Humboldt Redwood
COMPANY, LLC

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April 17th, 2012

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

Subject: Enrollment of THP 1-11-139 HUM into the Freshwater WWDR, "Tier I and II"

Dear: Ms. Kuhlman

HRC is requesting Tier I and II enrollment under Watershed-Wide Waste Discharge Requirement (WWDR) for portions of THP 1-11-090 HUM. WB staff attended the PHI. Within their PHI report, staff stated that "*Incorporating these recommendations into the THP will make these units eligible for enrollment*". All recommendations were agreed to and incorporated into the plan. Therefore a standard tier II enrollment review package is not provided. Board staff was provided with the tier 2 map package during THP submittal. The ECP, Form 200 and enrollment fee are attached.

While the THP is covered under the watershed wide WDR, the discharger is and will remain in compliance with the Terms and Provisions of this Order. No changes to the ECP for either plan have been noted since the previous enrollment of other portions of this THP.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information is, to the best of my knowledge and belief true, accurate and complete.

If you have any questions please call me.

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

Table 1. Proposed 2012 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
iron Gate	11-008	tier 1		0.3			52.5	26.5	48.7	4.1
Hole	11-139	tier 1		8.1			52	32.1	58.6	
Hole	11-139	tier 2					171.6	85.8	170.7	0.9
								144.4		

[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	144.4

Table 2. Summary of THPs to enrolled prior to establishment of Zero Discharge Monitoring Plan for South Fork Elk River.

THP Number	Unit Number	Harvest Acres	Hazard	
			Low	High*
iron gate		52.8	48.7	4.1
hole		60.1	60.1	
	Totals	112.9	112.9	

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
iron Gate	11-008	tier 1	5	47.2			
hole	11-139	tier1	58.6				
Hole	11-139	tier 2	171.6	0			

Hole

N *Yarding System Map*

T3N R1E Sec. 3, 9, 10, 14, 15 HB&M

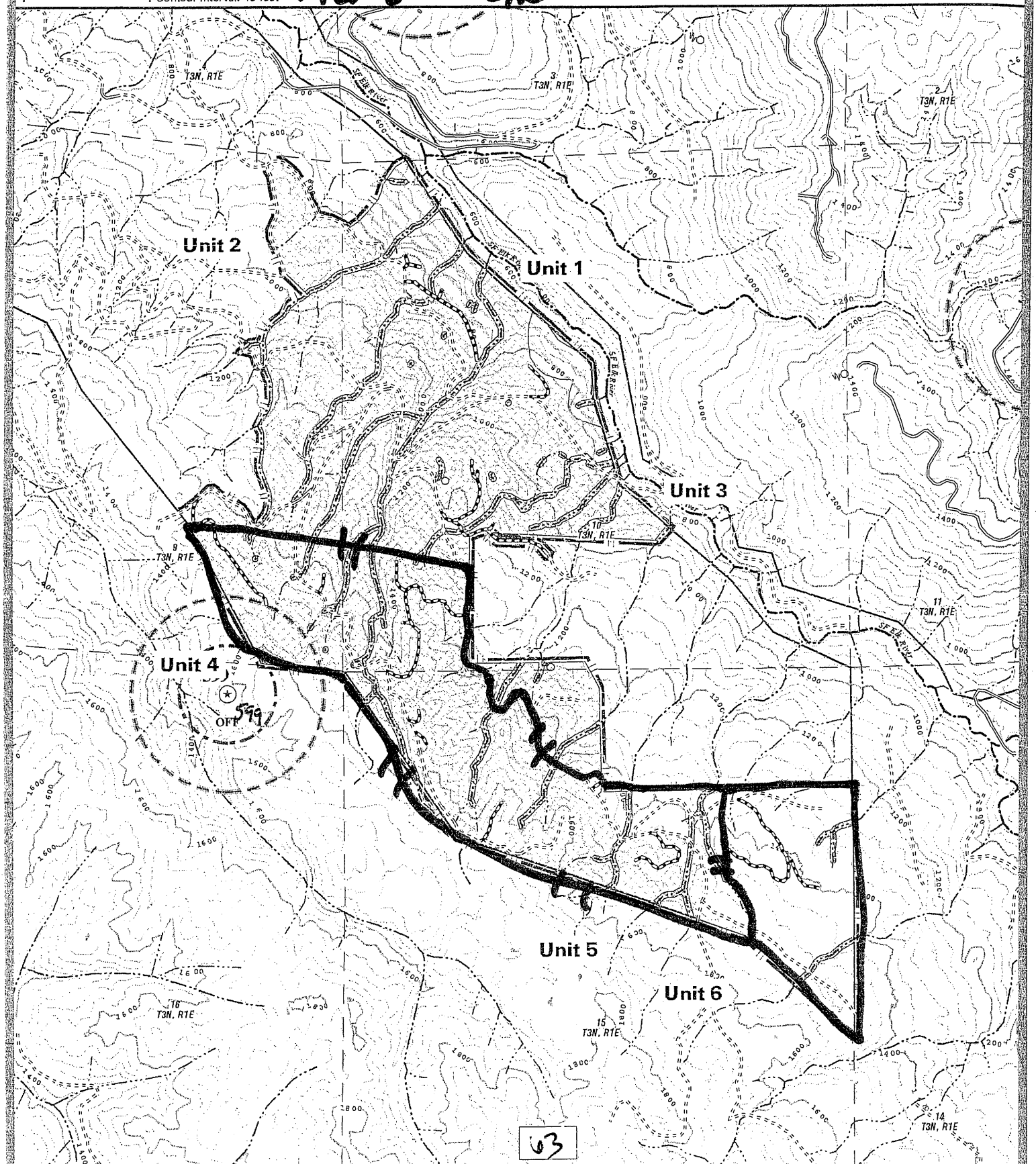
USGS Quad(s): MCWHINNEY CREEK

Map Scale: 1 inch = 1320 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
NSO Site
500' NSO Buffer
1000' NSO Buffer
HRA
Cable Yarding (Opt. Tractor Long Line)
Tractor Yarding (Opt. Cable Yarding)
No Harvest
Tractor Yarding

Tier 1 = O+ROW
Tier 2 = CW



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Produced By HRC GIS: z:/d/thp11/hole/thpyard.aml on Monday October 31, 2011 at 10:13 AM

Humboldt Redwood Company LLC

Erosion Control Plan (ECP) for the "Hole in the Headwaters" THP

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: **Hole in the Headwaters**
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

If no controllable sediment sources were discovered in your plan area (this means along your appurtenant road system and within your units), you must discuss that fact here. In addition, if all of the controllable sediment sources in your plan area were previously identified under other THP's, you must list those previously identified sites here. If you locate ECP sites that cannot be repaired list them here. All controllable sediment sources are listed in the attached "Erosion Control Plan" table. These sources have been assigned a treatment priority of low, medium or high based on: 1) potential for significant sediment delivery to a Class I, II or III channel; 2) treatment immediacy (a subjective combination of event probability and sediment delivery); and 3) treatment cost-effectiveness.

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

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

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

II. General Prevention and Minimization Measures for Controllable Sediment Discharge

In addition to the site specific measures detailed above, the general measures proposed in this project, either as required by another State or Federal regulating agency, or as a matter of Humboldt Redwood Company policy, will prevent or minimize future sediment delivery. These measures include, but are not limited to measures incorporated in the THP Section Items as follows:

THP Section II:

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

THP Section V:

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

Maps attached:

- **ECP Map**

III Inspection Plan and Reporting Requirements

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

B. Qualified and trained professionals will conduct all specified inspections of the project site to identify areas causing or contributing to a violation of the applicable water quality requirements or other provisions of these WWDRs. The responsible party for inspection and reporting is **Jon Woessner (707) 764-4376**.

C. No inspections are required in Project Areas where Timber Harvest Activities have not yet commenced.

D. Project Areas where Timber Harvest Activities have commenced and no winter period Timber Harvest Activities have occurred inspections will be conducted each year and throughout the duration of the Project while Timber Harvest Activities occur.

a. The Project is covered under WWDRs and the following inspection requirements will begin at the startup of timber harvest activities within the Project area:
   i. By November 15 to assure Project Areas are secure for the winter period;
   ii. Once following ten (10) inches of cumulative rainfall commencing on November 15 and prior to March 1, as worker safety and access allows; and
   iii. After April 1 and before June 15 to assess the effectiveness of management measures designed to address controllable sediment discharges and to determine if any new controllable sediment discharges sources have developed.

b. Project Areas with Winter Period Timber Harvest Activities will conduct inspections of such Project Areas while Timber Harvesting Activities occur and the Project is covered under the WWDRs as follows:
   i. Immediately following cessation of winter period Timber Harvest Activities to assure areas with winter Timber Harvest Activities are secure for the winter;
   ii. Once following ten (10) inches of cumulative rainfall commencing on November 15 and prior to March 1, as worker safety and access allows; and
   iii. After April 1 and before June 15 to assess the effectiveness of management measures designed to address controllable sediment discharges and to determine if any new controllable sediment discharges sources have developed.

c. Inspection reports will identify where management measures have been ineffective and when repairs and design changes will be implemented to correct management measure failures.

d. After completing the required inspections, and when it has been determined new controllable sediment discharges sources have developed, the ECP, implementation schedule, and inspection plan will be updated, if required, consistent with the WWDRs and submit the updated documents to the Regional Water Board to maintain coverage under the WWDRs. If the approved amendment is found to be out of compliance with the WWDRs, the Project will be amended to be consistent with the provisions of the WWDR within 30 days, or coverage under the WWDRs will be terminated. The Project will then be required to seek Project coverage under an individual WDR.

e. Equipment, materials, and workers will be available for rapid response to failures and emergencies, implement, as feasible, emergency management measures depending upon field conditions and worker safety for access.

D. If during the inspection or during the course of conducting timber harvest activities, a violation of an applicable water quality requirement or conditions of WWDRs is discovered, the following procedures will be followed:

a. When it has been determined that discharges are causing or contributing to a violation or an exceedence of an applicable water quality requirement or a violation of a WWDR prohibition:
   i. Corrective measures will be implemented immediately following the discovery that applicable water quality requirements were exceeded or a prohibition violated, followed by notification to the Regional Board by telephone as soon as possible but no later than 48 hours after the discharge has been discovered. The notification will be followed by a report within 14 days to the Regional Board, unless otherwise directed by the Executive Officer, that includes:
      1. the date the violation was discovered;
      2. the name and title of the person(s) discovering the violation;
      3. a map showing the location of the violation site;
      4. a description of recent weather conditions prior to discovering the violation;
      5. the nature and cause of the water quality requirement violation or exceedence or WWDR prohibition violation;

6. photos of the site characterizing the violation;
7. the management measure(s) currently being implemented;
8. any maintenance or repair of management measures;
9. any additional management measures which will be implemented to prevent or reduce discharges that are causing or contributing to the violation or exceedence of applicable water quality requirements or WWDR prohibition violation; and,
10. the signature and title of the person preparing the report.
11. the report will include an implementation schedule for corrective actions and describe the actions taken to reduce the discharges causing or contributing to violation or exceedence of applicable water quality requirements or WWDR prohibition violation.

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

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

Explanation of Information Included in the Controllable Sediment Sources Table	
Column Heading	Explanation
Site No.	Site identification unique to project area
Site Type	A description of the existing site. Example: Humboldt Crossing; Culvert Crossing; Unstable Fill; Unstable Cut Slope; Diversion Potential.
Estimate of Potential Erosion	A quantitative estimate of the volume, in cubic yards, of the total amount of potential erosion/displacement of soil that will occur should the site entirely fail. The landowner often uses a methodology developed by Pacific Watershed Associates to estimate erosion, which assumes 100% delivery of calculated volume—use of this method for individual sites is noted in Site Description.
Potential Sediment Delivery Percent	An estimate of the relative potential for sediment delivery expressed as a percent of the total amount of Potential Erosion that will be discharged to waters of the State should the site fail.
Sediment Prevention Volume	The volume, in cubic yards, of sediment discharge estimated to be prevented by implementation of the prescribed treatment. Volume represents the Estimate of Potential Erosion multiplied by the Potential Sediment Delivery Percent.
Priority for Treatment	Treatment priority reflects the immediacy of sediment discharge and the relative risk to the receptor, should the site fail. Low priority sites are ones that will not likely deliver significant amounts of sediment during the life of the WWDR permit, and will be treated prior to filing of THP work completion report, which does not exceed 5-years following THP approval date. Medium or high priority sites indicate potentially imminent discharge, and the timing of treatment is 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**

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 Hole in the Headwaters							
RD: SkidRoad STATION: 100 SITE: ST4 WOID: 1314398029 SEDID: 7344 REPAIRED: NO	Surface Drainage	3	3 100%	Low	Prior to THP Final Completion.	Skid trail fill in swale adjacent to Class II watercourse. Potential sediment delivery during large storm events. access is feasible when reconstructing adjacent Class II crossing and should be completed at that time.	Existing skid trail Humboldt, remove fill. Treat exposed soils as per Item 18 of the THP. This is not a watercourse.
RD: U08.08 STATION: 8749 SITE: SFE452 WOID: -698760568 SEDID: 15231 REPAIRED: NO	Crossing	15	15 100%	Low	Prior to THP Final Completion.	Flow is evident under the outlet of an 18" plastic culvert. At the time of installation of this culvert sediment savings were calculated, in an effort not to double count those savings no sediment is being assigned to this road work.	Class III crossing with existing 18" plastic culvert. Appears culvert has become separated as evidenced by flow under outlet, erosion is minimal. Excavate and replace with new 24" culvert at natural channel grade and alignment.
Total Estimated Yards		18	18				

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PART OF PLAN

Hole

N *Road Construction Location Map* ECP

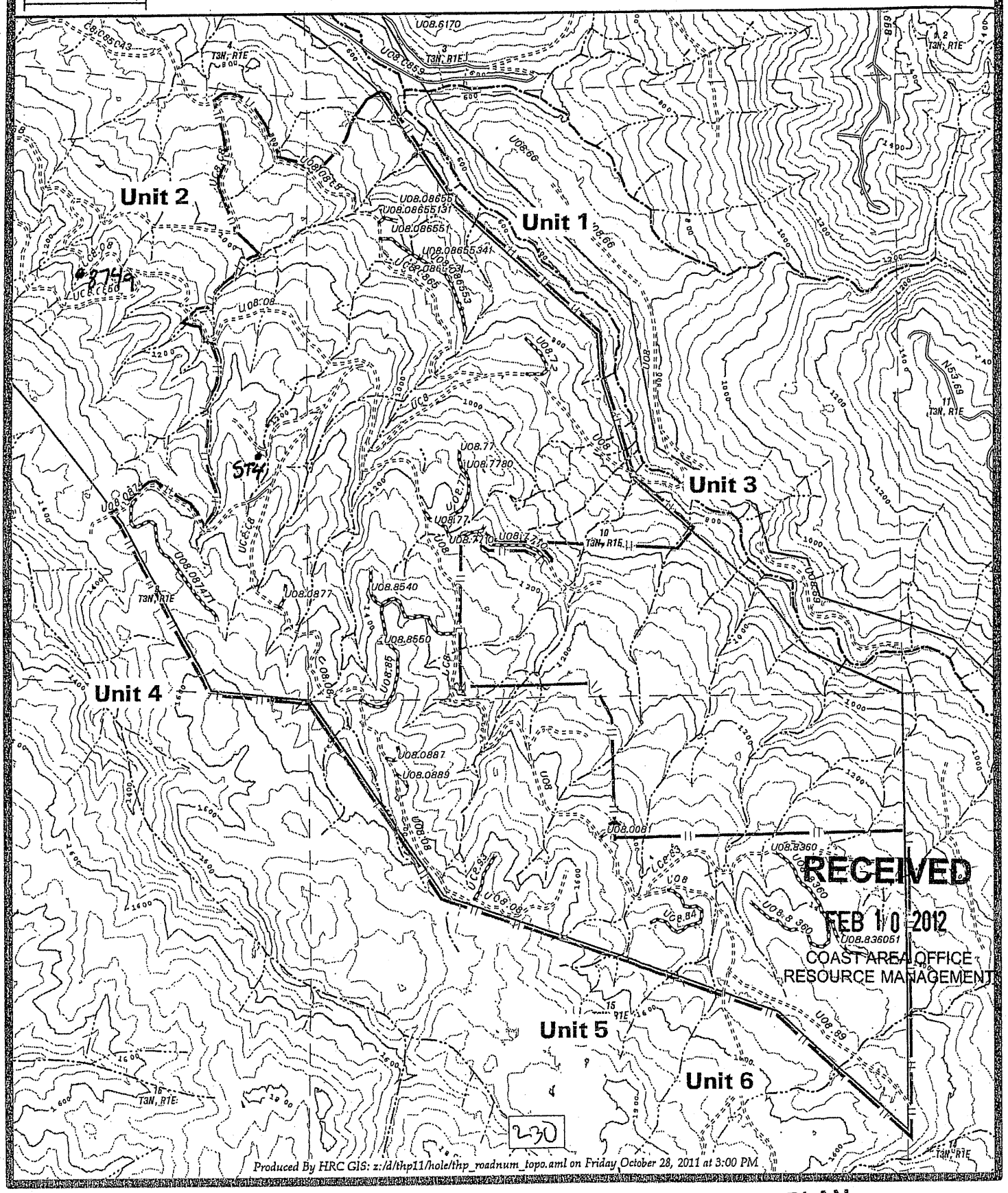
T3N R1E Sec. 3, 9, 10, 14, 15 HB&M

USGS Quad (s) : MCRHINNEY CREEK

Map Scale: 1 inch = 1100 feet

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

ECP



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FEB 10 2012
COAST AREA OFFICE
RESOURCE MANAGEMENT

Produced By HRC GIS: z:/d/thp11/hole/thp_roadnum_topo.aml on Friday October 28, 2011 at 3:00 PM

PART OF PLAN

FUEL SPILL PREVENTION AND CLEANUP PLAN FOR COLUMBIA HELICOPTERS FIELD OPERATIONS

Scope

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

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

Preparedness and Prevention

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

Emergency Command Structure

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

Emergency Coordinators Duties

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

Field Mechanics Duties

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

Emergency Equipment

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

Emergency Procedures

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

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

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

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

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

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

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

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

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

Follow Up

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

Required Reports

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

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

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

General Purpose Decontamination Solutions/Procedures

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

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

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

Revisions

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

SFT-024 (Rev 9/8/03 CG)

COLUMBIA HELICOPTERS, INC.

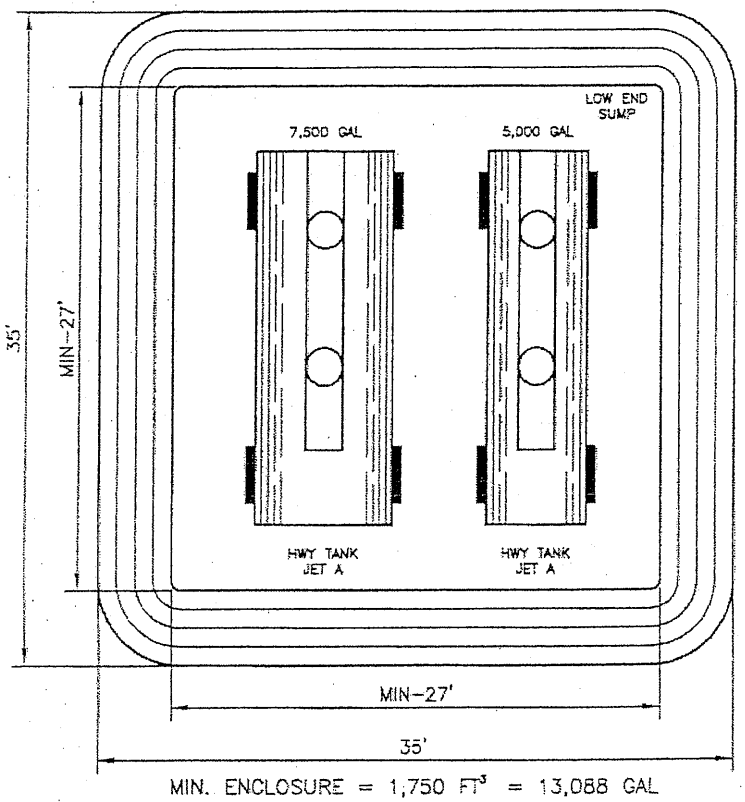
OIL SPILLAGE PROCEDURES

*** POST IN SERVICE VAN ***

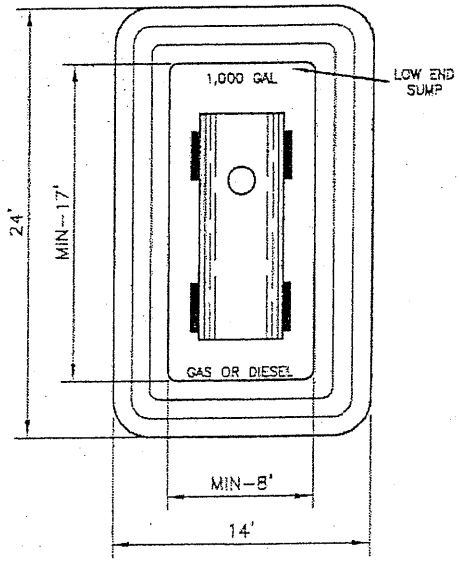
In the event of fuel or oil spillage, immediately contact the Aurora office.

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

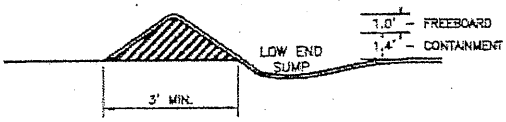
(DRAWING NOT TO SCALE)



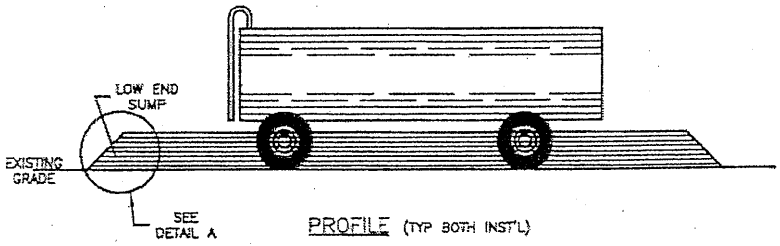
MIN. ENCLOSURE = 1,750 FT^3 = 13,088 GAL



MIN. ENCLOSURE = 326 FT^3 = 2,441 GAL



DETAIL A
TYPICAL CROSS SECTION

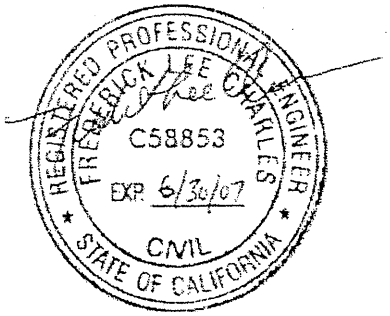


PROFILE (TYP BOTH INST'L)

NOTES

1. Blade fuel containment area clean of all brush, debris, stones and loose soil. Rake and shovel clean soil base (or sump liner). Provide slight slope to 8" deep sump at corner.
2. Sump liner to be Keptax VCR 2801 25 MIL PVC Fiberglass mesh reinforced fuel pit liner or equivalent. Lay liner over prepared base with edges folded back to allow berm construction. Construct berm to shape shown using soil (or equivalent) free of rock and debris which could puncture or abraid the liner. Roll liner over berm and secure. Volume of finished cell to be adequate to contain volume of largest single tank plus sufficient freeboard to allow for precipitation.
3. Minor holes and tears may be repaired using patches of PVC plastic with adhesives or mastics resistant to Jet A fuel.

SECONDARY CONTAINMENT FACILITIES SHOWN IN THIS DRAWING CONFORM TO EPA 40 CFR PART 112.8(c)(2)



THE PACIFIC LUMBER COMPANY HELICOPTER LOGGING OPERATIONS		
FIGURE 1		
SECONDARY CONTAINMENT DESIGN FOR PETROLEUM STORAGE TANKS		
PROJECT: 240033	DATE: 10/22/04	
REV:	BY: MH	CHECKED: FC
MFG, Inc. *consulting scientists and engineers*		

Date: 10/22/2004 Filename: H:\FALCO_ONLY_PROJECTS\240033_minesupport\HELI CONTAIN.dwg

243 237

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

I. FACILITY INFORMATION

A. Facility:

Name: THP 1-**11-139 Hole**			
Address:			
City:	County:	State:	Zip Code:
Contact Person: Jon Woessner		Telephone Number: 707-764-4376	

B. 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:

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:

D. 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: Jon Woessner		Telephone Number: 707-764-4376	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: 4/16/2012

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

Humboldt Redwood
COMPANY, LLC

Main Office
P.O. Box 37
Scotia, CA 95565
(707) 764-4472

Timber Operations
P.O. Box 712
Scotia, CA 95565
(707) 764-4472

April 27, 2012

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

Subject: Enrollment of THP 1-11-139 HUM in the Elk River WWDR, "Tier II" Additional information

Dear: Ms. Kuhlman

The attached is in response to request for more information regarding the tier II enrollment of portion of THP 1-11-139. HRC proposed enrollment in a letter dated 4/17/2012. HRC is requesting Tier II enrollment under Watershed-Wide Waste Discharge Requirement (WWDR) Order No. R1-2006-0039. This Tier II portion of the unit proposed for enrollment is comprised of 171.6 acres of group selection/ selection and group Selection (85.8 clear-cut equivalent acres). Total acres currently enrolled or proposed for enrollment under Order No. R1-2006-0039 Tier II is shown in the previously submitted Pre-Harvest Planning Report. The Erosion Control Plan (ECP), Form 200 and an annual waste discharge enrollment fee have already been submitted for this THP (4/17/12).

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

Tier 2 analysis was conducted on the entirety of the THP. The Hole in the Headwaters THP consists of six harvest units along the northeast facing slopes of the South Fork Elk River. Late Tertiary to Quaternary Wildcat Group sediments and Tertiary Yager terrain bedrock underlie the southwest and northeast portions of the plan area, respectively. The Wildcat Group is composed of Miocene to Pleistocene age sediments poorly to moderately indurated claystone and siltstone with smaller amounts of sandstone and conglomerate. The Yager terrain is composed of interbedded siltstone, sandstone, shale, mudstone and conglomerate that is moderately consolidated, sheared, and highly folded. The mass wasting features that were observed and documented within the plan area occur mostly within steep-stream side slopes and adjacent to legacy haul roads and skid trails. These unstable areas have been identified by a California Licensed Geologist and mitigated for in the THP.

It is our opinion that proposed harvest activities in the Hole in the Headwaters THP meet the requirements for Tier II enrollment.

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

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

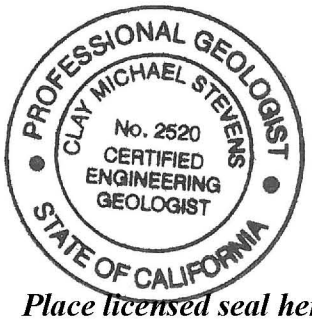
Respectfully,

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

Attachments:
Professional Certification of Design
THP Unit Review for Tier II enrollment
Maps

Professional Certification of Design

I, Clay Stevens, CEG 2520, on April 27, 2012,
Name License # Date



Place licensed seal here

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.: 11-139 Hole in Headwaters Unit No.: 1 through 6

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

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

THP: Hole in Headwaters THP No.: 11-137 Unit No.(s): 1 through 6 Date: April 26, 2012

Tools Used in This Assessment

Figure Number	Figure Name	Description	Base Map Reference
1	Location Map	Topographic map with 10-foot elevation contours created from light detection and ranging (LiDAR) data obtained in 2005.	Merrick & Company, 2005
2	Hillshade	Hillshade map created from LiDAR data.	Humboldt Redwood Company, LLC (HRC) GIS Department
	SHALSTAB	SHALSTAB model map of potentially unstable areas.	Montgomery and Dietrich, 1994; Pacific Lumber Company (PALCO), 2006
	Slope-Class Maps	Slope class map created from LiDAR data.	HRC GIS Department
3	Landslide Inventory and Geology Map	Official HRC landslide database for Elk River and, a geologic and geomorphic base map by the California Geologic Survey.	HRC GIS Department; Marshall and Mendes, 2005
4	Mass Wasting Potential Map	Mass-wasting model used for Habitat Conservation Plan (HCP) interim prescriptions prior to the completion of watershed analysis.	PALCO, 1999
5	Aerial Photo Map	Ortho-aerial photographs of plan area obtained in 2010.	3Di West, GeoTerra Mapping Group, 2010
6	Deep-Seated Mass Wasting Map	Elk River deep-seated landslide inventory created in 2002 for the 2005 watershed analysis.	HartCrowser, 2002
7	Road Condition Map	Storm-proof status of roads.	HRC GIS Department

Please see back of enrollment for references

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

The Hole in the Headwaters timber harvest plan (THP) is located along the northeast side of a northwest trending ridge and from the ridge top to the South Fork Elk River at the base of the slopes. Slope inclinations range from moderate to over 60% locally.

Published maps and reports of the area show Late Tertiary to Quaternary Wildcat Group sediments in the southwest portion of the THP area unconformably overlying the Tertiary Yager terrane bedrock in the northeast. The Wildcat Group is composed of Miocene to Pleistocene age sediments that consist of poorly to moderately indurated claystone and siltstone with smaller amounts of sandstone and conglomerate (Ogle, 1953; Kilbourne, 1985). The Yager terrane is generally described as siltstone, sandstone, shale, mudstone and conglomerate that is moderately consolidated and sheared highly folded (McLaughlin et al., 2000; Ogle, 1953).

Geologic review of this THP was conducted using guidelines established under Note 45 (CGS, 1999a), Note 50 (CGS, 1999b), and Freshwater Creek and Elk River WDR Permit Acreage Enrollment and Compliance Monitoring Program (PALCO, 2007). The reviewing geologist compared the maps provided for Tier 2 enrollment with mapping conducted during field evaluations. An excellent discussion of the findings is provided in the engineering geologic evaluation found in Section 5 of the THP. This is a public document and can be found on the internet at ftp://thp.fire.ca.gov/THPLibrary/North_Coast_Region/THPs2011/1-11-139HUM/.

The reviewing geologist identified several landslides within the units and found the foresters' proposed operations appropriate. The THP was reviewed by various agencies during pre-harvest inspection (PHI) and found to be compliant with the California Forest Practice Rules (California Department of Forestry and Fire Protection [Cal Fire], 2011) and regulations in the HCP (HRC, 2011) with respect to disclosure of all known unstable areas.

The harvest units were evaluated at the THP level with respect to partial harvest (selection) silviculture. Retention of timber on the slopes generally reduces the potential for harvest related mass wasting.

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

Forestry Silviculture/Site Prep Plan	Operational Design Plan
For reasons other than slope stability hazard, silviculture is group selection, selection, and commercial thinning with 75- to 150-square feet (sq-ft) basal area retention per acre (BA/A) post harvest.	No change to approved yarding methods. No site preparation will occur due to partial harvesting.

A) General Observations	B) Harvest Related Impacts and Hillslope Sensitivity
The THP units are bound by rocked and seasonal storm proofed roads, Class I, II, and III watercourses, and property lines along the Headwaters Forest Reserve. The plan area occupies convergent and divergent slope forms with inclinations that vary from gently inclined to over 60%. The slopes exceeding 60% are mostly located along the Class II tributaries to the South Fork Elk River. The SHALSTAB model (Montgomery and Dietrich, 1994) modeled unstable areas near the middle and northeastern edge of harvest unit 1. During our field review of these modeled unstable areas, we observed converging skid trails that had been constructed on moderate to steeply inclined slopes. We did not observe evidence of recent or suspended mass wasting within these areas. During THP development, an equipment exclusion zone was delineated around modeled unstable area near the middle of unit 1, and no protection was afforded around the modeled unstable area near the northeastern edge of unit 1. However, the moderate to steep slopes around the modeled unstable area near the northeastern edge of the unit descends to gently inclined slope that extends for approximately 230 feet before the steeper stream-side slopes of the South Fork Elk River. We consider the risk of sediment delivery to from the modeled unstable area near the northeastern edge of unit 1 to be low.	The slopes within the unit have experienced clearcut, burning and extensive tractor yarding. Regionally, the catchment area for the Class II and Class III watercourses appears low. The locations of SHALSTAB modeled elevated rating is consistent with the locations of observed skid-trail cut-slopes. The potential for the development of shallow debris slides increases significantly where roads are constructed across steeply inclined slopes and incorporated fills. These activities are not proposed in this plan. Partially harvesting the slopes within the unit is not likely to increase the potential for mass wasting.

A) General Observations	B) Harvest Related Impacts and Hillslope Sensitivity
Mass Wasting Potential (MWP) modeled for the unit is ranges from low to high. Moderate and high MWP is modeled within the southern portion of the unit. The high MWP modeling correlates with landslides mapped CGS (1999), which were used as . The areas matching high MWP are in response to the inclusion within the model the values for the Figure 3 mapped debris slide slopes. No potentially unstable areas were identified with the areas modeled as moderate and high MWP.	

C) Forestry / Silviculture Plan	D) Operational Design Plan
THP approved silviculture is group selection, selection, and commercial thinning with a targeted retention of 75- to 150-sq-ft BA/A. No harvest will occur within the Class III bank-full channel. Trees less than or equal to eight inches diameter at breast height (dbh) that are within 15 feet of the edge of the Class III bank-full channel will be retained, unless they need to be removed for safety. The riparian management zone (RMZ) will be 100-feet or 50-feet wide on side slopes that are greater than 50 percent or less than 50 percent, respectively, or the distance to the hydrologic divide, whichever is less. The RMZ is an equipment exclusion zone (EEZ) except for roads and permitted equipment crossings. Additionally, sub-merchantable trees and those with specific wildlife value characteristics (e.g., cavities, large limbs, broken tops, snags, etc.) will be retained within the harvest area to the extent feasible.	The THP calls for primarily tractor/cable option within areas where no concern or hazard was identified, and cable within areas that are either steep, potentially unstable, or within a RMZ. We do not anticipate any significant increase in potential for mass-wasting-related discharge as a result of yarding operations.

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. 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, only one value for all of the distinct facies of each geologic formation is used, and the model is heavily biased if past mass wasting has occurred or has been mapped as occurring in the area.

References:

3Di West, GeoTerra Mapping Group, 2010, flown by Bergman Photographic Services, color photographs, project 10-096, nominal scale 1:4,800.

California Geological Survey, 1999a, Note 45: Guidelines for Engineering Geologic Reports for Timber Harvest Plans.

--, 1999b, Note 50: Factors Affecting Landslides in Forested Terrain.

HartCrowser, 2002, Elk River and Salmon Creek Deep-Seated Landslide Inventory, dated December 11, 2002.

Humboldt Redwood Company, LLC, 2011, Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation Containing Language Changes from Adaptive Management, Minor Modification, and Property-Wide Consultations, dated: February 1999, Revised 1 April 2011.

Kilbourne, R.T., 1985, DMG Open-File Report 85-02, Geology and Geomorphic Features Related to Landsliding, Hydesville 7.5' Quadrangle, Humboldt County, California Scale 1:24,000.

Marshall, G.J. and Mendes, E., 2005, Maps and GIS Data for the Elk River Watershed, Humboldt County, California, Watershed Mapping Series, Map Set 4, California Geological Survey CGS CD 2005-01.

McLaughlin, R.J.; Ellen, S.D.; Blake, M.C.; Jayko, A.S.; Irwin, W.P.; Aalto, K.R.; Carver, G.A.; and Clark, S.H.; 2000, Geology of the Cape Mendocino, Eureka, Garberville and Southwestern part of the Hayfork – 30x60 minute Quadrangles and Adjacent Offshore Area, Northern California, U.S. Geological Survey, Miscellaneous Field Study 2336, 1:137,000.

Merrick & Company, 2005, ArcInfo workspaces with 10' topo, spot, and grid coverages for Areas 1 through 4 of the PALCO properties, Job #: 50014770, April 2005.

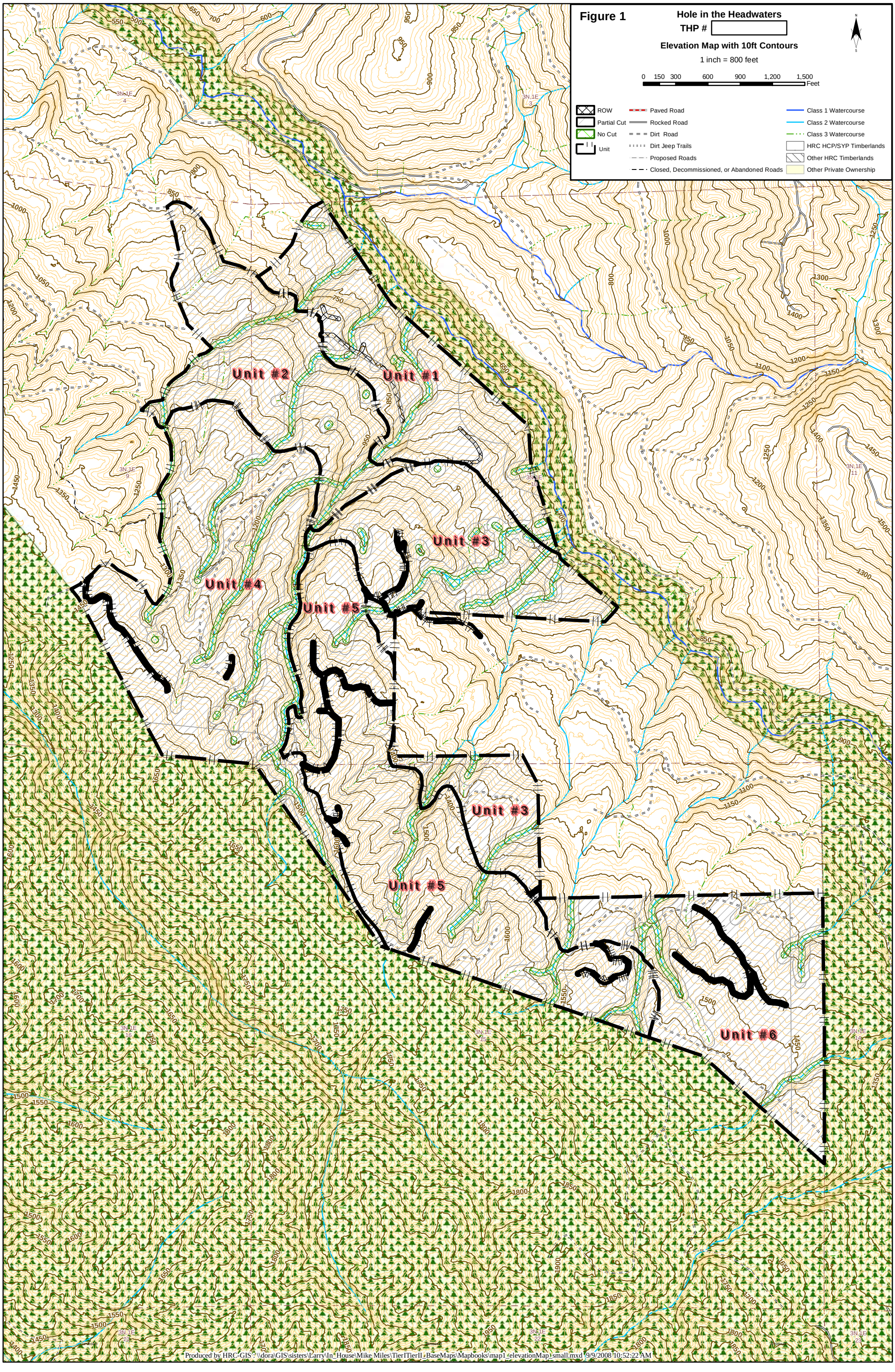
Montgomery, D.R. and W.E. Dietrich. 1994. A physically based model for the topographic control on shallow landsliding. Water Resources Research, Vol.30, No.4. April 1994. Pages 1153-1171. doi:10.1029/93WR02979. Additional information from the model authors is available at the following website: http://socrates.berkeley.edu/~geomorph/shalstab

Ogle, B.A., 1953, Geology of the Eel River Valley area, Humboldt County, California: California Division of Mines Bulletin 164, 128 p.

Pacific Lumber Company, 1999, Habitat Conservation Plan, Vol. 2 Part D, Landscape Assessment of Geomorphic Sensitivity, Public Review Draft.

--, 2005, The Pacific Lumber Company (PALCO) Prescriptions Based on Watershed Analysis for Elk River and Salmon Creek (ERSC), California, August 12, 2005.

--, 2007. 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, 2007.



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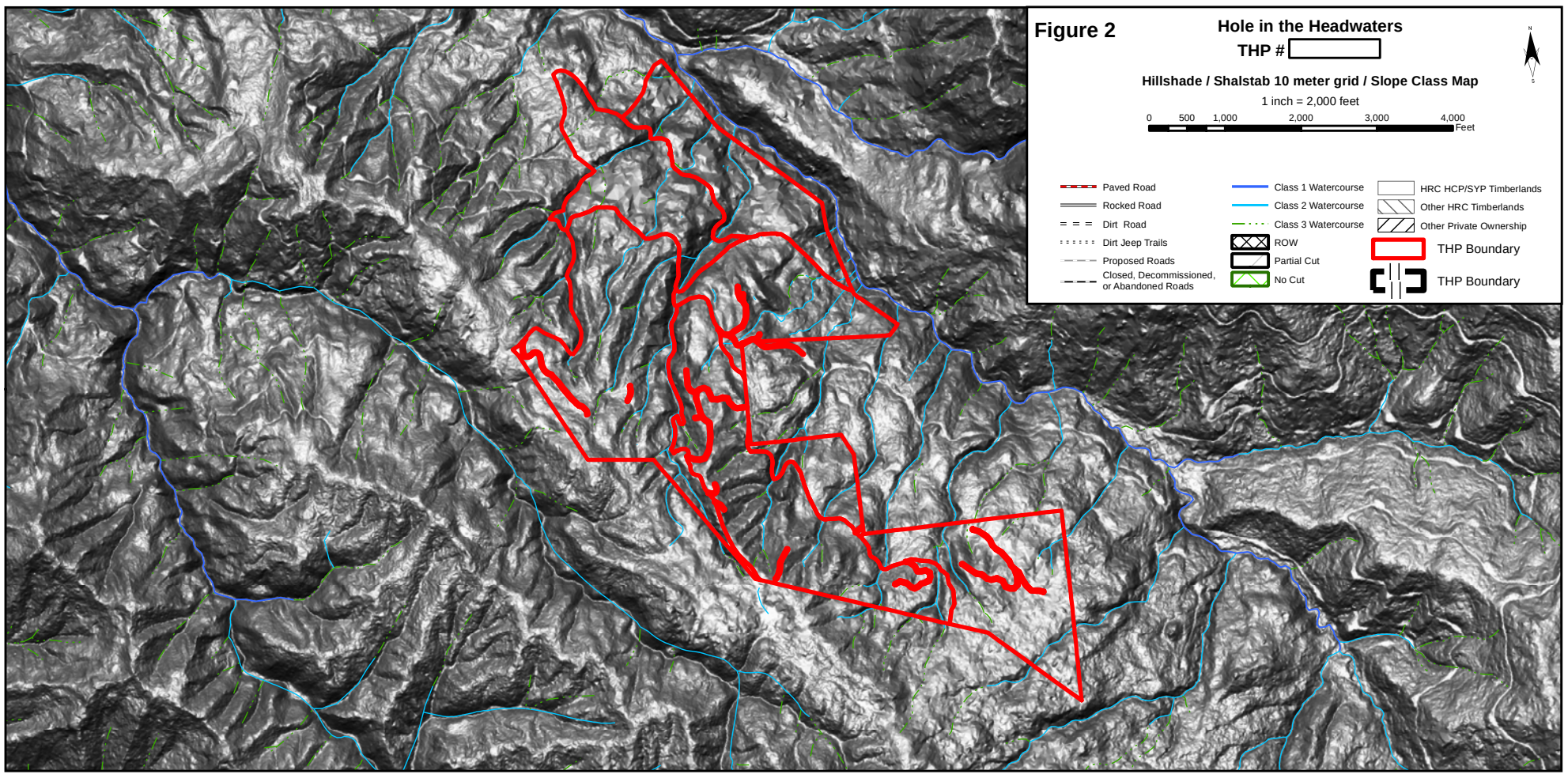
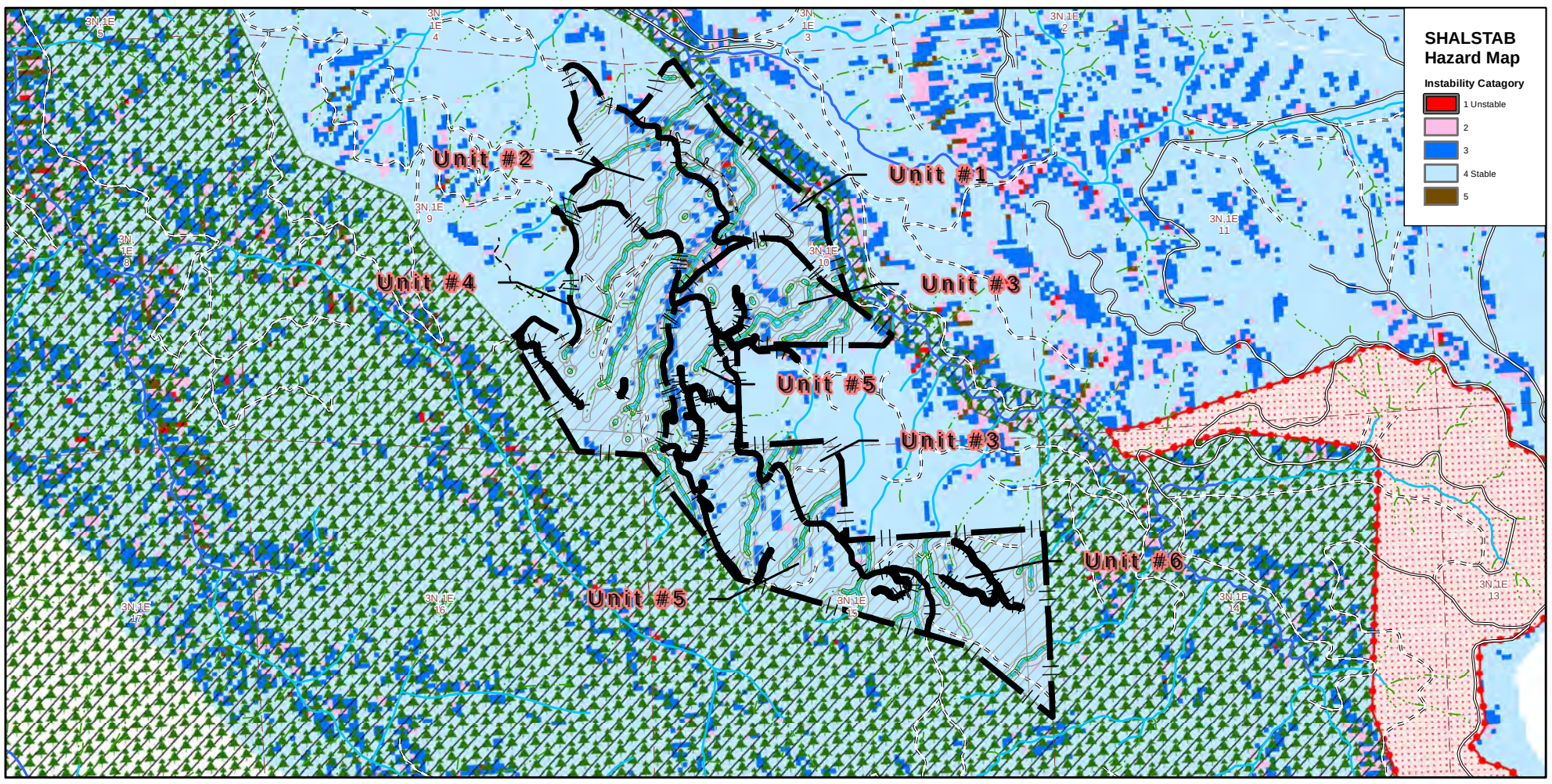
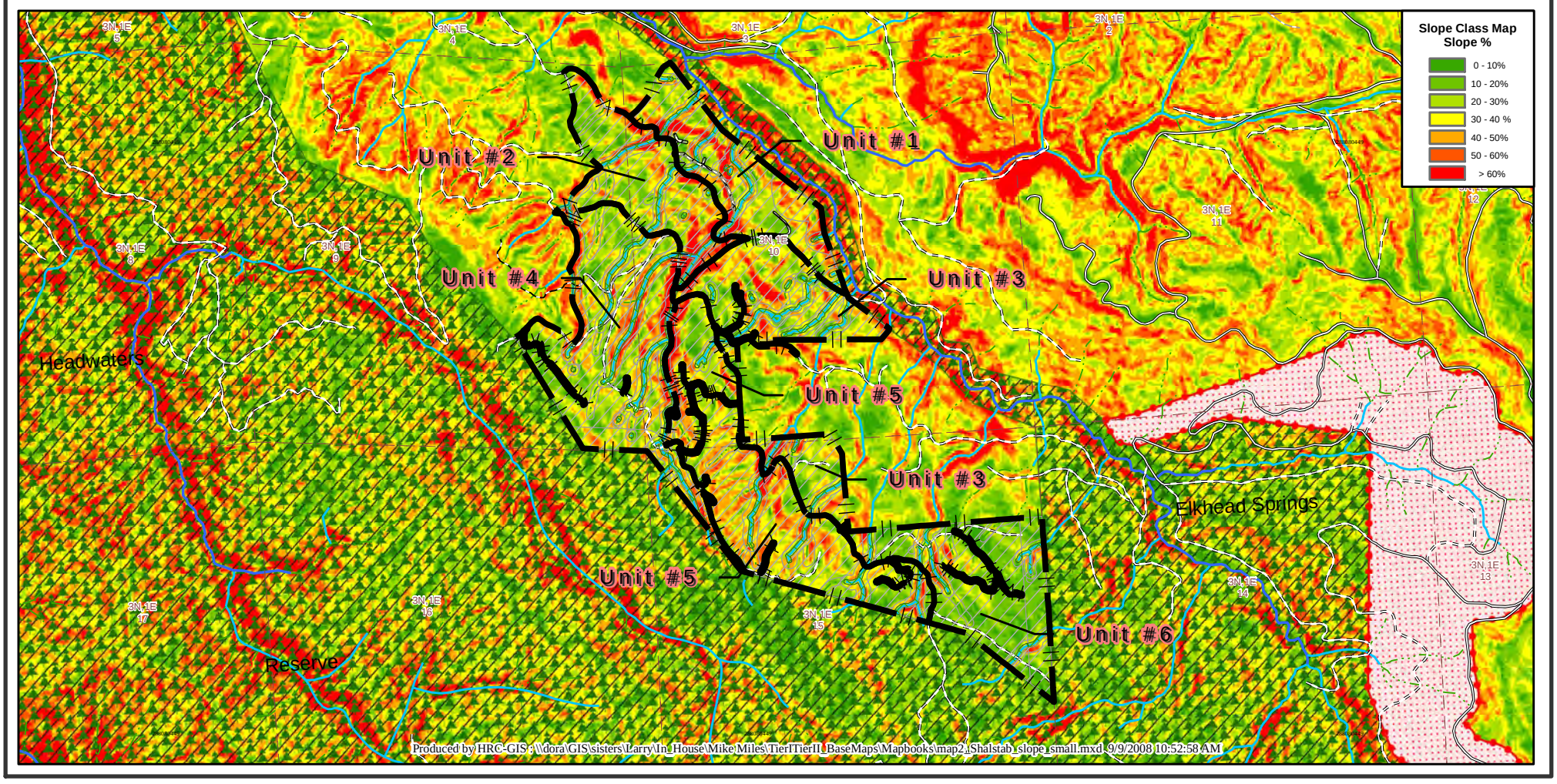


Figure 2
Hole in the Headwaters
THP #
Hillshade / Shalstab 10 meter grid / Slope Class Map
1 inch = 2,000 feet
0 500 1,000 2,000 3,000 4,000 Feet
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
ROW
Partial Cut
No Cut
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
THP Boundary
THP Boundary


SHALSTAB
Hazard Map
Instability Catagory
1 Unstable
2
3
4 Stable
5
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #3
Unit #5
Unit #6


Slope Class Map
Slope %
0 - 10%
10 - 20%
20 - 30%
30 - 40 %
40 - 50%
50 - 60%
> 60%
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #3
Unit #5
Unit #6
Headwaters
Reserve
Elkhead Springs
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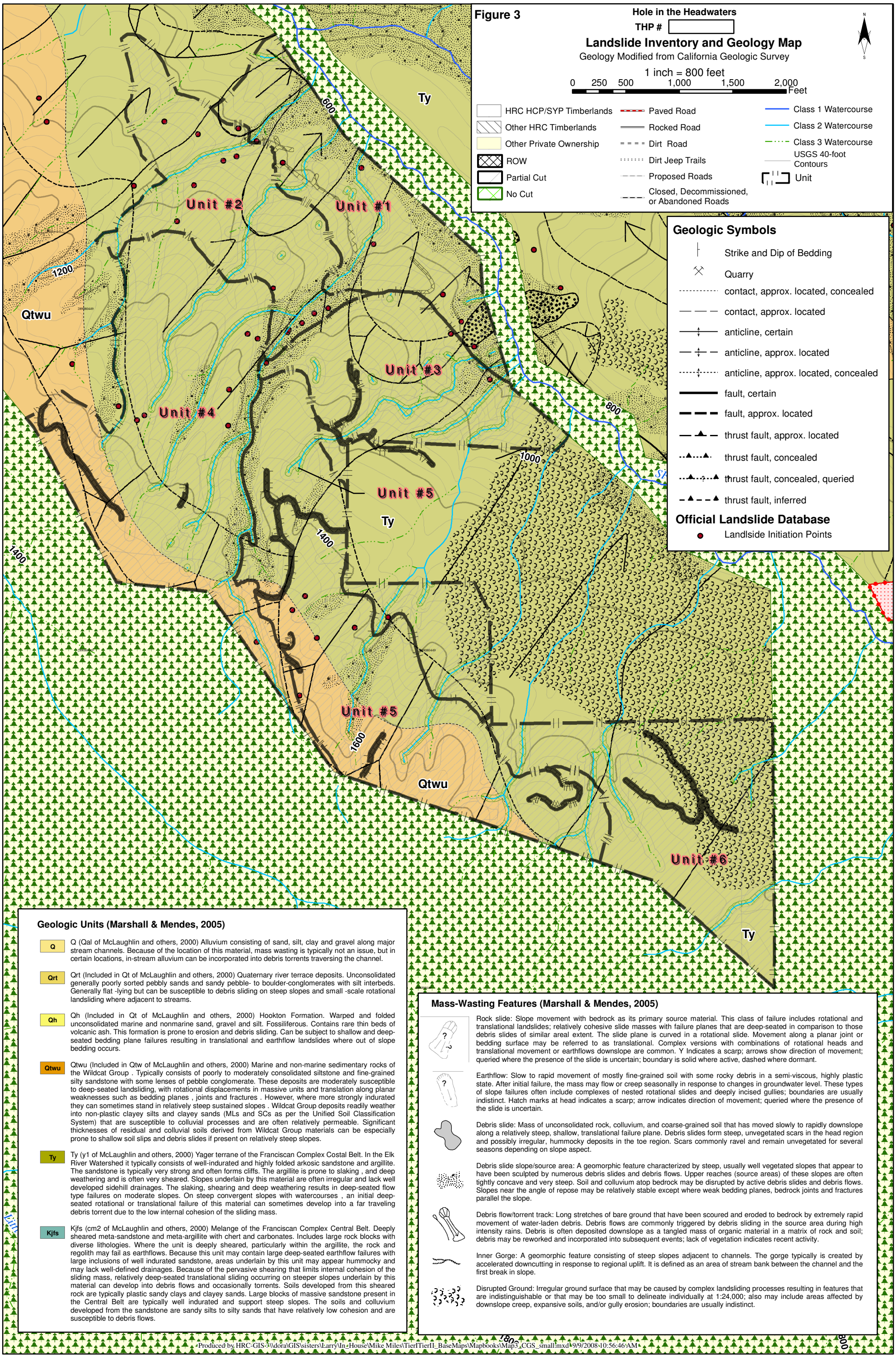
Figure 3
Hole in the Headwaters
THP #
Landslide Inventory and Geology Map
Geology Modified from California Geologic Survey
1 inch = 800 feet
0 250 500 1,000 1,500 2,000 Feet
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt 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
Landlside Initiation Points
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #5
Unit #6
Ty
Ty
Ty
Qtwu
Qtwu
600
800
1000
1200
1400
1400
1600
Geologic Units (Marshall & Mendes, 2005)
Q
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
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
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
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
Ty (y1 of McLaughlin and others, 2000) Yager terrane of the Franciscan Complex Costal 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
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 slope/source 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 flow/torrent 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.
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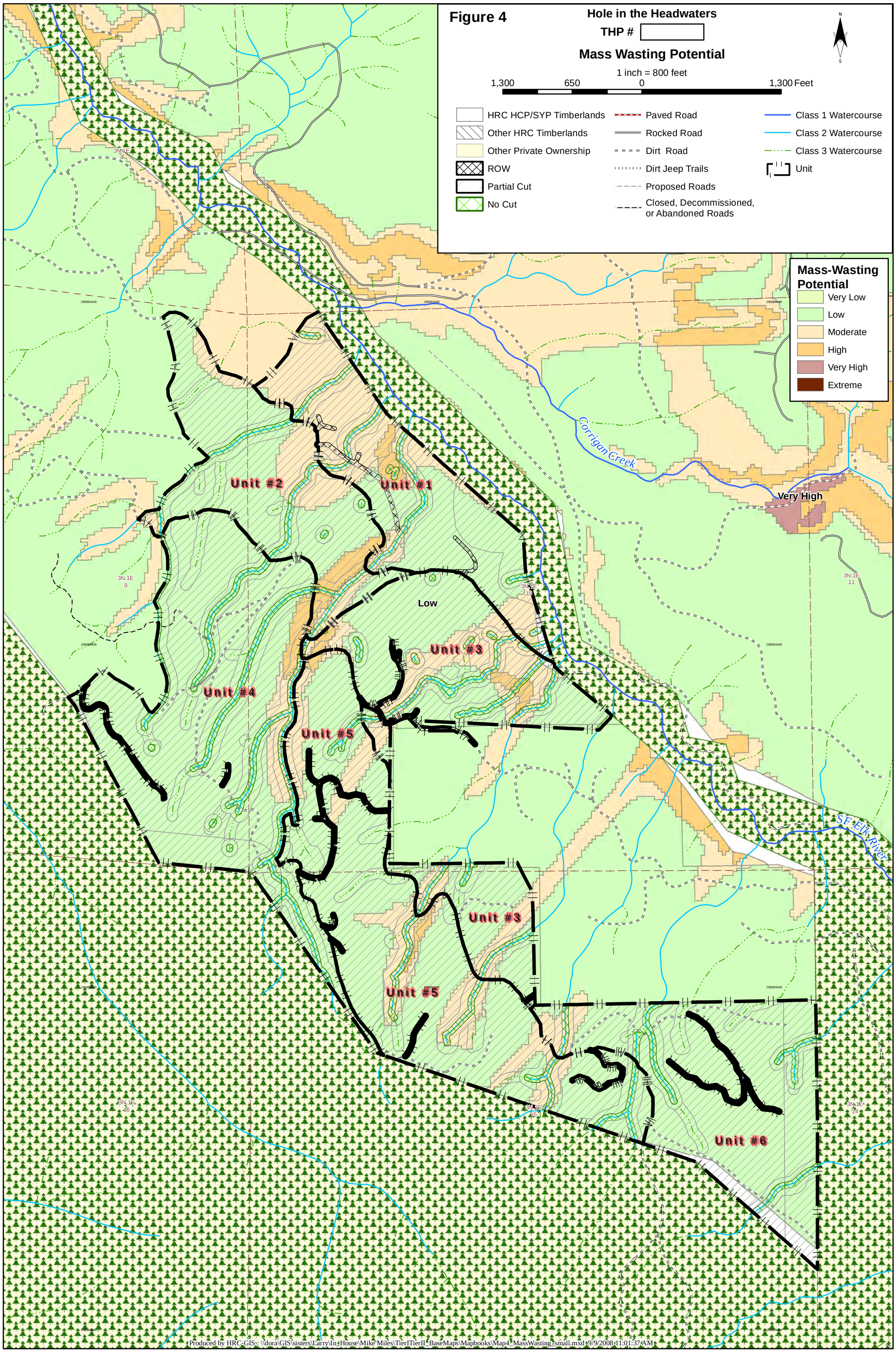
Figure 4
Hole in the Headwaters
THP #
Mass Wasting Potential
1 inch = 800 feet
1,300
650
0
1,300 Feet
N
S
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Unit
Mass-Wasting Potential
Very Low
Low
Moderate
High
Very High
Extreme
Corrigan Creek
Very High
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #6
Low
SF Elk River
3N,1E 9
3N,1E 10
3N,1E 11
3N,1E 16
3N,1E 15
3N,1E 14
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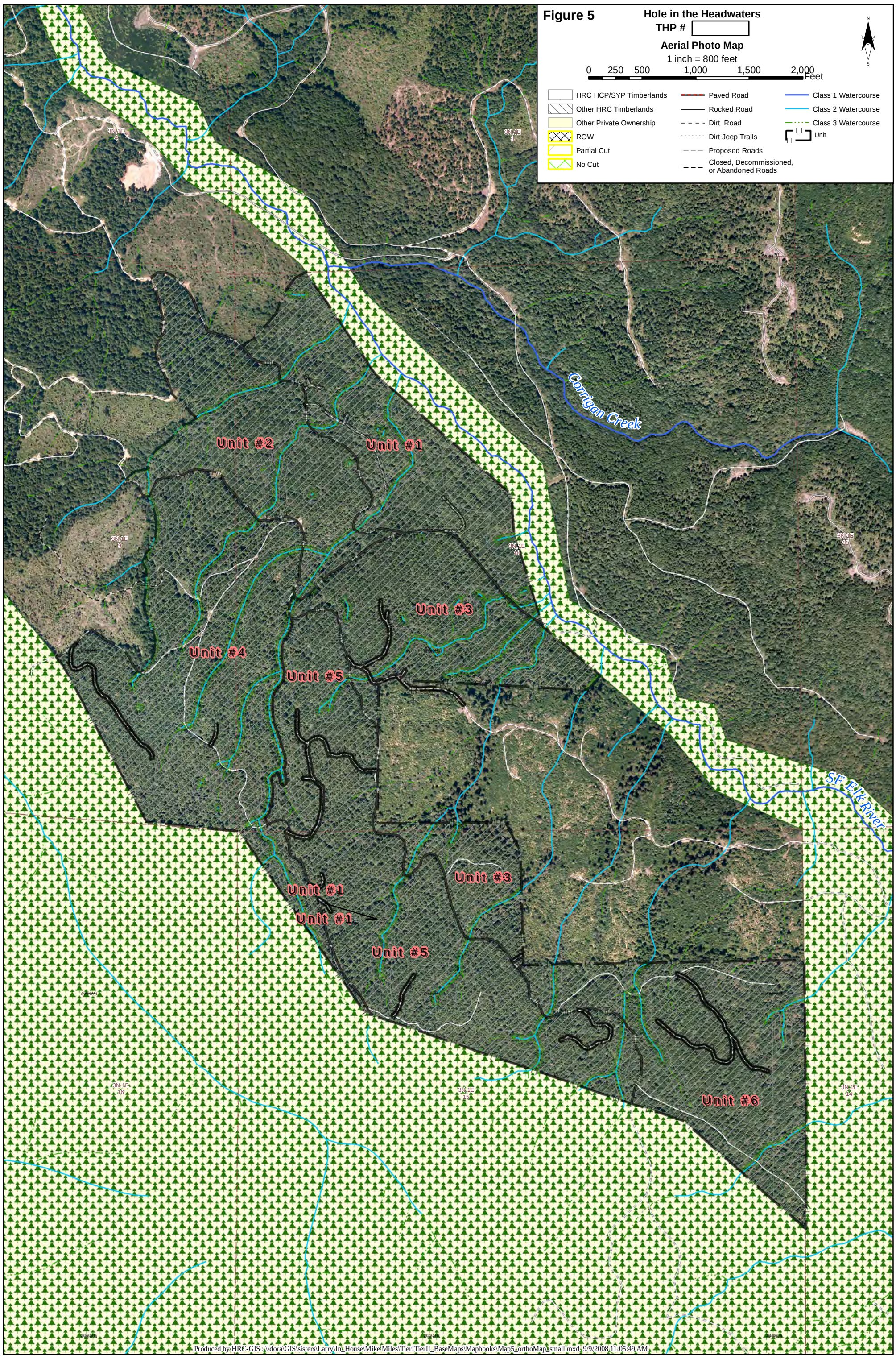

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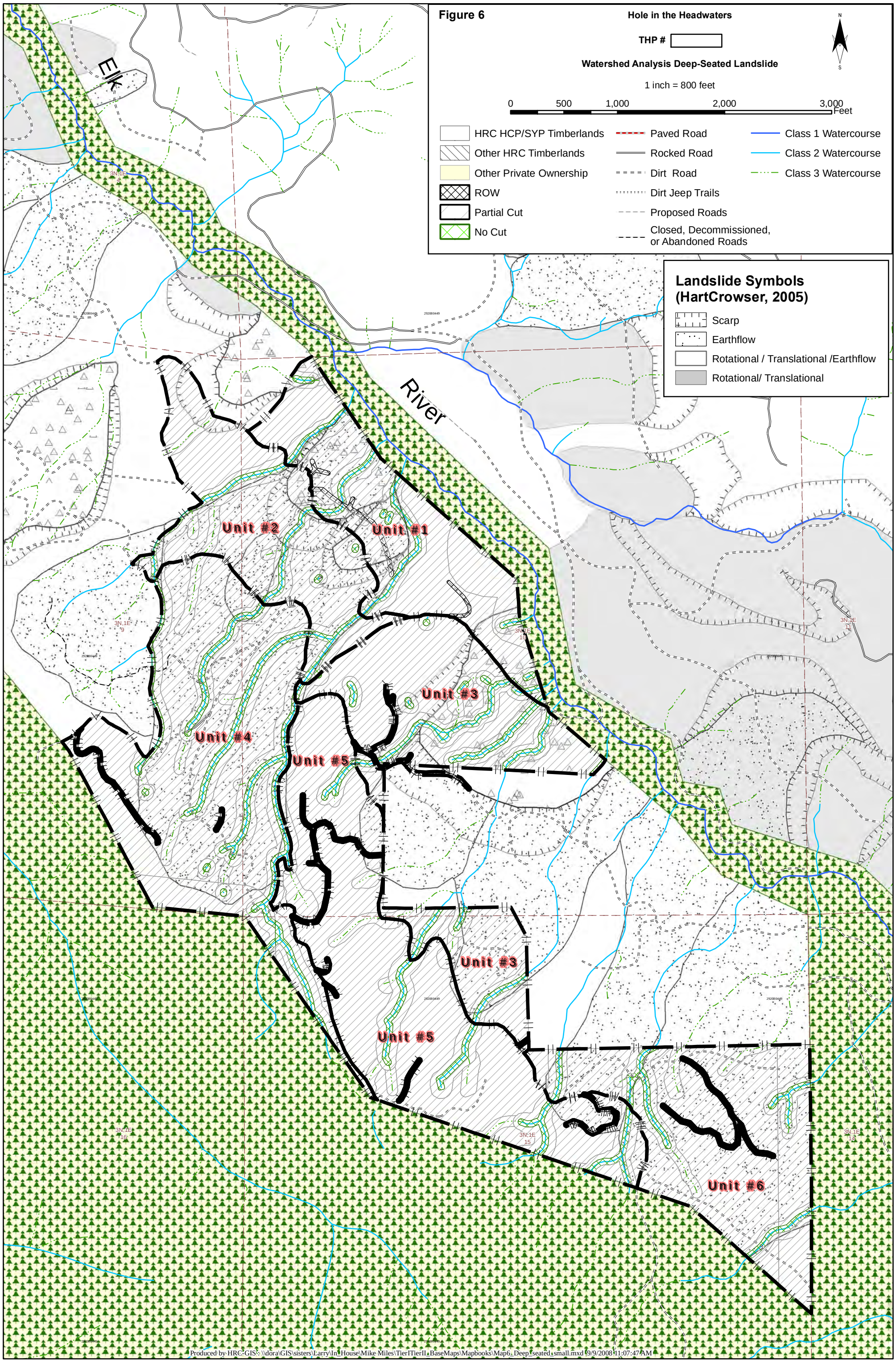
Figure 6
Hole in the Headwaters
THP #
Watershed Analysis Deep-Seated Landslide
1 inch = 800 feet
0
500
1,000
2,000
3,000
Feet
N
S
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Landslide Symbols (HartCrowser, 2005)
Scarp
Earthflow
Rotational / Translational /Earthflow
Rotational/ Translational
Elk
River
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #3
Unit #5
Unit #6
3N,1E 9
3N,1E 10
3N,1E 11
3N,1E 16
3N,1E 15
3N,1E 14
292080449
Produced by HRC-GIS: \\dora\GIS\sisters\Larry\In_House\Mike Miles\TierITierII_BaseMaps\Mapbooks\Map6_Deep_seated_small.mxd 9/9/2008 11:07:47 AM

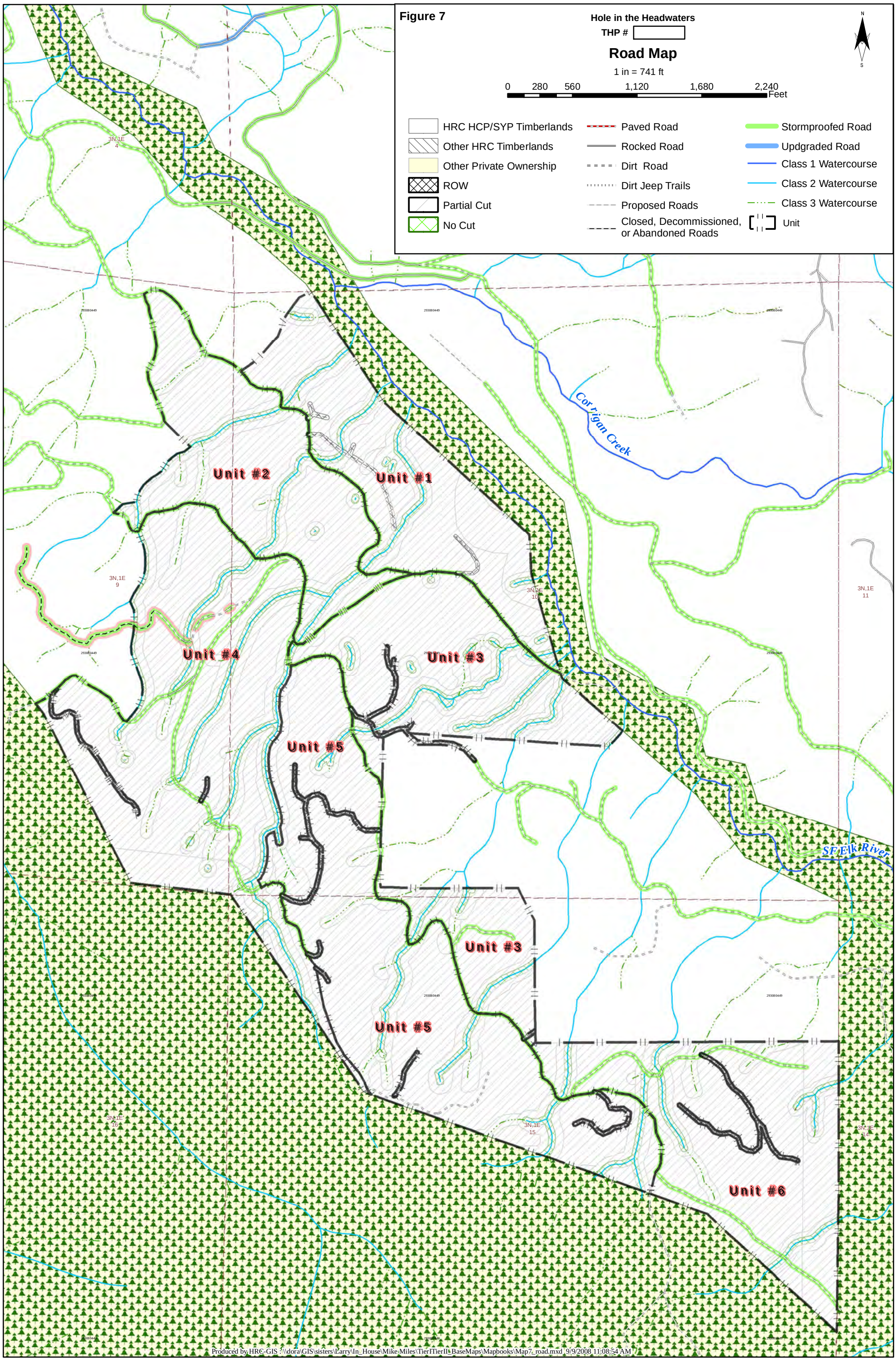
Figure 7
Hole in the Headwaters
THP #
Road Map
1 in = 741 ft
0 280 560 1,120 1,680 2,240 Feet
N
S
HRC HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
ROW
Partial Cut
No Cut
Paved Road
Rocked Road
Dirt Road
Dirt Jeep Trails
Proposed Roads
Closed, Decommissioned, or Abandoned Roads
Stormproofed Road
Updgraded Road
Class 1 Watercourse
Class 2 Watercourse
Class 3 Watercourse
Unit
Unit #1
Unit #2
Unit #3
Unit #4
Unit #5
Unit #3
Unit #5
Unit #6
Corrigan Creek
SF Elk River
3N,1E 4
3N,1E 9
3N,1E 10
3N,1E 11
3N,1E 16
3N,1E 15
3N,1E 14
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