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

Produced by HRC-GIS : : dora GIS sisters Larry In_House Mike Miles TierITierII_BaseMaps Mapbooks map1_elevationMap_small.mxd 9/9/2008 10:52:22 AM

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 HCP/SYP Timberlands
Other HRC Timberlands
Other Private Ownership
THP Boundary
THP Boundary

Unit #3
Unit #2
Unit #1

SHALSTAB Hazard Map

1
2
3
4
5

Slope Class Map
Slope %

0 - 10%
10 - 20%
20 - 30%
30 - 40 %
40 - 50%
50 - 60%
> 60%

Produced by HRC-GIS \\dora\GIS\sisters\Larry In House\Mike Miles\TierITierII BaseMaps\Mapbooks\map2_Shalstab_slope_small.mxd 9/9/2008 10:52:58 AM

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

- Landlside Initiation Points

Unit #1
Unit #2
Unit #3

Elk River
Shaw Gulch
NF Elk River
SF Elk River
Clapp Gulch
Railroad Gulch
Tom Gulch
McCloud Creek
Willow Brook

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.

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

Very Low

Very High

Moderate

High

Low

Unit #1

Unit #2

Unit #3

Elk River

Shaw Gulch

N F Elk River

S F Elk River

Clapp Gulch

Railroad Gulch

Tom Gulch

McCloud Creek

Willow Brook

Salmon Creek

4N,1W 16 | 4N,1W 15 | 4N,1W 21 | 4N,1W 22 | 4N,1W 23 | 4N,1W 24 | 4N,1E 30 | 4N,1W 28 | 4N,1W 27 | 4N,1W 26 | 4N,1W 25 | 4N,1E 31 | 4N,1W 33 | 4N,1W 34 | 4N,1W 35 | 4N,1W 36 | 3N,1W 4 | 3N,1W 3 | 3N,1W 2 | 3N,1W 1 | 3N,1E 6 | 3N,1W 9 | 3N,1W 10 | 3N,1W 11 | 3N,1W 12 | 3N,1E 7

Produced by HRC-GIS : \\dora\GIS\sisters\Larry In_House\Mike Miles\TierITierII_BaseMaps\Mapbooks\Map4_MassWasting_small.mxd 9/9/2008 11:01:37 AM

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

N.F. Elk River

S.F. Elk River

Shaw Gulch

Clapp Gulch

Railroad Gulch

Tom Gulch

Dunlap Gulch

McCloud Creek

Willow Brook

Salmon Creek

Unit 03

Unit 02

Unit 01

Produced by HRC-GIS : \\dora\GIS\sisters\Larry\In_House\Mike Miles\Tier1Tier1_BaseMaps\Mapbooks\Map5_orthoMap_small.mxd 9/9/2008 11:05:49 AM

Figure 6

McCloud Shaw

THP #

Watershed Analysis Deep-Seated Landslide

1 inch = 1,800 feet

0 900 1,800 3,600 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, 2000)

- Scarp
- Earthflow
- Rotational / Translational /Earthflow
- Rotational/ Translational

Unit #3

Unit #2

Unit #1

4N,1W 16 | 4N,1W 15 | 4N,1W 21 | 4N,1W 22 | 4N,1W 28 | 4N,1W 27 | 4N,1W 26 | 4N,1W 25 | 4N,1E 30 | 4N,1W 33 | 4N,1W 34 | 4N,1W 35 | 4N,1W 36 | 4N,1E 31 | 3N,1W 4 | 3N,1W 3 | 3N,1W 2 | 3N,1W 1 | 3N,1E 6 | 3N,1W 9 | 3N,1W 10 | 3N,1W 11 | 3N,1W 12 | 3N,1E 7 | 3N,1W 16 | 3N,1W 15 | 3N,1W 14 | 3N,1W 13 | 3N,1E 18

North

South

Gulch

McCloud Creek

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

McCloud Shaw

THP # [ ]

Road Map

1 in = 1,800 ft

0 700 1,400 2,800 4,200 5,600 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
- Decommissioned
- Class 1 Watercourse
- Class 2 Watercourse
- Class 3 Watercourse
- Unit

Unit #3

Unit #2

Unit #1

Elk River

Shaw Gulch

Clapp Gulch

Railroad Gulch

Willow Brook

Town Gulch

N.F. Elk River

SF Elk River

McCloud Creek

Salmon Creek

Produced by HRC-GIS : \\dora\GIS\sisters\Larry In_House\Mike Miles\Tier1Tier2_BaseMaps\Mapbooks\Map7_road.mxd 9/9/2008 11:08:54 AM