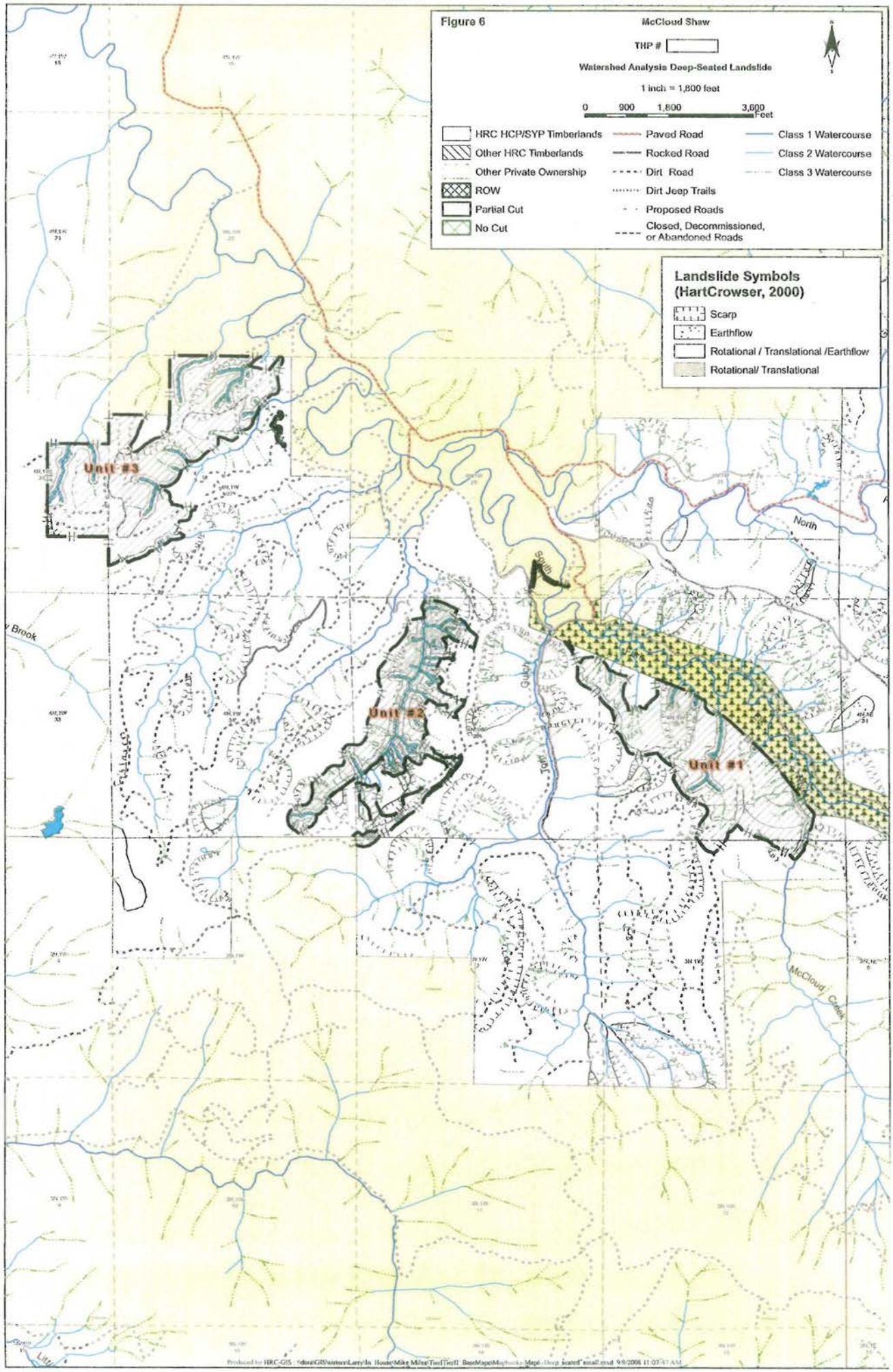


Figure 6
McCloud Shaw
THP #
Watershed Analysis Deep-Seated Landslide
1 inch = 1,800 feet
0 900 1,800 3,600 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Landslide Symbols (HartCrowser, 2000)
Scarp
Earthflow
Rotational / Translational /Earthflow
Rotational/ Translational
Unit #3
Unit #2
Unit #1
North
South
Gulch
Brook
McCloud Creek

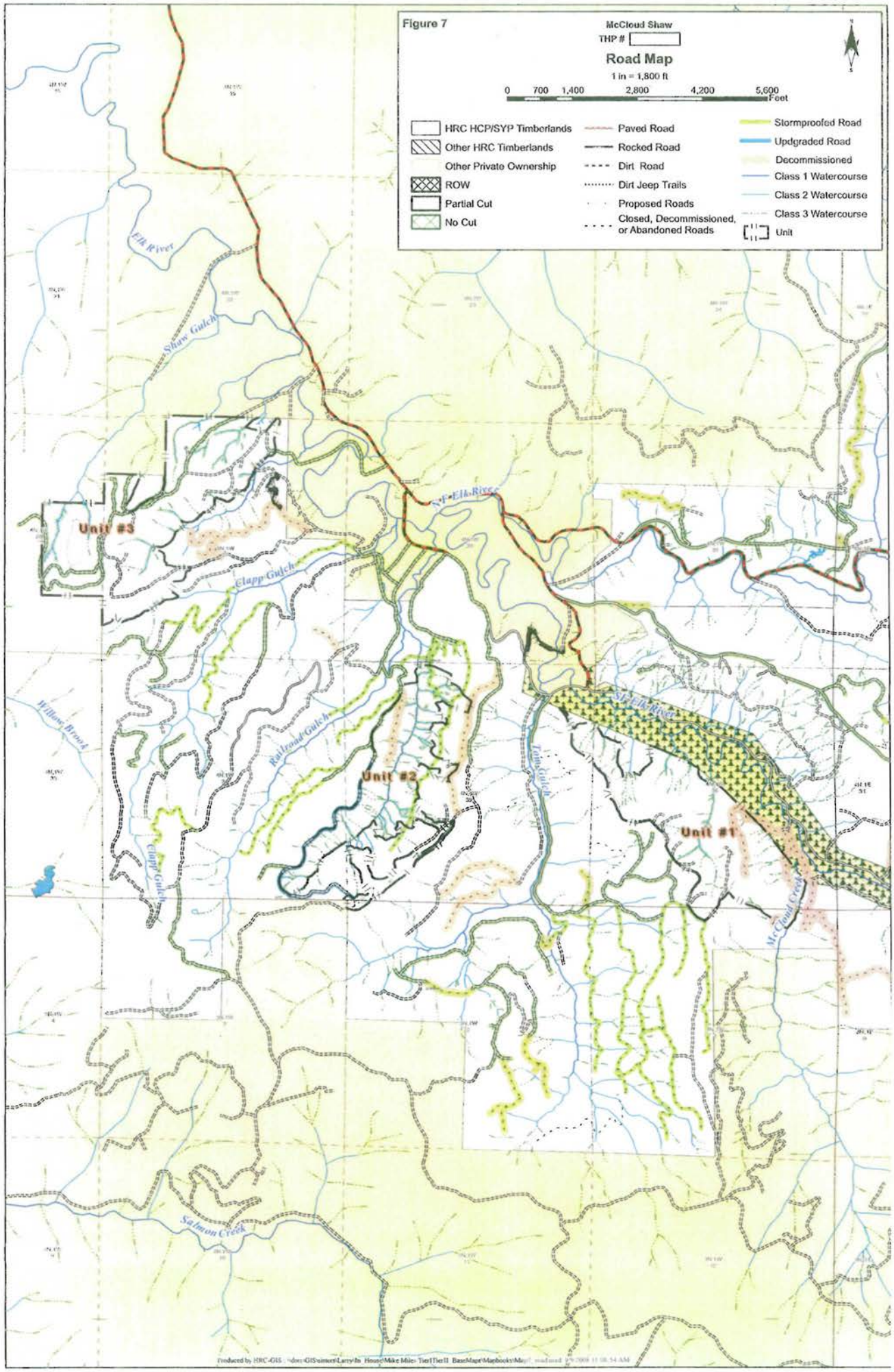


Figure 7
McCloud Shaw
THP #
Road Map
1 in = 1,800 ft
0 700 1,400 2,800 4,200 5,600
Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Stormproofed Road
Updgraded Road
Decommissioned
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Unit
Elk River
Shaw Gulch
Unit #3
Clapp Gulch
Willow Brook
Railroad Gulch
Unit #2
Lotts Gulch
Unit #1
McCloud Creek
Salmon Creek