NORTH FORK CALAWAH MASS WASTING MODULE
CAUSAL MECHANISM REPORT AND PRESCRIPTION

WAU: North Fork Calawah (200315)

Resource Sensitivity: Mass Wasting Hazard #3, MWMU #3 – Convergent Headwalls (Map K-2)

Landform Description:
Rule-identified convergent headwalls are steep (>70% and often much greater than 70%) teardrop-shaped landforms that are concave in both the vertical and horizontal planes. A convergent headwall is comprised of many bedrock hollow and hillslope inner gorges that converge into a single channel in a midslope position. Knife-edged ridges and broader convex surfaces may extend from the ridgetop above the convergent headwall, but are likely to be pinched out downslope by convergence. Some lower elevation headwalls, such as the large one delineated in Township 29 North, Range 11 West, Section 17, contain some broad, <70% ridges between the hollows and <70% swales between a hollow and its hillslope inner gorge. Higher elevation headwalls may have little slope area <90%. It is specifically the bedrock hollows and inner gorges that are unstable slopes and the convex, planar and lower gradient surfaces are stable, but where ridges are so narrow that both edges fall side hill into an adjacent hollow at 90+%, there may not be any stable areas.

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 #3 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. In some subbasins, landslides that initiated in convergent headwalls have triggered dam break floods that route to and through fish-bearing channels.

Triggering Mechanisms:
Loss of rooting strength by clearcut 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. These triggers cause twice as many landslides as loss of rooting strength.
Roads unavoidably capture and concentrate shallow groundwater; this is particularly problematic within MWMU #3 because the high density of MWMU #1 and #2 means that there few locations where it is safe to cross-drain ditch line water. For reasons that remain unclear, the bedrock hollows, and to a lesser extent the inner gorges, within MWMU #3 are preferentially unstable when compared with the same features outside of MWMU #3.

Rule Call for Management Response:
Hazard: High

Vulnerability: Moderate and High

Rule Call: Prevent and Avoid

Additional Comments:
Delineation of MWMU #1 and #2 within MWMU #3 shall follow the guidance provided in the Landform Description Sections of Mass Wasting Hazard #1 and Mass Wasting Hazard #2.

Prescriptions:
Current forest practices as appropriate may be conducted on the convex and planar slopes within MWMU #3 where these slopes do not meet the definition of either MWMU #1 or MWMU #2. This includes but is not limited to: 1) the harvest of timber; and 2) the construction of roads and landings.

Within MWMU #3 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 #3.