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Appendix B - Best Management Practices

Best management Practices (BMP's) are the primary mechanisms used to enable the achievements of water quality standards (Environmental Protection Agency 1987). The EPA has certified the Oregon Forest Practices Act and Washington Forest Practices Rules and Regulations as BMP's. The States of Oregon and Washington compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed State Requirements.

Following are the Best Management Practices that apply to the Tower Fire Rehabilitation Project.

TIMBER MANAGEMENT

T-1. Title: *Timber Sale Planning Process*

Description - Introduce hydrologic considerations into timber sale planning process.

Location - Entire Sale Area

Effects - Avoidance of potential damage during and following the sale layout and subsequent logging operation.

Consequences - Detrimental impacts to soil, riparian areas, sensitive plants and downstream water sources are reduced.

T-2. Title: *Timber Harvest Design*

Description - To ensure that timber harvest design will secure favorable water conditions of water flow, water quality and fish habitat.

Location - All harvest units

Effects - Where adverse impacts on the water resource can result, the harvest unit design is modified, and/or watershed treatment measures are applied to accelerate the natural recovery rate.

Consequences - Detrimental impacts to soil riparian areas, sensitive plants and downstream water sources are reduced.

T-3. Title: *Use of Erosion Potential Assessment for Timber Harvest Unit Design*

Description - Identify areas with high erosion potential and adjust harvest unit design as necessary.

Location - All harvest units.

Effects - Modify or eliminate harvest activities on areas with high erosion potential.

Consequences - Prevention of downstream water quality degradation.

T-4. Title: *Use of Sale Area Map for Designating Water Quality Protection Needs.*

Description - Delineate the location of protection areas and available water sources as a guide for both the Purchaser and the Sale administrator, and to ensure their recognition and proper consideration and protection on the ground.

Location - Entire sale area

Effects - Protected areas are identified on the Sale Area Map

Consequences - Detrimental impacts to protected areas are reduced.

T-5. Title: *Limiting the Operating Season.*

Description - To ensure that the purchaser conducts operations in a timely manner, within the time period specified in the timber sale contract.

Location - All harvest units.

Effects - Limited operation periods are identified and recommended during the Timber Sale Planning Process by the Interdisciplinary Team and followed through the life of the timber sale primarily by the Sale Administrator (TSA).

Consequences - Detrimental impacts to soils, water, and other resources are reduced.

T-7. *Streamside Management Unit Design*

Description - All riparian areas (streams, seeps, bogs, and springs) will be protected from harvest activities during harvest operations. Under alternatives 2, 3 and 6, this will be accomplished through avoiding PACFISH Riparian Habitat Conservation Areas (300 feet on each side of class 1 and 2 streams, 150 feet for class 3 streams and 100 feet for class 4 streams and springs, seeps, and bogs less than 1 acre). In alternative 5, the Riparian Habitat Conservation Area for class 3 streams will be buffered with an additional 150 feet on each side to decrease the risk of sediment reaching perennial water.

Location - All harvest units

Effects - Minimize potential adverse effects of logging and related land disturbance activities on water quality and beneficial uses.

Consequences - Avoidance of stream channels in the harvest areas.

T-8. *Streamside Protection (Implementation and Enforcement)*

Description - (1) To protect the natural flow of streams, (2) to provide unobstructed passage of streamflows and (3) prevent sediment and other pollutants from entering streams

Location - All harvest units

Effects - To minimize potential adverse effects from harvest activities to streams.

Consequences - Water quality is maintained.

T-9. *Determining Tractor Loggable Ground*

Description - Tractor logging is restricted to lands that can be harvested with a minimum of soil compaction and erosion. Factors considered when selecting tractor operable land are: slope, topography, soil texture, soil drainage, and drainage patterns.

Location - Land suitable for tractor logging is identified in the pre-sale (planning) phase of the timber sale planning process. Provisions in the Timber Sale Contract (TSC) specify the areas and conditions upon which tractors can operate. Requirements governing tractor operations are incorporated in the Timber Sale Contract (TSC).

Effects - The interdisciplinary team ensures that adequate protection measures for soil exist when using tractor logging.

Consequences - Detrimental impacts (compaction, displacement, erosion) to soils and potential impacts to downstream water quality are reduced by deterring the most effective logging operational method.

T-10. *Logging Landing Location.*

Description - Locate landings to minimize creation of hazardous watershed conditions.

Location - TSA approves landings, uses existing landings where possible. Landings will not be located inside PACFISH buffers, cultural sites, or on in-place emergency rehabilitation structures.

Effects - The Sale administrator ensures that the landings are located and constructed according to the Timber Sale Contract.

Consequences - Detrimental impacts to water quality are reduced by minimizing soil disturbances.

T-11. *Tractor Skid Trail Location and Design.*

Description - To minimize the area compacted, erosion, and runoff water. Skid trails will be located and approved in advance of skidding.

Location - All harvest units.

Effects - Careful control of skidding patterns can minimize on-site compaction and off-site damage.

Consequences - Detrimental impacts to soils and water quality are reduced.

T-12. *Suspended log Yarding in Timber Harvesting.*

Description - To protect soils from excessive disturbance. To maintain the integrity of sensitive watershed areas.

Location - All harvest units

Effects - Less soil disturbance and fewer truck roads.

Consequences - Detrimental impacts to soils and water quality are reduced.

T-13. *Erosion Prevention and Control measures During Harvest Operation.*

Description - To ensure that the purchaser's operations shall be conducted to minimize soil erosion.

Location - All harvest units.

Effects - Setting forth Purchasers responsibilities in the TSC.

Consequences - Prevent/control erosion and sediment movement.

T-14. *Revegetation of Areas Disturbed by Harvest Activities.*

Description - Where soil has been severely disturbed by the Purchaser's operation, and the establishment of vegetation/cover is needed to minimize erosion and protect water quality, the Purchaser shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation, including the application of seed, mulch and fertilizer as necessary, or take other agreed upon stabilization measures.

Location - All harvest units

Effects - Vegetative cover will be established on disturbed sites to prevent erosion and sedimentation.

Consequences - Prevent/control erosion and sediment movement.

T-15. *Log Landing Erosion Prevention and Control.*

Description - Landings will be monitored for erosion and compaction, and treated where necessary with water bars/lop and scatter. Sub-soiling will be done after operations.

Location - All harvest units.

Effects - Equipment shall not be operated when ground conditions are such that excessive damage will result.

Consequences - Erosion and compaction are reduced.

T-16. *Erosion Control on Skid Trails.*

Description - To protect water quality by minimizing erosion and sedimentation derived from skid trails.

Location - All skidtrails

Effects - Installation of erosion control measures on skid trails, tractor roads and temporary roads.

Consequences - Water quality is protected by minimizing erosion and sedimentation derived from skid trails.

T-18. *Erosion Control Structure Maintenance*

Description - To ensure that constructed erosion control structures are stabilized and working, including those constructed after the fire.

Location - All harvest units.

Effects - Protection of erosion control structures from the effects of timber harvesting.

Consequences - Long-term soil productivity is maintained and impacts to downstream water quality are reduced.

T-19. *Acceptance of Timber Sale Erosion Control Measures Before Sale Closure.*

Description - To ensure the adequacy of required erosion control work on timber sales. TSA will need to inspect BAER structures as well as measures put in place by the purchaser.

Location - All harvest units.

Effects - Performing inspections/checking erosion control work for effectiveness prior to the sale being closed.

Consequences - Detrimental impacts to water quality are eliminated by reducing erosion and sediment movement to downstream water sources.

T-20. *Reforestation*

Description - To reforest all suitable land harvested within five years after the salvage cut and to promptly reforest all other existing regeneration units destroyed in the fire.

Location - Salvage harvest areas as well as other areas burned in the fire.

Effects - Harvest areas are regenerated with trees within five years after cutting.

Consequences - Provide future timber growing stock, improve visual quality, improve wildlife habitat, stabilize soils, and provide improved infiltration.

T-21. *Servicing and Refueling of Equipment.*

Description - To prevent pollutants from being discharged into or near rivers, streams, and impoundment's or into natural or man-made channels leading thereto. No servicing or refueling where spills could reach a main channel or ephemeral stream.

Location - All harvest units.

Effects - Selecting service and refueling areas well away from wet areas and surface water, and by using berms around such sites to contain spills.

Consequences - Detrimental impacts to water quality will be reduced by restricting fueling locations to certain areas.

T-22. *Modification of Timber Sale Contract.*

Description - To modify the Timber Sale Contract if new circumstances or conditions arise and indicate that the timber sale will irreversibly damage soil, water or watershed values.

Location - All harvest units

Effects - Modification of Timber Sale Contract if watershed values are unacceptably compromised.

Consequences - Watershed values are placed ahead of timber harvest. Modification of the Timber Sale Contract by the Chief of the Forest Service may occur.

ROAD SYSTEM

R-4. *(Temporary) Road Slope Stabilization (Planning)*

Description - Road Stabilization considerations begin in the reconnaissance and location of temporary roads. Stabilization measures will be planned for completion on all disturbed ground prior to the winter season, when erosion is most severe.

Location - All temporary roads planned for construction.

Effects - Reduce sedimentation by minimizing erosion from road slopes and minimizing the chances for slope failure along roads.

Consequences - Reduce sedimentation from temporary roads.

R-7. Control of Surface Road Drainage Associated with Roads

Description - A number of measures can be used alone or in combination, to minimize possible detrimental effects of surface drainage. Methods used to reduce erosion may include energy dissipaters, aprons, downspouts, gabions debris racks, and armoring ditches and drain inlets and outlets. Soil stabilization can help reduce sedimentation by reducing the effects of erosion on fill slopes and roadbeds. Dispersal of runoff from roads can be accomplished by rolling the grade, insloping with cross drains, outsloping, crowing, installation of water spreading ditches, contour trenching, etc.

Location - all temporary roads planned for construction and existing roads planned for reconstruction.

Effects - Minimize the erosive effects of water concentrated by road drainage features, disperse runoff from the road.

Consequences - Reduce sedimentation from temporary roads and (through reconstruction) reduce sediment from existing roads.

R-9. Timely Erosion Control measures on Incomplete Roads and Stream Crossing Projects

Description - The best drainage design can be ineffective if projects are incomplete at the end of the dry season. Affected areas can include roads, waste areas, tractor trail, skid trails, landings, fills and stream crossings.

Location - Entire project area.

Effects - Minimize erosion of and sedimentation from disturbed ground on incomplete projects.

R-10. Construction of Stable Embankments (Fills)

Description - The failure of road embankments and the subsequent deposition of material into waterways may result from the incorporation of slash or other organic matter into fills, a lack of necessary compaction during the construction of the embankment, unsuitable soils, or from the use of inappropriate placement methods.

Location - Road reconstruction over the entire project area

Effects - Minimize the possibility of failure and subsequent water quality degradation.

R-14. Bridge and Culvert Installation and Protection of Fisheries

Description - Excavation is a common requirement for the installation of culverts and minor streamside structures such as riprap. Waste material developed in such operations should neither obstruct the streamcourse (including natural floodplains) nor the efficiency of the associated structures. Any instream project, such as culvert replacement, would occur during periods of low stream flows and outside the normal spawning times of native salmonids (July 15 through August 15).

Location - All restoration projects

Effects - Minimize sedimentation and turbidity resulting from excavation for in-channel structures.

Consequences - Reduce sedimentation from instream restoration projects.

R-18. Maintenance of Roads

Description - To maintain roads which provides for water quality protection by controlling the placement of waste material, keeping drainage facilities open, and by repairing ruts and failures, to reduce sedimentation and erosion.

Location - All Level 1 and above roads.

Effects - Maintenance of roads to maintain drainage, protect the road investment, and minimize damage to adjacent land and resources.

Consequences - Detrimental impacts to water quality from road maintenance activities are reduced.

R-19. Road Surface Treatments to Prevent Loss of Material

Description - To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.

Location - All Level 1 and above roads.

Effects - Protection of roads during periods of high precipitation and dust from dry periods.

Consequences - Detrimental impacts to the road prism from erosion and adjacent water sources are prevented.

R-20. Traffic Control During Wet Periods

Description - To reduce road surface damage and rutting of roads to lessen sediment washing from damaged road surfaces.

Location - All Level 1 long-term intermittent roads and above roads.

Effects - Project associated implementation procedures are formulated.

Consequences - Detrimental impacts to forest roads surfaces and forest road users are reduced.

R-21. Snow Removal Controls to Avoid Resource Damage.

Description - To minimize the impact of melt water on road surfaces and to consequently reduce the probability of sediment production resulting from snow removal operations.

Location - All roads used by the purchaser

Effects - Preventative measures are implemented to protect resources and indirectly, water quality.

Consequences - Damage to roads from erosion/water movements is minimized.

R-23. Obliteration of Temporary Roads and Landings.

Description - Measures designed to obliterate temporary roads and landings and revegetate, drain, etc. To minimize erosion and sedimentation. Temporary roads will be sub-soiled on completion of activities. Landings will be sub-soiled on completion of sale activities. Subsoiling must alleviate compaction without churning the soil.

Location - All landings and temporary roads used by the timber sale purchaser.

Effects - Improve wildlife habitat, minimize erosion, reduce sedimentation to downstream water sources.

Consequences - Downstream water sources are not affected, big game species are not harassed, soil productivity is maintained.

FIRE SUPPRESSION AND FUELS MANAGEMENT

F-1. Fire and Fuel Management Activities

Description - An objective of fire management activities is to reduce the potential public and private losses that could result from wildfire and/or subsequent flooding and erosion, by reducing the frequency, intensity and destructiveness of wildfire (especially in areas not burned by the Tower Fire).

Location - The entire project area.

Effects - Increase percent of fire tolerant species in the stands, create fuel breaks to facilitate use of natural prescribed fire, fire suppression activities, and fuels reduction using prescribed fire as well as other techniques.

F-2. Consideration of Water Quality in Formulating Prescribed Fire Prescriptions

Description - Prescription elements include, but are not limited to such factors as, fire weather, slope, aspect, soil moisture and fuel moisture. These elements will be used to maintain prescribed flame length. The amount of exposed soil will also be limited.

Location - The portions of the project area planned for prescribed fire.

Effects - Prescribed fire prescriptions will include management practices and mitigation that will protect ground cover and reduce the adverse impacts on water quality.

F-3. *Protection of Water Quality During Prescribed Burning Operations*

Description - To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering water bodies.

Location - Entire project area.

Effects - Water quality will be protected; downstream users of water will not be affected by the proposed project activities.

WATERSHED MANAGEMENT

W-1. *Watershed Restoration*

Description - develop restoration projects to correct existing watershed problems. Plan development will include consideration predicted changes in water quality, downstream values, (including fisheries), site productivity, threats to life and property, and any direct or indirect economic returns and social or scenic benefits. Watershed restoration measures will be state of the art and will reflect the unique hydrologic and climatic characteristics of each watershed.

Location - Entire project area.

Effects - Repair degraded watershed conditions and improve water quality and soil stability.

W-4. *Hazardous Substance Spill Contingency Plan and Spill Prevention Control & Countermeasure Plan.*

Description - To prevent contamination from accidental chemical spills.

Location - The Plan is located at the Umatilla N.F. Supervisor's Office. The entire sale area is included.

Effects - Implementation of a predetermined organization and action plan in the event of a hazardous substance spill

Consequences - Prevent oil products as well as other chemicals from entering the navigable waters of the United States.

W-5. *Cumulative watershed effects*

Description - Protect the beneficial uses of water and streams from the cumulative effects of past, present and future land management activities that may result in adverse (degraded) water quality or stream habitat conditions.

Location - Entire project area.

Effects - A cumulative watershed effects analysis was conducted to determine the effects of past, proposed and future land management activities within the North Fork John Day drainage.

Beneficial uses that comply with applicable State requirements for protection of waters have been identified. This analysis can be found in the EIS and supporting documents, most specifically the Water Resources Report.

W-7. *Water Quality Monitoring*

Description - Determine the effects of the proposed action on the beneficial uses of water.

Monitor baseline watershed conditions for comparison with State Water Quality standards, Forest Plan standards and estimate long-term trends. Ensure the health and safety of water users.

Evaluate BMP effectiveness.

Location - Entire project area.

Effects - Evaluates the effectiveness of management prescriptions in protecting water quality.

W-8. *Management by Closure to use (Seasonal, Temporary, and Permanent).*

Description - To exclude activities that could result in damage to either resources or improvements, such as roads and trails, resulting in impaired water quality.

Location - Entire project area.

Effects - Excluding access and/or restricting access would decrease adverse effects to the identified resources/areas, which would lessen adverse impacts to water quality.

Consequences - Maintaining down-slope water quality and sustaining the current condition of the watershed would be one consequence. Excluding activities that may result in additional resource damage and impair healthy water systems is another.