

## **Appendix D. Best Management Practices for the Jobs in the Woods Program**

The following Best Management Practices (BMPs) were specifically prepared for the Jobs in the Woods (JITW) Program in western Oregon by Dan Perritt and Alan Wetzel of the U. S. Fish and Wildlife Service's Oregon State Office, Portland, Oregon. BMPs are designed to reduce adverse impacts to fish, wildlife, and plant species and their critical habitats. Appropriate BMPs must be executed by all project coordinators. BMPs are listed by main project categories, but in practice overlaps do exist among the categories. Individual BMPs are subject to becoming more stringent or additional BMPs instituted if watershed restoration activities are changed.

### **General BMPs for all Project Categories:**

1. Follow all terms and conditions in regulatory permits and other official project authorizations to eliminate or reduce adverse impacts to any endangered, threatened, or sensitive species or their critical habitats.
2. Complete restoration activities at individual project sites in a timely manner. This will reduce disturbance and/or displacement of fish and wildlife species in the immediate project area.
3. Significant modifications to an approved work plan must be reviewed and approved by appropriate agency personnel and the landowner(s) before the work can be carried out or continued.
4. Unobstructed fish passage must be provided at all times during any restoration activity.
5. Use existing roadways or travel paths for access to project sites.
6. Avoid the use of heavy equipment and techniques that will result in excessive soil disturbances or compaction of soils, especially on steep or unstable slopes.
7. Vehicles and machinery must cross streams at right angles to the main channel whenever possible.
8. Excavation or transport equipment/machinery should be limited in capacity, but sufficiently sized to complete required restoration activities.
9. Streams, riparian zones, and wetlands must not be used as staging or refueling areas. Equipment must be stored, serviced, and fueled away from aquatic habitats or other sensitive areas.
10. Native vegetation must be planted on disturbed sites. Native vegetation should be salvaged from areas where ground disturbances will be occurring on projects. Salvaged vegetation should then be replanted after the completion of project activities. The use of nonnative vegetation will be strictly limited and will apply to situations where native vegetation (i.e., grasses) is not commercially available. All nonnative vegetation must be a close subspecies or variety to native species or reproductively altered (i.e., sterilized) to avoid future ecological complications with native species. Vegetative planting techniques must not cause major disturbances to soils and slopes. Hand planting is the preferred technique for all plantings. Plantings must occur during the optimal seasonal growth period for the respective plant species involved. Vegetation growth should also be enhanced by bank sloping/grading, seedbed and site preparations, mulching, or fertilizing.

11. Boulder and rock materials used for restoration projects must come from nonstreambed and nonwetland sources. Conifer and hardwood timber stands must not be specifically harvested to supply woody materials for any restoration activity, unless the harvest is part of an approved silvicultural operation. Boulder, rock, and woody materials must be collected during appropriate seasonal periods to reduce soil and slope disturbances.
12. A written contingency plan must be developed for all project sites where hazardous materials (e.g., pesticides, herbicides, petroleum products) will be used or stored. Appropriate materials/supplies (e.g., shovel, disposal containers, absorbent materials, first aid supplies, clean water) must be available on site to cleanup any small scale accidental hazardous spill; this action will protect the environment, project workers and public from direct contact with hazardous materials. Hazardous spills must be reported to the **Oregon Emergency Response System at 1-800-452-0311 (24 hrs)**. Emergency response, removal, transport, and disposal of hazardous materials must be done in accordance with the U.S. Environmental Protection Agency and Oregon Department of Environmental Quality laws and regulations.
13. The evaluation of herbicide, pesticide, and fertilizer use must include the accuracy of applications, effects on target and nontarget species, and the potential impacts to aquatic and terrestrial ecosystems. Treatments for the control or removal of invasive plants in riparian/wetland areas must be limited to hand or wick applications by qualified personnel. Apply chemicals during calm, dry weather and maintain unsprayed buffer areas near aquatic habitats and other sensitive areas. Chemical applications must be avoided where seasonal precipitation or excess irrigation water is likely to wash residual toxic substances into waterways. Consider persistence, soil/water mobility, toxicity, and plant uptake when selecting appropriate chemicals. All chemicals should be handled in strict accordance to label specifications. Proper personal protection (e.g., gloves, masks, clothing) must be used by all applicators. Obtain a copy of the material safety data sheet (MSDS) from the chemical manufacturer for detailed information on each chemical to be used. Refer to appropriate federal and state regulations concerning the use of chemicals. Contact your local state forester, state extension service agent, or Soil and Water Conservation District for information or assistance on chemical selection and use. Contact the **Oregon Poison Control Center at 1-800-452-7165 (24 hrs)** for assistance in responding to emergency chemical exposures. Chemicals must only be considered when other treatments would be ineffective or cannot be applied.
14. Sedimentation and erosion controls must be implemented on all project sites where the implementation of restoration activities will result in soil and/or slope disturbances. Soil and slope stabilization control structures/techniques must be bio-engineered to the extent possible. Structures/techniques must be placed and/or anchored appropriately to prevent adverse impacts to down slope habitats. Revegetate disturbed areas with native vegetation as soon as possible. Control structures/techniques may include, but are not limited to, silt fences, hay bale structures, seeding by hand and hydro-seeding, jutte mats, and coconut logs. Contact your local state forester, state extension service agent, or Soil and Water Conservation District for information or assistance on control structures/techniques. **NOTE: This requirement refers to all sediment and erosion control measures addressed in the following project categories.**
15. Staging and stockpile areas must be located on or immediately beside the project area whenever possible. Sediment and erosion controls must be implemented around all stockpiled material and disturbed project sites to prevent the introduction of pollutants into water sources. This will reduce the disturbance and displacement potentials to fish and wildlife species in the surrounding areas.

16. Excess excavated materials removed during the completion of a restoration activity must be disposed of properly and/or stabilized to eliminate future environmental problems. Disposal sites must not be located in riparian, wetland, or floodplain areas. Sedimentation and erosion controls must be implemented to prevent adverse impacts to down slope habitats. Disposal sites should be revegetated with native vegetation as soon as possible.
17. Project coordinators must ensure that all waste resulting from the completion of a project is removed and disposed of properly before work crews vacate the project site.
18. Structures containing concrete or wood preservatives must be cured or dried before they are placed in streams, riparian zones, or wetlands. Wet concrete must never enter aquatic habitats.
19. Monitoring is required during project implementation and for at least one year following project completion to ensure that restoration activities implemented at individual project sites are functioning as intended and do not create unintended consequences to fish, wildlife, and plant species and their critical habitats or adversely impact human health and safety. Corrective actions, as appropriate, must be taken for potential or actual problems.

#### **Instream Habitat Restoration BMPs:**

1. Instream restoration activities must occur during appropriate times as determined by the Oregon Department of Fish and Wildlife (ODFW) as cited in the 'Oregon Guidelines for Timing of In water Work to Protect Fish and Wildlife Resources.' Instream activities must not conflict with other timing restrictions imposed under the Endangered Species Act.
2. Large woody debris and boulders used for instream structures need to be appropriately sized, anchored, and/or placed to eliminate or reduce the movement of these materials during high flow events. Size standards must be determined by hydrologists, biologists, or other qualified professionals and should be based on individual stream reaches and their associated seasonal discharge rates. Durable wood and rock materials should be used for instream structures.
3. Installed instream or streambank structures altering hydrologic flow regimes must not impact adjacent or down stream properties or manmade structures.
4. Temporary coffer dams built as a part of a project must use materials from nonstreambed and nonwetland sources that are free of fines. Upon project completion, coffer dams must be feathered out in the streambed.
5. Adequate fish screening must be installed and maintained to eliminate or reduce fish emigration into water distribution systems as required by the Oregon Water Resources Department screening law and the National Marine Fisheries Service (NMFS) and ODFW guidelines. All off-channel livestock watering systems must adhere to this requirement.
6. Heavy equipment must have limited access to the streambeds and streambanks. Instream construction activities must be minimized to reduce sedimentation rates, channel instability, and aquatic habitat impacts.

7. Soil and/or slope disturbances along stream channels should be eliminated or reduced wherever possible. Undisturbed vegetated buffer zones must be retained along stream channels to reduce sedimentation rates, channel instability, and aquatic habitat impacts.

#### **Riparian/Wetland and Upland/Forest Restoration BMPs:**

1. Bank stabilizing vegetation removed or altered because of restoration activities must be replanted with native vegetation and protected from further disturbance until new growth is well established. Native shrubs and trees should also be included in the reclamation of disturbed sites. Waste organic materials (e.g., discarded lumber, woody vegetation) must not be used to stabilize soils and slopes in disturbed areas. Metal refuse or debris (e.g., petroleum containers, car bodies) must not be used for streambank protection; this violates both state and federal regulations. Broken asphalt and concrete and tires are not recommended materials for bank stabilization projects. Do not use instream materials (e.g., stream debris and gravels) to replace or restore eroded streambanks. **Stabilization projects should employ bioengineering methods to the greatest extent possible.**
2. Sedimentation and erosion controls must be implemented on site at all times during wetland restoration or creation activities to maintain the water quality of adjacent water sources.
3. Restoration activities that require prescribed burning of slash material or invasive vegetation must be planned and managed to maximize the benefits and reduce the detrimental effects of burns. Slash control and disposal must also be completed in a way that reduces the occurrence of debris from entering stream channels. Reduce the potential for very hot burns to conserve litter layers and eliminate or reduce the development of hydrophobic soil conditions. Develop plans for rapid site revegetation. Always consider nonburning alternatives whenever possible. Fire suppression equipment must always be located at the immediate project site during prescribed burnings. Project coordinators should follow Oregon Department of Forestry - Forest Practice Administrative Rules concerning the disposal of slash and treatment of waste materials.
4. Slash materials should be gathered by hand or with light machinery to reduce soil disturbances and compaction of soils. Avoid accumulating or spreading slash in upland draws, depressions, intermittent streams, and springs. Slash control and disposal activities should be conducted in a way that reduces the occurrence of debris in streams. These practices will eliminate or reduce debris torrents, avalanches, flows, and slides.
5. Silvicultural thinning and release activities on project sites must maintain a visual barrier of undisturbed vegetation next to open roads to eliminate or reduce wildlife disturbances whenever possible.
6. Use the appropriate timber yarding system during silvicultural operations to eliminate or reduce soil disturbances and compaction of soils.
7. Retain or develop snags on project sites for cavity dependent wildlife species whenever possible.
8. Abandoned and decommissioned roadways must be revegetated. Till compacted road surfaces to promote vegetation establishment and growth. Ensure that drainage patterns on these roadways will not

result in increased sedimentation rates or erosion to down slope habitats. Drainage improvements should be constructed and stabilized before the rainy season. Install water energy dissipators (e.g., water bars and rolling dips) along roadways and on all cross drain outfalls. Do not sidecast excavated road materials, and avoid accumulating or spreading these materials in upland draws, depressions, intermittent streams, and springs. Road entrances closed by tanking or ditching must have the excavated/disturbed areas stabilized as soon as possible.

9. Purchase seedlings from reputable suppliers or growers. Hardwood and conifer seedlings should be stored, handled, and planted properly. Seeds used to grow seedlings should have been collected in an area where the environmental conditions (e.g., elevation and range) closely match those on project sites; refer to a tree seed zone map and ensure that every purchased box or bag of seedlings are clearly marked with the seed zone and elevation. Reduce seedling competition by clearing grasses, forbs, and woody shrubs from around each seedling for a minimum distance of three feet. Employ the proper methods to protect seedlings from animal, insect, and environmental damages. Periodically examine planted seedlings for damages and diseases. Contact your local state forester or extension service agent for additional information or assistance.
10. Retain the appropriate amount of down and decaying woody debris to provide for wildlife habitats and nutrient recycling. Project coordinators should be aware of potential wild fire hazards in project areas because of retained woody debris.
11. Fall trees away from streams, riparian zones, and wetlands whenever possible. Tree falling on steep slopes should not be done or done in an appropriate manner to avoid damage to surrounding vegetation and soils. Employ the proper yarding technique on project sites to eliminate or reduce soil disturbances and compaction of soils. Refer to the Oregon Department of Forestry - Forest Practice Administrative Rules concerning falling and yarding regulations.
12. Fence designs (e.g., wire type and wire spacing) and installations should not restrict the movement of any wildlife species; limit the use of woven wire fences whenever possible. The quality and durability of fencing materials must meet or exceed the intended management objectives. Fences must not be constructed in areas where natural barriers restrict livestock movements. Refer to the Bureau of Land Management fencing handbook (Bureau of Land Management 1989) for additional information.
13. Livestock crossings and off-channel livestock watering facilities must not be located in areas where compaction and/or damage may occur to sensitive soils, slopes, or vegetation due to congregating livestock. Livestock fords across streams must be appropriately rocked to stabilize soils/slopes and prevent erosion. Do not use crushed rock to stabilize fords. Fords should be placed on bedrock or stable substrates whenever possible.
14. Silvicultural activities (e.g., herbicide treatment, thinning, and harvesting) should be limited or restricted on steep slopes and highly erodible soils to prevent accelerated soil erosion and increased sedimentation rates.
15. Fill material used on project sites must be from nonstreambed and nonwetland sources that are free of fines. Deposition of materials must not violate state or federal regulations, standards, or guidelines as set forth by local Soil and Water Conservation Districts, Oregon Division of State Lands, U. S. Army Corps of Engineers, or other regulatory agencies.

**Fish Passage Improvement BMPs:**

1. The dimensions, slopes, jump heights, water depths, and seasonal flows in fishways must be adequate to pass the intended fish species and life stages at critical migration periods. Provide fish resting areas, as necessary, within the fishways, and maintain appropriate entrance flows to attract fish. Restrict fish access to inappropriate areas to prevent fish morbidity and mortality.
2. Culverts and bridges, whether for livestock or vehicle access, must be sized to pass at least a normal seasonal high flow and designed to provide unobstructed fish passage at all times. Bridge abutments must be designed and installed in a way that does not alter stream flows or channel stability. Do not backfill culverts or bridge abutments with vegetation, debris, or mud. Abutments should be properly protected (e.g., rock armored) to prevent future scouring actions and erosion hazards. All culvert passage projects must be consistent with the NMFS "Culvert Passage Guidelines" and ODFW "Guidelines and Criteria for Stream-Road Crossings." Bridge designs and installations must conform to all federal and state standards.
3. Installed culverts should be aligned to stream flows and positioned at or below stream grades. Culvert inlets and outfalls should be properly protected (e.g., rock armored) to prevent future scouring actions and erosion hazards. Use appropriate culvert lengths and install culverts at proper slopes (less than 1% slope gradient) to aid fish passage. Install baffles inside culverts, as a last resort necessity, to reduce flow velocities. Open-bottom and arch culverts are the preferred culvert types to be used if existing culverts are to be replaced. A single large culvert is preferred over using several smaller culverts at individual stream crossings.
4. Develop maintenance schedules for culvert and bridge installations to ensure they remain in proper functioning condition. Install trash/debris racks, as necessary, to prevent blockage or damage to these structures. These racks must be installed and maintained in such a manner that fish are easily able to pass through them at any time.
5. Appropriate sediment and erosion controls must be implemented as they apply to specific fish passage structures. Revegetate bare soils with native vegetation as soon as possible to prevent sedimentation and erosion hazards.
6. All fish screening projects must be consistent with the Oregon Water Resources Department screening law, NMFS "Juvenile Fish Screen Criteria," and all intake screening projects must be consistent with NMFS "Pump Intake Screen Guidelines."
7. Fish passage structural designs (i.e., culverts and fishways) must be submitted to the NMFS, through the U. S. Fish and Wildlife Service, to obtain design approvals prior to the installation of the structures.

## References:

Publications listed below pertain to the above-mentioned JITW BMPs. Many of these publications are focused on issues in the Pacific Northwest. A complete list of references regarding BMPs is beyond the scope of this document. The U. S. Fish and Wildlife Service encourages interested individuals to obtain additional information from the various local/state/federal agencies; conservation organizations; colleges and universities; scientific books, journals, and newsletters; and other applicable sources to acquire the necessary knowledge to implement any of the BMPs effectively and efficiently.

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