Clackamas River Ranger District Standard Project Design Criteria (PDC) 3/2019

These practices were developed to minimize effects to resources but do not necessarily eliminate all impact. They are applicable to vegetation and road management projects. Some of these practices implement the National Core Best Management Practices (BMP) Technical Guide (USDA 2012) to minimize impacts to water quality. The National Core BMP Program was developed to improve agency performance and accountability in managing water quality consistent with the Federal Clean Water Act (CWA) and State water-quality programs, and represents the best available science regarding best management practices. The 2012 Technical Guide (USDA 2012) is incorporated by reference.

In this document, the term 'wet condition' is used instead of 'wet season.' Seasonal weather events can vary from year to year, and wet conditions can occur any time of year. Condition-based factors are used instead of calendar dates to constrain certain activities. Within the project area, typical wet-weather patterns set in sometime in the fall that shut down certain operations until soils and roads dry out sufficiently in the late spring or summer. Occasionally in the winter, in high elevation areas, frozen conditions may occur that can allow certain operations to occur without damage to resources.

A. Stream-Protection Buffers

A1. Streams within the project area would be protected with buffers. Stream buffers are measured using slope distance from the edge of active channel (stream banks) on both sides of the stream. Within these buffers, tree felling or yarding would not occur (with the exceptions for danger trees, approved skyline corridors and down wood enhancement projects described in B1).

The following are minimum stream-protection buffer widths.

Distances in Feet	Intermittent Streams	Perennial Streams Hill Slope < 30%	Perennial Streams Hill Slope 30 to 60%	Perennial Streams Hill slope > 60%
Thinning	50	70	75	85
Sapling Thinning	20	20	20	20
Regeneration Harvest	180	180	180	180

The streams that have a connection to listed fish habitat (LFH) were examined by the fisheries biologist and the minimum widths above were adjusted based on the proximity to listed fish habitat, and other factors such as stream gradient and orientation and the cumulative quantity of other past management along these streams. *National Core BMP Technical Guide – Plan 3 and Veg 3.*

A2. In certain instances, the buffer widths in A1 may be expanded, as directed by the District Ranger, based on recommendations by the unit fisheries biologist, hydrologist or geologist. Adjustments include unstable areas and areas with high water table such as wetlands, or

seasonally saturated soils.
National Core BMP Technical Guide – Plan 3 and Veg 3.

B. Tree Felling in Riparian Reserves

B1. Trees would not be felled within the stream-protection buffers with the following exceptions:

a) A stream enhancement project within the stream-protection buffer zone of certain proposed thinning units involves the felling of some second-growth trees into streams. A fisheries biologist would select the trees to fell from areas that are fully stocked with trees and would avoid unstable areas or areas with a high water table.

b) Danger trees may be felled from stream-protection buffers where necessary for safety. Felled trees would be left in place unless they land on a road or need to be moved to facilitate safe operations.

c) In some units, skyline cables would cross streams to tie off on the other side to gain needed lift. Where logs are yarded from one side of the stream to the other as described below in C1 and 2, a corridor less than 15 feet wide would be created. Where no logs are yarded from one side to the other, but a cable crosses the stream to gain needed lift, few if any trees would be cut in the stream-protection buffer. Any trees in the stream-protection buffer felled for skyline corridors would be left in place.

National Core BMP Technical Guide - Plan 3 and Veg 3.

B2. Harvested trees that are yarded would be felled away from streams, springs, or wetlands, or parallel to the stream buffer. Trees that are inadvertently felled into the stream-protection buffer would be left on site unless otherwise agreed by the contract administrator. *National Core BMP Technical Guide - Plan 3, AqEco 2, Veg 3, Veg 4 and Veg 5.*

C. Skidding, Yarding and Equipment Use

C1. Skyline yarding over streams is acceptable if the logs are fully suspended over stream channels and the ground within their protection buffers. One-end suspension is required in skyline corridors outside the protection buffers. During lateral yarding, use one-end suspension to the extent practicable. *National Core BMP Technical Guide - Plan 3, AqEco 2, Veg 2, Veg 3, and Veg 5.*

C2. Where skyline corridors are created by tree felling as described in B1 and C1, the number of skyline yarding corridors over perennial streams would be limited to no more than ten percent of the riparian canopy. Individual corridor widths would not exceed 15 feet where they cross Riparian Reserves. *National Core BMP Technical Guide - Plan 3, AqEco 2, Veg 3, and Veg 5.*

C3. Existing landings would be used where feasible. They would be limited to the area needed for safe and efficient yarding and loading operations and have proper drainage. Where necessary, straw bale catchments, wattles, silt fences or other erosion control measures would be used to minimize sediment transport to road ditches or streams. The catchments would be located to intercept runoff from the landing or skid trail prior to reaching any road ditch or

stream. These are standard contract provisions. *National Core BMP Technical Guide - Plan 3, Veg 2, Veg 3, Veg 4 and Veg 6.*

C4. Log landings would generally not be constructed, reconstructed or used within 200 feet of a stream, if the potentially affected stream reach is within 0.5 mile of Listed Fish Habitat, or within 100 feet of any other stream channel.

Distances are measured slope distance in the direction of the slope aspect (the direction water would flow) or distance would be measured along a road ditch if the ditch provides a hydrological connection from the landing to the stream.

Exceptions to these distances may be approved by the District Ranger. Exceptions would be based on site-specific conditions such as hydrologic connection, size of landing, and landing surfacing; based on recommendations from a fisheries biologist. If a landing is approved for use within these distances, erosion control measures would be installed prior to use where appropriate to prevent soil movement downslope from the landing. Erosion control measures may include, but are not limited to, straw bales around landing perimeter, rock surfacing, or avoidance during wet conditions. The portion of the landing outside a system road prism would be rehabilitated after use (compacted soils fractured, covered with slash or seeded and mulched). These are standard contract provisions. Helicopter service landings that occur on existing roads, quarries, or similar facilities would be exempted from C4 if no new construction or ground disturbance is involved. *National Core BMP Technical Guide - Plan 3, Road 1, Road 5, Veg 2, Veg 3 and Veg 6.*

C5. Landings used during wet conditions may need to be surfaced with rock, dependent upon soil moisture conditions. *National Core BMP Technical Guide - Veg 2, Veg 3, Veg 6 and Veg 7.*

C6. Use existing skid trails to the maximum extent possible. *National Core BMP Technical Guide - Plan 3, Veg 2, Veg 3, Veg 4 and Veg 6.*

C7. Skid trails would not be constructed through areas with indicators of a high water table, or be located in areas that would channel water onto unstable headwall areas, or located down swale bottoms. *National Core BMP Technical Guide - Plan 3, Veg 2, Veg 3, and Veg 4.*

C8. Adjacent to stream-protection buffers there would be additional restrictions for certain ground-based equipment. Only mechanical harvesting equipment used for tree falling and operating on top of slash would be allowed within 100 feet of perennial streams, or within 75 feet of intermittent streams. Distances are measured slope distance in the direction of the slope aspect. Exceptions may be made for the use of existing skid trails by the District Ranger based on recommendations from the unit fisheries biologist or hydrologist, and where there is low risk of sediment entering streams. Additional erosion control measures may be required. *National Core BMP Technical Guide – Plan 3, Veg 2, Veg 3, Veg 4 and Veg 5.*

C9. Operation of off-road ground-based equipment would generally not occur during wet periods when use could result in detrimental harm to soils or erosion. Exceptions may be made for the use of equipment operating over a sufficient slash mat when approved by the District Ranger with input from a soils scientist or hydrologist.

The appropriateness of ground-based operations would be condition-based. Three factors would be considered when determining if conditions are conducive to ground operations: a) soil type, b) antecedent precipitation, and c) visual indicators.

a) Soil type – Soil types in the planning area have been grouped into three categories and mapped for the proposed units. The contract administrator and harvest operators would use the maps to identify where to defer operations until conditions become drier when certain soil types have less moisture near the surface.

Soil Group 1: Most susceptible to ground disturbance when moist. These soil types can be wet any time of year, particularly during the spring and early summer, but also late fall in wetter years. They also can become too wet anytime there is at least a moderate rain event. Typically these soils are *not* dry for prolonged periods in most years. Ground-based operations on Group 1 soils should be deferred until late summer or early fall. Skidding should be avoided when moist.

Soil Group 2: Moderately susceptible to ground disturbance when moist. These soil types are typically wet in spring, and moist to dry in mid to late summer. Ground-based operations on Group 2 soils should be deferred until mid to late summer. Ground-based operations should be avoided when moist.

Soil Group 3: Least susceptible to ground disturbance when moist. These soil types are typically wet in spring, moist in early summer, and dry in mid to late summer. Ground-based operations on Group 3 soils can occur as soon as soil moisture status has transitioned from wet to moist.

b) Antecedent precipitation – This factor is considered next when attempting to determine if soil conditions are too wet for ground-based timber harvest operations. When the word 'rain' is used in this section, the intention is to also include melted snow.

Sometimes, even though it has not rained recently, soils can still be very wet. This can happen in the spring as snow melts or at other times.

- The USGS Clear Lake Snotel Site[1] will be used as the first test to determine when soils are likely wet or saturated. The soil is considered too wet to operate if soil moisture has been greater than 20 percent at the 2 inch depth reading for more than 5 consecutive days.

If rainfall in the proceeding days is less than the defined exceedance limits, then ground-based operations may be considered depending upon further evaluation of the visual indicators factor. The amount of rain that has fallen within a given time frame prior to operations is measured by automated online weather stations near the project area. For

[1] https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/snow/products/?cid=nrcs142p2_046386

example, the Remote Automated Weather Stations at Red Box[2] or Wanderer's Peak [3]. It would likely be considered too wet to operate when there has been more than

- 0.6 inch in 4 hours
- 1.0 inch in 24 hours
- 2.0 inches in 72 hours or
- 0.3 inches average for 7 days

Melting snow also affects soil moisture. It would likely be considered inappropriate to operate over snow if the following conditions are present.

- When it's warm and melting
- When there is less than 24 inches of uncompacted snow depth
- When temperature is above freezing for more than 6 hours each day
- When ground beneath an uncompacted snowpack is not frozen
- When rain is falling on snow

If the above conditions have not indicated the need to shut down ground-based operations, then the visual indicators would be used to verify whether operations are appropriate.

c) Visual indicators – If a visual indicator is present, operations should be deferred until soils dry further. Typical indicators would address the following

- Rutting in skidtrails greater than 12 inches
- Off-trail rutting greater than 6 inches
- Rutting of temporary roads greater than 6 inches
- Water running down road surface
- Standing water or ponding on the ground
- Puddles in skidtrails, landings or roads that last more than 5 days
- Observable turbidity in streams issuing from culverts or in ditches
- Presence of free water in a soil sample (water comes out of dirt clod when firmly squeezed)
- Mud mixed with snow from machine travel
- Ruts in soil below snowpack

Soils may be considered appropriate for use if the following conditions are met.

Soil not frozen	Need 10 inches of machine-packed snow
2 inches of frozen soil	Need 6 inches of machine-packed snow
4 inches of frozen soil	No snow cover necessary

National Core BMP Technical Guide - Veg 2, Veg 4, and Veg 7.

[2] http://www.wrh.noaa.gov/mesowest/getobext.php?sid=RXFO3&table=1&banner=off
[3] https://www.wrh.noaa.gov/mesowest/getobext.php?wfo=mso&sid=wpko3&num=48&raw=0&dbn=m&banner=no

Monitoring

Condition-based operating restrictions are intended to protect resources as well as, or better than previously used calendar-based restrictions. Since condition-based operations are relatively new, any ground-based operations that occur between November 1 and May 31 would be monitored to provide feedback and support adaptive management.

C10. Erosion control measures would be implemented to prevent off-site movement of disturbed soils from logging, and other related actions. Areas of soil displacement on steep slopes resulting from yarding systems would be treated to prevent rill and gully erosion and possible sediment delivery to stream courses. Where appropriate, erosion control treatment on bare soils may include water bar placement, hillslope contouring, creating small ditches or diversions to redirect surface water movement, scattering slash on disturbed soils, placement of mulch, and application of approved seed. Mulch may be used on slopes greater than 20%. Effective ground cover would be installed prior to shutting down for an extended period (e.g. two weeks or more). When operations occur when it is likely to soon become too wet to operate, erosion control work would be kept current and installed as soon as practicable. The coverage of effective ground cover would be sufficient to prevent off-site movement of soils as guided by Forest Plan standard and guideline FW-025 and by Forest Service Handbook 2509 (R6 supplement). These are standard contract provisions. *National Core BMP Technical Guide – Veg 2, Veg 3, Veg 4, Veg 5 and Veg 6.*

C11. Bare soils would be covered by slash or other vegetative material or seeded and mulched. The coverage of effective ground cover would be sufficient to prevent off-site movement of soils as guided by Forest Plan standard and guideline FW-025 and by Forest Service Handbook 2509 (R6 supplement). For restoration, revegetation, or erosion control on disturbed ground, use only locally adapted native plant materials; i.e., seed, cuttings, divisions, corms, bulbs, and/or transplants that have been collected from the Mt. Hood National Forest. If for some reason, native plant materials from the Forest are not available, materials from the west side of the Gifford Pinchot National Forest or the north side of the Willamette National Forest can substitute. The following would not be used: materials from outside this sub-region, non-native plants, invasive plants, orchard grass (*Dactylis glomerata*), annual ryegrass (*Lolium muliflorum*; also known as *L. perenne* ssp. *multiflorum*) or the cultivar Madsen sterile wheat (*Triticum aestivum*). Locally collected native blue wildrye (*Elymus glaucus*) and California brome (*Bromus carinatus*]) are appropriate to use.

C12. Where untethered ground-based skidding equipment is used, such as tractors or rubber tired skidders, equipment would be confined to pre-approved skid trails, roads or landings.

Where new skid trails are needed: skid trails would be spaced an average of 150 feet apart except where converging; skid trails would be located to minimize the alteration of surface hydrology; uphill skidding would generally be on slopes less than 20% except on short pitches; and downhill skidding would generally be on slopes less than 30%.

Where existing skid trails are used: some ground-based operations would occur on slopes steeper than 30% where existing skid trails are available and not hydrologically connected. Skid trails in these situations are typically contouring or diagonally constructed skid roads with cut

and fill. In these areas, equipment would stay on approved existing skid trails and directional felling and winching of logs would occur. *National Core BMP Technical Guide – Veg 2 and Veg 4.*

C13. Where forwarders and cut-to-length harvesters are used, the harvester/forwarder paths would be spaced a minimum average of 60 feet apart except were converging. Both machines would operate over continuous slash-covered paths. The layer of woody debris would be as thick as possible given the slash available from harvested trees and other available material. When tethered, these machines may operate on slopes up to 60%. *National Core BMP Technical Guide – Veg 2 and Veg 4.*

C14. Where harvesters are used in conjunction with traditional skidding equipment, skyline systems or helicopter systems, mechanical harvesting equipment used for tree falling would be limited to a single pass on each pathway unless operating on continuous slash-covered paths. The layer of woody debris would be as thick as possible given the slash available from harvested trees and other available material. A slash layer is not required when equipment is moving on approved skid trails. Untethered mechanical harvesting equipment would generally operate on slopes less than 35%, but may operate on slopes from 35 to 40% if farther than 180 feet from a stream and if equipment stays on existing approved skid trails or moves straight up and down the slope without turning. Tethered harvesters may operate on slopes up to 60%. *National Core BMP Technical Guide – Veg 2 and Veg 4.*

D. Temporary Road Construction and Existing Road Alignment Reconstruction

D1. Soil disturbing road construction or reconstruction activities would not occur during wet conditions. *National Core BMP Technical Guide - AqEco 2, Road 3, Veg 2, and Veg 3.*

D2. Emphasize the reuse of existing road alignments rather than the construction of new roads where appropriate. Where feasible, new temporary roads should not be constructed within 180 feet of perennial streams. Distances are measured slope distance in the direction of the slope aspect (the direction water would flow). Where stream crossings are needed, they would be designed to minimize impacts to aquatic resources using techniques such as French drains, log fords and temporary culverts. *National Core BMP Technical Guide - Plan 3, AqEco 2, Road 1, Road 5, Road 7, Veg 2, Veg 3 and Veg 6.*

D3. New temporary road construction would generally occur on or near stable ridgetop locations, or on stable, relatively gentle topography. Sidecast road-construction techniques would not occur when the hill slope exceeds 30%. *National Core BMP Technical Guide - Plan 3, Road 1, Road 5, Veg 2, and Veg 3.*

D4. New temporary roads would not increase the stream-drainage network (i.e. Roads would be outsloped, or the outflow of new ditch-relief culverts or other drainage structures would not drain to streams). *National Core BMP Technical Guide - Plan 3, AqEco 2, Road 1, Road 5, Veg 2, and Veg 3.*

D5. Where adjacent to system roads with ditches, temporary roads, reconstructed roads and landings would not obstruct ditch lines. Temporary obstructions of ditch lines or drainage ways may be approved if French drains or drivable dips are installed to provide effective drainage and prevent erosion. *National Core BMP Technical Guide – Road 1, Road 2, and Road 5.*

D6. Erosion control measures would be implemented to prevent off-site movement of disturbed or exposed soil associated with temporary road construction and use, (including cutbanks, fills, ditches, etc.) on road segments that have the potential to directly or indirectly deliver sediment to any stream channel. Erosion control measures include silt fences, wattles, straw bales, matting, mulch, slash, water bars, ditch check dams, grass seed, or other products. This work and installation of berms at the road entrance would occur prior to shutting down for an extended period (e.g. two weeks or more). When operations occur when it is likely to soon become too wet to operate, erosion control work would be kept current and installed as soon as practicable. *National Core BMP Technical Guide – Road 1, Road 5, Veg 2, Veg 3, Veg 4, Veg 5 and Veg 6.*

D7. Rock may be used when necessary to reduce erosion, puddling and compaction on temporary roads. To provide an efficient substrate for vegetative growth and water infiltration, rock would be removed and/or incorporated into the roadbed by subsoiling following harvest activities. *National Core BMP Technical Guide – Road 1, Road 5, Veg 2 and Veg 6.*

D8. Temporary roads, existing road alignments and adjacent landings that are used by the operator would be rehabilitated after use. The following applies to non-system, temporary roads and existing road alignments that are used by the operator.

Temporary roads and most existing alignments would be rehabilitated using a suite of techniques site-specifically designed for each, and may include placement of one or more berms at the road's entrance, construction of water bars, and/or placement of debris such as root wads, slash, logs or boulders where available. Native surfaced roads would be decompacted as needed with the jaws of a log loader or excavator. Roads or sections of roads that have rock surfacing may be decompacted where site-specific circumstances warrant. The technique known as "cratering," which is a standard practice often used for system road decommissioning, may be used to decompact temporary roads or reused existing road alignments.

Cross-drains or water bars would typically be installed every 150 feet, or more frequently, where the road grade exceeds 5%. Actual placement distances may vary with topography to ensure proper drainage. Temporary culverts would be removed.

Available logging slash, logs or root wads would be placed across the road and landing surface. Where slash, logs or root wads are not available in sufficient quantities, bare soils would be seeded and mulched. The coverage of effective ground cover would be sufficient to prevent off-site movement of soils as guided by Forest Plan standard and guideline FW-025 and by Forest Service Handbook 2509 (R6 supplement). *National Core BMP Technical Guide – Road 5, Road 6, Veg 2 and Veg 3.*

E. System Road Reconstruction and Maintenance

E1. Soil disturbing road reconstruction activities would not occur during wet conditions, unless the road segment has no hydrologic connection. *National Core BMP Technical Guide - AqEco 2, Road 3, Veg 2, and Veg 3.*

E2. During road maintenance activities, existing desirable vegetation (e.g. grass) growing in ditches that discharge to streams would not be removed unless an effective sediment trap is

installed and maintained until vegetation is reestablished. This does not restrict brush or tree cutting that leaves roots intact. The fill slopes at stream crossings would be vegetated or otherwise stabilized such that road surface sediments are retained prior to entering the stream channel. Roads approaching stream crossings would have adequate cross drainage to divert potential ditch sediment toward slopes where material can be trapped. Stream crossings that do not fully meet these standards would be repaired, reconstructed, or mitigated as directed by the District Ranger based on input from the unit fish biologist, hydrologist or soil scientist by inclusion of erosion control measures such as silt fences, wattles, straw bales, matting, mulch, slash, water bars, ditch check dams, grass seed or other products. This work would occur prior to shutting down for an extended period (e.g. two weeks or more). *National Core BMP Technical Guide – Road 4.*

E3. Material removed from ditches would not be graded onto the road surface where the road surfaces are between a cross drain culvert and a stream crossing culvert. Material that must be removed from ditch lines within this distance would be removed and stored farther than 100 feet of a stream and where they cannot flow directly to a stream. *National Core BMP Technical Guide – Plan 3, AqEco 2, Road 4, Veg 2, and Veg 3.*

E4. Excavated materials from ditch cleaning or other operations would be disposed of at approved sites. Material would be spread evenly over an appropriate area in non-conical shaped piles with a maximum layer thickness of three feet. Bare material would be seeded and mulched at the completion of operations. *National Core BMP Technical Guide – Road 4.*

E5. Where new cross drain culverts are needed, they would be located to drain to a stable slope with porous soils, allowing for water infiltration, with adequate energy dissipation, with a low probability of erosion, and where no new channel would connect to an existing stream. *National Core BMP Technical Guide –AqEco 2, Road 3, Road 4, Veg 2, and Veg 3.*

E6. Large woody material removed from stream channels during culvert maintenance would be retained in the stream network and would use techniques to minimize sediment mobilization. Typically, this would entail repositioning wood located upstream from a culvert to a location downstream of the culvert. *National Core BMP Technical Guide –AqEco 2, Road 4, Road 7 and Veg 3.*

E7. For Maintenance Level 1 System Roads (closed) - Roads would be reclosed and stormproofed as described in the post-haul maintenance specifications in the contract. If roads need to be used for more than one operating season, prior to shutting down for an extended period (e.g. two weeks or more), roads would be treated to minimize erosion and prevent use by using techniques such as water barring or construction of berms where appropriate. *National Core BMP Technical Guide –AqEco 2, Road 1, Road 3, Road 4, Road 6, Veg 2, and Veg 3.*

E8. Water needed for dust abatement, road maintenance, reconstruction or construction, or other uses, may be acquired off-Forest or may be acquired on-Forest if the following criteria are met.

Drafting from occupied Listed Fish Habitat (LFH) stream reaches would not occur. Water withdrawal in unoccupied LFH, and within 1500’ of any LFH (occupied or unoccupied) would be

limited to 10 percent or less of the stream flow at the point of withdrawal, by visual estimation. In non-LFH streams greater than 1,500 feet from LFH, water withdrawal would be limited to 50 percent or less of the stream flow at the point of withdrawal. Where multiple drafting operations occur, they would be dispersed in space and time. Pipe intakes would be screened; woven wire screens would have a maximum 1.75 mm gap, and perforated plate screens would have a maximum opening of 3/32nd inch. *National Core BMP Technical Guide – AqEco 2, Road 4, WatUses 3.*

F. System Road Decommissioning (and other road construction or reconstruction work in close proximity to streams) *National Core BMP Technical Guide – Road 3, Road 6 and Road 7.*

F1. For road removal projects close to streams, recontour the affected area to mimic natural floodplain contours and gradient to the greatest extent possible but restored areas should not have slopes greater than a 2 to 1 ratio.

F2. For those road segments immediately adjacent to a stream or where the road fill is near a wetted stream, use sediment control barriers where needed such as certified weed-free straw bales, wattles, or silt fencing between the project and the stream.

F3. Where decompaction is prescribed, the road surface would be de-compacted to a depth of 18 inches over an area sufficient to provide for water infiltration. The technique known as "cratering" may be used to decompact decommissioned roads.

F4. Where bare soil is exposed, the disturbed area would have effective ground cover installed using slash, logs or root wads. Where slash is not available, mulch would be applied at approximately 3,000 pounds per acre or so that there is completed coverage of the bare soil surface and the mulch is 2 inches deep. If seed is applied, it would be placed during conditions favorable for germination.

F5. Drainage features would be spaced to hydrologically disconnect road surface runoff from stream channels.

F6. Dispose of slide and waste material in stable sites out of the flood prone area. Waste material other than hardened surface material (asphalt, concrete, etc.) may be used to restore natural or near-natural contours.

F7. Minimize disturbance of existing vegetation in ditches and at stream crossings to the greatest extent possible.

F8. Conduct activities when soil moisture levels are low to moderate. Road decommissioning and activities near streams would be suspended if there is more than one inch of rain in a 24 hour period or more than two inches of rain in 48 hours. See discussion of automated weather stations at C9.

F9. The Oregon Department of Fish and Wildlife Guidelines for Timing of In-Water Work would be followed. In stream work would only occur between July 15th and August 31st. Exceptions to

these guidelines for timing of in-water work may be requested from appropriate regulatory agencies.

F10. Activities associated with culvert removal or replacement in streams with active streamflow would be suspended if there is an increase of 10 NTU's (Nephlometric Turbidity Units) below the project area.

F11. Operations would be scheduled and conducted so as to prevent eroded material from entering any waterway. Live streams would be diverted from work areas prior to excavation of culverts, or any other stream crossing structure. A stream diversion plan would be developed prior to starting of excavation in live streams.

F12. Excavations to remove or replace stream culverts would be matched to the approximate bed elevation and bank-full stream width of the existing streambed. Cuts would match natural bank slopes.

F13. At culvert removal sites, the road would have waterbars or other drainage features constructed to route surface water away from the newly excavated slopes.

F14. Dispose of side-cast and waste material (asphalt, concrete, etc.) in stable sites out of the flood prone area. Native soils and rock used to construct the road may be used to restore natural or near-natural floodplain and bankfull contours, which were altered by the road and associated ditches and structures.

F15. When removing or replacing a culvert, techniques to minimize turbidity would be used where appropriate such as the use of temporary sediment retention devices including biobags, straw bales or burlap.

F16. For culvert removal projects, restore natural drainage patterns (floodplain and bankfull) and, when possible, promote passage of all fish species and life stages present in the area. Evaluate channel incision risk and construct in-channel grade control structures when necessary.

F17. In-stream projects are covered by a Department of the Army Permit; Regional General Permit for U.S. Forest Service and Bureau of Land Management Aquatic Habitat Restoration Within the State of Oregon (RGP-4). The Forest complies with the conditions specified in the 401 Water Quality Certification issued by the Oregon Department of Environmental Quality on April 2, 2015. The following 401 WQC Category Specific Conditions would be implemented where applicable.

Turbidity: All practical Best Management Practices (BMPs) on disturbed banks and within the stream shall be implemented to minimize turbidity during in-water work. OAR 340-041-0036 states that turbidity shall not exceed 10% above natural stream turbidities, except where allowed by the rule. This rule also states that limited duration activities necessary to accommodate essential dredging, construction or other legitimate activities and which cause the turbidity standard to be exceeded may be authorized provided all practical turbidity

control techniques have been applied and a section 401 water quality certificate has been granted.

a. Monitoring: Turbidity monitoring shall be conducted and recorded as described below. Monitoring shall occur each day during daylight hours when in-water work is being conducted. A properly and regularly calibrated turbidimeter is recommended, however, visual gauging is acceptable.

i. Representative Background Point: a sample or observation must be taken every four hours at a relatively undisturbed area approximately 100 feet up-current from in-water disturbance to establish background turbidity levels for each monitoring cycle. Background turbidity, location, and time must be recorded prior to monitoring down-current.

ii. Compliance Point: Monitoring shall occur every four hours approximately 100 feet down-current from the point of discharge and be compared against the background measurement or observation. The turbidity, location, and time must be recorded for each sample.

b. Compliance: Results from the compliance points should be compared to the background levels taken during each monitoring interval. Exceedances are allowed as follows:

MONITORING WITH A TURBIDIMETER

ALLOWABLE EXCEEDANCE TURBIDITY LEVEL	ACTION REQUIRED AT 1st MONITORING INTERVAL	ACTION REQUIRED AT 2nd MONITORING INTERVAL
0 to 5 NTU above background	Continue to monitor every 4 hours	Continue to monitor every 4 hours
5 to 29 NTU above background	Modify BMPs & continue to monitor every 4 hours	Stop work after 8 hours at 5-29 NTU above background
30 to 49 NTU above background	Modify BMPs & continue to monitor every 2 hours	Stop work after 2 hours at 30-49 NTU above background
50 NTU or more above background	Stop work	Stop work

VISUAL MONITORING

ALLOWABLE EXCEEDANCE	ACTION REQUIRED AT 1st	ACTION REQUIRED AT 2nd
No plume observed	Continue to monitor every 4 hours	Continue to monitor every 4 hours
Plume observed	Modify BMPs & continue to monitor every 4 hours	Stop work after 8 hours with an observed plume

When monitoring visually, turbidity that is visible over background is considered an exceedance of the standard.

If an exceedance over the background level occurs, the operator must modify the activity and continue to monitor every four hours or as appropriate (above). If an exceedance over the background level continues after the second monitoring interval, the activity must stop until the turbidity levels return to background. If, however, turbidity levels return to background at second monitoring level due to implementation of BMPs or natural attenuation, work may continue with appropriate monitoring as above.

If an exceedance occurs at: 50 NTU or more over background; 30 NTU over background for 2 hours; or 5-29 NTU over background for 8 hours, the activity must stop immediately for the remainder of that 24-hour period.

c. Reporting: Copies of daily logs for turbidity monitoring shall be available to DEQ, USACE, NMFS, USFWS, and ODFW upon request. The log must include: background NTUs, compliance point NTUs, comparison of the points in NTUs, location, and time for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions.

d. Minimizing In-stream Turbidity:

i. Sequence/Phasing of work - The operator would schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket shall be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or by using a closed-lipped environmental bucket shall be implemented;
iii. Limit the number and location of stream crossing events. Establish temporary crossing sites as necessary at the least impacting areas and supplement with clean gravel or other temporary methods as appropriate;
iv. Machinery would not drive into the flowing channel;
v. Excavated material would be placed so that it is isolated from the water edge or wetlands and not placed where it could re-enter uncontrolled; and,
vi. Use of containment measures such as wattles, silt curtains, geotextile fabric, and silt fence would be implemented and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity.

F18. During road decommissioning, if danger trees need to be cut for safety reasons they would be left on site.

F19. For culvert removal or replacement projects, an experienced professional fisheries biologist, hydrologist or technician would be involved in project design.

F20. All stream crossing culverts would be designed to pass at least a 100-year flood streamflow.

G. Timber and Rock Transport (Haul)

G1. Haul would be carefully monitored, particularly during wet conditions and when it is likely to soon become too wet to operate. Depending on the surface type and specific design features of a road, haul and use by other heavy vehicles could damage the road or cause unacceptable resource impacts.

a. Paved Roads - Haul would not be restricted on paved roads unless they are being damaged.

b. Aggregate Roads - Haul may occur during wet conditions on aggregate roads. Haul would be stopped immediately if road use is causing rutting of the road surface, ponding of water on the road, failure of any drainage structure, or any other action occurs which increases the sediment delivery to a stream. On some roads, depending on haul volume, this would likely occur when there is more than one inch of rain in a 24 hour period or more than two inches of rain in 48 hours. See discussion of automated weather stations at C9.

c. Native Surfaced Roads - Haul would not occur on native surfaced roads during wet conditions as described at C9, unless hardened with crushed aggregate or other rock, and drainage structures or other erosion control measures are installed to prevent sediment delivery to streams and protect the road structure.

d. Haul routes would be inspected weekly, or more frequently if weather conditions warrant. Inspections would focus on road surface condition, drainage maintenance, and sources of soil erosion and sediment delivery to streams. If sediment traps are used, they would be inspected weekly during wet conditions and entrained soil would be removed when the traps have filled to ¾ capacity. Removed materials would be deposited in a stable site that is not hydrologically connected to a stream. These are standard contract provisions.

Technical Guide – AqEco 2, Road 1, Road 4, Veg 2, Veg 3 and Veg 7.

G2. To prevent road damage, haul would not occur when the roadbed is under freeze-thaw conditions. To determine if freeze-thaw conditions exist, measurements of the road surface temperature should be taken at the highest and lowest elevations along the haul route on National Forest System Roads to ensure that haul roads are either completely frozen or completely thawed. Temperature readings at these locations should both be at or below 28° F., or both be at or above 38° F. Roads that have been under standing snow for at least 3 days with no evidence of snow melt may be assumed to be completely frozen. The Contracting Officer may allow haul to proceed if other methods are used to determine that the haul roads are either completely frozen or completely thawed. The Contracting Officer would suspend haul if it is determined that road damage is occurring based on observation of field conditions. *National Core BMP Technical Guide – Road 4.*

H. Operations

H1. Spill Prevention - An approved Spill Prevention Control and Containment Plan (SPCCP) would be created, as required by contract provisions G.3.4.1/BT6.341, which describe measures to prevent or reduce impacts from potential spills. The SPCCP would include a description of the hazardous materials that would be used; and a spill containment kit would be located on-site. All trucks used for refueling would carry a hazardous material recovery kit. All vehicles and machinery would be free of petroleum leaks. Any leaks that occur would be immediately repaired. Power equipment would be refueled at least 150 feet from water bodies to prevent direct delivery of contaminants into a water body. If local site conditions do not allow for a 150-foot setback, then refueling would be as far away as possible from the water body. For all immobile equipment, absorbent pads would be used. All petroleum products being transported or stored would be in approved containers meeting Occupational Safety and Health Administration standards and Oregon Department of Transportation. The Contracting Officer

would be notified of any spills. Any contaminated soil, vegetation or debris must be removed from National Forest System lands and disposed of in accordance with state laws. *National Core BMP Technical Guide – Road 10.*

H2. Firewood would be made available to the public at landings where feasible. Certain units or portions of units may be made available for the removal of green biomass and firewood as part of the prescription. A mix of commercial and personal use removal may occur where feasible.

H3. Contracts would contain provisions for the protection of heritage resource sites found during project activities. In the event that sites are located during implementation, project activities would be halted until consultation with the Forest Archeologist can determine appropriate site-specific mitigation. Protection measures would be developed in consultation with the Oregon State Historic Preservation Officer (SHPO), appropriate Tribes, and, if necessary, the Advisory Council on Historic Preservation.

I. Invasive species

I1. All off-road equipment is required to be free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds prior to coming onto National Forest lands. Contracts would include provisions to minimize the introduction and spread of invasive plants. These provisions contain specific requirements for the cleaning of off-road equipment.

I2. Gravel or rock used for roads and landings would come from sources approved by the Forest invasive plant specialist.

I3. Road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants would be conducted in consultation with an invasive plant specialist.

I4. Seed used for erosion control or other reasons would preferably be grown under government-supervised contracts, or certified by the state of Oregon to assure noxious weed free status. In certain cases, non-certified seed may be used if it is deemed free of Oregon State Class A & B noxious weeds.

I5. When straw and mulch are utilized for erosion control, it would be annual ryegrass straw or spring wheat straw certified by the State of Oregon, or would originate from fields which grow State of Oregon certified annual ryegrass seed, or originate from Willamette Valley Oregon fields which grow only annual ryegrass seed for large-scale commercial seed production. In place of straw, wood fiber mulch may be used. *National Core BMP Technical Guide – Veg 4.*

J. Wildlife

J1. Snags & Down Wood

Snags would be retained in all units where safety permits. If snags must be cut for safety reasons, they would be left on site. To increase the likelihood that snags would be retained, they may be included in skips.

Certain live trees would also be selected as leave trees that have the "elements of wood decay" as described in the DecAID advisor. This may include trees with features such as dead tops, broken tops and heart rot. They may be retained in skips.

Old down logs currently on the forest floor would not be removed.

Additional down woody debris would be generated by operations. This would include the retention of cull logs, tree tops, broken logs and any snags that would be felled for safety reasons.

Some units have standing trees that were girdled or topped in the past. These would be protected where feasible.

Except in certain root rot patches where snags are abundant, live trees would be treated within harvest units and protection buffers to provide future snags and down wood. Tree topping is generally the technique used to create longer lasting snags and to create live trees with decay. Girdling is the technique used to create snags quickly but they decay, fall over sooner, and become down wood. Some trees are felled to get immediate down wood. After harvest, and after one or two winters elapse, the units would be examined to determine whether trees died or fell down. In areas where the following target levels are not already met, additional trees would be topped, felled or girdled. In LSRs, there should be three trees per acre with broken tops, five trees per acre should be dead and two trees per acre should be on the ground. In thinning units outside LSRs, there should be one tree per acre with a broken top, and two trees per acre should be either dead or down. In regeneration harvest units, outside the skips there should be one tree per acre either dead or with a broken top, and three trees per acre on the ground. If trees need to be treated to meet these numbers, they would be treated farther than one tree-height from system roads to minimize safety issues and potential losses from firewood gathering.

K. Wood Enhancement in Streams

K1. The project fisheries biologist would select trees to be felled, pushed, or lined over; and the locations of in-stream placement.

K2. Only live trees that are 24 inches diameter or less would be felled, pushed, or lined over. Where appropriate, down wood lying above a stream would be bucked so that at least one end falls into the stream. Some wood would be brought in from off site.

K3. Trees or logs would be placed in a manner that creates new aquatic habitat and does not block fish passage.

K4. The Oregon Department of Fish and Wildlife Guidelines for Timing of In-Water Work would be followed. In stream work would only occur between July 15th and August 31st. Exceptions to these guidelines for timing of in-water work may be requested from appropriate regulatory agencies.

K5. When operating chainsaws near streams, a vegetable-based bar oil would be used. Refueling would be done greater than 100 feet from a stream.

K6. A post-project review would be conducted after winter and spring high flows and adjustments would be made where necessary to provide for fish passage or to minimize bank erosion.

L. Fuel Treatment

L1. Where slash is piled for later burning, machine or hand piles would be no less than 6 feet high by 6 feet in diameter and would be no greater than 12 feet high by 20 feet in diameter. Landing piles may be larger. Piles would be constructed 20 feet or farther from live trees where leave-tree spacing allows. Where leave-tree spacing does not allow a 20-foot gap between a live tree and a pile, piles would be constructed closer to the minimum size of 6 feet high by 6 feet in diameter to minimize tree scorch. Piles would not be constructed in roadside ditches or in areas where burning may damage infrastructure. Fuels would not be treated or piles created within the riparian protection-buffer distances specified in A1 for thinning. Piles would be covered with 6 mil black polyethylene plastic over at least 50% of the pile. Piles would be constructed to minimize soil movement to protect soil productivity and provide for efficient burning.

L2. Fuels would be treated within some units to reduce fire hazard, prepare the site for planting or enhance forage for deer and elk.

a. Within regeneration harvest units that have a ground-based logging system, activity fuels would be grapple piled. To the extent feasible, piling equipment would operate on existing skid trails or roads to minimize additional soil impact. To the extent feasible, piles would be placed on top of areas already impacted by heavy equipment such as skid trails, to minimize additional soil impact from severe burning.

b. Where broadcast burning or underburning is prescribed, burning would be accomplished at the appropriate time of year to consume a sufficient quantity of slash and brush while protecting soil and leave trees. Where fire line is constructed, techniques to minimize erosion and sedimentation risks, would be included such as constructing water bars on fire lines during initial fire-line construction where slopes are greater than 20%. Where Riparian Reserves are involved, no ignition would occur, but fire would be allowed to move through Riparian Reserves where flame lengths can be kept sufficiently low to result in a low intensity burn with a mosaic pattern of burned and unburned areas. If control line is needed within Riparian Reserves; wet line, black line or pre-existing features (roads, trails, etc.) would be used to control prescribed fire perimeter. Post-burning erosion control would be included as described in C10 and C11.

L3. Prescribed fire burn plans would follow the Interagency Prescribed Fire Planning and Implementation Procedures Guide 2017 as well as the Best Smoke Management Practices to minimize smoke effects. The Oregon Smoke Management Plan, which is administered by the Oregon State Forester, regulates the amount of forestry related burning that can be done at any one time.

L4. If the operator processes chips at the landing, the waste product called flail should be spread out across the landings and skid trails to a maximum depth of 6 inches, keeping at least a 10-foot buffer of bare ground between the flail and the edges of slash piles. The total size of

the flail spread should not exceed 2,500 square feet at each site. Any material that cannot be spread in this manner would be piled and covered with 6 mil black polyethylene plastic for later burning.

M. Adaptive Management

Projects would utilize the concept of adaptive management. Proposed actions are identified that are considered appropriate at the time but sometimes situations change that warrant adjustment of the action. For example, when dealing with road closures, unauthorized Off-Highway Vehicle use or unauthorized target shooting, situations can change rapidly between planning and implementation and adaptive management is appropriate to make sure the desired outcome is actually achieved. The exact treatment details may be adjusted at the time of implementation, or conceivably after implantation if it becomes clear that more work is needed. Revised actions would be tailored to changing site-specific conditions with the objective of achieving resource protection and public safety.

Before final actions are taken, an interdisciplinary team would be assembled to review projects to ensure their effectiveness. The District Ranger would approve projects and certify that the anticipated effects and benefits fall generally within the range of effects and benefits described in the relevant NEPA document.

References

USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide, April 2012, FS-990a.