NORTH FORK CALAWAH MASS WASTING MODULE
CAUSAL MECHANISM REPORT AND PRESCRIPTION

WAU: North Fork Calawah (200315)

Resource Sensitivity: Mass Wasting Hazard #6, MWMU #6 – Relict Deep-Seated Landslides (Map K-2)

Landform Description:
These features vary from approximately 15 acres to approximately 200 acres in size. Typically, there is a distinct head scarp which may be a bedrock cliff but is more commonly a 50-70% slope that supports living trees, and has old growth stumps and soil including a humus layer. The latter indicate significant age. The side scarps are often less obvious, but where deep-seated landslides are adjacent to one another as they are on Bigler Mountain, discrete ridges may exist between features. In the broad perspective, these features are horizontally planar or concave and vertically convex, planar or concave. Locally, surfaces can be hummocky. Some features are formed of a few large blocks, creating benched topography. Marginal streams are often cut deeply into the hillslope (20-100 feet) and usually qualify as inner gorges as defined in MWMU #1; they may delineate the side scarps of the deep-seated landslides. Bedrock hollows (MWMU #2) are not common on the deep-seated landslides, but can occur.

Evidence of recent or active deep-seated movement is not present. Trees are not curved or jack-strawed (although pistol-butted trees growing on logs or stumps are common, as they are everywhere on this near-coastal landscape where western hemlock is prevalent). Tension cracks and stretched tree roots are not present. Bare mineral soil can be associated with shallow, rapid failures such as debris flows and debris slides within the inner gorges and bedrock hollows that have developed on the deep-seated landslides and nowhere appears to be symptomatic of deep-seated movement. Small wet or seepy areas may occur. However, rainfall is 130+" per year and the bedrock is highly fractured with alternating units of massive sandstone and thin siltstone beds; such seeps are common across the geologic unit and do not appear to reflect continued activity of the deep-seated landslides.

Situation Summary:
Clearcut harvest, fires and roads have all been observed to increase the extent and frequency of mass wasting. Roads and harvest in MWMU #1 and #2 within MWMU #6 increase frequency and volume of landslides with direct delivery to the habitat of salmonids and other aquatic species. Likely channel effects in fish-bearing waters are filling of pools and bed aggradation as a result of coarse sediment inputs, and the infiltration of spawning gravels by fine sediments.

Triggering Mechanisms:
MWMU #6, meaning the relict deep-seated landslide bodies, has a Low sensitivity to forest practices. During the watershed analysis, the following was noted: "There is no evidence that forest practices reinitiated movement on a deep-seated landslide in the North Fork Calawah Watershed; confidence is low that this possibility is a real concern." Eighteen years later, many of these features have been field evaluated and then harvested again. Confidence that the relict deep-seated landslides are truly relict and do have a low sensitivity to forest practices is now high. However, the sensitivity of the inner gorges and bedrock hollows that have developed on the relict deep-seated landslides is Very High. Just like MWMU #1 and #2 outside of MWMU #6, loss of rooting strength by clear cut harvest or wildfire elevates landslide rates above levels observed in mature forests. Road-related triggers include focused water, undersized stream-crossing culverts and sidecast construction. In general, these triggers cause twice as many landslides as loss of rooting strength.

Rule Call for Management Response:
Hazard: Low overall for MWMU #6; Very High for MWMU #1 and #2 within MWMU #6.

Vulnerability: Moderate and High

Rule Call: Standard Forest Practices for MWMU #6; Prevent and Avoid for MWMU #1 and #2 within MWMU #6.

Additional Comments:
Delineation of MWMU #1 and #2 within MWMU #6 shall follow the guidance provided in the Landform Description Sections of Mass Wasting Hazard #1 and Mass Wasting Hazard #2.

Prescriptions:
Within MWMU #6 where these slopes do not meet the definition of either MWMU #1 or MWMU #2 forest practices activities may be conducted following standard forest practice rules. This includes but is not limited to: 1) The harvest of timber; 2) The construction of roads and landings.

If it is determined that a deep-seated landslide or some portion therein is not relict as defined by Keaton and DeGraff (1996 - full reference provided in Reanalysis Report) and summarized in Section 16 of the Forest Practices Board Manual, then standard forest practices rules as they pertain to bedrock deep-seated landslides, particularly the toes, are to be followed. Where delivery to public resources is possible or a threat to public safety exists for the non-relict feature, geotechnical evaluation is necessary and the forest practices application may be a Class IV-Special requiring SEPA review.

Within MWMU #6 and within MWMU #1 or MWMU #2, the harvest and road prescriptions for MWMU #1 or MWMU #2 are to be followed.

Justification for and Intent of Prescriptions:
Justification for the prescriptions is provided in the section titled Testing the Prescriptions in Module K – 2015 Mass Wasting Prescription Reanalysis Level 2 of the North Fork Calawah Watershed Analysis (Dieu, 2015). Additional justification for MWMU #1 and #2 prescriptions are provided in those prescriptions.

The intents for MWMU #1 and MWMU #2 as described in those prescriptions are also the intents for MWMU #1 and MWMU #2 as they occur within MWMU #6.