



United States Department of Agriculture
Forest Service

***National Forest System Roads, Maintenance
and Reconstruction with Vegetation
Management Projects on the Mt. Hood
National Forest***

Prepared by:
Josh Marxen
Forest Transportation Planner
02/20/2020

for:
Mt. Hood National Forest

Introduction

Road management and reconstruction is a necessity for any road network as it is managed over time. In the Forest Service, law, policy and Forest Service Handbook direction guides or requires the type and quantity of maintenance or reconstruction necessary on any National Forest System Road (NFSR). Given the existing transportation funding, vegetation management projects are an opportune time to accomplish activities that are in line with law, policy and Handbook direction which moves the road network toward the desired future condition. This paper will define the road classification system as well as the difference between road maintenance and reconstruction. Additionally, it will describe how road maintenance and reconstruction needs and changes are determined on the Mt. Hood National Forest as well as how existing transportation funding plays a role.

Defining the Road Classification System

System roads within the Forest range from Maintenance Level 5 (commonly paved or continuously dust controlled for travel at speeds of nominally 35 mph) to Maintenance Level 1 (storage roads closed to all vehicular traffic and not maintained for use), and include asphalt paved roads, aggregate (gravel) surfaced roads, improved (stabilized or pit-run aggregate) roads, and native surface roads. Maintenance Levels (ML) are defined as follows:

Road Maintenance Level 5 – Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage", except that, unless otherwise specifically authorized, non-street-legal Off-Highway Vehicle (OHV) use is prohibited.

Road Maintenance Level 4 – Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage" passenger cars. However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times; unless otherwise specifically authorized, non-street-legal OHV use is prohibited.

Road Maintenance Level 3 – Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept" passenger cars. "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users; unless otherwise specifically authorized, non-street-legal OHV use is prohibited.

Road Maintenance Level 2 – Assigned to roads used by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1)

discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles. Some may be closed with gates seasonally or year round to allow administrative use only.

Road Maintenance Level 1 – Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period should exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate". Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be available and suitable for non-motorized uses.

Road Reconstruction Activities

Road Reconstruction activities occur on existing system roads and generally fall within three categories:

- 1) Heavy Maintenance. This involves work that is similar to road maintenance activities but exceeds the work defined in the standard road maintenance specifications. This work is more intensive and causes somewhat greater disturbance than road maintenance work, though still contained within the existing road prism. Examples include roadbed reconditioning, ditch reconditioning, roadside clearing & grubbing, culvert replacement, and road resurfacing (aggregate, bituminous material, or a combination).
- 2) Road Repairs. Consists of heavy equipment construction needed to repair or bypass existing roadway failures or failure of existing road features. This work may require detailed engineering design and oversight and can involve excavating, moving, or disposing of large quantities of earth. Examples include full-depth asphalt patches, asphalt pulverization, installing new drainage culverts, underdrain installations, sinkhole repairs, slide removal, deep patch repairs with geotextile, slope stabilization, and road realignments. This work seeks to remain within the existing road prism but construction limits may extend outside the existing road prism as-needed to complete the work.
- 3) Constructive Improvements. This work constructs improvements to an existing system road to meet design objectives for safety or resource protection. It would involve detailed engineering design and oversight and can involve excavating, moving, or disposing of large quantities of earth and construction materials. This work may redefine the existing road prism. Examples include road re-alignment, construction of Aquatic/Terrestrial Organism Passages (including bridges), hardened low-water fords, earth retaining structures, roadside guardrails, rock-fall arresters, road paving, and road daylighting.

With vegetation management projects the majority of roads used for haul would receive some type of reconstruction work that is considered beyond the definition of maintenance. Collector

and primary haul routes would likely receive more road repairs and constructive improvement work than some others to accommodate heavy use.

Road Maintenance Activities

Road maintenance would occur on all roads used for haul of commercial materials (log and rock haul). These road maintenance activities create limited disturbances contained within existing road prisms and is conducted prior to and during operations to ensure minimum safety standards and effective roadway drainage. Regular road maintenance activities would occur on roads designated for haul as needed:

1. **Brushing** – Cutting of vegetation which encroaches along roadsides to provide visibility to meet minimum sight distances for stopping and maneuvering by vehicle operators. This work includes cutting of vegetation in drainage ditches to a maximum height of 6 inches.
2. **Blading** – Grading of road surfaces to remove irregularities and provide road cross-slopes to ensure sheeting of water from the road travel way. This work, while conducted with the objective of improving or maintaining road drainage, also removes surface wash-boarding and minor potholes thereby maintaining a vehicle's contact with the road surface and improving an operator's ability to maintain positive control of a vehicle while driving.
3. **Surfacing** – Also known as 'Spot-Rocking', this involves placement of crushed aggregate or pit-run material over the surface of the road. Placement of processed rock on road surfaces serves to distribute applied loads over a wider area as the load is transferred to the road subgrade. This helps to prevent rutting of the roadway which channelizes water in the road and causes erosion or saturates the road subgrade and compromises the structural integrity of the road. Saturation of road subgrade is the primary cause of catastrophic road failure. Surfacing may also be used for safety on steep grade roads to provide an improved running surface whereby a heavy haul vehicle can better maintain contact with the road surface for improved braking and maneuvering.
4. **Ditch Cleaning** – Removal of soils that have collected in ditch lines over time due to deposit of sands & silts from the road surface or sloughing of cut-slope soils, rock, and organics. Cleaning of ditches is needed to facilitate proper flow of water away from roads to avoid subgrade saturation. Cleaning of ditches results in the removal of existing vegetation from ditch lines over the short term and should be used in conjunction with temporary erosion control and revegetation measures. Typically, material removed from ditches is not suitable for incorporation into road surfaces and must be hauled away and disposed of at approved disposal sites on the Forest or removed from the Forest entirely (end-haul).
5. **Culvert Cleaning** – In many cases, culverts that facilitate conveyance of water away from roadways become blocked by soils and vegetative debris and need to be cleaned out in order to ensure proper flow of water, both at ditch drainage crossings and at road-stream crossings. Cleaning of culverts may produce temporary minor disturbance of soils at culvert inlets and outlets. Erosion control measures may be used to prevent downstream sedimentation as-needed and the need for erosion control measures

would be evaluated on a case-by-case basis using Clean Water Best Management Practices and the Project Design Criteria.

6. Roadway Drainage Maintenance – Also referred to as Storm proofing or Storm Damage Risk Reduction (SDRR), involves reshaping of existing or installation of new drainage dips and/or water-bars in the roadway. These drainage features, as opposed to culverts, are features that are constructed into the roadbed itself and are comprised of the existing road's rock and earthen material reshaped to redirect water away from the road surface and into ditches or onto road fill slopes. This practice is commonly used on roads that are closed to public traffic, but may also be utilized on steep graded roads and roads that receive little road maintenance. These features, if existing, would be smoothed out prior to heavy haul during the dry season. Replacement of these features or construction of new features would be accomplished on roads prior to the wet season and at the completion of operations.
7. Treatment of Danger Trees – Where roads that are expected to receive higher than normal volumes of traffic during the life of the project are endangered by the potential imminent failure of standing trees, such 'Danger Trees' would be felled to provide for the safety of the public and workers engaged in operations under the action alternatives.

The full text of the standard Timber Sale Road Maintenance Specifications along with their associated Intent and Use Guide can be found online at: [Forest Service Pacific Northwest Region Transportation Systems Operations and Maintenance](http://www.fs.fed.us/database/acad/om/tsmaintenance_specs.htm).¹

Determination of Road Maintenance and Reconstruction Needs

Reconstruction and maintenance for timber sales and stewardship contracts are limited to the proportionate share of the total traffic on a road per U.S. Forest Service policy known as the Commensurate Share Policy (referenced in Forest Service Handbook 7709.59). The Commensurate Share Policy is used to determine maintenance and reconstruction responsibilities for any project that has commercial haul. Under this policy all competing users would be assessed their commensurate share of responsibility for maintenance and reconstruction. The commensurate share of responsibility for any given commercial haul is determined by examining typical structural degradation of roads under heavy haul (AASHTO, 1993) (USDA, 1996).

Determination of road reconstruction needed to safely conduct operations associated with the proposed treatments was made utilizing the standards and guidelines set forth in the following documents with authority under 36 CFR Parts 212, 251, 261, and 295:

- Roads Analysis: Mt. Hood National Forest, 2003
- Forest Service Manual (FSM) 7700 – Travel Management
- FSM 7710 – Travel Planning
- FSM 7730 – Transportation System Road Operation and Maintenance
- Highway Safety Act of 1966 (P.L. 89-564) in compliance with applicable Highway

¹ http://www.fs.fed.us/database/acad/om/tsmaintenance_specs.htm

National Forest System Roads, Maintenance and Reconstruction with Vegetation Management projects on the Mt. Hood National Forest

- Safety Program Guidelines, as specified in the Memorandum of Understanding found in FSM 1535.11
- Forest Service Handbook (FSH) 7709.55 – Travel Analysis Handbook
- FSH 7709.56 – Road Preconstruction Handbook
- FSH 7709.58 – Transportation System Maintenance Handbook
- FSH 7709.59 – Transportation System Operations Handbook

Determination of Needed Changes to the National Forest Road System

In 2015, the Mt. Hood National Forest completed a transportation system analysis at the Forest scale, titled 2015 Travel Analysis Report (TAR) (USDA, 2015), which sought to outline a sustainable Forest Transportation System for the future. The TAR is the culmination of a series of travel management analyses dating back two decades, including the 1999 Access and Travel Management analysis (ATM), the Roads Analysis: (USDA, 2003) and The Legacy Roads Strategy of 2010. The TAR analysis categorized all system roads on the Forest as either “Likely Needed” or “Likely Not Needed” as part of the desired future transportation system. While not a decision document, the TAR set the stage for project-level decisions about whether to retain roads and maintain for public access use, close roads to public access but maintain for administrative use, place roads into storage for later use, or to decommission roads. A project-level analysis would take the general information from the TAR and looks at the local roads with proposals that may differ from what was listed in the TAR based on more detailed and site-specific information. The [TAR document](#)² is incorporated by reference into this report.

Existing Transportation Funding

Across the Forest the historic needs for and uses of the system have shifted as timber harvest on national forests has declined and other uses, such as recreation, have grown. Steady decline of funding to maintain the system accompanied by the reductions in timber harvest funding for road maintenance have resulted in funding lower than the level needed to properly maintain the open roads on the Forest. In the project area, the value of timber removed is the primary funding mechanism to accomplish work, since timber operators are required to maintain and repair system roads. Recent trends show that appropriated funds that are distributed to the Mt. Hood National Forest provide only enough to maintain or make repairs to about 15 percent of the road system annually. In April of 1981 the “Reduced Road Reconstruction Policy” was implemented on the Mt. Hood National Forest with the stated objective of reducing the total cost of developing, maintaining, and operating the transportation system. The policy statement from FSM 7730 - Transportation System Road Operation and Maintenance:

7730.3 (b) Existing Road Reconstruction

(1) Existing roads not meeting Forest Service Manual (FSM) requirements now or for future critical elements may be operated without reconstruction when the Forest Engineer determines the inadequacies can be mitigated (made less severe) by (a) user scheduling (sale or public), (b) maintenance, and (c) adequate traffic devices that identify the hazards.

² <http://www.fs.usda.gov/main/mthood/landmanagement/planning>

And in turn, the 2003 Roads Analysis identified, for approximately half of the road system existing at that time, the need to change maintenance levels to lower standards, to store roads in a maintenance level-one category, or to decommission roads.

In consideration of this policy, past transportation system analyses and decisions, detrimental environmental effects of unmaintained roads, and the need to reduce the operational transportation system to one that could be affordably maintained, the 2015 TAR strives to define a sustainable road system that balances the goals of providing for the access for public and administrative uses, provides options, continues to diminish unwanted environmental effects, as well as reduces the cost of our transportation network. The TAR defined the transportation system's Desired Future Condition as, "A minimum Forest transportation system that safely and efficiently serves current and anticipated management objectives and public uses; ... A balance of routine and deferred maintenance funding maintains this system, which meets public uses and resource protection objectives; ...(A system where) Available funding is primarily allocated to the ML 4-5 roads. Roads that are ML 2 and 3 primarily are maintained by project-associated funds commensurate with project use." The need to maintain the current operational transportation system while the primary funding sources decline, constrains and challenges how the priorities of annual maintenance funds are allocated to the transportation network. Consequently, roads with lower level maintenance designations have only been maintained sporadically as commercial timber operations occur.

Road Closure Method for status changes

Site-specific treatments would be tailored to site-specific conditions using one or more of the following treatments:

1. Road Closure with a Gate (remains a system road).
2. Road Closure with a Berm and storm proofing (remains a system road). Storm proofing usually involves water-bars or other structures to provide drainage & hydrologic stability and reduce erosion. Culverts would be retained unless specified. Where appropriate, the depth of fill material over culverts may be reduced.
3. Road Closure with Entrance Management (remains a system road) - installing one or more earth berms or trenches and decompacting approximately the first 1/8 mile of road. Culverts would be retained unless specified.
4. Active Decommissioning - removing culverts, reestablishing former drainage patterns or natural contours at stream channels, installing water bars, removing gravel surfacing, decompacting road surfaces, pulling back unstable fill slopes or road shoulders, scattering slash on the roadbed, applying erosion control mulch and seed on disturbed areas, and blocking and disguising the former road entrance to prevent motorized vehicle traffic.
5. Passive Decommissioning - removes a road from the transportation system but involves no physical treatments on the ground because the road is overgrown in a naturally recovering state.

References

AASHTO. (1993). *Guide for Design of Pavement Structures, American Association of State and Highway Transportation Officials*. Washington, D.C.: AASHTO.

USDA. (1996). *Earth and Aggregate Surfacing Design Guide for Low Volume Roads*. Washington, D.C.: U.S. Department of Agriculture.

USDA. (2003). *Roads Analysis, Mt. Hood National Forest*.

USDA. (2015). *Travel Analysis Report, Mt. Hood National Forest*. Sandy, OR: USDA Forest Service.