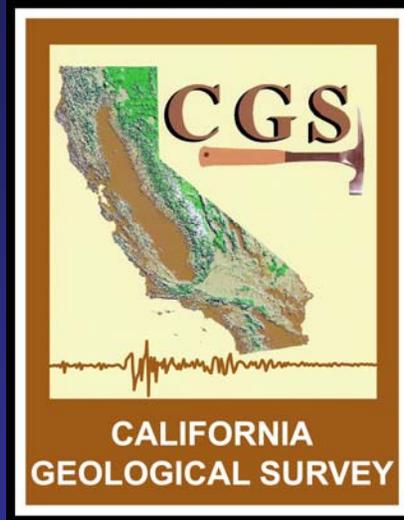


# Timber Harvest Plan Review Workshop



## California Geological Survey

December 2008 - January 2009

# **Outline**

- I. Legal Requirements for Geologic Input**
- II. Common Geologic Issues affecting THP's**
- III. THP Preparation – Office Research and Field Work**
- IV. Determining when a Geologist is Needed**
- V. Element of the Geologic Assessment**
- VI. Standards of Practice**

# **I. Legal Requirements for Geologic Input**

**a) Forest Practice Rules**

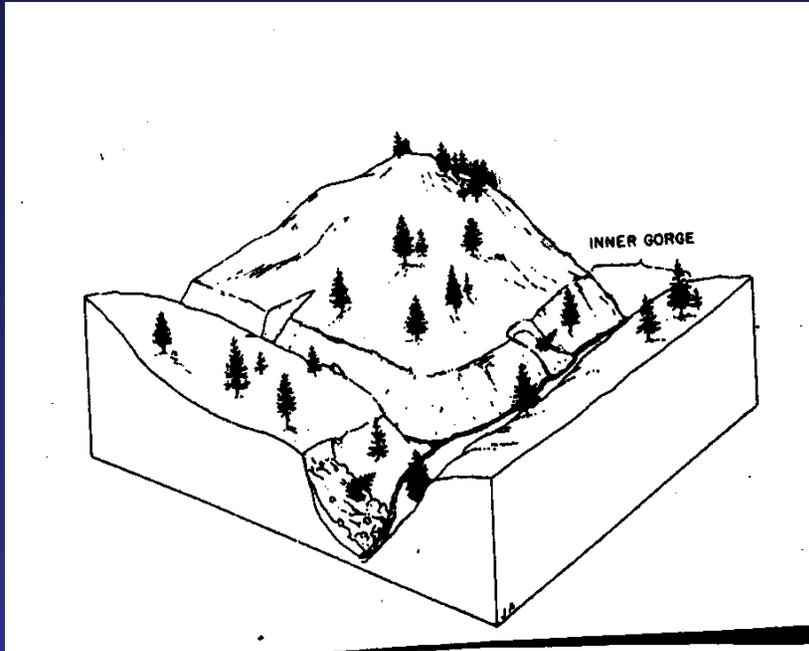
**a) Geologist and Geophysical Act**

## **a). Forest Practice Rules**

### **Threatened and Impaired Watersheds**

- **Consultation with Experts** (page 33)
  - Landslide identification, Soils/Erosion, Public Safety/Welfare
- **Records Examined** (page 33)
  - Geologic maps, previous geologic reports
- **Inner Gorge** (page 74)
- **Surface Mining and Reclamation Act (SMARA)** (page 294)
- **Headwall Swales** (page 304)
  - Road repair/construction/decommissioning

# Inner Gorge



Inner Gorge is a geomorphic feature formed by coalescing scars originating from landsliding and erosional processes caused by active stream erosion. The feature is identified as that area beginning immediately adjacent to the stream channel below the first break in slope.

# SMARA – Surface Mine and Reclamation Act



11/18/2008

# **SMARA – Surface Mine and Reclamation Act**

- Disturbed area exceeds 1 acre or volume is greater than 1000 cubic yards

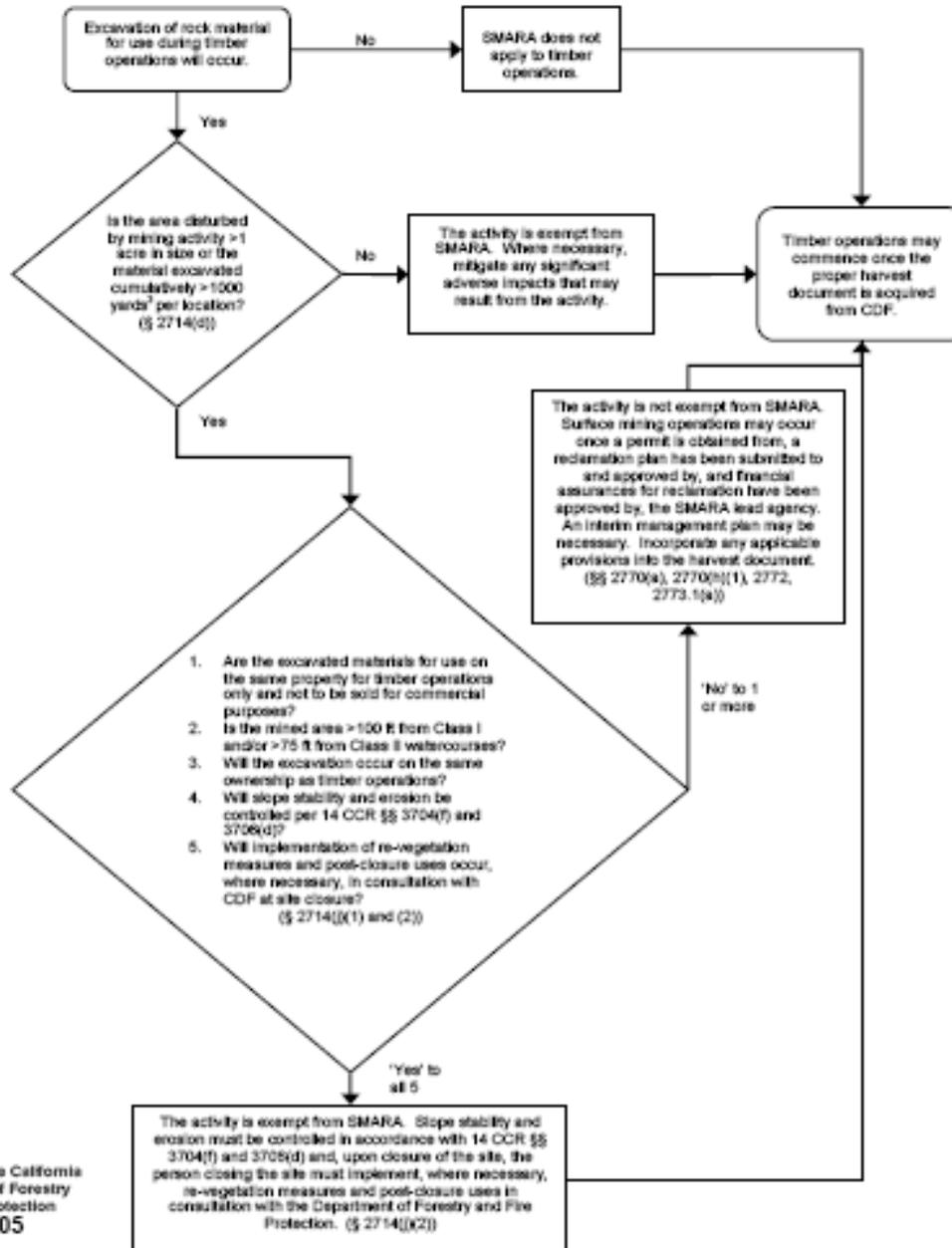
- Within 100 feet of Class I

- Within 75 feet of Class II

- Within 25 feet of Class III

11/18/2008

## How SMARA Applies to Timber Operations



Prepared by the California Department of Forestry and Fire Protection 7/15/05

# SMARA

# DECISION

# TREE

# HEADWALL SWALES



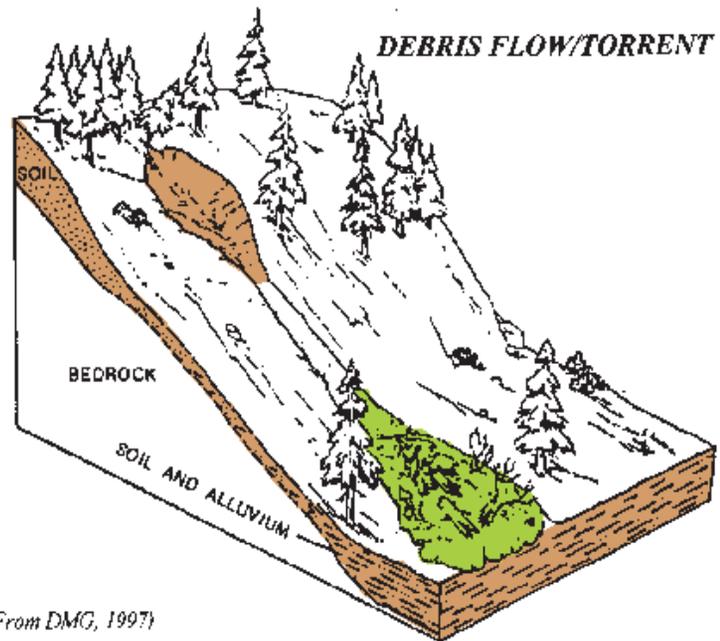
## FOREST PRACTICE RULES DEFINITION (2008)



***Connected Headwall Swale*** means a geomorphic feature consisting of a concave depression, with convergent slopes typically of 65 percent or greater, that is connected to a watercourse or lake by way of a continuous linear depression. A linear depression interrupted by a landslide deposit is considered to be continuous.



# Debris Flows



# **ROAD REPAIR and CONSTRUCTION in Headwall Swales**







11/19/2008

## **b). Geologist and Geophysical Act**

- **Defines who can practice geology**
- **Reason for Geologist and Geophysical Act is to ensure reports on which the public may rely**
- **Define an ethical standard of practice and competency**

## II. Common Geologic Issues Affecting Timber Harvest Plans

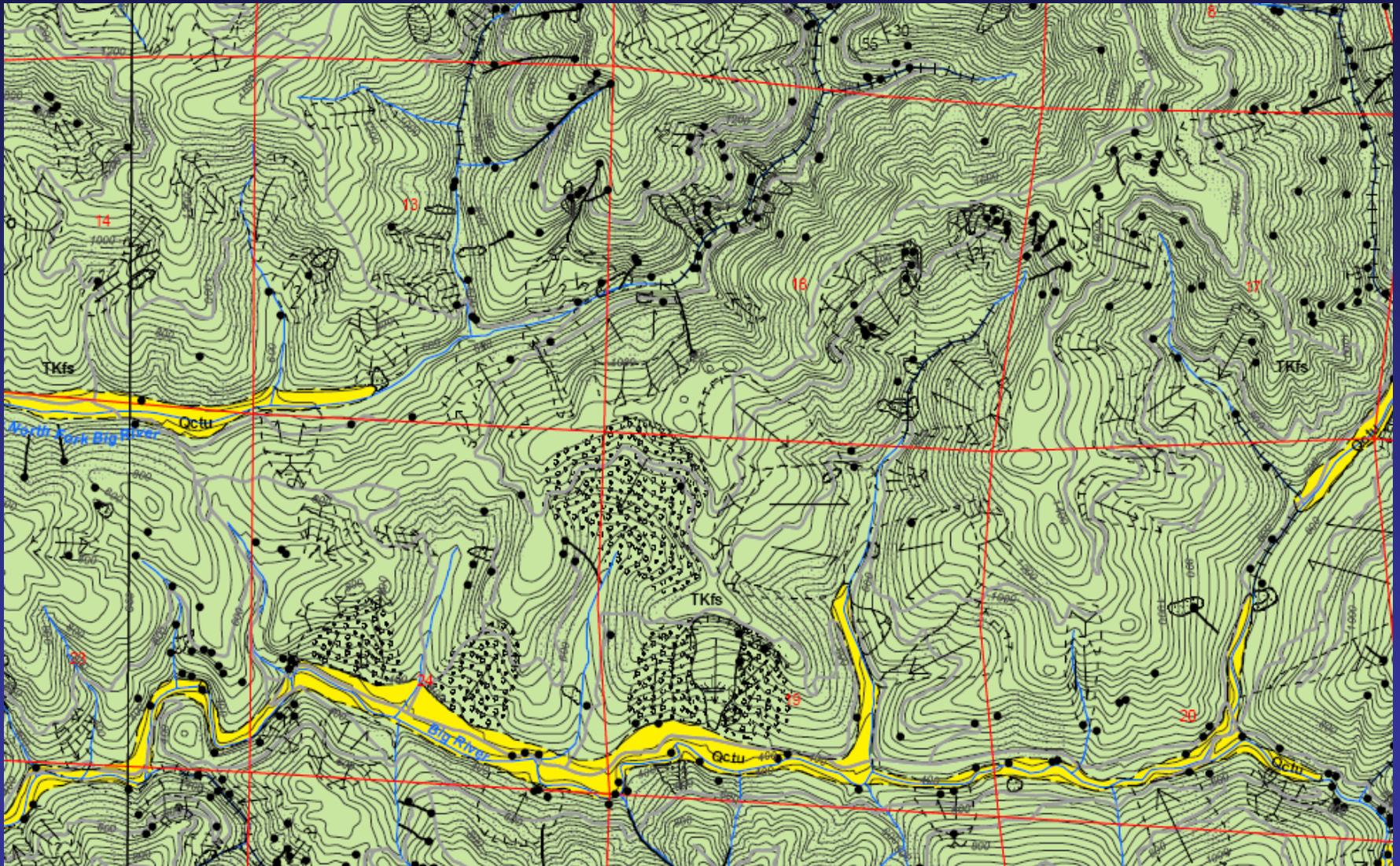
- Effects of Tree Removal on Hillslope Stability
- Effects of Road/Skid Trail Construction on Hillslope Stability and Erosion
- Excessive Sedimentation
- Impacts to:
  - Public Safety
  - Natural Resources including water quality/habitat.
  - Economic Concerns
- HCP, SYP, or other requirements

# **III. Geologic Disclosure in THP**

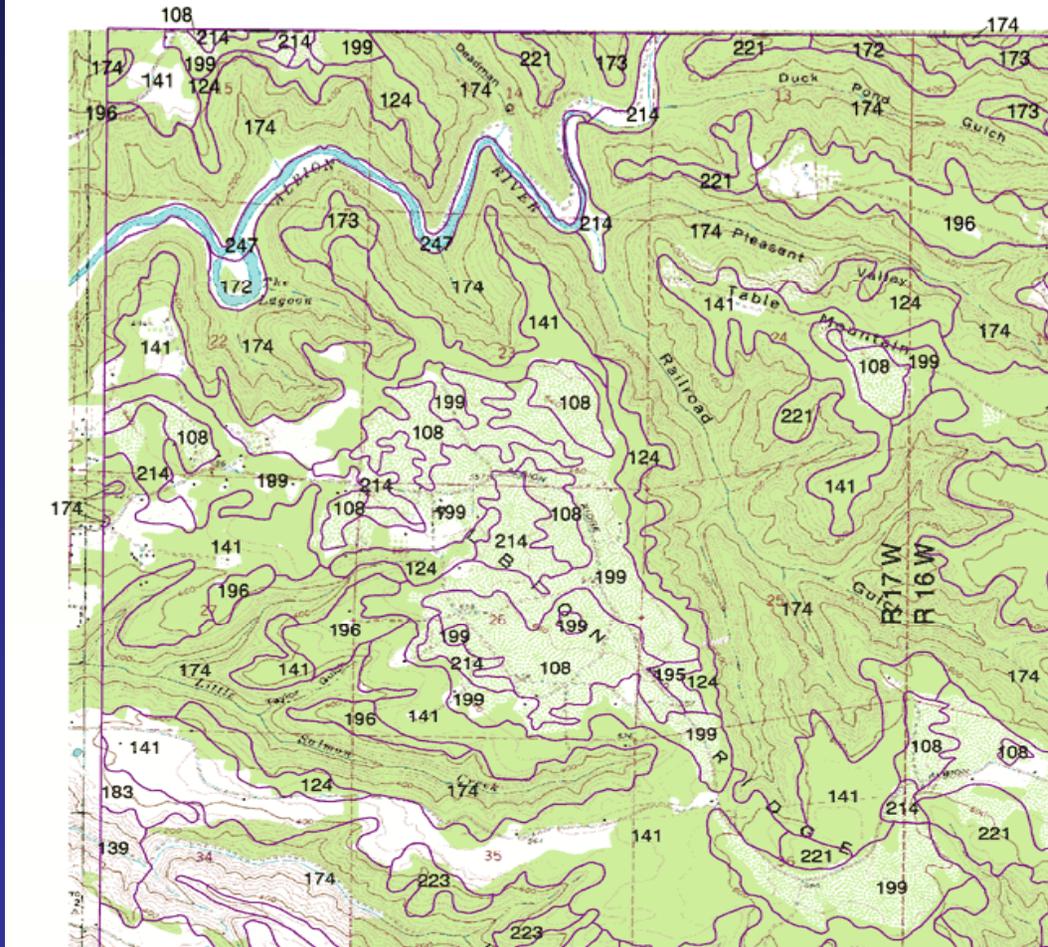
## **RPF Office Research**

- CEQA**
- Regional Geologic Maps (starting point)**
- Soils Maps**
- Previous geologic report or reviews in the THP area.**
- Aerial photo collections**

# REGIONAL GEOLOGIC MAPS



Soil Survey of Mendocino County, CA, Western Part - Elk Quadrangle



**SOIL**  
**SURVEY**  
**MAPS**



**RESEARCH**

**PREVIOUS**

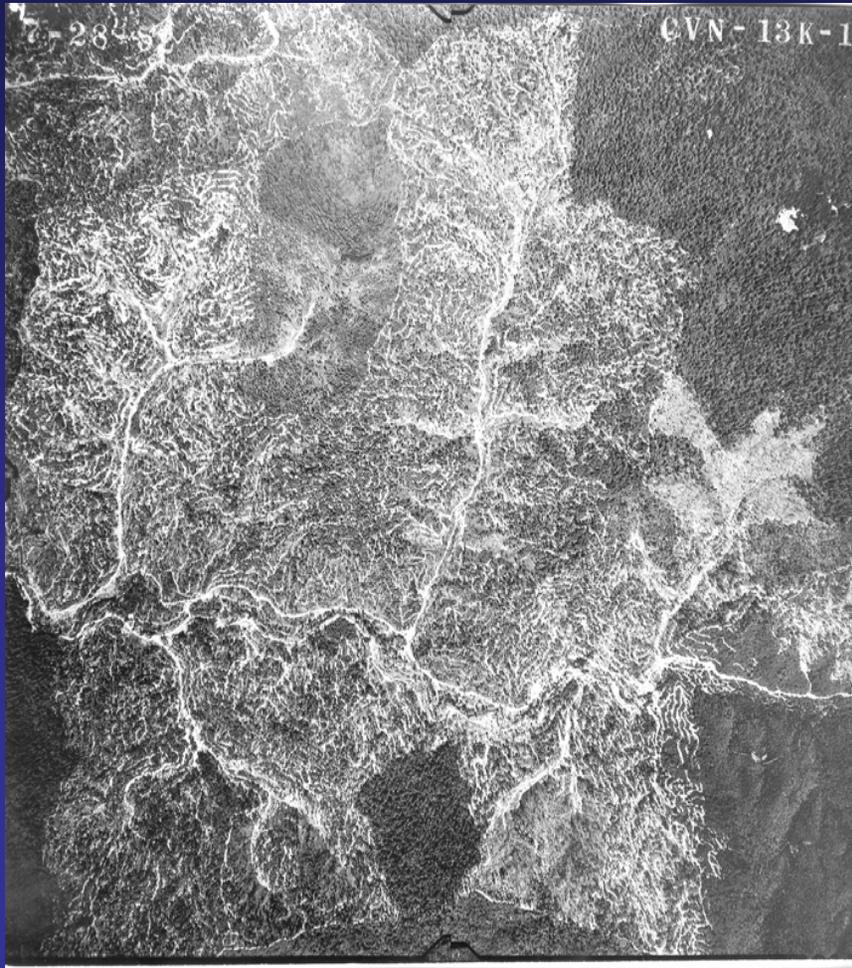
**GEOLOGIC**

**REPORTS**

**OR**

**REVIEWS**

# AERIAL PHOTO REVIEW = HISTORY OF LAND USE



1952 1"=2000'



2000 1"=2640'

# III. Geologic Disclosure in THP

## RPF field work

### – Recognition of unstable areas

- CFLA guidelines
- CDMG Note 50
- CGS pre-permit consultation

### – Public Safety

- Residential structures
- Roads, Highways, Railroads
- Domestic and Municipal Water supplies
- Power lines, off site properties

# Landslide Identification

DRAFT  
August 4, 1999

## California Licensed Foresters Association's Guide to Determining the Need for Input from a Licensed Geologist in THP Preparation

The following questions should be addressed by Registered Professional Foresters (RPF) during Timber Harvesting Plan (THP) preparation. RPFs are encouraged to review Division of Mines and Geology Note 50, Factors Affecting Landslides in Forested Terrain.

- Are there unstable areas located within or adjacent to the proposed THP area?
- Were unstable areas identified on available geologic, landslide, and watershed maps, aerial photos, or previous THPs in the vicinity of the plan area?

A Map of 7.5' Quadrangles (based on published landslide maps for the California Coast Ranges extending from Monterey through Del Norte County) for use in Timber Harvesting Plan preparation on non-federal lands is available as California Division of Mines and Geology Special Publication 120, available from:

The Division of Mines and Geology  
Publications and Information Office  
801 K Street, MS 14-33  
Sacramento, CA 95814-3532  
916-445-5716

Copies of the landslide maps are on file at the Division of Mines and Geology Library at the above address, and at Department of Forestry and Fire Protection offices in Fortuna, Willits, Santa Rosa, and Felton. Many of the maps that are published by the Division of Mines and Geology are available at:

<http://www.cdmr.ca.gov/brg/index.htm>

- Were unstable areas observed in the field? Features associated with unstable areas may include:
  - Hill slopes greater than 6%, including linear gully areas
  - Loose, unconsolidated soils
  - U-shaped scarps
  - Irregular topography



CALIFORNIA DEPARTMENT OF CONSERVATION  
DIVISION OF MINES AND GEOLOGY

## FACTORS AFFECTING LANDSLIDES IN FORESTED TERRAIN

### NOTE 50

Landslides and geomorphic features related to landsliding have been mapped by the Department of Conservation, Division of Mines and Geology (DMG) on forest lands within numerous northern California watersheds under contract with the Department of Forestry and Fire Protection (CDFP; see DMG Note 40). In this document, was developed in conjunction, and is compatible with, ongoing U.S. Forest Service (USFS) and California Department of Water Resources (CDWR) mapping on forest lands. Descriptions presented here are excerpted from Dickinson (1993).

generally is well established. Although some large-scale landsliding may have developed under conditions different from today, the causes of failure may remain and movement could be renewed.

#### Translational/Rotational Slide

**Definition.** The translational/rotational slide is characterized by a somewhat cohesive slide mass and a failure plane that is relatively deep when compared to that of a debris slide of similar areal extent. The sense and is similar to "rotational" in the case of a rotational slide (Figure 1). Complete rotation involving rotational heads with some rotation or earthflow down a shear joint or bedding discontinuity. The translation may be referred to as a block slide.

Factors affecting landslide potential are described according to the geological conditions, drainage characteristics, slope gradient and soil/vegetation, removal of underlying support, and other conditions specific to each landslide related category (Figures 1-6). Management objectives and guidelines for each landslide-related category were developed primarily from field experience, recommendations made by geologists during the Timber Harvesting Plan review process, practices currently required under the Forest Practice Rules (California Administrative Code, 1997), and geologic reports prepared for CDFP, DWR, and the USFS. The guidelines address each landslide-related category and provide recommendations for forest practices related to road construction, logging, and site preparation.

#### LANDSLIDE TERMINOLOGY

Landslide terminology described here includes debris flow/current neck, debris slide amphitheater, debris flow gorge. The term debris slide amphitheater, however, in part, as a result of debris slide processes, and they may be subject to continued debris slide activity. These features should not be misinterpreted as complex landslides subject to more than one type of landslide process. Accordingly, the management implications for such areas may be more complex than referred here.

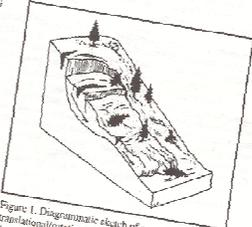


Figure 1. Diagrammatic sketch of a translational/rotational landslide. Drawing by Janet Appleby, Richard Killmer, and Thomas Spitzer, modified from Varney (1978).

Most landslides are classified as active or dormant. The active or probably active slides are those which are presently moving or have recently moved, as indicated by the presence of distinct topographic slide features (backstravel) scars, cracks, and typical or slides in the active category. Dormant slides show little evidence of recent movement; slide features have been modified by weathering and erosion and vegetation

**Factors affecting landslide potential.** Translational/rotational slides generally occur in soil masses that may be greater than 5 feet thick, but sliding is not restricted to the zone of weathering. Failure commonly occurs along bedrock bedding planes that are steeply-dip and dip in the same direction as the slope. In saturated conditions, the compression along bedrock material may fail under overburden weight and high pore pressures, resulting in a deep-seated rotational-type failure. Translational slides commonly are controlled structurally by surfaces of weakness such as joints, faults, bedding planes, and contacts between bedrock and overlying deposits.

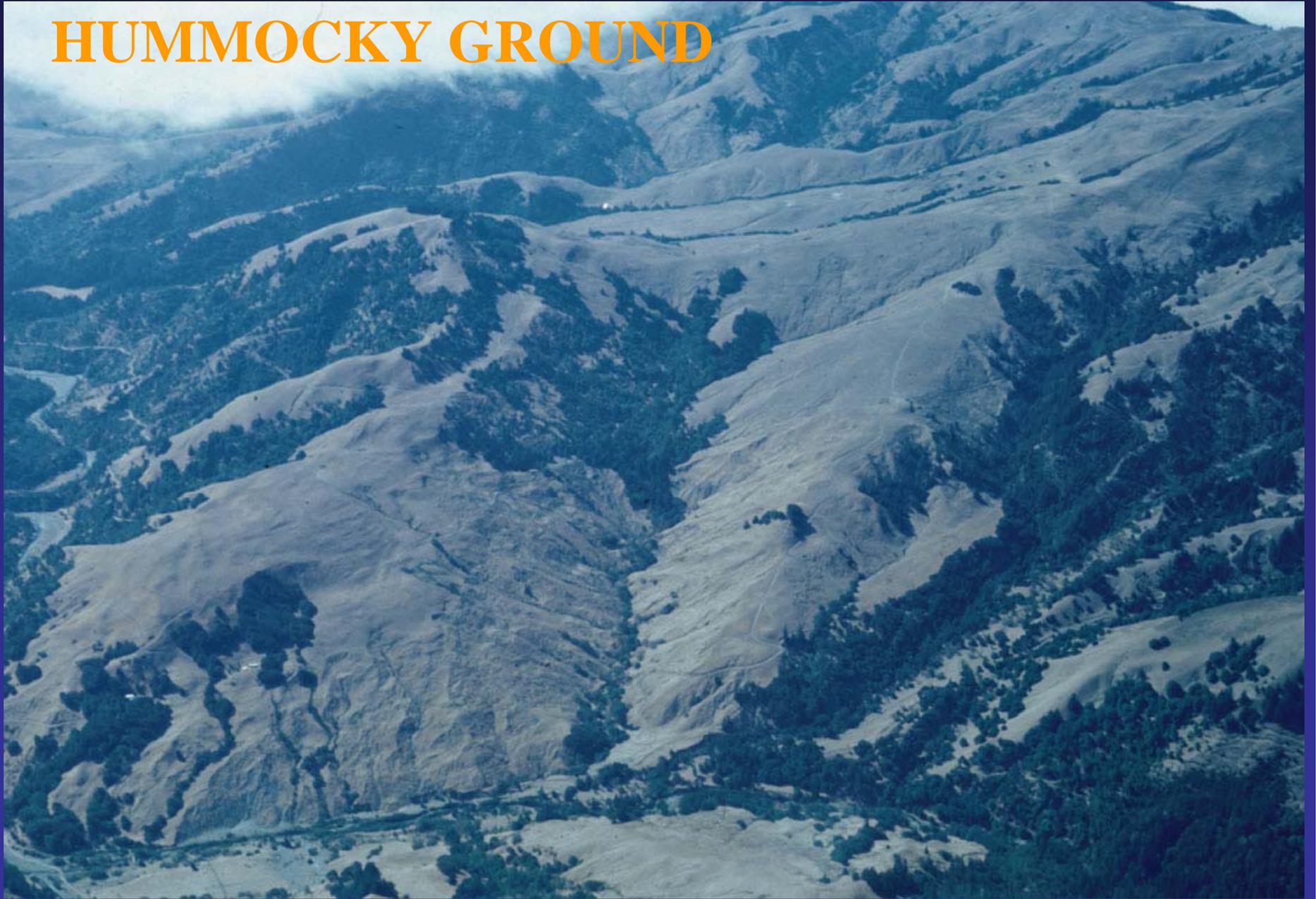
Revised 8/97  
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PETE WILSON  
GOVERNOR

DEPARTMENT OF CONSERVATION  
LAWRENCE J. GOLDBAND  
DIRECTOR

# HUMMOCKY GROUND

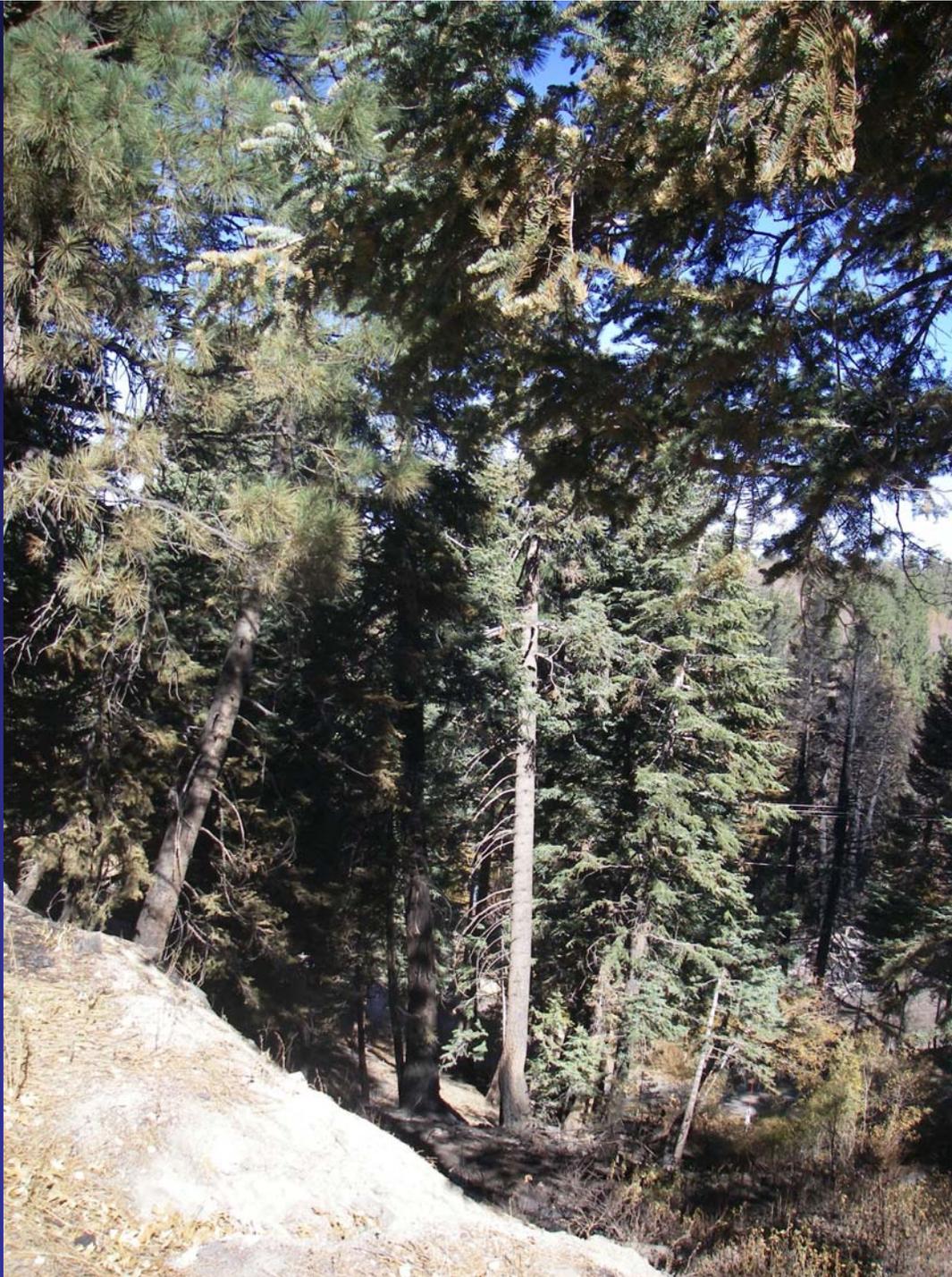




**SCARPS**

**AND**

**BENCHES**



**LEANING**

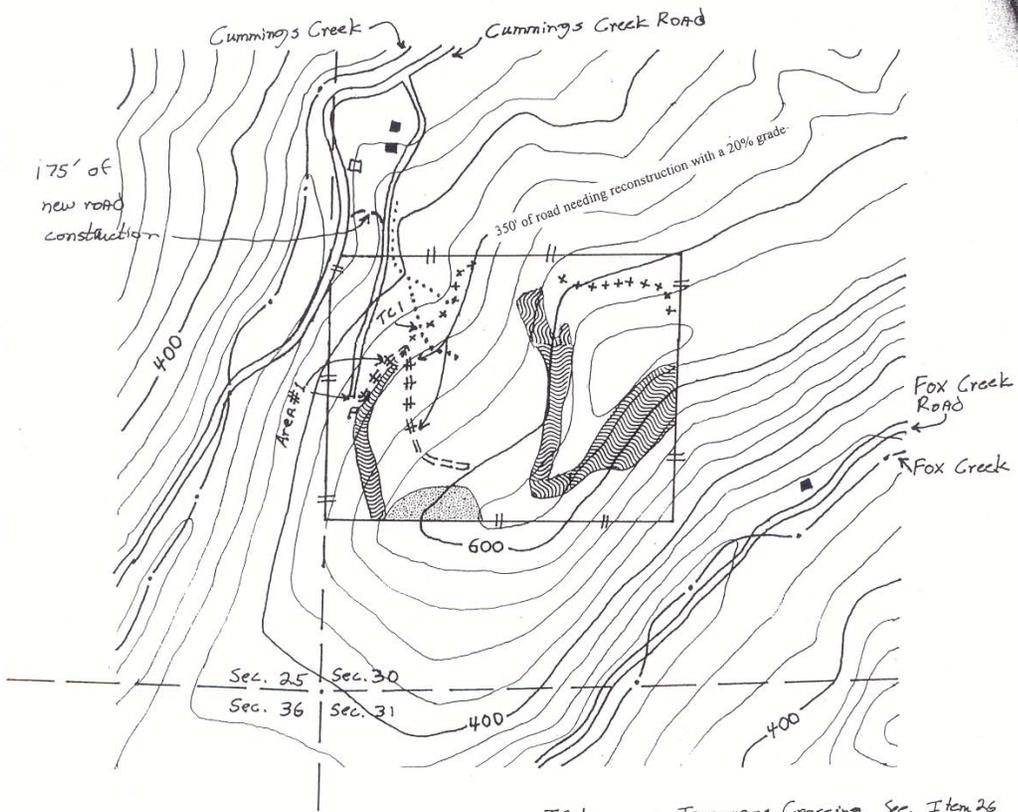
**TREES**



ROAD  
OR  
LANDING  
FILL  
FAILURE

## IV. Determining when a geologic consultant is needed.

- CLFA Guidelines
- Impacts to Public Safety/Welfare
- Focused needs (watercourse crossings, road construction, road abandonment/decommissioning, mitigations)
- Interagency requests (new rules, HCP, TMDL, Waivers)



**THP Map**

- #-#- Plan Boundary
- ==== Existing Permanent Road
- == == Existing Seasonal Road
- ++++ Seasonal Road Needing Reconstruction
- Class I Watercourse
- ..... Class III Watercourse
- P - Class IV Pond

- TC1 - Temporary Crossing, See Item 26
- ~~~~~ EEZ Cliff Area
- ▒▒▒ Clearcut Area, Rest of plan is Group Selection
- □ - House or Outbuilding
- Area #1 - Area of Road Reconstruction, See Section II, Item 25
- ++++ Existing Skid trail

Hydesville & Owl Creek Quads. Cont. Int. - 40'  
 Scale: 1" = 500' T. 2 N. R. 2 E. HB&M

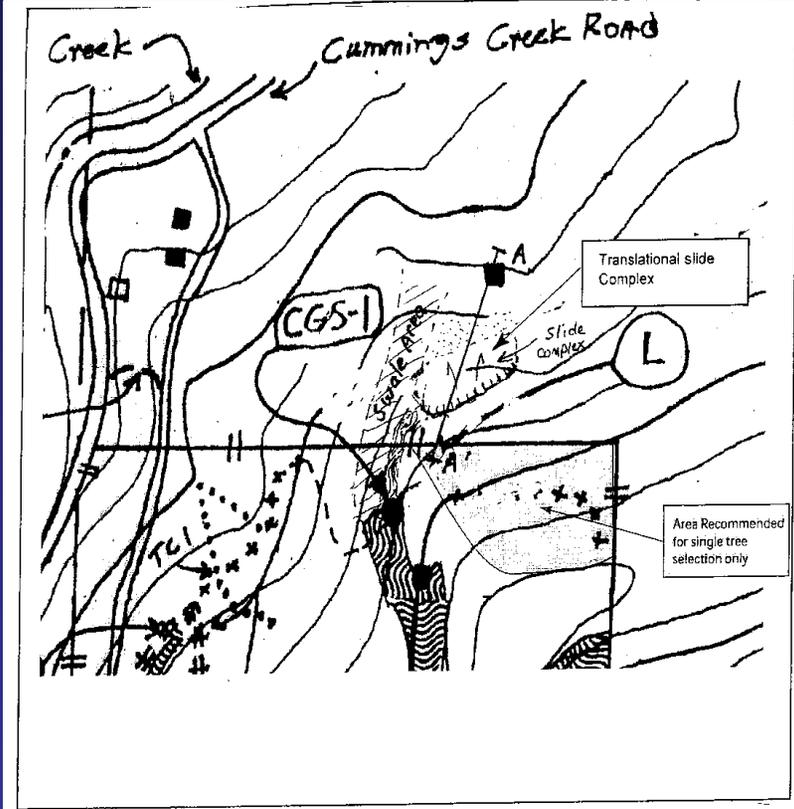
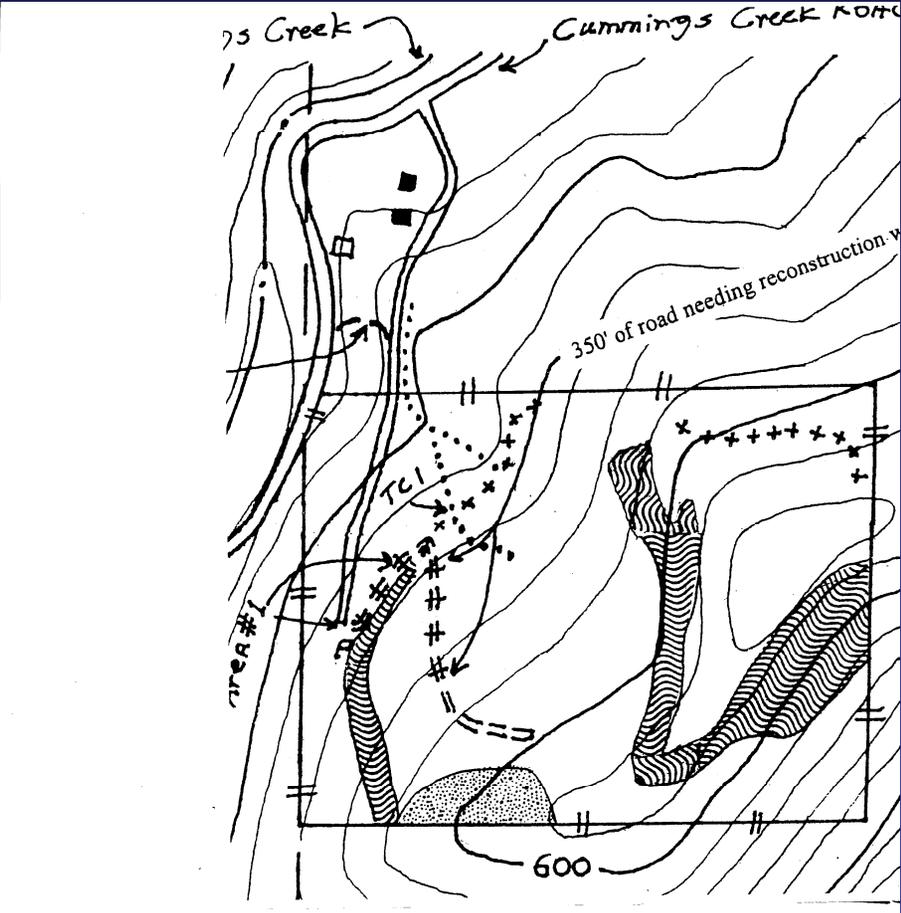
# PUBLIC SAFETY

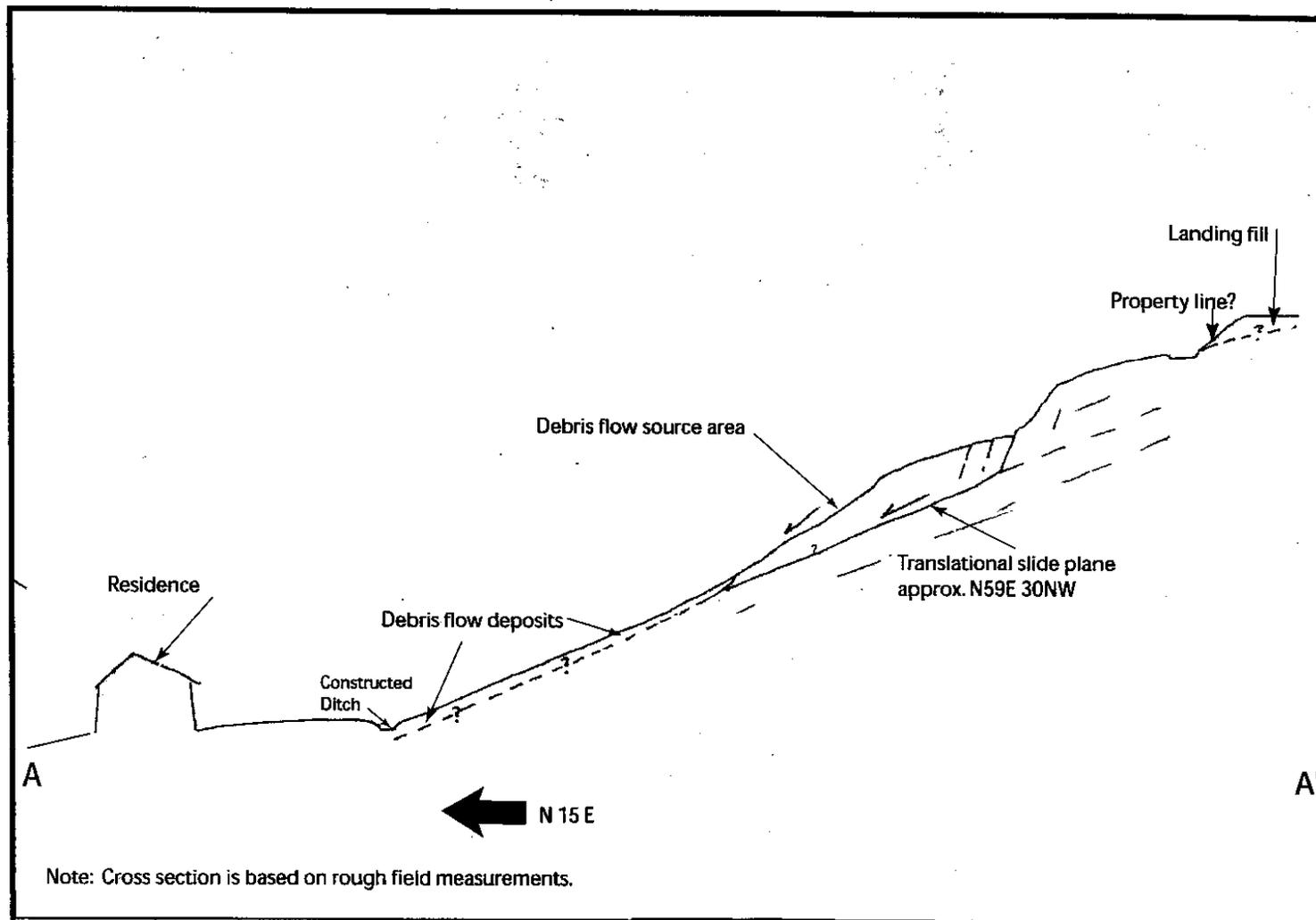


# CASE STUDY

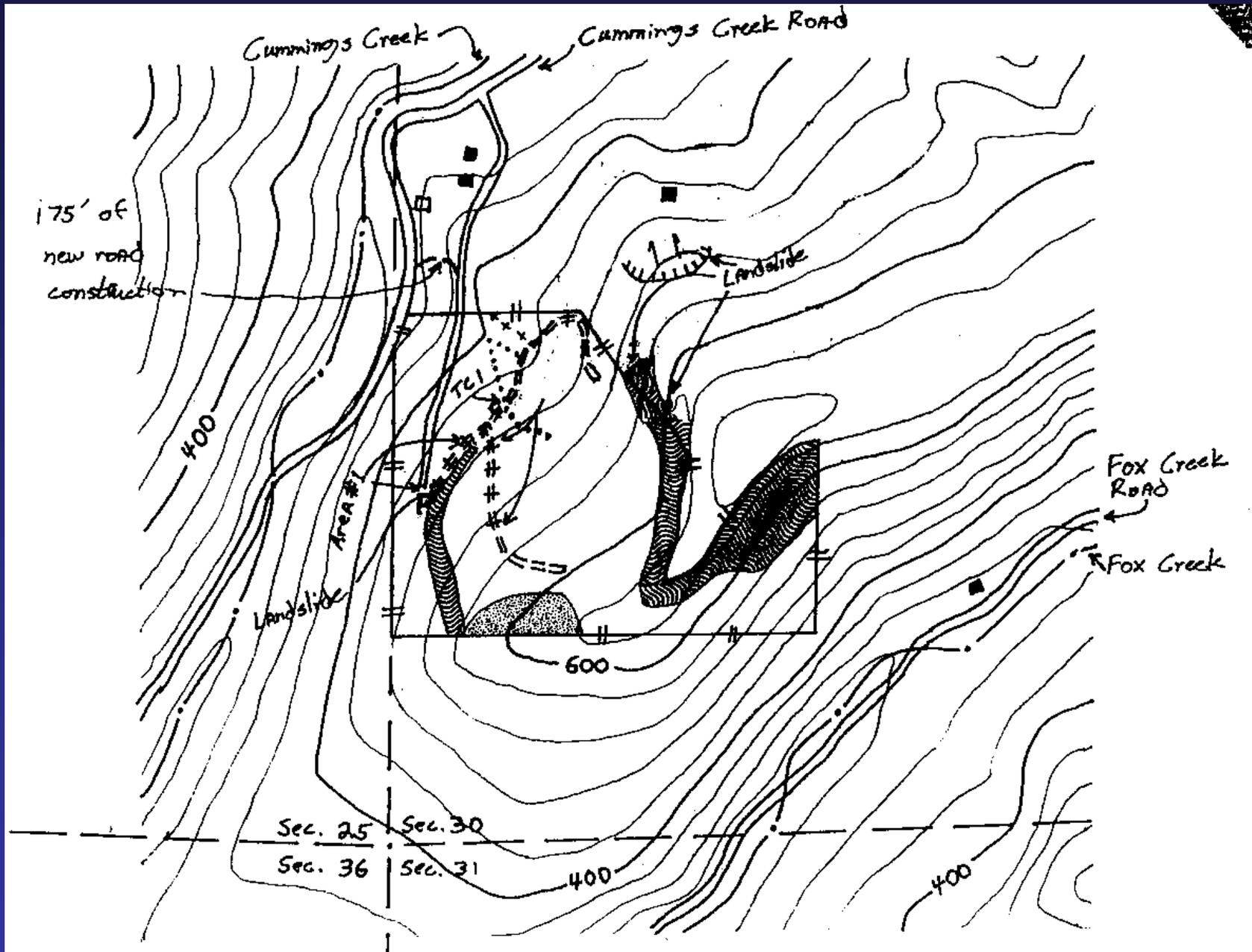
Original map submitted with THP

CGS Review Notes Following PHI





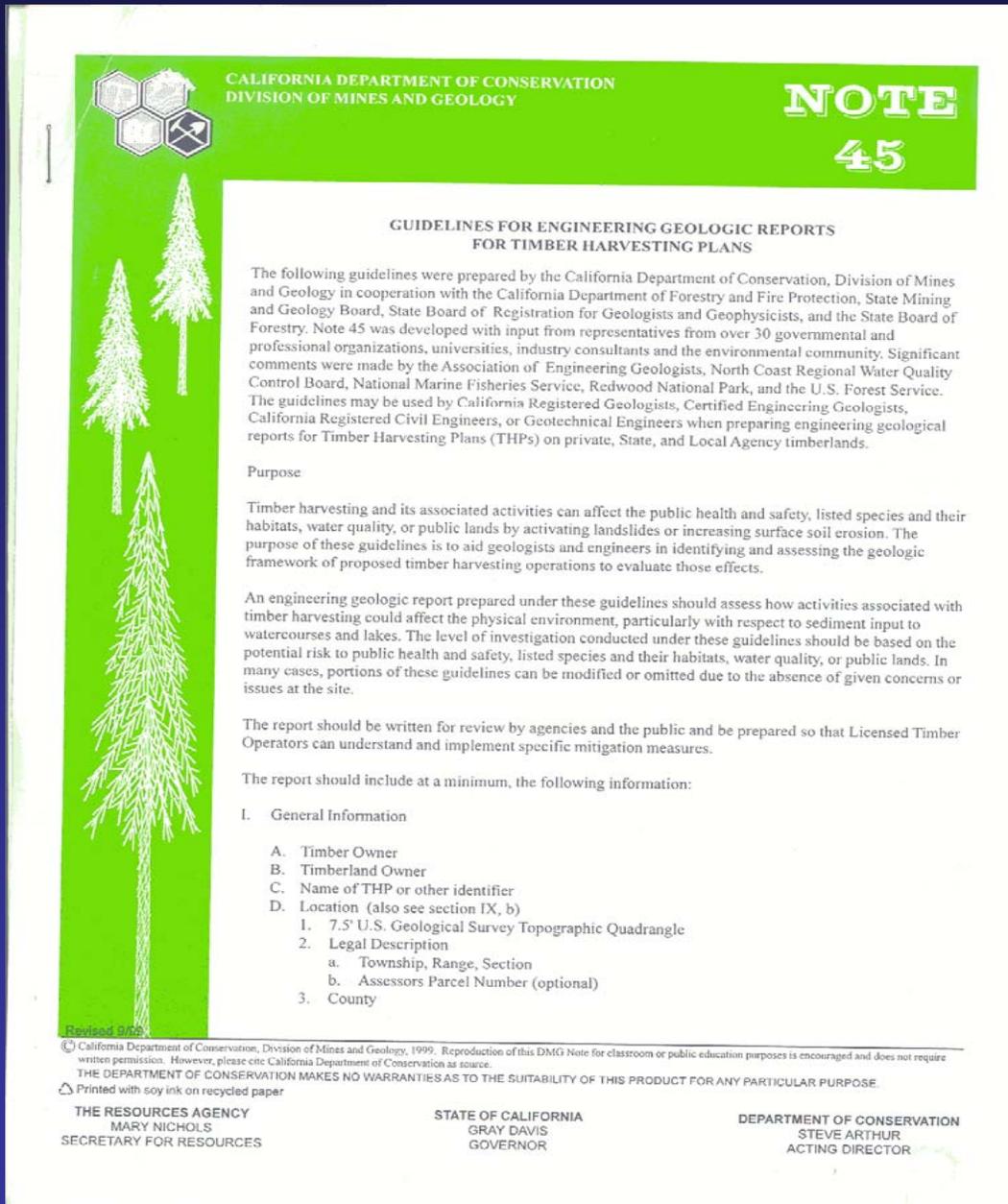
Date: 2/15/05	Cross Section A - A' Residence to landing area	Figure:	Horizontal and Vertical Scale 1 inch equals 50 feet
Scale: 1" = 50'		2	
Approved By: CGS			



# V. Consultant Geologic Assessment

- Types of Investigations
  - Focused Investigation
  - Full Investigation
  - Disclosure
- What CGS expects to see
- Note 45 – Guidelines for Engineering Geologic Reports for Timber Harvest Plans
- What CGS does not expect to see

# VI. STANDARDS OF PRACTICE



## NOTE 45

- General Information
- Scope of Investigation
- Geologic Conditions
- Proposed Activities
- Potential Effects
- Cumulative Effects
- Mitigations
- References



Questions and  
Comments???