

Appendix I – Best Management Practices

Introduction

A Best Management Practice or BMP is a practice, or combination of practices that have been determined to be the most effective and practicable in preventing or reducing the amount of pollution generated by diffuse sources to a level compatible with water quality goals (40 CFR 130.2 [m]).

The BMPs described in this appendix are methods, measures, or practices selected based on site-specific conditions to ensure that water quality would be maintained at its highest practicable level to meet water quality standards and TMDL load allocations as set by the State of Oregon, Department of Environmental Quality. These site-specific BMPs are a compilation of commonly employed practices developed through professional experience or research, and designed to minimize water quality degradation and loss of soil productivity. The BMPs include, but are not limited to, avoidance, structural and nonstructural treatments, operations, and maintenance procedures. Although normally preventative, BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation). The implementation of these BMPs would be the beginning of an iterative process that includes the monitoring and modification of BMPs, where needed, to achieve water quality goals. This cyclic process would be the primary mechanism to achieve Oregon's water quality standards.

The BLM is responsible for implementing BMPs on the lands it administers.¹³⁵ The BMPs provide compliance with the Clean Water Act of 1972, as amended, State of Oregon water quality legislation (chapter 340), and the O&C Act. For proposed management actions, BMPs would be designed and implemented in a manner that is consistent with the DEQ Memorandum of Understanding (2011), and with the Clean Water Act. The BLM believes the BMPs are at least as protective as the rules adopted under the Oregon Forest Practices Act, covering similar operations on state and private forestlands.

The Resource Management Plan allocations and Management Objectives, especially relating to the Riparian Reserve, are broad scale BMPs. For vegetation treatments using herbicides on BLM-administered lands in the decision area, BMPs are included in *Vegetation Treatments Using Herbicides on BLM Lands in Oregon Record of Decision, October 2010* as mitigation measures and standard operating practices, incorporated by reference. Briefly, mitigation and standard operating procedures in *Attachment A; General, Soil, Water Resources, Wetlands and Riparian Areas, Fish and Other Aquatic Organisms, Recreation* and other beneficial uses and values (pp. 33-45), and additional mitigation (pp. 13-15) are considered BMPs for herbicide treatments. For other management activities, including minerals exploration and development, linear transmission projects and most hazardous materials, the mechanism to achieve Oregon State Water Quality Standards would be guided by existing Management Direction, other regulations or separate Environmental Analysis and not necessarily be covered by the BMPs contained in this RMP. For example, management of locatable minerals is non-discretionary and governed by regulations found in 43 CFR 3809. The BMPs for locatable minerals include language from 43 CFR 3809 that requires operators to prevent unnecessary and undue degradation from mining operations.

¹³⁵ The DEQ has granted Designated Management Agency status to the BLM through the Memorandum of Understanding.

The following lists of site-specific BMPs are more detailed than, and in addition to, the Management Objectives contained in the RMP. The BMPs are not intended to be all-inclusive nor replace site-specific project planning, which may require the use of different or additional BMP practices.

Purpose

Best management practices (BMPs) are required by the federal Clean Water Act (1972), as amended to reduce nonpoint source pollution to the maximum extent practicable. Nonpoint source pollution is defined as pollutants detected in water bodies such as streams, or lakes that come from the landscape in a dispersed manner, often related to a wide range of forest and rangeland ground disturbing activities. The BMPs are the primary controls for achieving Oregon's water quality standards pertaining to nonpoint source pollution. Oregon's narrative and numeric criteria within water quality standards, are designed to protect designated beneficial uses (such as salmonid spawning and rearing, resident fish and aquatic life, domestic water supplies, and water-contact recreation).

BLM's and DEQ's strategy for managing and controlling nonpoint source water pollution from BLM-managed lands in the State of Oregon is through a Memorandum of Understanding (2011) between the State of Oregon, Department of Environmental Quality (DEQ) and the United States Department of the Interior, Bureau of Land Management, (BLM). This MOU defines the process by which the BLM and DEQ will cooperatively meet State and Federal water quality rules and regulations. The physical, chemical, and biological conditions of "waters of the State" that support beneficial uses (defined in Oregon Revised Statute (ORS), Chapter 468B Water Quality, and Oregon Administrative Rules (OAR), Division 41) would be protected, restored, and maintained by working in a proactive, collaborative, and adaptive manner. The MOU specifies that the BLM would implement site-specific BMPs as specified in Management Objectives, standards, guidelines, design features, and mitigation developed in Resource Management Plans (RMP), RMP amendments, project level plans, and Water Quality Restoration Plans (WQRP) to meet applicable water quality standards. Monitoring is required, under the MOU, to ensure that practices are properly designed and applied, to determine the effectiveness of practices in meeting water quality standards, and adjustment of BMPs when it is found that water quality standards are not being protected.

Organization, Selection, and Application of BMPs

The tables that follow this introduction are organized by core activities on BLM-administered lands in the Decision Area. For each core activity, the sequential number, and Best Management Practice is listed first in the left columns, the source, or reference in the center column, and the applicable DEQ narrative or numeric water quality standards in the right column. The right column identifies the DEQ Oregon Administrative Rules (OAR) number(s), and provides OAR references within the roads and landings section, to compare these BMPs to similar Oregon Department of Forestry OARs.

Core activities with BMPs include:

- Road and landing maintenance and construction
- Timber harvest activities
- Silvicultural activities
- Fire and fuels management
- Surface source water for drinking water
- Recreation management
- Range management

- Minerals (salable) development
- Spill prevention and abatement
- Restoration activities
- Dry forest-specific BMPs

Those BMPs that are necessary for typical situations have been included. When applied, the BLM would expect BMPs to prevent water quality degradation and to meet water quality standards and TMDL load allocations.

Selection of BMPs are made by decision-makers using input from soil, water, fisheries, geology and other professionals during project-level analyses. It is not intended that all of the BMPs listed will be selected for any specific management action. Each activity is unique, based on site-specific conditions and the selection of an individual BMP or a combination of BMPs and measures that becomes the BMP design. Resource aspects of land management activities normally have many facets that require site-specific BMP design. Therefore, there may be some repetition of the BMPs between sections of the following tables. An activity may use an individual BMP, whereas another activity may involve BMPs in combination from several core management activities for water quality protection.

BMPs that relate to instream activities may coincidentally be similar to applicable practices specified in Army Corps of Engineers, Department of State Lands, and ODFW joint removal/fill permits, DEQ water quality permits and 401 certifications, or project design criteria contained in biological assessments. The BMPs in the following tables are not specific permit requirements, but rather demonstrate the process by which nonpoint source pollution from instream activities would be controlled.

The BMPs are practices, techniques, or management strategies that have been evaluated through common practice or studies, and are shown to be an effective and practical means of preventing or reducing nonpoint source pollution. The BMPs are not intended to serve as detailed engineering specifications or design criteria. Such specifications are available for field use from various sources.

The BMPs would be applied in a manner that is consistent with all Resource Management Plan objectives. The overall goal is not to adhere strictly to a particular BMP(s), but to meet water quality objectives when implementing management actions. Although this appendix does not provide an exhaustive list of BMPs, the included BMPs, when applied correctly for varying ground-disturbing activities, would maintain water quality for the range of project activities in the Decision Area. Additional nonpoint source control measures would be identified during the interdisciplinary process when evaluating site-specific management actions.

Monitoring and Adjustment

BMPs are selected and applied, based upon site-specific conditions, technical feasibility, resource availability and the water quality of those water bodies potentially impacted. Specialists may consider baseline environmental conditions, type of activity, proximity to water, disturbance level, direct, indirect, and cumulative effects and timing. They may also evaluate new technology and relevant implementation or effectiveness monitoring data, and published studies or other sources of information, in refining existing BMPs or recommending new BMPs. Post-project implementation monitoring of selected BMPs demonstrate that BMPs are carried forward from the project level plans, and properly designed and applied. Effectiveness monitoring demonstrates that selected BMPs meet water quality standards and criteria and assure protection of beneficial uses. Modification of BMPs would be initiated when it is

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found that water quality standards are not being protected. This process involves continued learning and applying monitoring feedback. Summarizing thousands of on-site evaluations show that BMPs protect surface waters and are implemented correctly at least 86% of the time and are effective in 85% to 99% of applications (Rogers 2007, USDA FS 2012).

Review and update of this appendix, including BMP corrections or additions that are within the core subject areas of existing BMPs, would be completed through plan maintenance.

Roads and Landings

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-1. Best management practices for roads and landings.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
General Construction			
R 1	Locate temporary and permanent roads and landings on stable locations, e.g., ridge tops, stable benches, or flats, and gentle-to-moderate side slopes. Minimize construction on steep slopes, slide areas, and high landslide hazard locations.	USDI BLM 2008, Appendix I-Water, R 1, p. 270. OAR 629-625-0200 (3)	OAR 629-625-0200–ODF, Road Location DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 2	Locate temporary and permanent road construction or improvement to minimize the number of stream crossings.	USDI BLM 2008, Appendix I-Water, R 2, p. 270. OAR 629-625-0200 (3-4)	OAR 629-625-0200–ODF, Road Location DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 3	Locate roads and landings away from wetlands, Riparian Reserves, floodplains and waters of the State, unless there is no practicable alternative. Avoid locating landings in areas that contribute runoff to channels.	USDI BLM 2008, Appendix I-Water, R 4, p. 270. OAR 629-625-0200 (2)	OAR 629-625-0200–ODF, Road Location DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 4	Locate roads and landings to reduce total transportation system mileage. Renovate or improve existing roads or landings when it would cause less adverse environmental impact. Where roads traverse land in another ownership, investigate options for using those roads before constructing new roads.	USDI BLM 2008, Appendix I-Water, R 2, p. 270. EPA 2005, pp. 3-12, Bullet 1 OAR 629-625-0200 (5) EPA 2005, pp. 3-10, Bullet 1	OAR 629-625-0200–ODF, Road Location DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 5	Design roads to the minimum width needed for the intended use as referenced in BLM Manual 9113.	USDI BLM 2008, Appendix I-Water, R 8, p. 271. OAR 629-625-0310 (3)	OAR 629-625-0310-ODF, Road Prism DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 6	Confine pioneer roads to the	USDI BLM 2008,	OAR 629-625-0410-ODF, Disposal of Waste

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	construction limits of the permanent roadway to reduce the amount of area disturbed and avoid deposition in wetlands, Riparian Reserves, floodplains and waters of the State. Install temporary drainage, erosion, and sediment control structures. Storm proof or close pioneer roads prior to the onset of the wet season.	Appendix I-Water, R 11, p. 271. EPA 2005, p. 3-41, Bullet 2	Materials DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 7	Design road cut and fill slopes with stable angles, to reduce erosion and prevent slope failure.	USDI BLM 2008, Appendix I-Water, R 3, p. 270. EPA 2005	OAR 629-625-0310-ODF, Road Prism DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 8	End-haul material excavated during construction, renovation, and/or maintenance where side slopes generally exceed 60 percent and any slope where side-cast material may enter wetlands, floodplains, and waters of the State.	USDI BLM 2008, Appendix I-Water, R 10, p. 271. EPA 2005, pp. 3-12, Bullet 5	OAR 629-625-0310-ODF, Road Prism DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 9	Construct road fills to prevent fill failure using inorganic material, compaction, buttressing, sub-surface drainage, rock facing, or other effective means.	USDI BLM 2008, Appendix I-Water, R 13, p. 271. OAR 629-625-0310-5	OAR 629-625-0310-ODF, Road Prism DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 10	Design and construct sub-surface drainage in landslide prone areas and saturated soils (e.g., trench drains using geo-textile fabrics and drain pipes).	USDI BLM 2008, Appendix I-Water, R 19, p. 272. DEQ 2005, RC-1, RC-6, pp.4-5, 4-6	OAR 629-625-0300-ODF, Road Design DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 11	Locate waste disposal areas outside wetlands, Riparian Reserves, floodplains and unstable areas to minimize risk of sediment delivery to waters of the State. Apply surface erosion control prior to the wet season. Prevent overloading areas, which may become unstable.	USDI BLM 2008, Appendix I-Water, R 80, p. 281. OAR 629-625-0340	OAR 629-625-0340-ODF, Waste Disposal Areas DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 12	Use controlled blasting techniques to minimize loss of material on steep slopes or into wetlands, Riparian Reserves, floodplains, and waters of the State.	USDI BLM 2008, Appendix I-Water, R 12, p. 271.	OAR 629-625-0410-ODF, Disposal of Waste Materials DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 13	Use temporary sediment control measures (e.g., check dams, silt fencing, bark bags, filter strips and mulch) to slow runoff and contain	USDI BLM 2008, Appendix I-Water, R 14, p. 271.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1)

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	sediment from road construction areas. Remove any accumulated sediment and the control measures when work or haul is complete. When long-term structural sediment control measures are incorporated into the final erosion control plan, remove any accumulated sediment to retain capacity of the control measure.	DEQ 2005, RC-11	Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 14	Avoid use of road fills for water impoundment dams unless specifically designed for that purpose. Impoundments over 9.2-acre feet or 10 feet in depth will require a dam safety assessment by a registered engineer. Upgrade existing road fill impoundments to pass 100-year flood events.	OAR 629-625-0310-5	OAR 629-625-0310-ODF, Road Prism DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Permanent Stream Crossings			
R 15	Design culverts, bridges, and other stream crossings for the 100-year flood event including allowance for bed load and anticipated floatable debris.	USDI BLM 2008, Appendix I-Water, R 45, p. 276.	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 16	Minimize fill volumes at permanent and temporary stream crossings by restricting width and height of fill to amounts needed for safe travel and adequate cover for culverts. For deep fills (generally greater than 15 feet deep,) incorporate additional design criteria (e.g., rock blankets, buttressing, bioengineering techniques) to reduce the susceptibility of fill failures.	USDI BLM 2008, Appendix I-Water, R 47, p. 276. OAR 629-625 -0320 (1b)	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 17	Locate stream-crossing culverts on well-defined, unobstructed, and straight reaches of stream. Locate these crossings as close to perpendicular to the streamflow as stream allows. When structure cannot be aligned perpendicular, provide inlet and outlet structures that protect fill, and minimize bank erosion. Choose crossings that have well defined stream channels with erosion resistant bed and banks.	USDI BLM 2008, Appendix I-Water, R 48, p. 276. EPA 2005, pp. 3-14 Gesford and Anderson 2006, pp. 5-30	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 18	On new construction, install culverts at the natural stream grade, unless a lessor gradient is required for fish passage.	USDI BLM 2008, Appendix I-Water, R 49, p. 276.	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036

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R 19	Use stream crossing protection techniques to allow floodwater and debris to flow over the top of the road prism without the loss of the fill or diversion of streamflow. This protection could include hardening crossings, armoring fills, dipping grades, oversizing culverts, hardening inlets and outlets, and lowering the fill height.	USDI BLM 2008, Appendix I-Water, R 53, p. 277.	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 20	Design stream crossings to prevent diversion of water from streams into downgrade road ditches or down road surfaces.	USDI BLM 2008, Appendix I-Water, R 31, p. 274. OAR 629-625 -0330 (3)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 21	Place instream grade control structures above or below the crossing structure, if necessary, to prevent stream headcutting, culvert undermining and downstream sedimentation. Employ bioengineering measures to protect the stability of the streambed and banks.	DEQ 2005 , RC - 2 Gesford and Anderson 2006, pp 5-31. USDA FS 2002 Chapter 20	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 22	Prevent culvert plugging and failure in areas of active debris movement with measures such as beveled culvert inlets, flared inlets, wingwalls, over-sized culverts, trash racks, or slotted risers.	USDI BLM 2008, Appendix I-Water, R 59, p. 278.	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 23	Utilize stream diversion and isolation techniques when installing stream crossings. Evaluate the physical characteristics of the site, volume of water flowing through the project area and the risk of erosion and sedimentation when selecting the proper techniques.	USDI BLM 2008, Appendix I-Water, R 50, R 51, p. 277.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 24	Limit activities and access points of mechanized equipment to streambank areas or temporary platforms when installing or removing structures. Keep equipment activity in the stream channel to an absolute minimum.	USDI BLM 2008, Appendix I-Water, R 52, p. 277. OAR 629-625-0430 (2)	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 25	Install stream crossing structures before heavy equipment moves beyond the crossing area.	USDI BLM 2008, Appendix I-Water, R 60, p. 278.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011

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			Turbidity OAR 340-041-0036
R 26	Disconnect the road runoff to the stream channel by outsloping the road approach. If outsloping is not possible, use runoff control, erosion control and sediment containment measures. These may include using additional cross drain culverts, ditch lining, and catchment basins. Prevent or reduce ditch flow conveyance to the stream through cross drain placement above the stream crossing.	USDI BLM 2008, Appendix I-Water, R 26, p. 273, R 33 p. 274. Gesford and Anderson 2006, pp. 5-22. OAR 629-625-0330 (4)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Temporary Stream Crossings for Roads and Skid Trails			
R 27	When installing temporary culverts, use washed rock as a backfill material. Use geotextile fabric as necessary where washed rock will spread with traffic and cannot be practicably retrieved.	USDI BLM 2008, Appendix I-Water, R 63, p. 279. DEQ 2005, NS-3	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 28	Use no-fill structures (e.g., portable mats, temporary bridges, or improved hardened crossings) for temporary stream crossings. When not practicable, design temporary stream crossings with the least amount of fill and construct with coarse material to facilitate removal upon completion.	OAR 629-625-0320 (2)	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 29	Remove temporary crossing structures promptly after use. Follow practices under the Closure/Decommissioning section for removing stream crossing drainage structures and reestablishing the natural drainage.	USDI BLM 2008, Appendix I-Water, R 65, p. 279. OAR 629-625-0430 (5)	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Surface Drainage			
R 30	Effectively drain the road surface by using crowning, insloping or outsloping, grade reversals (rolling dips) and waterbars or a combination of these methods. Avoid concentrated discharge onto fill slopes unless the fill slopes are stable and erosion proofed.	USDI BLM 2008, Appendix I-Water, R 22, p. 272. EPA 2005, p. 3-41	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 31	Outslope temporary and permanent low volume roads to provide surface drainage on road gradients up to 6% unless there is a traffic hazard from the road shape.	USDI BLM 2008, Appendix I-Water, R 23, R 24, p. 273. EPA 2005, p. 3-42 USDA FS 2002 Chapter 13	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 32	Consider using broadbased drainage dips and/or lead-off ditches in lieu of cross drains for low volume roads. Locate these surface water drainage	USDI BLM 2008, Appendix I-Water, R 25, R 26, p. 273.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1)

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	measures where they will not drain into wetlands, floodplains, and waters of the State.	EPA 2005, pp. 3-41-45 USDA FS 2002 Chapter 13	Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 33	Avoid use of outside road berms unless designed to protect road fills from runoff. If road berms are used, breach to accommodate drainage where fill slopes are stable.	USDI BLM 2008, Appendix I-Water, R 27, p. 273. Gesford and Anderson 2006, pp. 3-7.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 34	Construct variable road grades and alignments (e.g., roll the grade, grade breaks) which limit water concentration, velocity, flow distance and associated stream power.	USDI BLM 2008, Appendix I-Water, R 28, p. 273. Gesford and Anderson 2006, pp. 5-20. OAR 629-625-0310 (1)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 35	Install underdrain structures when roads cross or expose springs, seeps, or wet areas rather than allowing intercepted water to flow downgradient in ditchlines.	USDI BLM 2008, Appendix I-Water, R 29, p. 273. OAR 629-625-0330 (5)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 36	Design roads crossing low-lying areas so that water does not pond on the upslope side of the road. Provide cross drains at short intervals to ensure free drainage.	USDI BLM 2008, Appendix I-Water, R 19, p. 272. EPA 2005, p. 3-14, Bullet 1	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 37	Divert road and landing runoff water away from headwalls, slide areas, high landslide hazard locations, or steep erodible fill slopes.	USDI BLM 2008, Appendix I-Water, R 29, p. 273. OAR 629-625-0330 (2)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 38	Design landings to disperse surface water to vegetated stable areas.	USDI BLM 2008, Appendix I-Water, R 30, p. 274.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Cross Drains			
R 39	Locate cross drains to prevent or minimize runoff and sediment conveyance to wetlands, Riparian Reserves, floodplains, and waters of the State. Implement sediment reduction techniques such as settling basins, brush filters, sediment fences, and check dams to prevent or minimize sediment conveyance.	USDI BLM 2008, Appendix I-Water, R 33, p. 274. OAR 629-625 -0330 (4)	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036

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R 40	Space cross drain culverts at intervals sufficient to prevent water volume concentration and accelerated ditch erosion. At a minimum, space cross drains at intervals referred to in the BLM Road Design Handbook 9113-1, Illustration 11 - "Spacing for Drainage Lateral." Increase cross drain frequency through erodible soils, steep grades, and unstable areas.	USDI BLM 2008, Appendix I-Water, R 34, p. 274.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 41	Choose cross drain culvert diameter and type according to predicted ditch flow, debris and bedload passage expected from the ditch. Minimum diameter is 18 inches.	USDI BLM 2008, Appendix I-Water, R 35, p. 274. Johansen <i>et al.</i> 1997, p. 3.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 42	Locate surface water drainage measures (e.g., cross drain culverts, rolling dips, water bars) where water flow will be released on convex slopes or other stable and non-erosive areas that will absorb road drainage and prevent sediment flows from reaching wetlands, floodplains and waters of the State. Where possible locate surface water drainage structures above road segments with steeper downhill grade.	USDI BLM 2008, Appendix I-Water, R 26, p. 273. Johansen <i>et al.</i> 1997, p 3.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 43	Armor surface drainage structures (e.g., broad based dips, leadoff ditches) to maintain functionality in areas of erosive and low strength soils.	USDI BLM 2008, Appendix I-Water, R 38, p. 275.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 44	Discharge cross drain culverts at ground level on non-erodible material. Install downspout structures and/or energy dissipaters at cross drain outlets or drivable dips where water is discharged onto loose material, erodible soils, fills, or steep slopes.	USDI BLM 2008, Appendix I-Water, R 39, R 40, p. 275. DEQ 2005, RC-2 Gesford and Anderson 2006, pp. 5-31.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 45	Cut protruding "shotgun" culverts at the fill surface or existing ground. Install downspout and/or energy dissipaters to prevent erosion.	USDI BLM 2008, Appendix I-Water, R 41, p. 275.	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 46	Skew cross drain culverts 45 to 60 degrees from the ditchline as referenced in BLM Road Design Handbook 9113-1 and provide pipe gradient slightly greater than ditch gradient to reduce erosion at cross drain inlet.	BLM Road Design Handbook H9113-1 2009	OAR 629-625-0330-ODF, Drainage DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 47	Provide for unobstructed flow at culvert inlets and within ditch lines during and	OAR 629-625-0420	OAR 629-625-0330-ODF, Drainage

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	upon completion of road construction prior to the wet season.		DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Timing of In-Water Work			
R 48	Conduct all nonemergency in-water work during the ODFW instream work window.	USDI BLM 2008, Appendix I-Water, R 44, p.276, R 65, p. 279. Oregon guidelines for timing of in-water work to protect fish and wildlife resources. ODFW 2008 OAR 629-625-0430	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 49	Remove stream crossing culverts and entire in-channel fill material during ODFW instream work period.	USDI BLM 2008, Appendix I-Water, R 93, p. 283. Oregon guidelines for timing of in-water work to protect fish and wildlife resources. ODFW 2008	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Low-Water Ford Stream Crossings			
R 50	Harden low water ford approaches with durable materials. Provide cross drainage on approaches.	USDI BLM 2008, Appendix I-Water, R 67, p. 279. EPA 2005, pp.3-50.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 51	Restrict access to unimproved low water stream crossings.	USDI BLM 2008, Appendix I-Water, R 69, p. 280. OAR 629-625-0430 (5)	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 52	Use permanent low water fords in debris-flow susceptible streams (e.g., concrete, well-anchored concrete mats, etc.).	USDI BLM 2008, Appendix I-Water, R 70, p. 280. EPA 2005, pp. 3-50.	OAR 629-625-0320-ODF, Stream Crossing Structures DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Maintaining Water Quality - Noxious Weeds			
R 53	Locate equipment-washing sites in areas with no potential for runoff into wetlands, Riparian Reserves, floodplains, and waters of the State. Do not use solvents or detergents to clean equipment on site.	USDI BLM 2008, Appendix I-Water, R 75, p. 280. DEQ 2005 , NS-5	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7)

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			Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Water Source Development and Use			
R 54	Limit disturbance to vegetation and modification of streambanks when locating road approaches to in-stream water source developments. Surface these approaches with durable material. Employ erosion and runoff control measures.	USDI BLM 2008, Appendix I-Water, R 102, p. 285.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 55	Direct pass-through flow and/or overflow from in-channel and any connected off-channel water developments back into the stream.	USDI BLM 2008, Appendix I-Water, R 104, p. 285.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 056	Overflow from water harvesting ponds should be directed to a safe non-eroding dissipation area, and not into a stream channel.	USDI BLM 2008, Appendix I-Water, R 105, p. 285.	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 057	Limit the construction of temporary in-channel water drafting sites. Develop permanent water sources outside of stream channels and wetlands.	USDI BLM 2008, Appendix I-Water, R 106, p. 286. DEQ 2005, NS-1	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 058	Do not place pump intakes on the substrate or edges of the stream channel. When placing intakes instream, place on hard surfaces (e.g., shovel, rocks) to minimize turbidity. Use a temporary liner to create intake site. After completion of use, remove liner and restore channel to natural condition.	USDI BLM 2008, Appendix I-Water, R 107, p. 286. DEQ 2005, NS-1	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 059	Placement of road fill shall not be located in the proximity of a public water supply intake (404(f) exemption criteria xi), in waters of the State.	ACOE 404(f) exemption criteria xi	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Erosion Control Measures			
R 060	During roadside brushing, remove vegetation by cutting rather than uprooting.	OAR 629-625-0430 (4)	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7)

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			Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 061	Limit road and landing construction, reconstruction, or renovation activities to the dry season. Keep erosion control measures concurrent with ground disturbance to allow immediate stormproofing.	USDI BLM 2008, Appendix I-Water, R 9, p. 271.	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 062	Apply native seed and certified weed free mulch to cut and fill slopes, ditchlines, and waste disposal sites with the potential for sediment delivery to wetlands, Riparian Reserves, floodplains and waters of the State. Apply upon completion of construction and as early as possible to increase germination and growth. Reseed if necessary to accomplish erosion control. Select seed species that are fast growing, have adequate provide ample ground cover and soil-binding properties. Apply mulch that will stay in place and at site-specific rates to prevent erosion.	USDI BLM 2008, Appendix I-Water, R 17, p. 272.	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 063	Place sediment-trapping materials or structures such as straw bales, jute netting, or sediment basins at the base of newly constructed fill or side slopes where sediment could be transported to waters of the State. Keep materials away from culvert outlets.	USDI BLM 2008, Appendix I-Water, R 14, p. 271, R 21, p. 272. USDA FS 2002 Chapter 18	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 064	Use biotechnical stabilization and soil bioengineering techniques to control bank erosion (e.g., commercially produced matting and blankets, live plants or cuttings, dead plant material, rock or other inert structure).	USDI BLM 2008, Appendix I-Water, R 54, p. 277. USDA FS 2002, Chapters 18 and 20	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 065	Suspend ground-disturbing activity if projected forecasted rain will saturate soils to the extent that there is potential for movement of sediment from the road to wetlands, floodplains, and waters of the State. Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include but not limited to erosion control blankets and mats, soil binders, soil tackifiers, slash placement.	USDI BLM 2008, Appendix I-Water, R 57, p. 278, R 88, p. 282.	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 066	Apply fertilizer in a manner to prevent direct fertilizer entry to wetlands, Riparian Reserves, floodplains, and waters of the State.	OAR 629-625-0440 Aquatic Resources Biological Opinion NMFS-ARBO 2013.	OAR 629-625-0440-ODF, Stabilization DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1),

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			(7) Turbidity OAR 340-041-0036
Road Use and Dust Abatement			
R 067	Apply water or approved road surface stabilizers/dust control additives to reduce surfacing material loss and buildup of fine sediment that can enter into wetlands, floodplains and waters of the State. Prevent entry of road surface stabilizers/dust control additives into waters of the State during application.	USDI BLM 2008, Appendix I-Water, R 76, p. 281. DEQ 2005, EP-13	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Road Maintenance			
R 068	Prior to the wet season, provide effective road surface drainage maintenance. Clear ditch lines in sections where there is lowered capacity or obstructed by dry ravel, sediment wedges, small failures, or fluvial sediment deposition. Remove accumulated sediment and blockages at cross-drain inlets and outlets. Grade natural surface and aggregate roads where the surface is uneven from surface erosion or vehicle rutting. Restore crowning, outsloping or insloping for the road type for effective runoff. Remove or provide outlets through berms on the road shoulder.	USDI BLM 2008, Appendix I-Water, R 81, R 84, R 85, p. 281. OAR 629-625 0600 (2-4) EPA 2005, pp. 361-362.	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 069	Retain ground cover in ditch lines, except where sediment deposition or obstructions require maintenance.	USDI BLM 2008, Appendix I-Water, R 86, p. 282.	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 070	Maintain water flow conveyance, sediment filtering and ditchline integrity by limiting ditchline disturbance and groundcover destruction when machine cleaning within 200 feet of road stream crossings.		DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 071	Avoid undercutting of cut-slopes when cleaning ditch lines.	USDI BLM 2008, Appendix I-Water, R 78, p. 281. EPA 2005, p. 362	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 072	Remove and dispose of slide material when it is obstructing road surface and ditchline drainage. Place material on stable ground outside of wetlands, Riparian Reserves, floodplains, and waters of the State. Seed with native seed and weed-free mulch.	USDI BLM 2008, Appendix I-Water, R 79, p. 281. OAR 629-625-0600 (6)	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 073	Do not sidecast loose ditch or surface material where it can enter wetlands, Riparian Reserves, floodplains, and	USDI BLM 2008, Appendix I-Water, R 80, p. 281.	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution:

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	waters of the State.	OAR 629-625-0600 (7)	Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 074	Retain low-growing vegetation on cut-and-fill slopes.	USDI BLM 2008, Appendix I-Water, R 86, p. 282. EPA 2005, EP-6	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 075	Seed and mulch cleaned ditch lines and bare soils that drain directly to wetlands, floodplains, and waters of the State, with native species and weed-free mulch.		OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Road Stormproofing			
R 076	Inspect and maintain culvert inlets and outlets, drainage structures and ditches before and during the wet season to diminish the likelihood of plugged culverts and the possibility of washouts.	USDI BLM 2008, Appendix I-Water, R 81, R 82, p. 281. OAR 629-625 -0600 (3)	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 077	Repair damaged culvert inlets and downspouts to maintain drainage design capacity.	USDI BLM 2008, Appendix I-Water, R 82, p. 281. OAR 629-625 -0600 (3)	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 078	Blade and shape roads to conserve existing aggregate surface material retain or restore the original cross section, remove berms and other irregularities that impede effective runoff or cause erosion, and ensure that surface runoff is directed into vegetated, stable areas.	USDI BLM 2008, Appendix I-Water, R 84, p. 281. OAR 629-625 -0600 (4)	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 079	Stormproof open resource roads receiving infrequent maintenance to reduce road erosion and reduce the risk of washouts by concentrated water flows. Stormproof temporary roads if retained over-winter.	USDI BLM 2008, Appendix I-Water, R 87, p. 282. OAR 629-625-0600 (2)	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 080	Suspend stormproofing/decommissioning operations and cover or otherwise temporarily stabilize all exposed soil if conditions develop that cause a potential for sediment-laden runoff to enter a wetland, floodplain or waters of the State. Resume operations when conditions allow turbidity standards to be met.	USDI BLM 2008, Appendix I-Water, R 88, p. 282.	OAR 629-625-0600-ODF, Road Maintenance DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Road Closure and Decommissioning			
R 081	Inspect closed roads to ensure that	OAR 629-625 -0650 (2)	OAR 629-625-0650-ODF, Vacating Forest

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	vegetation stabilization measures are operating as planned, drainage structures are operational, and noxious weeds are not providing erosion control. Conduct vegetation treatments and drainage structure maintenance as needed.		Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 082	Fully decommission temporary roads upon completion of use unless there is a foreseeable need for reuse.	USDI BLM 2008, Appendix I-Water, R 90, p. 283.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 083	Prevent use of vehicular traffic utilizing methods such as gates, guard rails, earth/log barricades, to reduce or eliminate erosion and sedimentation due to traffic on roads.	USDI BLM 2008, Appendix I-Water, R 91, p. 283. OAR 629-625 -0650 (2)	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 084	Convert existing drainage structures such as ditches and cross drain culverts to a long-term maintenance free drainage configuration such as an outsloped road surface and waterbars.	USDI BLM 2008, Appendix I-Water, R 92, p. 283. OAR 629-625 -0650 (3)	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 085	Place and remove temporary stream crossings during the dry season, without overwintering, unless designed to accommodate the 100-year theoretical flood. See also R 049.	OAR 629-625-0430 (5)	OAR 629-625-0430-ODF, Stream Protection DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
R 086	Place excavated material from removed stream crossings on stable ground outside of wetlands, Riparian Reserves, floodplains, and waters of the State. In some cases, the material could be used for recontouring old road cuts or be spread across roadbed and treated to prevent erosion.	USDI BLM 2008, Appendix I-Water, R 94, p. 284.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 087	Reestablish stream crossings to the natural stream gradient. Excavate sideslopes back to the natural bank profile. Reestablish natural channel width and floodplain.	USDI BLM 2008, Appendix I-Water, R 95, p. 284.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 088	On each side of a stream crossing, construct waterbars or cross ditches that will remain maintenance free.	USDI BLM 2008, Appendix I-Water, R 96, p. 284.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution:

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		OAR 629-625 -0650 (3)	Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 089	Following culvert removal and prior to the wet season, apply erosion control and sediment trapping measures (e.g., seeding, mulching, straw bales, jute netting, and native vegetative cuttings) where sediment can be delivered into wetlands, Riparian Reserves, floodplains, and waters of the State.	USDI BLM 2008, Appendix I-Water, R 97, p. 284. OAR 629-625 -0650 (3)	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 090	Implement tillage measures, including ripping or subsoiling to an effective depth. Treat compacted areas including the roadbed, landings, construction areas, and spoils sites.	USDI BLM 2008, Appendix I-Water, R 98, p. 285.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 091	After tilling the road surface, pull back unstable road fill and end-haul or contour to the natural slopes.	USDI BLM 2008, Appendix I-Water, R 99, p. 285.	OAR 629-625-0650-ODF, Vacating Forest Roads DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Wet-Season Road Use			
R 092	On active haul roads, during the wet season, use durable rock surfacing and sufficient rock depth to resist rutting or development of sediment on road surfaces that drain directly to wetlands, floodplains, and waters of the State.	USDI BLM 2008, Appendix I-Water, R 71, p. 280. OAR 629-625-0700 (2)	OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 093	Prior to winter hauling activities, implement structural road treatments such as: increasing the frequency of cross drains, installing sediment barriers or catch basins, applying gravel lifts or asphalt road surfacing at stream crossing approaches, and armoring ditch lines.	USDI BLM 2008, Appendix I-Water, R 72, p. 280. OAR 629-625-0700 (2)	OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 094	Suspend commercial use where the road wear surface is deteriorating by vehicular rutting or standing water causing a mud layer, or where turbid runoff from the road is likely to reach waters of the State.	USDI BLM 2008, Appendix I-Water, R 73, p. 280. OAR 629-625-0700 (3)	OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 095	Remove snow on surfaced roads in a manner that will protect the road and adjacent resources. Retain a minimum layer (4 inches) of compacted snow on the road surface. Provide drainage through the snow bank at periodic	USDI BLM 2008, Appendix I-Water, R 74, p. 280. BLM snow removal letter.	OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1),

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	intervals to allow snowmelt to drain off the road surface.		(7) Turbidity OAR 340-041-0036
R 096	Avoid removing snow from unsurfaced roads where runoff drains to waters of the State.		DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 097	Maintain road surface by applying appropriate gradation of aggregate and suitable particle hardness to protect road surfaces from rutting and erosion under active haul where runoff drains to wetlands, Riparian Reserves, floodplains, and waters of the State.	USDI BLM 2008, Appendix I-Water, R 71, p. 280. OAR 629-625-0700 (2)	OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 098	To reduce sediment tracking from natural surface roads during active haul, provide a gravel approach before entrance onto surfaced roads.		OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
R 099	Install temporary culverts and washed rock on top of low water ford to reduce vehicle contact with water during active haul. Remove culverts promptly after use.		OAR 629-625-0700-ODF, Wet Weather Road Use DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036

Timber Harvest Activities

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-2. Best management practices for timber harvest activities.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Cable Yarding			
TH 1	Design yarding corridors to limit canopy loss in Riparian Reserves and to maintain effective shade. Techniques include limiting the number of such corridors, using narrow widths, and using the most perpendicular orientation to the stream feasible.	USDI BLM 2008, Appendix I-Water, TH 2, p. 287.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
TH 2	Trees felled for yarding corridors in the Riparian Reserve within a tree height distance of a stream channel would be directed toward the stream and left on site.		DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 3	Require full suspension over flowing streams, non- flowing streams with erodible bed and bank, and jurisdictional wetlands.	USDI BLM 2008, Appendix I-Water, TH 3, p. 287.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
TH 4	When logging downhill into Riparian Reserves, design the logging system to prevent converging yarding trails from intersecting the stream network.	USDI BLM 2008, Appendix I-Water, TH 4, p. 287.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 5	Prevent streambank and hillslope disturbance on steep slopes (generally >60%) along stream channels, by yarding across the Riparian Reserve with full suspension or one-end suspension with seasonal restrictions, as needed. Yard the remaining areas across the Riparian Reserve using one-end suspension	USDI BLM 2008, Appendix I-Water, TH 5, p. 287.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 6	Implement erosion control measures such as waterbars, slash placement, and seeding in cable yarding corridors where the potential for erosion and delivery to water bodies, fland seedi and wetlands exists.	USDI BLM 2008, Appendix I-Water, TH 6, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Ground-Based Harvesting			
TH 7	Exclude machinery from the Riparian Reserve inner zone, except for road and temporary skid trail crossings, restoration, and wildfire operational reasons.	USDI BLM 2008, Appendix I-Water, TH 7, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
TH 8	Exclude ground-based equipment on hydric soils, defined by the Timber Productivity Capability Classification (TPCC).	USDI BLM 2008, Appendix I-Water, TH 8, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 9	Limit detrimental ground disturbance (soil compaction, organic matter displacement, and alteration of soil structure) to 20% of the harvest unit area. This percentage includes permanent and temporary roads, landings, stockpiles, skid trails, and machinery built burn piles.	Soil Quality Standards USDA FS 1998	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 10	Limit designated skid trails for harvesting to ≤15 percent of the harvest unit area including legacy trails, where there are no other planned detrimental soil disturbances.	Soil Quality Standards USDA FS 1998	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 11	Limit width of skid roads to single width of what is operationally necessary for the equipment. Where multiple machines are used, provide a minimum sized pullout for passing.	USDI BLM 2008, Appendix I-Water, TH 10, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 12	Ensure one-end suspension of logs when skidding. Harvesting done with a track or wheel driven type machine must have an extendable and retractable arch and fair lead that is an integral part of the machine and is capable of lifting the leading end clear of the ground.	USDI BLM 2008, Appendix I-Water, TH 11, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 13	Restrict skidding and forwarding operations to periods of low soil moisture, frozen ground, or adequate snow cover when soils have the greatest strength to support equipment	USDI BLM 2008, Appendix I-Water, TH 12, p. 288.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	and increased resistance to compaction and displacement. The soil texture moisture limit, applied at the harvest unit level, would be 25% for clay/clay loam, 20% for loam/silt loam, and 15% for sandy/sandy loam.		
TH 14	Use existing compacted surfaces (e.g. skid trails, landings), where feasible, for ground-based logging equipment, considering proper spacing, skid trail direction and location relative to terrain and stream channel features.	USDI BLM 2008, Appendix I-Water, TH 13, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 15	Limit conventional skidders and tracked equipment to slopes less than 35 percent, except when using legacy trails or accessing isolated ground based harvest areas requiring short trails (up to 100 feet) over steeper pitches without causing undue effects to soils.	USDI BLM 2008, Appendix I-Water, TH 14, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 16	Monitor use where specialized ground-based mechanized equipment (i.e. low psi tracked or wheeled or self-leveling cabs with oversized tracks or tires) operate on slopes greater than 35%, and restrict where water and sediment could channel in overland flow.	USDI BLM 2008, Appendix I-Water, TH 15, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 17	Designate skid trails in locations that channel water from the trail surface away from water bodies, floodplains, and wetlands, or unstable areas adjacent to them.	USDI BLM 2008, Appendix I-Water, TH 16, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 18	Directionally fall trees to lead for skidding and skyline yarding to minimize ground disturbance when moving logs to skid trails and skyline corridors.	USDI BLM 2008, Appendix I-Water, TH 17, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 19	Apply erosion control measures to skid trails and other disturbed areas with potential for erosion and subsequent sediment delivery to water bodies, floodplains, or wetlands. These practices could include seeding, mulching, water barring, tillage, and woody debris placement. Use guidelines from the road decommissioning section.	USDI BLM 2008, Appendix I-Water, TH 18, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 20	Construct waterbars on skid trails using guidelines in Table C-5, where there is potential for soil erosion and delivery to water bodies, floodplains, and wetlands.	USDI BLM 2008, Appendix I-Water, TH 19, p. 289.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 21	Subsoil skid trails, landings, or temporary roads where needed to minimize surface runoff, improve soil structure and water movement through the roadbed. See also R 90.	USDI BLM 2008, Appendix I-Water, R 98, p. 285.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 22	Block skid trails to prevent OHV and other unauthorized use at the end of seasonal use.	USDI BLM 2008, Appendix I-Water, TH 21, p. 290.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1)

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
			Turbidity OAR 340-041-0036
TH 23	Plan one-entry operations, by combining ground-based timber harvesting with pre-commercial thinning, and/or biomass opportunities, or reducing fuel loading.	USDI BLM 2008, Appendix I-Water, TH 22, p. 290.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Helicopter			
TH 24	Consider the use of helicopter or aerial logging systems to prevent water quality impacts from road construction or ground-based timber yarding, where other BMPs would be more costly or have limited effectiveness.	USDI BLM 2008, Appendix I-Water, TH 23, p. 290.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
Horse			
TH 25	Within Riparian Reserves, limit horse logging to slopes less than 20 percent.	USDI BLM 2008, Appendix I-Water, TH 24, p. 290.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
TH 26	Construct waterbars on horse skid trails when there is potential for soil erosion and delivery to water bodies, floodplains, and wetlands.	USDI BLM 2008, Appendix I-Water, TH 25, p. 290.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036

Silvicultural Activities

See *Summary of Oregon Water Quality Standards* additional details about the standards and regulations that are associated with the best management practices.

Table I-3. Best management practices for planting, pre-commercial thinning, and fertilization.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Planting and Pre-Commercial Thinning			
S 1	Limit the crossing of stream channels with motorized support vehicles (e.g., ATV's) and mechanized equipment to existing road crossings.	USDI BLM 2008, Appendix I-Water, S 1, p. 291.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
S 2	Scatter treatment debris on disturbed soils and water bar any equipment access trails that could erode and deposit sediment in water bodies, floodplains, and wetlands.	USDI BLM 2008, Appendix I-Water, S 4, p. 291.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Fertilization			
S 3	For streams and water bodies that support domestic use, apply fertilizer further than 100 feet from the edge of the active channel or shoreline.	USDI BLM 2008, Appendix I-Water, S 5, p. 291.	EPA 440/5-86-001,-10 mg/L nitrate nitrogen for domestic water supply. DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
S 4	Locate storage, transfer, and loading sites outside Riparian Reserves and separated from hydrological connections: (e.g., road ditches that are linked to stream channels).	USDI BLM 2008, Appendix I-Water, S 6, p. 291.	EPA 822-R-13-001 2013,-salmonid acute criterion, 17 mg total ammonia nitrogen/L at pH 7 and temperature of 20°C. DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
			Toxic Substances OAR 340-041-0033
S 5	When aerially applying fertilizer, avoid drift of fertilizer into water bodies.	USDI BLM 2008, Appendix I-Water, S 7, p. 291.	EPA 822-R-13-001 2013,-salmonid acute criterion, 17 mg total ammonia nitrogen/L at pH 7 and temperature of 20°C. DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
S 6	When aerially applying fertilizer, suspend fertilizer application when heavy precipitation is expected at the time of application.	USDI BLM 2008, Appendix I-Water, S 8, p. 292.	EPA 822-R-13-001 2013,-salmonid acute criterion, 17 mg total ammonia nitrogen/L at pH 7 and temperature of 20°C. DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033

Fire and Fuels Management

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-4. Best management practices for fire and fuel management.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Underburn, Jackpot Burn, and Broadcast Burn			
F 1	Keep broadcast burns and jackpot burns out of Riparian Reserves inner zone, unless prescribed for restoration purposes, e.g., sudden oak death sanitation, improve species composition, invigorate deciduous trees. Locate ignition lines above large open meadows associated with stream channels, unless prescribed for restoration.	USDI BLM 2008, Appendix I-Water, F 1, p. 293.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
F 2	Reduce fuel loads by whole tree yarding, and piling material, as necessary, prior to under burning in dry forest types where fuel loads are elevated.	USDI BLM 2008, Appendix I-Water, F 2, p. 293.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
F 3	Avoid direct ignition or ignition by a backing-in fire of large woody material that is touching the high water mark of a water body or that may be affected by high flows.	USDI BLM 2008, Appendix I-Water, F 3, p. 293.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
F 4	Avoid delivery of chemical retardant foam or additives to water bodies, and wetlands. Store and dispose of ignition devices/ materials (e.g., flares, plastic spheres, etc.) outside Riparian Reserves or a minimum of 100 feet from water bodies, floodplains, and wetlands. Maintain and refuel equipment (e.g.,	USDI BLM 2008, Appendix I-Water, F 4, p. 293.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033


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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	drip torches, chainsaws) a minimum of 100 feet from water bodies, floodplains, and wetlands. Portable pumps can be refueled on-site within a spill containment system.		
F 5	Limit fire lines inside Riparian Reserves. Construct fire lines by hand on all slopes greater than 35 percent and inside the Riparian Reserve inner zone. Use erosion control techniques such as tilling, waterbarring, or debris placement on fire lines when there is potential for soil erosion and delivery to water bodies, floodplains, and wetlands. Space the waterbars as shown in Table C-5. Avoid placement of any fire line where water would be directed into water bodies, floodplains, wetlands, headwalls, or areas of instability.	USDI BLM 2008, Appendix I-Water, F 5, p. 294.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Pile and Burn			
F 6	Avoid mechanical or hand piling in the Riparian Reserve inner zone.	USDI BLM 2008, Appendix I-Water, F 6, p. 294.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Mechanical and Manual Fuel Treatments			
F 7	Prevent mechanical fuel reduction equipment within the Riparian Reserve inner zone, unless prescribed for restoration. Limit mechanical fuel reduction equipment to slopes less than 35 percent. Restrict non-track mechanized equipment, e.g., feller bunchers, horizontal bar masticators, to slopes less than 20 percent.	USDI BLM 2008, Appendix I-Water, F 7, p. 294.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
F 8	Use temporary stream crossings if necessary to access the opposite side with any equipment or vehicles (including ATVs). Follow Temporary Stream Crossing practices under Roads section.	USDI BLM 2008, Appendix I-Water, F 8, p. 294.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
F 9	Place residual slash on severely burned areas, where there is potential for sediment delivery into water bodies, floodplains and wetlands.	USDI BLM 2008, Appendix I-Water, F 9, p. 294.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Wildfire Suppression			
F 10	Limit firelines inside Riparian Reserves. Where hand constructed firelines are necessary in Riparian Reserves, angle the approach, where feasible, rather than have it perpendicular to the Riparian Reserve. Limit heavy equipment to slopes less than 35 percent.	USDI BLM 2008, Appendix I-Water, F 5, p.294, F 11, p. 295.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	Locate fire lines to minimize directing water into water bodies, wetlands, headwalls, or areas of instability. Use erosion control techniques such as tilling, waterbarring, or debris placement on fire lines when there is potential for soil erosion and delivery to water bodies, floodplains, and wetlands. Space waterbars as shown in Table C-5. Block dozer lines and roads or landing intersections with an approved barricade and/or scattered slash to preclude OHV use.		
F 11	Prevent cutting of logs or woody material if any portion of that material extends into the stream channel, unless for restoration. Fall snags in the Riparian Reserve towards the stream channel when felling is necessary for safety or fire suppression activities.	USDI BLM 2008, Appendix I-Water, F 12, p. 295.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
F 12	Avoid locating incident bases, camps, helibases, staging areas, constructed helispots, and other centers for incident activities in Riparian Reserves or within 200 feet of any waterbody, floodplain, or wetland. Water drafting sites for engines and tankers would be permitted.	USDI BLM 2008, Appendix I-Water, F 13, p. 295.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
F 13	Locate and maintain portable sanitation facilities at incident bases, camps (including spike/ remote camps), helibases, staging areas, constructed helispots, and other centers for incident activities in accordance with state and local regulations.	USDI BLM 2008, Appendix I-Water, F 14, p. 295.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009
F 14	Avoid application of chemical retardant, foam, or other chemicals to waterways, maintain a 300 ft. buffer (FA-IM-2008-029), unless the wildfire is deemed a threat to human safety or private property. Apply aerial retardant adjacent to Riparian Reserves by making parallel passes.	USDI BLM 2008, Appendix I-Water, F 15, p. 295.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
Rehabilitation			
F 15	Implement emergency fire rehabilitation treatments to accomplish erosion control as quickly as possible and before the wet season. Soil and water conservation practices may include, but are not restricted to: Native vegetation for short-term cover development and long-term recovery, unless not available in quantities necessary for the emergency response.	USDI BLM 2008, Appendix I-Water, F 16, p. 296. Interagency Burned Area Emergency Response Guidebook; Interpretation of Department of the Interior 620 DM 3 and USDA Forest Service Manual 2523 For the	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	<p>Mulch with straw, wood chips, or other suitable material. To avoid introducing noxious weeds when mulching, use certified weed-free straw mulch or rice straw where available.</p> <p>Straw wattles placed on the contour at adequate spacing between each row to capture eroded material without overflowing. Embed to the surface of the soil in slight trench to prevent undermining.</p> <p>Log erosion barriers placed and anchored similarly to straw wattles.</p> <p>Spreading available cut vegetation or slash on bare soils.</p> <p>Placing channel sediment retention or stabilization structures.</p> <p>Placing trash racks for debris above road drainage structures.</p> <p>Installing drainage structures, such as waterbars or drainage dips, on fire lines, fire roads, and other cleared areas according to guidelines in Table 5 (Waterbar spacing by gradient and erosion class).</p> <p>Repairing damaged road drainage facilities such as flattened or ripped culvert ends, burned out plastic pipes or cleaning ditch lines of materials that impede natural flow</p> <p>Blocking or decommissioning roads and trails.</p>	<p>Emergency Stabilization of Federal and Tribal Trust Lands Version 4.0 February 2006</p>	
Post-Fire Road Repair			
F 16	<p>Implement emergency fire rehabilitation treatments to accomplish erosion control as quickly as possible and before the wet season.</p> <p>Soil and water conservation practices may include, but are not restricted to:</p> <p>Reduce road system hydrologic conductivity through proper grading, culvert spacing, and installing drivable dips.</p> <p>Replace culverts to increase peak flow capacity of stream crossing culverts to accommodate the 100-year design flood.</p>	<p>USDI BLM 2008, Appendix I-Water, F 17, p. 297.</p> <p>Interagency Burned Area Emergency Response Guidebook; Interpretation of Department of the Interior 620 DM 3 and USDA Forest Service Manual 2523 For the Emergency Stabilization of Federal and Tribal Trust Lands Version 4.0 February 2006</p>	<p>DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036</p>

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	Prevent culvert plugging. Correct stream diversions.		
Fuel/Retardant Transport			
F 17	<p>If more than 42 gallons of fuel or combined quantity of petroleum product and chemical substances would be transported to a project site, the following precautions would be implemented.</p> <ol style="list-style-type: none"> 1. Plan a safe route and transfer sites that could contain the transported volume. 2. Plan an active dispatch system that can relay the information to appropriate resources. 3. Ensure a spill containment kit that can absorb and contain 55 gallons of petroleum product and chemical substances is readily available. 4. Provide for immediate notification in the event of a spill. Have a radio equipped vehicle lead the chemical or fuel truck to the project site. 5. Assemble a spill notification list that includes the district hazardous materials coordinator, DEQ, and spill clean-up contractors. 6. Construct a water user contact list with address and phone numbers. 7. When operating within Source Water Watersheds, pre-estimate travel times through the watershed to predict downstream arrival times. 8. Be prepared to sample water and carry sample containers. 	USDI BLM 2008, Appendix I-Water, F 18, p. 297.	<p>[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is forty-two U.S. Gallons not involving waterways, a visible sheen where waterways are involved.</p> <p>DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) and (13) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033</p>

Table I-5. Water bar spacing by gradient and erosion class.

Gradient	Water Bar Spacing ^a (Feet) Per Erosion Class ^b		
	High Class	Moderate Class	Low Class
2-5%	200	300	400
6-10%	150	200	300
11-15%	100	150	200
16-20%	75	100	150
21-35%	50	75	100
36+%	50	50	50

^a Spacing is determined by slope distance and is the maximum allowed for the grade.

^b The erosion classes include the following rock types:

High: Granite, sandstone, andesite porphyry, glacial or alluvial deposits, soft matrix conglomerate, volcanic ash, and pyroclastics.

Moderate: Basalt, andesite, quartzite, hard matrix conglomerate, and rhyolite.

Low: Metasediments, metavolcanics, and hard shale.

Surface Source Water For Drinking Water

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices

Table I-6. Best management practices for surface source water for drinking water protection.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
SW 1	Sanitary facilities would be planned, located, designed, constructed, operated, inspected, and maintained, to minimize water contamination.	USDI BLM 2008, Appendix I-Water, SW 1, p. 299.	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 2	Locate contractor camps outside DEQ sensitive zones in drinking water source areas for public water systems. If this is not possible, require self-contained sanitary facilities.	USDI BLM 2008, Appendix I-Water, SW 2, p. 299. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 3	Require self-contained sanitary facilities in surface source water watersheds, when long-term camping (greater than 14 days) is involved with contract implementation.	USDI BLM 2008, Appendix I-Water, SW 3, p. 299.	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 4	Provide self-contained sanitary facilities when there is high recreational use (almost continuous occupancy) inside DEQ sensitive zones within drinking water source areas for public water systems, known domestic source water watersheds, or Riparian Reserves inner zone.	USDI BLM 2008, Appendix I-Water, SW 4, p. 299. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 5	Locate pack and riding, facilities outside DEQ sensitive zones within drinking water source areas for public water systems, known domestic source water watersheds, or Riparian Reserves inner zone.	USDI BLM 2008, Appendix I-Water, SW 5, p. 299. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 6	Do not allow surface occupancy within 200 feet of a known domestic water source or within DEQ sensitive zones in drinking water source areas for public water systems.	USDI BLM 2008, Appendix I-Water, SW 6, p. 299. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 7	Do not apply sewage sludge as a soil amendment within drinking water source areas for public water systems, known domestic source water watersheds, or Riparian Reserves.	USDI BLM 2008, Appendix I-Water, SW 7, p. 300. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
		us/wq/dwp/swcountymap.htm	
SW 8	Avoid loading, or storing chemical, fuel, or fertilizer in DEQ sensitive zones within drinking water source areas for public water systems, known domestic source water watersheds, or Riparian Reserves inner zone.	USDI BLM 2008, Appendix I-Water, SW 8, p. 300. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 9	Conduct equipment maintenance outside DEQ sensitive zones within drinking water source areas for public water systems, known domestic source water watersheds, or Riparian Reserves inner zone.	USDI BLM 2008, Appendix I-Water, SW 9, p. 300. DEQ Drinking Water Protection Program http://www.deq.state.or.us/wq/dwp/swcountymap.htm	DEQ-Water Pollution: Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 10	Use non-oil-based dust suppressants within surface source water watersheds.	USDI BLM 2008, Appendix I-Water, SW 10, p. 300.	DEQ-Water Pollution: Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)
SW 11	Use fire retardant and surfactants as a last resort in fire suppression activities within surface source water watersheds.	USDI BLM 2008, Appendix I-Water, SW 11, p. 300.	DEQ-Water Pollution: Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)

Recreation

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-7. Best management practices for recreation management

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
All Recreation Facilities			
REC 1	Implement erosion control measures at recreation sites to stabilize exposed soils where water flows or sediment, may reach water bodies.	USDI BLM 2008, Appendix I-Water, REC 1, p. 301.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 2	Locate new recreational facilities, developed and dispersed sites, outside of the water influence area. Low impact uses, such as hiking trails, picnic sites, or water dependent facilities (e.g., boat ramps or docks), are excluded.	USDI BLM 2008, Appendix I-Water, REC 2, p. 301.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
Developed Recreation Sites			
REC 3	Self-contained sanitary facilities would be used at all developed recreational facilities, unless a sewage system and drain field is approved by the Department of Environmental Quality.	USDI BLM 2008, Appendix I-Water, REC 3, p. 301.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009
REC 4	When conducting recreation site maintenance, do not cut portions of	USDI BLM 2008, Appendix I-Water,	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1)

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	logs or coarse woody debris that fall across the active stream channel. Keep adequate lengths of material on the banks to anchor it in place. If not possible to make the log stable, it may be removed.	REC 5, p. 301.	Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Water Dependent Facilities			
REC 5	Construct boat ramps and approaches with hardened surfaces.	USDI BLM 2008, Appendix I-Water, REC 6, p. 301.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
Off-Highway Vehicle (OHV) Trails			
REC 6	Use existing stream crossings to the extent possible when constructing trails through Riparian Reserves.	USDI BLM 2008, Appendix I-Water, REC 7, p. 301.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
REC 7	When constructing or maintaining trails within Riparian Reserves, do not cut the portion of logs or coarse woody debris that extend into the active stream channel. Provide for adequate stabilization of the logs if not doing so would create a safety hazard.	USDI BLM 2008, Appendix I-Water, REC 8, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
REC 8	Stream crossings would be designed to accommodate active channel width, bed load, and fish passage and exceeding capacity for the 100-year flood event.	USDI BLM 2008, Appendix I-Water, REC 10, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
REC 9	Suspend construction or maintenance of trails, where erosion and runoff into water bodies would occur.	USDI BLM 2008, Appendix I-Water, REC 11, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 10	Locate staging areas outside Riparian Reserves. Design or upgrade staging areas to prevent sediment/pollutant delivery to wetlands, floodplains, and water bodies, e.g., rocking or hardening, drainage through grading or shaping.	USDI BLM 2008, Appendix I-Water, REC 12, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
REC 11	Harden trail approaches to stream crossings using materials such as geotextile fabric and rock aggregate.	USDI BLM 2008, Appendix I-Water, REC 13, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 12	Drain dips or drainage features would be installed on approaches to stream crossings as needed to divert runoff and reinforced with rock for longevity.	USDI BLM 2008, Appendix I-Water, REC 14, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 13	When constructing bridges or walkways over streams or water bodies, avoid use of chemically treated materials at water level contact points, where leachate or solids may enter soil or water.	USDI BLM 2008, Appendix I-Water, REC 15, p. 302.	DEQ-Water Pollution: Toxic Substances OAR 340-041-0033 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (10)
REC 14	Use a temporary flow diversion bypass to minimize downstream turbidity, when constructing perennial stream	USDI BLM 2008, Appendix I-Water, REC 16, p. 302.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1)

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	crossings (See Roads Section for Stream Crossing BMPs.).		Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
REC 15	Prevent vehicle access to nearby wetlands by using suitable barriers.	USDI BLM 2008, Appendix I-Water, REC 17, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033 Turbidity OAR 340-041-0036
REC 16	Where trails intersect road ditches, provide erosion resistant crossings. Divert water from the trail to keep from reaching wetlands, floodplains, and water bodies.	USDI BLM 2008, Appendix I-Water, REC 18, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 17	If trail width is too wide for the designated use (such as old roads converted to trails), consider tilling one side of the trail, covering with brush, and seeding or planting.	USDI BLM 2008, Appendix I-Water, REC 19, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 18	Repair rills and gullies to keep sediment from reaching wetlands, floodplains, and water bodies.	USDI BLM 2008, Appendix I-Water, REC 20, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 19	Water bars, drain dips, and lead off ditches will be constructed or repaired as needed. These features may need rock reinforcement to promote longevity. Self-maintaining drain dips or lead-off features are the preferred design.	USDI BLM 2008, Appendix I-Water, REC 21, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 20	Drain dips or lead off ditches would be constructed on steeper gradient trails and approaches to stream crossings.	USDI BLM 2008, Appendix I-Water, REC 22, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Trails (Hiking)			
REC 21	When constructing or maintaining trails within Riparian Reserves, do not cut any portion of logs or coarse woody debris that extend into the active stream channel. Use alternative passage options, such as earthen ramps, small notch steps, or slight trail realignments, to facilitate maintenance of intact logs. Cut and stabilize if necessary for safe passage and safety.	USDI BLM 2008, Appendix I-Water, REC 23, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Biocriteria OAR 340-041-0011 Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Trail Closure			
REC 22	Remove existing stream crossings or bridges (See Road Decommissioning, BMPs).	USDI BLM 2008, Appendix I-Water, REC 24, p. 303.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (8) Turbidity OAR 340-041-0036
REC 23	Position fill or waste material in a location that would avoid direct or indirect sediment discharge to streams or wetlands.	USDI BLM 2008, Appendix I-Water, REC 25, p. 304.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
REC 24	Restored stream banks would be planted with native vegetation, mulched, and then planted with water-tolerant species where appropriate.	USDI BLM 2008, Appendix I-Water, REC 26, p. 304.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
REC 25	Barricade and allow nearby vegetation to grow into closed trails.	USDI BLM 2008, Appendix I-Water, REC 27, p. 304.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
Dispersed Recreation			
REC 26	Site camps for permitted group overnight camping would be greater than 100 feet from surface water.	USDI BLM 2008, Appendix I-Water, REC 28, p. 304.	DEQ-Water Pollution: Bacteria OAR 340-041-0009 Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (13)

Range Management

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-8. Best management practices for grazing.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
G 1	Fence water developments, including springs and seeps, unless other methods are available. Pipe overflow away from the developed source area.	USDI BLM 2008, Appendix I-Water, G 1, p. 305.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004 Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Biocriteria OAR 340-041-0011 Dissolved Oxygen OAR 340-041-0016 Temperature OAR 340-041-0028 Turbidity OAR 340-041-0036
G 2	Do not locate salting areas within ¼ mile of permanent water sources or Riparian Reserves.	USDI BLM 2008, Appendix I-Water, G 2, p. 305.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004 Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Biocriteria OAR 340-041-0011 Dissolved Oxygen OAR 340-041-0016 Temperature OAR 340-041-0028 Turbidity OAR 340-041-0036
G 3	Locate new permanent livestock handling or management facilities (corrals, pens, or holding pastures) outside Riparian Reserves or 200 feet from water bodies and on level ground where drainage would not enter surface waters. Make changes as necessary to existing facilities within Riparian Reserves to meet water quality standards and regulations.	USDI BLM 2008, Appendix I-Water, G 3, p. 305.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004 Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Biocriteria OAR 340-041-0011 Dissolved Oxygen OAR 340-041-0016 Temperature OAR 340-041-0028 Turbidity OAR 340-041-0036
G 4	Apply specific grazing strategies for riparian wetland areas, including timing, intensity, or exclusion for maintenance of proper functioning condition. Use one or more of the following features: Inclusion of the water bodies, floodplains, and wetlands within a	USDI BLM 2008, Appendix I-Water, G 4, p. 306.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004 Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Biocriteria OAR 340-041-0011 Dissolved Oxygen OAR 340-041-0016 Temperature OAR 340-041-0028 Turbidity OAR 340-041-0036

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	<p>separate pasture.</p> <p>Fence or herd livestock out of water bodies, floodplains, and wetlands for as long as necessary to allow vegetation to recover.</p> <p>Control the timing and intensity of grazing to keep livestock off stream banks when they are most vulnerable to damage and to coincide with the physiological needs of target plant species.</p> <p>Add more rest to the grazing cycle to increase plant vigor, allow stream banks to revegetate, or encourage more desirable plant species composition.</p> <p>Limit grazing intensity to a level that will maintain desired species composition and vigor.</p> <p>Permanently exclude livestock from those water bodies, floodplains, and wetlands areas that are at high risk and have poor recovery potential, and when there is no practical way to protect them while grazing adjacent uplands.</p>		
G 5	Recover degraded water bodies through adjustments to forage utilization levels, improved livestock distribution, and management through fencing, vegetation treatments, water source developments, or changes in season of use or livestock numbers.	USDI BLM 2008, Appendix I-Water, G 5, p. 306.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004 Statewide Narrative OAR 340-041-0007(1) Bacteria OAR 340-041-0009 Biocriteria OAR 340-041-0011 Dissolved Oxygen OAR 340-041-0016 Temperature OAR 340-041-0028 Turbidity OAR 340-041-0036

Minerals (Salable)

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-9. Best management practices for minerals (salable).

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Salable Minerals			
M 1	Locate stockpile sites on stable ground where the material would not move into water bodies, floodplains, and wetlands.	USDI BLM 2008, Appendix I-Water, M 18, p. 309.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 2	Stabilize and control erosion of overburden and stockpiles. Separate and windrow or stockpile topsoil for use in reclamation.	USDI BLM 2008, Appendix I-Water, M 10, p. 308.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 3	Locate, design, and construct salable mineral sites to control runoff and prevent or minimize sediment delivery	USDI BLM 2008, Appendix I-Water, M 18, p. 309.	OAR 629-625-0500-ODF, Rock Pits and Quarries

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	to streams. Prevent overburden, solid wastes, drainage water or petroleum products from entering wetlands, Riparian Reserves, flood plains and waters of the State.	OAR 629-625-0500 1-5	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 5	Outslope quarry floors to provide for adequate drainage of the floor and away from stream channels.		DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 6	Locate, design, and maintain settling ponds to contain sediment discharges.	USDI BLM 2008, Appendix I-Water, M 1, p. 309.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 7	When a quarry or rock pit is depleted or vacated, stabilize cutbanks, headwalls, and other surfaces to prevent surface erosion and landslides. Close roads, excavations, and crusher pads in accordance with Roads and Landings section. Remove all potential pollutants to prevent their entry into wetlands, Riparian Reserves, floodplains, and waters of the State.	OAR 629-625-0500 DEQ 2005 NS - 6	OAR 629-625-0500-ODF, Rock Pits and Quarries DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036
M 8	Use erosion-reduction practices, such as seeding, mulching, silt fences, and woody debris placement, to limit erosion and transport of sediment to streams from quarries. Provide drainage from stockpiles and mineral sites, dispersed over stable vegetated areas rather than directly into stream channels. Grade all material sites, where practicable to conform with the surrounding topography prior to closure. Utilized topsoil as a medium to for successful revegetation. Reseed and plant trees, where needed.	USDI BLM 2008, Appendix I-Water, M 22, p. 309.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Turbidity OAR 340-041-0036

Spill Prevention and Abatement

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-10. Best management practices for spill prevention and abatement.

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Operations Near Water bodies			
SP 1	Take precautions to prevent leaks or spills of petroleum products, e.g., fuel, motor oil, and hydraulic fluid, from entering the waters of the State.	[40 CFR 112] OAR 629-620-0100(2)	[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is a visible sheen where waterways are involved. OAR 629-620-0100-ODF, Chemical and Other Petroleum Product Rules DEQ-Water Pollution:

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
			Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) and (13) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
SP 2	Take immediate action to stop and contain leaks or spills of chemicals and other petroleum products. Notify the Oregon Emergency Response System, through the District Hazard Materials specialist, of any spill that enters the waters of the State.	[40 CFR 112] OAR 629-620-0100(3), (4)	[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is a visible sheen where waterways are involved. OAR 629-620-0100-ODF, Chemical and Other Petroleum Product Rules DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) and (13) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033


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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
SP 3	<p>Inspect and clean heavy equipment as necessary prior to moving on to the project site, in order to remove oil and grease, noxious weeds, and excessive soil.</p> <p>Inspect hydraulic fluid and fuel lines on heavy-mechanized equipment for proper working condition.</p> <p>Where possible, maintain and refuel equipment a minimum of 100 feet away from streams and other water bodies , except small equipment e.g. chainsaws or water pumps. Refuel small equipment from no more than 5-gallon containers. Use absorbent material or a containment system to prevent spills when re-fueling small equipment within the stream margins or near the edge of water bodies.</p> <p>In the event of a spill or release, all reasonable and safe actions to contain the material will be taken. Specific actions are dependent on the nature of the material spilled.</p> <p>Use spill containment booms or as required by DEQ. Have access to booms and other absorbent containment materials.</p> <p>Immediately remove waste or spilled hazardous materials (including but not limited to diesel, oil, hydraulic fluid) and contaminated soils near any stream or other water body, and dispose of it/them in accordance with the applicable regulatory standard. Notify Oregon Emergency Response System of any spill over the material reportable quantities, and any spill not totally cleaned up after 24 hours.</p> <p>Store equipment containing Reportable Quantities of toxic fluids outside of Riparian Reserves.</p>	<p>USDI BLM 2008, Appendix I-Water, SP 1, p. 311.</p>	<p>[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is forty-two U.S. Gallons not involving waterways, a visible sheen where waterways are involved.</p> <p>DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) and (13) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033</p>

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
SP 4	<p>If more than 42 gallons of fuel or combined quantity of petroleum product and chemical substances, as project materials, would be transported to a project site, the following precautions will be implemented.</p> <ol style="list-style-type: none"> 1. Plan a safe route and material transfer sites so that all spilled material will be contained easily at that designated location. 2. Plan an active dispatch system that can relay the information to appropriate resources. 3. Ensure a spill containment kit that can absorb and contain 55 gallons of petroleum product and chemical substances is readily available. 4. Provide for immediate notification to OERS in the event of a spill. Have a radio-equipped vehicle lead the chemical or fuel truck to the project site. 5. Assemble a spill notification list that includes the district hazardous materials coordinator, DEQ, and spill clean-up contractors. 6. Construct a downstream water user contact list with addresses and phone numbers. 7. When operating within Source Water watersheds, pre-estimate water flow travel times through the watershed to predict downstream arrival times. 8. Be prepared to sample water and carry sample containers. <p>Be prepared to assist OSP and ODFW to assess wildlife impacts of any material spilled.</p>	<p>USDI BLM 2008, Appendix I-Water, SP 2, p. 312.</p>	<p>[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is forty-two U.S. Gallons not involving waterways, a visible sheen where waterways are involved.</p> <p>DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) and (13) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033</p>
Spill Abatement			
SP 5	<p>Spill Prevention, Control, and Countermeasure Plan (SPCC): All operators shall develop a modified SPCC plan prior to initiating project work if there is a potential risk of chemical or petroleum spills near water bodies. The SPCC plan will include the appropriate containers and design of the material transfer locations. No interim fuel depot or storage location other than a manned transport vehicle would be used</p>	<p>USDI BLM 2008, Appendix I-Water, SP 3, p. 312.</p>	<p>[40 CFR 112]-Oil Pollution Prevention. Reportable quantity is forty-two U.S. Gallons not involving waterways, a visible sheen where waterways are involved.</p> <p>OAR-340-142-0030-DEQ, Oil and Hazardous Materials Emergency Response Requirements</p>
SP 6	<p>Spill Containment Kit (SCK): All operators shall have a SCK as described in the SPCC plan on-site during any operation with potential for run-off to adjacent water bodies. The SCK will be appropriate in size and type for the oil or hazardous material carried by the operator.</p>	<p>USDI BLM 2008, Appendix I-Water, SP 4, p. 313.</p>	<p>OAR-340-142-0030-DEQ, Oil and Hazardous Materials Emergency Response Requirements</p>

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
SP 7	Operators shall be responsible for the clean-up, removal, and proper disposal of contaminated materials from the site.	USDI BLM 2008, Appendix I-Water, SP 5, p. 313.	OAR-340-102-DEQ, Standards Applicable to Generators of Hazardous Waste OAR-340-122-DEQ, Hazardous Substance Remedial Action Rules

Restoration

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Table I-11. Best management practices for restoration activities

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
RST 1	Confine work in the stream channels to the low flow period unless a waiver is obtained from the permitting agencies.	USDI BLM 2008, Appendix I-Water, RST 1, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
RST 2	In stream channels that are sensitive to disturbance (e.g., meadow streams), do not drive heavy equipment in flowing channels and floodplains.	USDI BLM 2008, Appendix I-Water, RST 2, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
RST 3	In well-armored channels that are resistant to damage (e.g., bedrock, small boulder, or cobble dominated), consider conducting the majority of heavy-equipment work from within the channel, during low streamflow, to minimize damage to sensitive riparian areas.	USDI BLM 2008, Appendix I-Water, RST 3, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
RST 4	Design access routes for individual work sites to reduce exposure of bare soil and extensive stream bank shaping.	USDI BLM 2008, Appendix I-Water, RST 4, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
RST 5	Limit the number and length of equipment access points through Riparian Reserves.	USDI BLM 2008, Appendix I-Water, RST 5, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
RST 6	Limit the amount of stream bank excavation to the minimum necessary to ensure stability of enhancement structures. Provide isolation from flowing water during excavation. Place excavated material above the flood prone area and cover or place a berm to avoid its reentry into the stream during high flow events.	USDI BLM 2008, Appendix I-Water, RST 6, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036 Temperature OAR 340-041-0028
RST 7	Inspect all mechanized equipment daily for leaks and clean as necessary to ensure that toxic materials, such as fuel and hydraulic fluid, do not enter the stream.	USDI BLM 2008, Appendix I-Water, RST 7, p. 314.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
			Toxic Substances OAR 340-041-0033
RST 8	Locate equipment storage areas at least 100-feet from any water feature, including machinery used in stream channels for more than one day.	USDI BLM 2008, Appendix I-Water, RST 8, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
RST 9	When using heavy equipment in or adjacent to stream channels during restoration activities, develop and implement an approved spill containment plan that includes having a spill containment kit on-site and at previously identified containment locations.	USDI BLM 2008, Appendix I-Water, RST 9, p. 315.	DEQ Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
RST 10	Refuel equipment, including chainsaws and other hand power tools, at least 100 feet from water bodies (or as far as possible from the water body where local site conditions do not allow a 100-foot setback) to prevent direct delivery of contaminants into a water body.	USDI BLM 2008, Appendix I-Water, RST 10, p. 315.	DEQ Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (12) Biocriteria OAR 340-041-0011 Toxic Substances OAR 340-041-0033
RST 11	Use waterbars, barricades, seeding, and mulching to stabilize bare soil areas along project access routes prior to the wet season.	USDI BLM 2008, Appendix I-Water, RST 11, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
RST 12	Prior to the wet season, rehabilitate and stabilize disturbed areas where soil will support seed growth by seeding and planting with native seed mixes or plants, or using erosion control matting.	USDI BLM 2008, Appendix I-Water, RST 12, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
RST 13	When replacing culverts design placement location, crossing type, and installation depth to avoid excessive scour through the site, consider installation of grade control structures e.g., boulder vortex weirs or boulder step weirs	USDI BLM 2008, Appendix I-Water, RST 13, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036
RST 14	Rehabilitate headcuts and gullies.	USDI BLM 2008, Appendix I-Water, RST 14, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
RST 15	Implement measures to control turbidity. Measures may include installation of turbidity control structures (e.g., isolation, diversion, or silt curtains) immediately downstream of in-stream restoration work areas. Remove these structures following completion of turbidity generating activities.	USDI BLM 2008, Appendix I-Water, RST 15, p. 315.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1) Biocriteria OAR 340-041-0011 Turbidity OAR 340-041-0036

Dry Forest Specific BMPs

See *Summary of Oregon Water Quality Standards* for additional details about the standards and regulations that are associated with the best management practices.

Soils of concern in the dry forest area include those with a high potential for severe surface erosion, soil creep, periodic slumping (even when not overly saturated), and low nutrient potential. These soils weathered from granite, schist, and pyroclastic materials. They are predominately located in the Medford District but also found in the southern end of the Roseburg District and the Klamath Falls Field Office. On the Medford District, concentrations of these vulnerable soils occur in Evans, Snow, Sugar, and Meadow Creeks, upper portions of Williams Creek and headwaters of Birdseye Creek. These soils are mapped as fragile soils within the decision area. Limiting disturbance is key to keeping these soils in place; particularly from ground-based operations.

The Timber Production Capability Classification (TPCC) and Handbook (5251-1) involves mapping, with discrete mapping units and interpretations of timbered lands. The classification uses geology, landform, topographic position, climate (especially precipitation), soil properties, and vegetation. Lands with the capacity to erode excessively or prone to movement, e.g., creep or slump, are denoted with either a fragile code of FM (surface erosion potential) or FP (mass movement potential). Sites could have varying severity of either of these conditions. Management activities and restrictions would be scaled to reflect the differences in erosion or mass movement potential.

Table I-12. Timber Production Capability Classification soil categories of concern.

Category	Description of Soil Categories
Surface Erosion FM	These sites have soil surface horizons that are highly erodible, easily detached and subject to bouncing or sliding downhill (dry ravel), even if partially vegetated. The soils overlay intrusive volcanic bedrock, e.g., granite, diorite, or schist. The Natural Resources Conservation Service (NRCS) provides a Revised Universal Soil Loss Equation soil loss tolerance factor, known as T factor. It ranges from a low of 1 on shallow soils, 1-10 inches depth, to a 5 on soils deeper than 60 inches. This factor describes the maximum rate of annual soil loss in tons/acre that can be lost and still permit crop productivity to sustain economically and indefinitely. Disturbances from harvesting or burning create increased dry raveling of soil, losses of soil nutrients, and burying of newly planted seedlings. Classification coding may be FMR for suitable lands or FMNW for non-suitable lands.
Mass Movement FP	These sites range from gentle to moderately steep slopes, ten to sixty percent, where the rate of sliding is slow enough to permit forest management, but with some loss in wood quality in certain areas. Sites may have an impervious clay pan overlaying pyroclastic bedrock, e.g., volcanic tuffs, breccia, and are subject to movement. Tree roots providing strength and certain landforms act as resisting forces, while gravity and soil moisture may initiate non-uniform spatial and temporal rates of movement. Slow deep seated, slump or earth flow types of mass movements may occur, forming an undulating topography. Classification coding may be FPR for suitable lands or FPNW for non-suitable lands.

Table I-13. Additional dry forest best management practices (refer to **Table X[C-12]** for category type).

BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
Roads and Landings: General Construction, Maintenance			
Timber Harvest: Cable Yarding			
DF 01	Use full suspension whenever possible on TPCC soils identified as prone to surface erosion, category FM in Table C-12. Use one-end suspension on these soils if full suspension is not practicable. Restrict yarding to the dry season, generally from June to end of September.	USDI BLM 2008, Appendix I-Water, MFO 1, p. 317.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036

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BMP Number	Best Management Practices	Source	Water Quality Standards and Regulations
	Use one-end suspension on TPCC soils identified as prone to mass movement, category FP in Table C-12. Restrict yarding to the dry season.		
Timber Harvest: Ground-Based			
DF 02	<p>Limit ground-based yarding equipment to slopes less than 20% on TPCC soils identified as category FM or FP in Table C-12, where soils include less than 20% clay. Limit ground-based yarding equipment to slopes less than 35%, on TPCC soils identified as category FM or FP in Table C-12, where soils include greater than 20% clay.</p> <p>Avoid tilling on TPCC soils identified as category FM or FP in Table C-12, unless adequate ground cover is present to arrest potential sediment transport.</p>	USDI BLM 2008, Appendix I-Water, MFO 2, p. 317.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Fire and Fuels Management			
DF 03	Avoid mechanical piling to limit severe surface disturbance and displacement on TPCC soils identified as category FM or FP in Table C-12.	USDI BLM 2008, Appendix I-Water, MFO 3, p. 318.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
DF 04	Allow ground-based equipment on TPCC soils identified as category FM or FP in Table C-12, where slopes are less than 20% and clay content is less than 20%. Limit ground-based equipment to slopes less than 35%, where clay contents are greater than 20%.	USDI BLM 2008, Appendix I-Water, MFO 4, p. 318.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Wildfire: Suppression			
DF 05	Limit the use of track driven heavy machinery and other major surface-disturbing activities to slopes of 20% or less on TPCC soils identified as category FM or FP in Table C-12.	USDI BLM 2008, Appendix I-Water, MFO 5, p. 318.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036
Rights-of-Way			
DF 06	<p>Avoid facility construction on soils identified on TPCC soils identified as the FM category in Table C-12, unless water quality would be maintained.</p> <p>Locate rights-of-ways to minimize surface disturbance on TPCC soils identified as category FM or FP in Table C-12.</p>	USDI BLM 2008, Appendix I-Water, MFO 6, p. 318.	DEQ-Water Pollution: Antidegradation OAR 340-041-0004(1) Statewide Narrative OAR 340-041-0007(1), (7) Turbidity OAR 340-041-0036

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