NORTH FORK CALAWAH MASS WASTING MODULE
CAUSAL MECHANISM REPORT AND PRESCRIPTION

WAU: North Fork Calawah (200315)

Resource Sensitivity: Mass Wasting Hazard #4, MWMU #4 – Outer Edges of Meander Bends (Map K-2)

Landform Description:
Rule-identified outer edges of meander bends occur where the North Fork Calawah River is experiencing channel migration. This causes a meander bend to erode into a glacial terrace or the base of the hillslope for a period of years or decades (e.g., in the middle valley downstream of the confluence of the North Fork Calawah Headwaters and Pistol Creek) or where the North Fork Calawah River is somewhat entrenched and has relatively permanent outer meander bends with a slow rate of erosion (e.g., in the lower valley). These slopes are concave in the horizontal plane, often extend for several hundred feet along the river and then may re-develop of the other side of the river where the next meander occurs. They are rarely >30 feet high except for those rare locations where the CMZ is against the hillslope. These were not directly identified or discussed in the original watershed analysis because most are protected within riparian buffers and the large ones also reasonably meet inner gorge definitions; they have been added here because they are now a rule-identified landform.

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 #4 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:
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. Because modern forest practices avoid the near-river corridor, responses to forest practices are not expected to be observed today but the existing road network is still contributing sidecast failures.

Rule Call for Management Response:
Hazard: High

Vulnerability: Moderate and High

Rule Call: Prevent and Avoid

Additional Comments:
Modern road design and riparian buffers have greatly reduced impacts to outer meander bends where they occur at the scale observed in the North Fork Calawah Watershed (e.g., <30 vertical feet above the river).

Prescriptions:

Harvest Prescriptions:

Except where an allowable exception is applied, there is no timber harvest within MWMU #4 if delivery to public resources is possible or a threat to public safety exists.

Allowable Exceptions:

1) Yarding Corridors (where full suspension over the timber rooted within MWMU #4 is not possible and some impacts to the timber may occur)
    a. Yarding corridors are not to exceed 30-feet in width and shall not be spaced closer than 150 feet where they cross the MWMU (see Figure 1 of MWMU #1 prescription).
    b. Yarding corridors must be placed so that they do not cross sensitive sites as defined in WAC 222-16-010 where these sensitive sites lie within MWMU #4.
    c. Full suspension is required over the MWMU. Best management practices such as 40-feet log lengths, mid-span supports and elevated tail holds will be used as necessary to achieve full suspension.
    d. Approximate yarding corridor locations and profiles will be provided to the WADNR where full suspension above the canopy of the MWMU is not possible.
    e. As mitigation, trees cut within the MWMU must be left on the ground. To the extent possible, these shall be felled side hill within the MWMU so that they may stop small debris slides and limit delivery of surface erosion.
2) Road Right-of-Ways
    a. Harvest and removal of trees within the MWMU are allowed for road construction spatially coincident with orphaned roads; road construction where an orphaned grade does not exist is not allowed within MWMU #4 except for bridge crossings of the mainstem. Where a cutslope occurs, harvest may extend to the estimated top of the cutslope as delineated by slope staking (see below), and may extend one more tree width where individual trees are deemed to be danger trees by the road builder. Harvest may extend 30-feet horizontal from the center line downhill to allow the road builder room to safely maneuver and to remove existing fill where it exists. Harvest may extend 30-feet horizontal from the center line across a terrace surface (i.e., away from MWMU #4) to allow the road builder room to safely maneuver.
    b. Right-of-way trees may not be decked within the MWMU between October 15th and March 15th. If decked before October 15th, they must be moved or hauled away before October 15th. If road construction spatially coincident with an existing road prism is occurring between October 15th and March 15th, the logs must be placed outside of the MWMU as road construction occurs.

Road Prescriptions, to be followed if delivery to public resources is possible or a threat to public safety exists:

1) New road construction is not permitted within MWMU #4 except for the purposes of placing a new bridge across the mainstem river. If a new bridge is planned over the North Fork Calawah River where MWMU #4 exists, this activity will require SEPA review.

2) Construction spatially coincident with existing road prisms, including orphaned roads, is permitted subject to all the following prescriptions.

3) The upper extent of the cutslope is to be slope staked within MWMU #4.

4) No waste areas or landings are to be placed within MWMU #4.

5) Sidecast:
   a. No sidecast may be placed within MWMU #4. When blasting has the potential to sidecast irretrievable material into MWMU #4, then smaller and more controlled blasting efforts, with the use of blast mats, is required. The no sidecast requirement does not preclude the construction of stream-crossing fills, described below.
   b. An FPA to construct road that crosses one or more MWMU must include a table that catalogs the road into discrete segments by road station. Each segment must have a landform designation such as planar or convex. If the segment is the crossing of a MWMU, the MWMU is the landform designation. The table must also include, for each segment, a gradient or gradient range, and a specific designation about sidecast.
   c. An FPA to construct a road that is spatial coincident with an existing road prism must include a map of the road location that displays MWMU #4 within 200 feet of the road right-of-way.

6) As mitigation, during construction spatially coincident with existing road prisms including orphaned roads, sidecast pullback must be done within MWMU #4 wherever there is remaining sidecast. In some locations, there may be no remaining sidecast because of previous failures.

7) Cross-drain culverts:
   a. Wherever possible, cross-drain culverts should be placed on convex or planar surfaces outside of MWMU #4. No cross-drain outlets may be placed within MWMU #4 except in the following two situations and where these situations exist, the ditch length to these cross-drains must be minimized by another cross-drain:
      i. The road lies within MWMU #4 or a combination of MWMU #4 and another MWMU for a total, unbroken distance exceeding 200 feet; or
      ii. Construction spatially coincident with an orphaned road has a low point within the MWMU.
      iii. Where a cross-drain culvert must be placed within MWMU #4, this shall be noted on the table and map as described about in 3) b and c.
   b. Cross-drain culverts shall be spaced so that the length of ditch draining to each is less than 300 feet.
   c. Wherever a cross-drain culvert outlet is placed on a hillslope exceeding 40%, either a downspout (see below for definition) or a keyed energy dissipater (see below for definition) is required.

8) Stream-crossing culverts:
   a. Tributary stream crossings within or on the top edge of MWMU #4 shall be constructed following the MWMU #1 prescriptions.

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).

Inherent in the avoidance of harvest within this MWMU, except for the allowable exceptions, is the intent that other activities such as broadcast burning and aerial spraying are not conducted within the MWMU. Basic road maintenance including road-side herbicide application, where normally permitted by current forest practices rules and other applicable laws, and mechanical brushing are allowed.

It is the intent of the yarding corridor requirements for full suspension and 150-feet-spacing that: 1) A careful analysis of yarding is conducted by the landowner so these restrictions can be met; 2) The careful analysis can be provided to the WADNR if they ask for additional information; and 3) The FPA be submitted as a Class IV-S with a SEPA checklist and a geotechnical report where these restrictions cannot be met. It is also the intent of the yarding corridor requirements that, to the extent practicable, the corridors be perpendicular to the MWMU #4 feature.

It is the intent of this prescription that danger trees, as defined by Labor & Industries WAC, within MWMU #4 be felled within the MWMU and left on the ground.

It is the intent of this prescription that construction of an entirely new road prism within MWMU #4 is only permissible for a bridge approach over the mainstem North Fork Calawah River; it is the harvest prescriptions above that specify this. The construction of existing road prisms within MWMU #4 is preferable to the construction of entirely new road prisms that cross other MWMU.

It is the intent of the use of the word "downspout" that a full-round pipe be used to carry ditch water away from the outlet of a cross-drain culvert. As most cross-drain culverts are double-walled plastic pipes, the downspouts will most often be single-walled "flex" pipes. This specifically means that half-round drainage structures, formally called "flumes," are not to be used.

It is the intent of the use of the phrase "keyed energy dissipator" that the object (large rock or stump) or collection of objects (pile of smaller rocks) be keyed into the hillslope by excavating a small platform onto which the energy dissipator can be placed and remain secure.