

# **Best Management Practices for Routine Road Maintenance**

Adopted for Washington County DLUT  
from Oregon Department of Transportation  
Best Management Practices for Routine Road Maintenance  
September 2004

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## 1. INTRODUCTION AND PURPOSE

The Oregon Department of Transportation (ODOT) first developed a program to identify impacts to water quality from routine road maintenance activities in 1995, developing Best Management Practices (BMPs) to minimize those impacts. In 1997, ODOT again reviewed maintenance activities for impacts to wildlife habitat, including a review of the impacts that specific activities could have on habitat and fishery resources listed as threatened under the Endangered Species Act. This served as the basis for a Programmatic Biological Assessment for routine road maintenance, which evolved into the Routine Road Maintenance - Water Quality And Habitat Guide (1999).

In October of 2000 the Washington County Board of County Commissioners (BOCC) adopted Roadway Operations Best Management Practices, Water Quality And Habitat Guide which was based on the original ODOT document. These practices are focused on the enhancement of public safety, the structural integrity of the roadway system and on the preservation, protection and restoration of the land and aquatic environments that support natural resource based economic activity, native flora and fauna, rural lifestyles and recreation opportunities. During the winter of 2003-2004, DLUT revisited BMPRO and began an effort to further develop the program in anticipation of submittal to NOAA Fisheries for coverage under the Endangered Species Act 4(d) rules, a process resulting in Best Management Practices for Routine Road Maintenance (2004).

This document is designed to provide guidance to Washington County employees in the effective operation of the roadway system through implementation of Best Management Practices (BMPs). These practices are designed to maintain the functional integrity of the roadway system, to provide for public safety, to preserve critical habitat and to meet the specific requirements outlined by NOAA Fisheries in Limit 10 of the 4(d) rules of the ESA for the protection of salmon and steelhead. Best Management Practices for Routine Road Maintenance includes a description of roadway management activities along with a description of techniques to minimize or avoid actions that may cause harm to endangered fish species, resource waters or wildlife habitats.

These Best Management Practices (BMPs) provide guidance in addressing the Endangered Species Act 4(d) rules as administered by NOAA Fisheries. With noted and infrequent exception, correctly applying the appropriate BMPs will result in meeting the intent of the rules. The primary focus of these BMPs is to protect water quality, to protect aquatic and riparian resources and to help reduce or prevent potential or actual resource damage related to roadway management activity.

This document covers procedures and performance measures for roadway operations. In several chapters maintenance activities have environmental implications: roadway maintenance (erosion control, integrated vegetation management, dust abatement), drainage (aquatic habitat, water quality, wetlands), bridge repair and reconstruction, emergency operations (hazardous materials spills), and snow and ice control.

## **2. THE BEST MANAGEMENT PRACTICES**

### **A: General Considerations**

The following list of general considerations in applying Best Management Practices in Routine Road Maintenance operations incorporate the multiple goals of environmental protection, safety, and structural integrity of the roadway system:

- Develop roadway maintenance plans that are measurable against current standards.
- Schedule activities in phases when possible to minimize sediment production.
- Reduce repetitive activity by taking permanent corrective action.
- Use creative and suitable alternatives to correct recurring maintenance problems.
- Activities that expose soil need to be followed with the establishment of non-invasive vegetation, preferably with native species, to minimize potential sedimentation. The seed mixtures for the project site, proper timing and fertilizer and mulch selection are also important to success.
- Periodically inspect and repair bridges, culverts, fences and other structures.
- Plan for the response to emergency events. Use regular roadway inspections to identify and correct smaller problems and identify those situations requiring repair by heavy equipment.
- Material recovered from landslides (mass wasting events) should be transferred to a stable location above the 100-year floodplain level to prevent entry into any protected resource.
- Minimize ground-disturbing activities whenever possible.

### **B: Riparian Management Areas**

A Riparian Management Area (RMA) is an area adjacent to natural streams, rivers, wetlands or other resource waters within which operational limitations may be assigned. Unless otherwise specified these areas will extend two hundred fifty (250) feet either side of a resource water, measured from the outer edge of an intersecting stream or the

centerline of an adjacent roadway. 250 feet is the objective; however, roadway design or other limiting factors may cause this standard to be adjusted.

Riparian Management Areas provide a natural buffer between a resource water and adjacent activity and also provide an opportunity for potential contaminants to be filtered from run-off before entering resource waters. Providing for the safety of roadway users and the structural integrity of the roadway system will require certain roadway management activities to be performed within RMAs. Following Avoidance and Minimization measures and Best Management Practices will reduce the potential impacts that roadway management may have on resource waters or the quality of RMAs.

### **C:     Minimization and Avoidance Measures**

A standard practice of roadway maintenance is to avoid adverse impacts to the aquatic environment. Whenever avoidance is not attainable, impacts will be minimized. The guidance sets forth the principle that avoidance of adverse impacts is the highest priority, and for those impacts which cannot be avoided, minimization is required. These measures are stated in the following chapters as “Best Management Practices”, or BMPs.

### **D:     Washington County Activity Codes**

In 2000, Washington County DLUT adopted the same standards as the ODOT document *Routine Road Maintenance, Water Quality and Habitat Guide, Best Management Practices, July 1999*. Since then, the managers and staff improved the BMP descriptions and matched them to existing activity codes used for cost accounting purposes. The “Cost Accounting System” generates regular reports to assist program supervisors in determining the effectiveness and efficiency of each activity and for managing both the work program and program budgets. This document covers all original BMPs, organized according to precise Washington County activities. It also adds a new Series 1000 for Fish Preservation and Enhancement activities. The BMPs include:

Series 100	Bridge Operations
Series 200	Roadway Surfaces
Series 300	Vegetation Management
Series 400	Drainage Operations
Series 500	Traffic Operations
Series 900	Emergency Response
Series 1000	Fish Preservation and Enhancement

Performance Standards developed for each Road and Bridge Operations activity, consist of an activity code, description, months during which the activity is performed, and identified Minimization and Avoidance measures as Best Management Practices. While the terms “when practical” and “where possible” are not listed with each measure or practice, it is understood that all measures or all practices may not be possible at all

times. DLUT will make every reasonable effort to apply the identified measures and practices.

### **3. BRIDGE OPERATIONS (SERIES 100)**

- **Number of Bridges:** The Bridge Operations program is responsible for the operation of Washington County's 194 bridges and large (over six-foot diameter) culvert structures.
- **In-Water Work:** All work activity within the flowing channel of any aquatic system will be performed during the appropriate ODFW in-water work window for that system, or as negotiated with ODFW, except when there is imminent hazard to life, health or damage to the structure. In such emergency events, the appropriate regulatory agencies will be contacted as soon as possible.
- **Repair:** Bridge Operations activity may include the repair of bridges and large culverts. In-water bridge repairs may include the installation, repair or replacement of rip-rap, drainage structures and catch basins and the replacement of structural components.
- **Best Management Practices:** These practices are focused on the protection of habitat and ensuring that potentially harmful materials are not allowed to enter resource waters. This is achieved through the proper use of containment devices, sound work-site practices, a minimum removal of material from streams and the proper timing of the activity.

**Environmental Concern to be Addressed: Bridge Operations have the potential to impact the following:**

- Debris from bridge cleaning may carry contaminants into water or flood plain.
- Loose concrete or form material may fall into water.
- Paint or other chemicals may accidentally spill into water or flood plain.
- Sawdust from cutting on pressure treated lumber may fall into water.
- Activity can temporarily increase turbidity in stream.
- Sediment loading may cause destruction of spawning habitat.



**BMPs for All Series 100: The following Best Management Practices will be employed for all Bridge Operations and Maintenance Activities Described Below:**

- Prevent all construction debris (wood, sawdust, drill shavings, nails, oil) from entering stream.
- Use cofferdams for structural repairs as appropriate.
- Re-fuel equipment outside of Riparian Management Areas and at least 250 feet from any water body.
- Bridge structural repairs that require in-water work activity will be coordinated with ODFW and other appropriate agencies to identify measures that may minimize potential impacts. These contacts will determine whether or not the repair activity will require a modification of the aquatic system and thus require a biological assessment and consultation with NMFS and USFWS. This type of in-water work may include permanent impacts such as placing rip-rap or temporary impacts such as installing false-work or developing a stream access.
- Coordinate with ODFW and the wetland permitting agencies USACOE and DSL and with other appropriate environmental regulatory agencies when placing rip-rap material that is in addition to existing conditions and that occurs within the two-year floodplain of protected waters.
- If a USACOE permit is required, an Endangered Species Act consultation may be required.
- Coordinate with ODFW (where and when necessary) to divert or otherwise segregate resource waters from areas where concrete is used during structural repairs of bridges and culverts.
- Uncured concrete should never come in contact with a wetland or flowing stream.
- When repairing drainage structures, make reasonable attempts (using engineering judgment) to incorporate fish passage solutions and enhancements, such as adding roughness (by adding cobble to the bottom of a culvert) in coordination with ODFW and other regulators.
- Schedule and perform any in-water work activity within the appropriate ODFW in-water work window or within the time framework as negotiated with and agreed upon by ODFW.
- Place waste material above the 100-year floodplain level, away from waterways and wetlands.
- Ensure that the active flowing stream will not come into contact with fresh concrete.

- Dispose of material in locations and manners identified in the Material Disposal Plan.
- Provide for a stable concrete delivery truck chute clean-out area and require that all project employees properly use those areas to keep material from being deposited in riparian corridors.
- Contain chainsaw chips where practical.
- Avoid use of creosote or “penta” treated wood for permanent structures.
- Provide for the collection and proper disposal or recycling of sandblasting materials and other bridge cleaning debris and prevent those materials from entering resource waters or habitat.
- While performing work above water, reasonable attempts will be made to keep debris from falling from the structure into water. Material that does fall into water will be removed in the least destructive way possible or may be left in place if this would be less destructive to habitat.

101	BRIDGE CONSTRUCTION	APRIL - OCTOBER
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#### DESCRIPTION

This activity varies in scope depending upon whether the work is done on a roadway bridge, pedestrian bridge or a concrete, steel or timber bridge. Span length is also a determining factor. Typically, bridge construction projects will include a preliminary design that will specify construction methods and will also identify appropriate fish and habitat protection measures.

102	BRIDGE DEMOLITION	JANUARY - DECEMBER
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#### DESCRIPTION

Bridge demolition is typically accomplished using heavy equipment to remove deteriorated bridge segments. Some materials may be salvaged; the remainder are removed and properly disposed of.

106	SHOULDER EROSION REPAIR	JANUARY - DECEMBER
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#### DESCRIPTION

Repairing roadway shoulder erosion at bridge or guardrail sites usually consists of placing and compacting additional aggregate to restore the shoulder, proper drainage and structural integrity. Work should be done when there is sufficient moisture in the aggregate to provide for proper compaction. This work should be avoided during heavy rainfall or very dry weather. A silt fence may need to be installed between the work area and stream when working near resource waters.

107	PLACE CONCRETE BARRIERS	JANUARY - DECEMBER
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#### DESCRIPTION

This work is typically done to prohibit vehicle traffic from entering a restricted area. The barriers are generally transported to a project site and placed with a crane truck. Advance warning signs and or flashing barricade lights may be required. Work may occur at any time during the year.

108	CLEAN BRIDGE & BRIDGE RAIL	NOVEMBER - MARCH
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#### DESCRIPTION

Bridge cleaning involves the scraping and washing of bridge decks, rails and curbs on timber, concrete and steel bridges. Heavier debris should be removed from bridge decks and disposed of outside the project area prior to pressure washing. Bridge washing should be done in a manner that minimizes the chance of debris entering the waterway. Bridge deck drains and scuppers should be blocked when washing, with the water directed off the deck and into vegetated areas. This also includes the sweeping of gutters and bridge decks and scuppers (bridge deck drains) to remove dirt and debris. Scupper cleaning involves clearing and sweeping of material away from clogged scuppers to provide for proper drainage. Vacuum sweepers will be used within RMAs.

#### ADDITIONAL BMPS FOR BRIDGE CLEANING

- Washing will occur only during high-water, typically between November 15 and March 15.
- Temporarily block deck drains and scuppers when pressure washing, sandblasting or scraping structures in order to direct water off the deck and toward adjacent vegetated areas.
- Remove debris from bridge decks in a manner that would reasonably minimize the potential of the materials entering a waterway. Recommended methods

include the removal of large debris from bridge decks with a mobile sweeper or a hand shovel. Other materials may be scraped with hand tools before being collected, removed and disposed of prior to pressure washing.

- The following ODFW guidelines for bridge washing will be required. If any of the above criteria cannot be met, the local office of the Oregon Department of Fish and Wildlife (ODFW) must be contacted and the specific bridge conditions will be discussed.
  - ❑ Activity must occur between November 15 and March 15.
  - ❑ Activity must occur during a high-water event.
  - ❑ Use only high-pressure water to scour the debris deposits.
  - ❑ If paint is observed being displaced, cease washing operations.
  - ❑ Avoid washing tight areas (cracks and crevices) where bats may be present.
  - ❑ If bats are observed to be displaced, cease washing operations.
  - ❑ If birds are building nests, laying eggs or tending young, no washing will occur.
- Use water (as needed) to reduce dust during sweeping.
- Dispose of waste materials at an appropriate site, in an appropriate manner.
- Recycle sweeping materials where appropriate.
- Coordinate crews to follow sweeping and flushing with bridge deck drain cleaning.
- Remove sweepings produced within 250 feet of identified resource waters.
- Employ vacuum sweepers within Riparian Management Areas.

109	DEBRIS REMOVAL - STREAM	JANUARY - DECEMBER
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#### DESCRIPTION

Removing logs, limbs and associated drift from a stream when build-up occurs adjacent to a bridge structure. Removal may be done from a boat in the stream or utilizing a crane situated on the bridge structure or on the embankment. Drift should be dislodged and turned to float downstream whenever practical. Cutting drift into pieces may be required.

When drift cannot be cut and turned, care must be taken to not disturb vegetated stream-banks. This work is typically necessary during winter months when high-water events create drift build-up potential. Drift removal that does not present an imminent hazard to a bridge structure should be coordinated with ODFW.

#### ADDITIONAL BMPS FOR DEBRIS REMOVAL

- Cut, when necessary, and turn drift to allow it to flow through and under the bridge structure, when this would not endanger any downstream crossing structures or other facilities.
- Allow wood to float free of the bridge to perhaps lodge and create habitat elsewhere.
- Repair and restore riparian areas temporarily impacted during drift removal.
- Long-term access for drift removal will be coordinated with ODFW.
- Do not disturb vegetated stream banks.

110	STREAMBED INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

Streambed inspection occurs at bridge and culvert structures during high-water events to ensure that log deposits or other debris do not compromise structural integrity. Two-person teams are assigned routes to inspect bridges and culverts in an assigned area. Structures that may be threatened are reported to the Bridge Operations Supervisor for scheduling of debris removal.

111	PAINTING BRIDGE RAIL	MAY - SEPTEMBER
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#### DESCRIPTION

This activity involves painting of steel bridge members to restore protective coating and prevent corrosion. Work is generally accomplished between May and September. Surfaces must be thoroughly cleaned prior to painting (See the Clean Bridge and Bridge Rail standard). Adequate protective measures must be installed to prevent paint chips or any other debris from entering the waterway.

#### ADDITIONAL BMPS FOR BRIDGE RAIL PAINTING

- If sandblasting is used, provide for the collection and disposal or recycling of those materials and other debris.

- Install drip and spill protection.
- Do not allow paint to enter stream.

112	PILING REPAIR & REPLACE	APRIL - OCTOBER
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#### DESCRIPTION

This includes repairing deteriorated timber pilings in order to restore bridge integrity. The work is generally accomplished between April and October. Silt fences or other appropriate erosion control devices should be placed prior to excavation. Hydraulic jacks should support the pile cap. Repair consists of excavating around piling to locate solid section of timber, cutting out deteriorated sections, placing pile jack splice plate and new treated-timber piling sections, then re-tensioning the piling. A concrete form and reinforcement wire is then placed around the splice and concrete is poured to encase the splice.

#### ADDITIONAL BMPS FOR PILING REPAIR

- Care must be taken to ensure that no fresh concrete enters the water.
- Install silt fence.

113	PILING CAP REPAIR & REPLACEMENT	APRIL - OCTOBER
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#### DESCRIPTION

The repair of a deteriorated timber pile cap generally involves removing the deteriorated cap and installing a new cap. Work is usually done between April and October. The bridge superstructure must be lifted off the old cap using hydraulic jacks. A crane is utilized to pull out the old cap and to insert a new treated-timber or steel cap. The bridge is lowered back into place and all components are reconnected. Adequate measures must be installed to prevent potentially damaging material from entering the waterway. All construction debris is hauled away and disposed of properly.

114	STRINGER REPLACEMENT	APRIL - OCTOBER
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#### DESCRIPTION

Replacement of deteriorated timber stringers restores support for the bridge deck and is generally accomplished between April and October. The bridge deck must be raised with hydraulic jacks. The deteriorated stringer is removed and a new treated-timber stringer is installed. The bridge deck is then lowered back into place and all components are reconnected.

115	SWAY BRACE REPLACEMENT	JANUARY - DECEMBER
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#### DESCRIPTION

The replacement of deteriorated timber braces minimizes the lateral movement of bridge piling. Work can be accomplished throughout the year. Using ladders or scaffolding to obtain access, the deteriorated brace is disconnected and removed then replaced with a new treated-timber brace and reconnected.

116	FELLOE GUARD REPLACEMENT	JANUARY - DECEMBER
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#### DESCRIPTION

The replacement of deteriorated timber felloe guards (wheel guards) restores the stability of the bridge deck. Work can be accomplished throughout the year. Deteriorated timber sections are disconnected and removed, then replaced with new treated-timber members. Adequate measures must be installed to prevent potentially damaging material or debris from entering the waterway.

117	DECK REPAIR & REPLACEMENT TIMBER	APRIL - OCTOBER
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#### DESCRIPTION

This activity involves replacement of decayed timber bridge decks to restore bridge integrity which is typically accomplished between April and October. Any asphalt surfacing must be removed from the bridge prior to deck replacement. The decayed timber deck boards are removed and properly disposed of. New treated timber deck boards are spiked into place. Asphalt surfacing is then placed over the deck. Adequate measures must be in place to prevent potentially damaging material from entering the waterway.

118	TIMBER BULKHEAD REPLACE	APRIL - OCTOBER
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#### DESCRIPTION

This activity involves the replacement of a deteriorated timber bulkhead to restore the structural integrity of the bridge and approach roadway and is best accomplished between April and October when groundwater levels are low. Excavate the roadbed adjacent to the bridge bulkhead. The excavation must be wide enough to allow for the appropriate benching or sloping of the trench. Shoring will be required if the trench cannot be benched or sloped. Remove the deteriorated bulkhead timbers and install new pressure treated timbers. Place geo-textile fabric at bottom of the trench. Aggregate is placed in eight-inch lifts and compacted. Repave the roadway surface when appropriate. Adequate measures must be in place to prevent potentially damaging material from entering the waterway.

#### ADDITIONAL BMPS FOR TIMBER BULKHEAD REPLACEMENT

- Silt fences and other appropriate erosion control devices should be in place prior to excavation.

119	EMBANKMENT STABILIZATION	JANUARY - DECEMBER
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#### DESCRIPTION

This activity is the restoration of an unstable embankment that has eroded near a bridge structure, typically due to a high-water or flooding event. Work may be accomplished throughout the year. Stabilization may require the replacement of rip-rap. Coordinate with ODFW and wetland permitting agencies, COE and DSL and with other appropriate environmental regulators when placing rip-rap that is in addition to existing conditions and occurs within the two-year floodplain of protected waters. Perform work during ODFW in-water work windows or as negotiated with ODFW. Measures must be in place to prevent debris from entering waterway. (See also Drainage Operations Activity #408.)

#### ADDITIONAL BMPS FOR EMBANKMENT STABILIZATION

- In planning for bridge repairs that may require installation of rip-rap, consider the application of bio-engineering solutions where that application may be practical. These may include those areas not shaded by bridge elements and that are above full-bank-stage, and where the success of the solution is probable and the integrity of the bridge structure is reasonably assured.



122	CONCRETE REPAIR	APRIL - OCTOBER
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#### DESCRIPTION

This activity involves repairing concrete bridge sections that have deteriorated and that may have exposed reinforcing steel. Work is generally accomplished between April and October. Chip away loose or deteriorated concrete. Sandblasting may be required to clean concrete surfaces and exposed re-bar. Adequate measures must be in place to collect debris and prevent materials from entering the waterway. Exposed re-bar should be painted. Concrete patch material is mixed and applied to the repair area.

#### ADDITIONAL BMPS FOR CONCRETE REPAIR

- Install drip and spill protection.
- Care must be taken to ensure that no fresh concrete comes into contact with resource waters.

123	PEDESTRIAN WALKWAY MAINTENANCE	JANUARY - DECEMBER
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#### DESCRIPTION

The repair of a pedestrian walkway bridge, typically found adjacent to a roadway bridge, may be scheduled throughout the year. Remove damaged or deteriorated structural members such as the substructure, deck and rails. Replace with new treated-timber members. Appropriate control measures must be installed to prevent potentially damaging materials from entering the waterway.

124	CHANNEL DREDGING	JULY - SEPTEMBER
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#### DESCRIPTION

Channel maintenance includes the cleaning, repair and restoration of existing channels, an activity that may include placing rip-rap to restore appropriate grade. A channel is different from a ditch in that a channel is a facility that collects drainage water, can be either parallel or perpendicular to the roadway, and may or may not be a natural stream or within a Riparian Management Area.

#### ADDITIONAL BMPS FOR CHANNEL DREDGING

- During the replacement of significant sections of rip-rap within existing channels that are acting as streams, employ bio-engineering solutions where possible, stable and cost-effective.
- Any excess material or construction debris will be removed from the channel after maintenance work activities have been completed. No materials that could potentially contribute sediment to downstream habitats will be deposited below the floodplain level, in waterways or wetlands.
- Within the two-year floodplain of systems supporting sensitive fish species, perform work activity during the ODFW in-water work window or as negotiated with ODFW.
- The work schedules and proposed methods for the repair of channels will be communicated to ODFW (by letter) at least two weeks prior to working in ODFW identified sensitive areas such as spawning grounds. Any in-water work activity will be coordinated with ODFW to ensure that no fish stranding occurs, to minimize or avoid any potential sediment impacts (except during emergencies) and to define in-water work periods for transitional stream reaches.
- If the pumping of water is necessary, use proper fish screens on the pump inlets, ensure that relevant water laws are observed and that stream hydrology and ecology is not impacted.
- Coordinate with ODFW and with the wetland permitting agencies USACOE and DSL when the placement of rip-rap in addition to existing installations occurs within the two-year floodplain of protected waters. This activity may require a CWA 404 and a DSL fill removal permit.
- If a USACOE permit is required, an Endangered Species Act consultation may be required.
- When restoring a channel to re-establish original flow, the schedules and proposed methods of the repairs will be communicated to ODFW (by letter) at least two weeks prior to beginning work in ODFW identified sensitive areas. In-water work will be coordinated with ODFW to ensure that no fish stranding occurs, to minimize sediment impacts and to define in-water work periods for transitional stream reaches and may require CWA 404 and DSL fill removal permits.

125	GUARDRAIL INSPECT & MAINTAIN	JANUARY - DECEMBER
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#### DESCRIPTION

This activity includes the inspection of roadway and bridge guardrail to ensure structural stability and the safety of the public. Work may be accomplished throughout the year.

Guardrail sections are physically inspected by walking along the rail section, observing and documenting the condition of posts, blocks, rails and connectors. Minor maintenance work such as bolt tightening or block replacement should be performed at time of inspection. Other more substantial maintenance needs should be noted and reported to the supervisor for the scheduling of the appropriate repairs.

126	GUARDRAIL REPAIR & REPLACEMENT	JANUARY - DECEMBER
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#### DESCRIPTION

This includes the repair or replacement of existing roadside guardrail and bridge-rail installations, often damaged in vehicle accidents. Work may be accomplished throughout the year. Repair typically consists of the removal and replacement of damaged posts, blocks, rails and connectors.

127	GUARDRAIL INSTALLATION	JANUARY - DECEMBER
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#### DESCRIPTION

This involves the installation of guardrail along a section of roadway to enhance public safety. Work may be accomplished throughout the year. Accurate layout and marking is critical to ensure the proper alignment of posts and rail. Dig postholes, set posts and attach rail to posts. Compact back-fill around posts and securely tighten all connections. Installation of silt fence or other erosion controls between work areas and the stream may be necessary when working near resource water.

#### ADDITIONAL BMPS FOR GUARDRAIL REPAIR OR INSTALLATION

- In unstable slope situations, areas down-slope from the guardrail installation will be protected through the placement of appropriate erosion control measures (silt fences or other control devices) where necessary to minimize additional sediment deposits into aquatic systems.

128	JOINT SEAL & REPAIR	APRIL - OCTOBER
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#### DESCRIPTION

The repair of an expansion joint on a concrete bridge deck is generally done in dry weather between April and October. Saw-cut or grind the pavement surface then thoroughly clean the joint area with compressed air or by sandblasting. Install waterproof

joint material and seal. Adequate measures must be in place to prevent potentially damaging materials from entering the waterway.

#### ADDITIONAL BMPS FOR EXPANSION JOINT REPAIR

- Provide for the collection and proper disposal or recycling of sandblasting materials and other bridge cleaning debris and prevent those materials from entering resource waters or habitat.

129	PILE PAINTING	APRIL - OCTOBER
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#### DESCRIPTION

This activity typically includes coating steel piling with paint to inhibit corrosion and is usually done in dry weather between April and October. Pilings are generally accessed with ladders then cleaned and painted by hand with brush and roller.

#### ADDITIONAL BMPS FOR PILE PAINTING

- Adequate precautionary and collection measures must be installed to prevent paint and other construction debris from entering the waterway, which may include the proper placement, maintenance and disposal of plastic tarpaulins or drop cloths.

130	ROADWAY INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

Roadway inspections are scheduled throughout the year and should include a careful examination of the function and physical condition of roadway assets and systems including roadway surfaces, drainage structures, traffic signs and pavement markings, vegetation, guardrails and bridges.

## 4. ROADWAY SURFACES (SERIES 200)

The Roadway Surfaces management activities include aggregate surfaces, asphalt and concrete pavements, roadway shoulders and all roadway surface-related concerns. These activities are designed to preserve the structural integrity of the roadway system and to provide for the safety, mobility and comfort of the roadway user.

**Environmental Concern to be Addressed: Roadway Surfaces Activities have the potential to impact the following:**

- Excess rock and sediment deposits in ditches may cause sediment loading in stream, causing habitat degradation.
- Asphalt spills or runoff may enter habitat area.
- Fuel spills may occur during equipment refueling which may reach streams or flood plain.

**BMPs for All Series 200: The following Best Management Practices will be employed for all Roadway Surfaces Operations and Maintenance Activities described below:**

- Re-fuel equipment outside of the 250 foot Riparian Management Area.
- Eliminate diesel fuel as a releasing or cleaning agent.
- Use environmentally sensitive cleaning and releasing agents.
- Use heat sources to heat and clean distributor nozzles during operations.
- Carry adequate erosion control supplies to keep materials out of protected water.
- Dispose of excess materials at appropriate sites.
- Use commercial asphalt plants for asphalt materials supply.
- Provide areas for concrete truck chute clean-out with proper containment of wet concrete.
- Clean trucks and equipment at corporation yards or materials supply facilities.
- Avoid working during heavy rainfall.
- Avoid working in cold weather.
- Additional caution when working in Riparian Management Areas.
- Additional caution when working next to down-slopes.

201	EXCAVATE & REPLACE - GRAVEL	JANUARY - DECEMBER
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DESCRIPTION

This activity involves removal and replacement of failed or poor quality portions of gravel surfaced roads in order to stabilize the roadway. Work consists of removing the problem material as needed, generally 6 to 12 inches deep and back-filling with aggregate in 4 to 6 inch lifts and compacting, repeating until level with the road grade. This work can generally be accomplished year-round when proper mitigation methods are employed to address weather conditions. Restrictions may include not working during heavy rainfall, which may cause erosion concerns; working in very dry weather when a lack of moisture in the aggregate may not allow proper compaction, increasing the possibility of erosion; working in close proximity to resource waters, which may require additional erosion control measures; or working on steep road grades or next to down slopes which also may add to erosion concerns. When completed, the aggregate should be level with the roadway surface and tightly compacted.

202	EXCAVATE & REPLACE - PAVED	MAY - SEPTEMBER
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#### DESCRIPTION

This activity involves removal and replacement of failed or poor quality portions of paved roadways in order to strengthen the road, extend its life and improve the ride quality. Work consists of removing the problem material, back-filling with asphalt mix in 3-inch lifts, compacting, repeating until level with the road grade. Add shoulder aggregate if needed. Work may be accomplished during summer months when the weather is sufficiently warm and dry. Restrictions include working during rain and cold weather; working in close proximity to resource waters, which may require additional erosion control measures; or working on steep roadway grades or next to down-slopes which may add to erosion concerns. When activity is complete, asphalt should make a smooth transition from old to new.

203	SURFACE PREPARATION - ACP	JANUARY - DECEMBER
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204	SURFACE PREPARATION - BST	JANUARY - DECEMBER
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#### DESCRIPTION

Activities include preparation of the roadway for upcoming asphalt re-surfacing in order to facilitate the process and ensure the continuation of the existing utilities and pavement markings. Work consists of delineating the work area, sweeping or flushing the roadway surface, if needed, shoulder grading; removing obstructing vegetation; marking the type and location of all utilities; noting the type and locations of pavement markings; documenting other problem items such as low-hanging overhead utility lines and ordering the installation of public notice signs. Work should be accomplished during the

same time period that is acceptable for the scheduled re-surfacing. Restrictions may include working during heavy rainfall. When the activity has been completed, the roadway should be properly marked, inventoried, cleaned, signed, with all obstructions removed or noted for further review.

#### ADDITIONAL BMPS FOR SURFACE PREPARATION

- Excess materials produced by shoulder grading shall either be removed and disposed of properly or incorporated (graded) back into the shoulder slopes, keeping materials out of drainage areas.

205	BLADE PATCHING - ACP	MAY - SEPTEMBER
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#### DESCRIPTION

Work consists of interim paving to lengthen roadway life until it can be re-paved or reconstructed. Work consists of sweeping and flushing the roadway, then tacking the old pavement. Asphalt is spread or dumped, then bladed with a motor grader and compacted. More than one lift may be necessary. Sand seal all seams after final compaction is complete. Install temporary tape if necessary and shoulder rock if needed. Work may be accomplished during summer months when the weather is sufficiently warm and dry. Restrictions include working during rain and cold weather, working in close proximity to resource waters, which may require additional erosion control measures, or working on steep grades or next to down-slopes which may add to erosion concerns. When activity is completed, the roadway surface should have smooth and uniform appearance and ride quality.

206	MACHINE PATCHING - ACP	MAY - SEPTEMBER
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#### DESCRIPTION

Machine patching involves interim paving to lengthen the road life until it can be re-paved or reconstructed. Work consists of sweeping and flushing the roadway, then tacking the old pavement. Pave the work area in 2 to 3 inch lifts, compact, and repeat as needed. Sand seal all seams after rolling is complete. Install shoulder rock if needed. Work may be accomplished during summer months when the weather is sufficiently warm and dry. Restrictions include working during rain or cold weather, working in close proximity to resource waters which may require additional erosion control measures or working on steep road grades or next to down-slopes, which may add to erosion concerns. When activity is complete, the road surface should have smooth and uniform appearance and ride quality.

208	GRAVEL ROAD AGGREGATE	JANUARY - DECEMBER
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#### DESCRIPTION

This activity is to add aggregate to poor quality segments of gravel roads in order to minimize further road damage and facilitate traffic. Work consists of identifying areas with potholes or areas where dirt is pumping up through the surface and spreading a layer of aggregate across the entire area. Work can also consist of spreading a lift of aggregate over the entire roadway for scheduled road grading. This work can generally be accomplished year-round. Restrictions may include working during heavy rainfall, which may cause erosion concerns; working when materials are very dry and may not properly compact, creating potential for erosion; and working in close proximity to resource waters, which may require additional erosion control measures. When the activity is completed, the roadway may be rough, but potholes should be filled, dirt covered and the roadway passable.

#### ADDITIONAL BMPS FOR GRAVEL ROAD AGGREGATE

- Avoid working in very dry conditions.

209	GRADING GRAVEL ROADS	MARCH - MAY SEPTEMBER - NOVEMBER
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#### DESCRIPTION

This activity consists of grading gravel-surfaced roadways to help minimize roadway damage, facilitate traffic safety and maintain environmental quality. Work consists of placing crushed aggregate as needed and then grading and shaping the road with a motor grader, incorporating the additional aggregate. Work may be accomplished during spring or fall months when the weather conditions are not too dry and not too wet. Restrictions may include working during heavy rainfall, which may cause erosion concerns; working in very dry weather when the lack of moisture in the aggregate may not provide proper compaction; working in close proximity to resource waters, which may require additional erosion control measures; and working on steep road grades or next to down-slopes, which may also add to erosion concerns. When the activity is completed, the roadway should have minimal potholes or washboards and should have improved ride quality and safety.

#### ADDITIONAL BMPS FOR GRADING

- Avoid working in very dry conditions.



- Excess materials produced by shoulder grading shall either be removed and disposed of properly or incorporated (graded) back into the shoulder slopes, keeping materials out of drainage areas.

210	SHOULDER AGGREGATE	APRIL - JUNE SEPTEMBER - OCTOBER
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#### DESCRIPTION

The addition of surface aggregate to the edges of paved roadways increases safety for motorists by eliminating roadway edge drop-off hazards. Work consists of adding crushed aggregate to shoulder areas and adding larger-sized rock when necessary for support. Work may be accomplished when there is sufficient moisture in the aggregate to provide for proper compaction, usually November through May unless a water truck is used during dry weather to provide moisture. Restrictions may include working during heavy rainfall, which may cause an erosion concern; working in very dry weather when the lack of moisture in the aggregate may not provide proper compaction; working in close proximity to resource waters, which may require additional erosion control measures; or working on steep roadway grades or next to down-slopes, which may add to erosion concerns. When the activity is complete, the aggregate should be level with the edge of the pavement and sloping slightly away, tightly compacted, with uniform width and a straight edge.

#### ADDITIONAL BMPS FOR SHOULDER AGGREGATE

- Surface aggregates must be prevented from entering roadside ditches or adjacent waterways.

211	SHOULDER GRADING	NOVEMBER - MAY
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#### DESCRIPTION

Work includes re-grading the aggregate shoulders of paved roadways to eliminate road edge drop-off hazards and to stabilize the edge of the pavement. The work consists of pulling the shoulder towards (onto) the pavement with a motor grader, grading the material back in place, then applying compaction effort. Work may be accomplished when there is sufficient moisture in the aggregate to provide proper compaction, usually November through May, unless a water truck is used during dry weather to provide moisture. When the activity has been completed, the aggregate should be level with the edge of pavement and sloping slightly away, tightly compacted with a uniform width and straight edge. The pavement should be swept or flushed of any loose aggregate.

#### ADDITIONAL BMPS FOR SHOULDER GRADING

- Install check dams or other control devices in adjacent ditches to protect resource water.
- Evaluate for alternatives to recurrent grading, such as paving the shoulder.
- Evaluate the width of the grading; modify to minimize disturbance of vegetation.
- Grade in dry weather but while moisture is still present in soil and aggregate.
- Permanently stabilize disturbed roadway slopes with BMPs (native vegetation preferred).

215	STREET SWEEPING (RANDOM)	JANUARY - DECEMBER
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#### DESCRIPTION

This activity is in the rural area. Urban area street sweeping is accomplished by Clean Water Services. Activity includes sweeping soil debris from the roadway for motorist, bicycle and pedestrian safety, and to lengthen the life of the road by eliminating places for vegetation to encroach. Work consists of (rural road) using power brooms to clean debris from roads, intersections and shoulders. Work may be accomplished year-round. Restrictions may include working near catch basins, which causes environmental concern; and working in very dry weather that requires wetting the broom segments in order to minimize dust. When the activity is complete, the road surface should be clean and free of debris.

#### ADDITIONAL BMPS FOR STREET SWEEPING (RURAL)

- Use water (as needed) to reduce dust during sweeping.
- Dispose of waste materials at an appropriate site, in an appropriate manner.
- Recycle sweeping materials where appropriate.
- Coordinate crews to follow sweeping and flushing with bridge deck drain cleaning.
- Remove sweepings produced within 250 feet of identified resource waters.
- Employ mobile sweepers within Riparian Management Areas.
- Place sediment barriers along stream routes or direct drainage routes.
- Additional caution when working around drainage catchments.

217	ROADWAY INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

Investigate roadways to identify any safety or roadway structure concerns and to develop effective schedules for management activity. Work consists of cataloging surface conditions, shoulder type and condition, drainage concerns and vegetation obstructions on all types of roadways. Work should be accomplished year-round. When the activity is complete, the roadway conditions should all be accurately assessed and properly reported and any necessary follow-up is documented.

218	GRADING ROADS - DUST ABATEMENT	MARCH - MAY SEPTEMBER - NOVEMBER
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#### DESCRIPTION

This work consists of grading sections of gravel roadways in order to facilitate the placement of dust mitigation materials. Work includes the addition of surface aggregate as needed to portions, or all, of the roadway. Grade the roadway with a motor grader, incorporating the additional aggregate. Compact the aggregate as necessary and practical. When the activity is complete, the roadway should be free of potholes or washboards and be properly graded, providing appropriate drainage.

#### ADDITIONAL BMPS FOR DUST ABATEMENT

- See the Dust Abatement Program (Appendix A to Routine Road Maintenance Limit 10 ESA 4(d) Submittal), and OACES Gravel Road Maintenance Template.

220	TEMPORARY PATCHING (COLD)	JANUARY - DECEMBER
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#### DESCRIPTION

Fill potholes on paved roads during bad weather or emergency situations to temporarily stabilize the roadway. Work consists of removing loose debris and water from the hole, filling it with (cold) asphalt mix and compacting. Work is typically necessary during winter weather. There are no restrictions. When the activity is complete potholes will be filled to road level and compacted.

221	PERMANENT PATCHING - ACP	MAY - SEPTEMBER
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#### DESCRIPTION

This activity involves filling potholes on paved roads to stabilize the roadway surface. Work consists of removing loose debris or the temporary cold patch, if necessary. Fill the hole with ACP and compact. Tack edges again only where needed and sand seal all around. Work may be accomplished throughout the year when the weather is reasonably compatible with the activity. When the activity is complete the asphalt patch should make a smooth transition between the existing pavement surfaces and will be properly compacted and sealed.

223	PAVEMENT CRACK SEALING	MAY - SEPTEMBER
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#### DESCRIPTION

Work includes filling longitudinal and transverse cracks in the asphalt pavement surface in order to slow the growth of the cracks and lengthen the life of the roadway. Work consists of removing all vegetation and other debris from the cracks using compressed air. Sweep the roadway with a power broom, then repeat the use of the compressed air. Fill cracks with liquid bitumen. This work can be accomplished during the summer months when the road surface is dry and sufficiently warm. When the activity is completed, all pavement surface cracks should be filled to the level of the roadway surface, forming a tight and positive seal.

224	LANE WIDENING & SHOULDER PAVING	MAY - SEPTEMBER
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#### DESCRIPTION

This activity extends the pavement width to increase vehicle, pedestrian and bicycle safety and roadway stability. Work consists of saw cutting the existing pavement to create a straight edge. Relocate the ditch line as necessary and install erosion controls. Excavate the area to be widened, back-filling it with aggregate and compacting until the aggregate grade matches the existing base. Tack the old pavement and pave the new extension to the grade and slope of the existing pavement. Sand seal all seams after rolling is complete. Install pavement marking temporary tape if necessary. Install "Abrupt Edge" signs until shoulder work can be completed. Work may be accomplished during summer months when the weather is sufficiently warm and dry. Restrictions include working during heavy rain and cold weather; working in close proximity to resource waters, which may require additional erosion control measures; or working on steep roadway grades or next to down-slopes which may add to erosion concerns. When

activity has been completed, the asphalt should make a smooth transition between old and new, and the edges should be uniformly straight.

#### ADDITIONAL BMPS FOR LANE WIDENING AND SHOULDER PAVING

- Additional caution when working next to down-slopes.
- Excess materials produced by shoulder grading shall either be removed and disposed of properly or incorporated (graded) back into the shoulder slopes, keeping materials out of drainage areas.

225	STREET FLUSHING	JANUARY - DECEMBER
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#### DESCRIPTION

Clean roadways of excess debris, especially where a power broom is not sufficient or appropriate. Work consists of using a water wagon to flush debris from roadways, intersections, bike paths and shoulders. Work may be accomplished year-round. Restrictions may include working near an RMA or drainage basin, which may cause environmental concerns; and cold weather when flushing may cause ice to form. When activity is complete, the roadway should be clean and free of debris.

#### ADDITIONAL BMPS FOR STREET FLUSHING

- Use erosion control measures to prevent sediments from entering the system.

226	BST - CHIP SEAL - PAVED ROAD	MAY - SEPTEMBER
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#### DESCRIPTION

Resurface the roadway to prolong service life. Work consists of grading the shoulders, sweeping the roadway and flushing when necessary. Apply asphalt oil, cover with chip seal aggregate and compact, repeating if necessary. Spread sand layer over entire roadway, roll, then sweep off the excess materials. Post “Loose Gravel - Fresh Oil” and “Slow” traffic signs; then return several days later and sweep roadway again. A final “fog seal” may be placed to minimize the loss of aggregate from the surface treatment. Work may be accomplished during summer months when the weather is sufficiently warm and dry. Restrictions include working during rainfall and cold weather; working on roads with catch basins, which require additional erosion control measures; and working on roads with utilities which require protecting. When activity is complete, aggregate should be tightly compacted, with no loose aggregate or uncovered oil on the roadway surface.

#### ADDITIONAL BMPS FOR CHIP SEAL 226 and 227

- Additional caution when working in Riparian Management Areas, use vacuum sweepers.
- Additional caution when working near steep slopes.

227	BST - CHIP SEAL - GRAVEL ROAD	MAY - SEPTEMBER
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#### DESCRIPTION

This activity involves placement of a durable surface to facilitate travel and reduce potholes and fugitive dust. Work consists of grading the roadway surface and adding aggregate where needed and then applying compaction effort. Apply layers of asphalt oil and cover each layer with chip seal aggregate and compact with rubber tire rollers, repeating if necessary. Spread sand over the entire roadway, compact, and sweep off any excess. Post “Loose Gravel - Fresh Oil” and “Slow” signs, then return several days later and sweep the roadway again. Work may be accomplished during summer months when weather is sufficiently warm and dry. When the activity has been completed, the aggregate and sand should be tightly compacted, with no loose aggregate or uncovered oil remaining on the roadway surface.

230	STOCKPILING	JANUARY - DECEMBER
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#### DESCRIPTION

Accumulate aggregate close to upcoming work sites in order to minimize truck travel time during the planned activities. Work consists of picking up aggregate from the quarry and dumping it at the designated location. A preferred location will have an asphalt pad to avoid contamination of the aggregate. Work may be accomplished at any time, but preferably not more than one month in advance of work activity. Storage areas on grades will require additional erosion control measures. When the activity is complete, stockpiles should be of appropriate size and properly contained.

#### ADDITIONAL BMPS FOR STOCKPILING

- Develop appropriate site management plans for materials storage areas that are in close proximity to Riparian Management Areas.
- Implement appropriate erosion mitigation and sediment control measures to ensure the containment and stability of the stockpiled material.

- Stockpile sites should be identified in the development of Materials Disposal and Storage Plans.

231	STOCKPILING (LIQUIDS)	JANUARY - DECEMBER
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#### DESCRIPTION

Accumulate liquid materials in corporation yards in order to minimize truck travel time during planned activities. Work consists of picking up liquid asphalt from the manufacturer and storing the tanker truck and trailer in designated areas of the yard. Anti-icing materials are stored in self-contained plastic storage tanks. When the activity is complete, materials will be appropriately located and contained, stored in reasonable amounts with environmental protections in place.

#### ADDITIONAL BMPS FOR STOCKPILING LIQUIDS

- Develop appropriate site management plans for materials storage areas that are in close proximity to Riparian Management Areas.
- Stockpile sites should be identified in the development of Materials Disposal and Storage Plans.
- Check environmental statements on material containers and act according to instructions.

## 5. VEGETATION MANAGEMENT (SERIES 300)

The Vegetation Management program is responsible for managing all vegetation control activity within Washington County roadside rights-of-way. Brush cutting, roadside mowing, and sight-distance clearing activities are designed to improve public safety, restore sight distance, reduce ice formation (shading) and enhance ice control efforts, to preserve roadway structural integrity and prevent roadway slope failure. These activities include mechanical mowing and chopping, tree pruning and the mechanical and manual removal of brush:

- **Mechanical:** Mowing operations, surface grading and ditch cleaning activities to physically remove vegetation.
- **Cultural:** Manually performed controlled burning, plant shading, plant competition, cultivation, seeding, fertilizing, placing of mulch and installation of weed barriers.

- **Chemical:** Application of chemical agents to control vegetation and pests and in accordance with all applicable local, Federal and State regulations.

**Environmental Concern to be Addressed: Vegetation Management activities have the potential to impact the following:**

- Riparian destruction, loss of shade for habitat.
- Improper disposal of brush may cause vegetation to die, causing erosion.
- Chemical runoff, overspray or spills may impact water quality.
- Noxious weeds may overtake native vegetation, adversely impacting riparian area.
- **Note:** Vegetation management activity will not typically create nor cause the delivery of sediments.

**BMPs for All Series 300: The following Best Management Practices will be employed for all Vegetation Management Activities described below:**

- Brush cut within Riparian Management Areas will be left in place where doing so does not interfere with sight distance, compromise drainage systems or public safety, cause fire hazards, involve noxious weeds or impact the proper functioning of roadway structures or systems.
- Limit mowing widths to no more than eight (8) feet from the edge of pavement in significant resource areas, unless necessary to maintain the proper functioning of roadway facilities.
- Maintain shade trees within RMAs unless they have been identified as Hazard Trees. Whenever removing trees over six-inch “diameter-at-breast-height” from within RMAs, replace those trees at a one-to-one caliper ratio (Clean Water Services). Permits may be required for these removals.
- Hazard trees which otherwise provide shade or bank stabilization, or grow within 250 feet of RMAs and are determined to be removed, (removal) will be coordinated with ODFW and other agencies.
- Ensure that replacement trees will not compromise future management operations.
- Only brush within twenty feet of (on either side), and under, bridge structures will be removed. All other brush not within the clear zone will be left in its current condition, unless it interferes with sight distance, shades the structure, or if the brush is a noxious weed (Scotch Broom).



- On culverts of six-foot diameter or greater, remove ten feet of brush on both sides of the culvert on the up-stream end of the culvert and ten feet on both sides on the down-stream end, unless the brush is a noxious weed. If other brush removal is needed, coordinate with ODFW.
- Whenever removing trees over six-inch “diameter-at-breast-height” from within RMAs, replace those trees at a one-to-one caliper ratio. Permits may be required for these removals.
- In areas that are not within an RMA or wetland, open the vegetation (tree) canopy over roadways as necessary to increase the drying benefits of air movement and of sun exposure.
- Remove brush, trees and debris from the right-of-way to a width that allows proper roadway management functions, including roadway surface grading and drainage operations.
- Control roadside brush through manual or mechanical removal and the careful application of chemical controls, and by establishing desirable low-growing (native species) ground cover.
- Chemical agents used for brush control must not reach the stream system or a wetland.
- Pursue permanent solutions to chronically unstable slope areas through the project development process, including artificial hillside drainages or permanent shoring.

301	BRUSH MOWING & CUTTING	JANUARY - DECEMBER
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## DESCRIPTION

This activity involves the removal of vegetation along rural roadsides using tractor-powered flail or rotary brush cutters to maintain safety sight distance as well as visual clearance of traffic control signs, to maintain safety “clear zones” and to provide for a safe and visually pleasing roadside for roadway users.

## ADDITIONAL BMPS FOR BRUSH MOWING & CUTTING

- Mowing is typically limited to within eight feet of the pavement edge within Riparian Management Areas unless mowing is necessary to maintain the proper functioning condition of roadway assets.
- Vegetation will typically be cut no lower than six (6) inches above surrounding ground level.

- Under typical circumstances near bridges, only remove brush twenty feet on either side and under the bridge to provide necessary access for repair and other management activities. In some situations, roadway access under or adjacent to a bridge will be outside of the twenty-foot buffer area.
- Near bridges, only remove the brush necessary to perform the management activity.

302	ROADSIDE CLEARING (MANUAL)	JANUARY - DECEMBER
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#### DESCRIPTION

Roadside clearing includes the removal of encroaching or overhanging vegetation to allow sunlight to penetrate to the roadway surface to help keep frost from forming in the surface and also includes the removal of vegetation to provide for visibility of traffic control signs and other roadway assets. In usual circumstances, encroaching vegetation will be removed from within twenty feet either side of bridges. Vegetation will be removed to enhance public safety by maintaining safety “clear zones” and visibility of roadway assets and to prevent compromising the structural integrity of the roadway.

#### ADDITIONAL BMPS FOR MANUAL ROADSIDE CLEARING

- Brush within twenty feet of and underneath bridge structures will typically be removed. Proper caution will be exercised when conflicts with the resting zones of migrating fish may be possible.
- Significant consideration should be given to preserving those trees that provide stream shading.

303	APPROVED CHEMICAL CONTROLS	JANUARY - DECEMBER
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#### DESCRIPTION

Chemical control consists of the selective application of approved herbicides to control the growth of noxious weeds and other undesirable species. DLUT does not use any (EPA) restricted-use chemicals to control roadside vegetation. Materials that may be applied include broad-based foliar-active herbicides and soil residual herbicides. Computer-assisted delivery systems are used to control the mixture, rate of application and placement to prevent an impact to resource waters and habitats.

The application of selected herbicides along roadsides and within rights-of-way is a proven method of vegetation management designed to retard the growth of weeds and other undesirable species. Pre-emergent pesticide applications on landscaped areas

should result in the absence of weeds for up to six months depending on the soil type and organic matter and the germination of the targeted seeds.

#### ADDITIONAL BMPS FOR CHEMICAL CONTROLS

- Full consideration will be given to alternative management methods before approving the use of chemical applications.
- Eliminate spray activities on structures located over streams or adjacent to wetlands.
- The Riparian Management Area Maps identify the locations of RMAs where spraying will be restricted.
- Only those chemicals approved for use near aquatic resources (EPA labels) will be used.
- Herbicides will be used in accordance with EPA labels.
- Within riparian areas, hand spray around structures that require chemical control.
- Within 250 feet of any active and flowing stream, targeted chemical applications will be used only upon the development and approval of an appropriate Vegetation Management Prescription.
- Boom spraying within two hundred fifty (250) feet of a resource stream will not be considered.
- DLUT will boom-spray no further than three (3) feet from edge of the pavement between the months of March and July. The protection of wildlife habitat may also cause the modification of the timing and width of these applications, which will be determined by the Vegetation Management Supervisor.
- Pre-emergent herbicides should be applied when moderate rainfall is expected in order to transport the materials into the top inch of soil. Application should be avoided when heavy precipitation or flooding is expected.

304	LANDSCAPE MOWING	APRIL - SEPTEMBER
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#### DESCRIPTION

This activity includes the mechanical trimming of established grass and ground cover along urban boulevards, walkways and sidewalks and the cutting of tall grass and weeds

at roadway intersections for improving safety line-of-sight visibility using small garden tractors and other types of power equipment.

#### ADDITIONAL BMPS FOR LANDSCAPE MOWING

- Grass or ground cover should be no more than three (3) to four (4) inches tall and shrubs no higher than three (3) feet high. Clippings should be removed from the sidewalk to avoid pedestrian hazards.

305	ROADSIDE MOWING	APRIL - OCTOBER
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#### DESCRIPTION

This activity includes the cutting of tall grass and weeds on roadway shoulders using tractor mowers. The cutting of tall grass reduces fire hazards, improves safety sight-distance, helps to prevent damage to the roadway shoulder or pavement and facilitates roadway surface and drainage operations activity.

#### ADDITIONAL BMPS FOR ROADSIDE MOWING

- Roadways will be scheduled for mowing in coordination with Gravel Road grading and other activity schedules.
- Roadway shoulder vegetation will typically be cut no lower than six (6) inches above the ground level extending four (4) to five (5) feet from the edge of the travel lane.

307	LANDSCAPE MAINTENANCE - IRRIGATION	JANUARY - DECEMBER
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#### DESCRIPTION

This activity includes the maintenance of landscaped areas along roadway medians, boulevards and walkways including the maintenance, operation and repair of irrigation systems and other landscape facilities is usually accomplished through manual labor, often with Community Service crews. Irrigation systems will usually be shut down between October and June. All systems undergo an annual back-flow test.

#### ADDITIONAL BMPS FOR LANDSCAPE MAINTENANCE

- The goal would be to keep roadway medians reasonably free of weeds with other plants trimmed to a maximum height of three (3) feet.
- Dead trees or shrubs and dying limbs will be removed and disposed of. Landscaped areas will be raked free of leaves, twigs and other debris.

- All sprinkler heads, control boxes and sprinkler lines will be tested for proper operation and repaired or replaced as necessary.

308	SIGHT DISTANCE CLEARING	JANUARY - DECEMBER
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#### DESCRIPTION

This includes the removal of encroaching vegetation to improve visibility of traffic signs and roadway structures, roadway intersections and curves in order to improve the safety of roadway users. Sight distance clearing is performed on a routine basis and also in response to specific concerns or report. Sight distance clearing is designed to ensure compliance with minimum engineering standards for visibility.

#### ADDITIONAL BMPS FOR SIGHT DISTANCE CLEARING

- Encroaching vegetation that obstructs sight distance for roadway users will be removed.
- Traffic signs should be visible at ten (10) times the posted speed limit, for example, 10 x 30 mph = 300 feet of visibility required. When notified of an obstructed "STOP", "STOP AHEAD" or other regulatory traffic control sign, DLUT will make every effort to clear the obstruction within 2 hours.

309	DEBRIS REMOVAL	JANUARY - DECEMBER
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#### DESCRIPTION

This activity includes the removal and disposal of trees, tree limbs and other debris that has fallen into or upon the right-of-way. This activity is usually associated with weather-related events such as high wind.

#### ADDITIONAL BMPS FOR DEBRIS REMOVAL

- Debris should be removed and disposed of either by mulching through a wood chipper or hauled to an appropriate landfill. Upon completion, the area should be free of debris and swept or blown clean.

310	TREE MANAGEMENT	JANUARY - DECEMBER
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## DESCRIPTION

Tree pruning involves the removal of basal and vigorous epicormic sprouts. Work is performed with emphasis on public safety, aesthetics and the structural integrity of the tree. All roadside trees will have their canopies raised to a minimum of fifteen (15) feet on paved roads and eighteen (18) feet on gravel roads. This is to allow vertical clearance of large equipment, spreading of aggregate surfacing materials and to allow sunlight to penetrate to the roadway surface to prevent freezing and ice build-up. Crown raising is an everyday practice for Vegetation Management and involves the removal of branches from the bottom of the crown of a tree to provide clearance for pedestrians, vehicles and sight distance.

## ADDITIONAL BMPS FOR TREE MANAGEMENT

- The ratio of live crown to total tree height should be at least two-thirds.
- Make cuts as close as possible to the stem in the branch axil but outside the branch bark ridge so that the stem tissue is not injured and the wound can heal in the shortest time possible.
- Discourage making flush cuts inside the branch collar or too far from the stem, leaving a branch stub. Branch tissue usually dies and wound closure is delayed when wound-wood does not seal over the stub that was left.
- When necessary to remove more than half of the foliage from a branch, remove the entire branch to the tree trunk. Flush cuts made inside the branch collar will result in pronounced development of wound-wood on the sides of the pruning wounds with very little wound-wood forming on the top or bottom.
- Larger branches should be pre-cut (sectioned) to avoid splitting or tearing of the bark.
- Whenever removing trees over six-inch “diameter-at-breast-height” from within RMAs, replace those trees at a one-to-one caliper ratio (CWS). Permits may be required for these removals.
- Coordinate with ODFW on species and location of plantings.
- Ensure that re-planted trees do not compromise roadway structures.

311	ESTABLISH VEGETATION	OCTOBER - MAY
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## DESCRIPTION

This activity involves the establishment of desirable ground cover vegetation, preferably native species, along roadsides and within rights-of-way and anywhere construction activity disturbs the soil. Roadway construction and Drainage Operations projects will be considered for the establishment of vegetation as a standard practice as well as activity where there might be an opportunity to establish desirable vegetation.

#### ADDITIONAL BMPS FOR VEGETATION ESTABLISHMENT

- Re-vegetation will consist of planting locally originating native grasses and ground cover.
- The plants established must accommodate relevant safety, economic and ecological considerations and should provide, where possible, adequate erosion control and bank stabilization measures that are necessary to keep debris from entering resource waters.
- Activity within RMAs may require additional review.
- The re-vegetation of embankments should be accomplished in appropriate weather to prevent erosion of soils that could deliver sediments to protected waters. Existing soil conditions may need to be modified to provide for stability and to allow the vegetation to become properly established.

312	PAVE PREP VEGETATION REMOVAL	JANUARY - DECEMBER
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#### DESCRIPTION

This includes the removal of grass, weeds and other debris along curbs, gutters and roadway edges, and also includes the cutting back of shrubs and ground cover in preparation for re-surfacing projects.

#### ADDITIONAL BMPS FOR PAVEMENT PREPARATION

- All vegetation over curbs and at the edges of pavement will be trimmed back using shovels, hedge trimmers, rakes and blowers to allow for roadway repairs and the application of surfacing materials.

313	ROADWAY INSPECTION	JANUARY - DECEMBER
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## DESCRIPTION

This includes investigation and processing of Road Condition Reports, the planning and supervision of routine and project work activities and the routine inspection of road and bridge systems and assets.

314	HAZARDOUS TREE REMOVAL	JANUARY - DECEMBER
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## DESCRIPTION

Hazard trees are those that create or may create a potential threat of injury to roadway users or to property. When a potential hazard is identified, that a tree may fall into or upon right-of-way, DLUT will remove or otherwise mitigate the hazard, working with adjacent landowners as necessary.

### ADDITIONAL BMPS FOR HAZARDOUS TREE REMOVAL

- Hazardous trees should be cut to the ground or cut back to the extent the hazard is eliminated. All tree limbs and debris should be disposed of properly and the area cleared when the job is completed.
- Whenever removing trees over six-inch “diameter-at-breast-height” from within RMAs, replace those trees at a one-to-one caliper ratio (Clean Water Services). Permits may be required for these removals.
- Coordinate with ODFW on species and location of seedlings or cuttings to be replanted.

330	LANDSCAPE MAINTENANCE (CS)	JANUARY - DECEMBER
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## DESCRIPTION

This activity involves weed abatement on landscaped areas employing Community Service crews.

### ADDITIONAL BMPS FOR LANDSCAPE MAINTENANCE BY COMMUNITY SERVICE CREWS

- Area should be raked clean with shrubs and ground cover trimmed to Vegetation Management Program standards.
- Only trained personnel will handle potentially hazardous or unidentified materials.



331	LITTER PATROL (CS)	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves employing Community Service crews to perform litter clean up along County roadways. Collected debris is stacked close to roadway shoulder while litter is bagged, tied and stacked.

#### ADDITIONAL BMPS FOR LITTER PATROL

- Roadway shoulders and ditches and other areas within the rights-of-way should be reasonably clear of debris.
- Only trained personnel will handle potentially hazardous or unidentified materials.

332	ILLEGAL DUMP CLEAN-UP (CS)	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves employing Community Service crews to remove trash and other debris along roadways. Community Service crews are transported to the area where the illegal dumping has occurred. Litter and debris is bagged and piled for subsequent pick-up leaving the area clear of any unsightly debris.

#### ADDITIONAL BMPS FOR ILLEGAL DUMP CLEAN-UP

- Only trained personnel will handle potentially hazardous or unidentified materials.

## **6. DRAINAGE OPERATIONS (SERIES 400)**

The Drainage Operations program constructs and maintains rural roadside drainage facilities (ditches, culverts, and related structures) throughout the Washington County roadway system, working closely with Vegetation Management personnel to ensure proper re-vegetation of project sites and other disturbed areas.

**Environmental Concern to be Addressed: Drainage Operations have the potential to impact the following:**

- If not maintained, drainage facilities have the potential to cause damage to roadways and other structures.
- If not maintained, drainage facilities may cause damage from flooding, storms and other events.
- Erosion can impact wetlands, and in-stream water quality.

**BMPs for All Series 400: The following Best Management Practices will be employed for all Drainage Operations Activities described below:**

- Re-fuel all equipment outside of the (250-foot) Riparian Management Area.
- Store and dispose of excess construction materials above the 100 year floodplain level at an approved location and not within 250 feet of a stream, wetland or riparian area, installing appropriate control measures to minimize erosion and the delivery of sediments to resource waters.
- Refer to RMA maps to ensure proper precautions in resource sensitive areas.
- Consistently apply appropriate erosion control measures such as check dams, silt fences or other established devices when the potential may exist for sediment to enter protected waters.
- Determine if silt devices are adequate to filter water prior to draining to waterways.
- If the pumping of stream water is necessary, use the proper fish screens on pump inlets, ensure that relevant water laws are observed and that stream hydrology and ecology is not impacted.
- Apply additional caution when working in Riparian Management Areas.
- Where a vegetated ditch is designed to help control soil erosion, disturb only when necessary to maintain proper drainage activity. Clean only those ditch segments that have filled in to the extent where the drainage may not function properly during a major weather event.
- Where a significant ditch length delivers stormwater run-off directly to a stream system and management activity removes desirable vegetation from ditches or disturbs soil, develop sediment traps between the disturbed segment and the nearest down-slope stream crossing.
- Where roadways parallel streams, within a 250-foot horizontal distance, ensure that roadway slopes are stabilized with vegetation, filter windrows or other appropriate measures.

401	DITCH MAINTENANCE – BACKHOE	JANUARY - DECEMBER
402	DITCH MAINTENANCE – EXCAVATOR	
403	DITCH MAINTENANCE – MOTOR GRADER	

## DESCRIPTION

Ditch maintenance includes use of heavy equipment for the cleaning and re-shaping of ditches including excavating, loading, hauling and disposing of excess materials. This activity is performed in all weather, throughout the year. Restrictions may include periods of heavy rainfall or sustained rainfall while working on steeper roadway grades. When activity has been completed, the ditch should provide good flow and filtration for the water run off. The ideal drainage system would be a two-foot road shoulder with 3:1 in-slope, one-foot flat bottom and a 4:1 back-slope. Time of year may cause a restriction within these areas.

## ADDITIONAL BMPS FOR DITCH MAINTENANCE

- Excess, or waste, materials are to be removed to an appropriate location for disposal or storage.
- Vegetation may be removed during ditch cleaning. Desirable vegetation will be established on exposed areas.
- Excess material will be handled in a manner consistent with the standards identified in the Road Waste Management section.
- Temporary erosion controls will be installed and will remain in place until permanent vegetation is established.
- All disturbed areas will be re-vegetated with an appropriate species of ground cover.
- When working within an RMA, an appropriate erosion control plan will be developed, approved and implemented.
- Establish desirable vegetation in drainage ditches and on roadway slopes.
- Perform ditch work in optimum weather to minimize environmental impacts.
- Evaluate and modify existing ditch slopes to trap surface sediments.
- Grade ditch slopes to support establishment of desirable vegetation.
- Retain existing desirable ditch-line vegetation, when possible, to increase bio-filtration.

404	DITCH RELOCATION & CONSTRUCTION	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the re-location or construction of a roadside drainage ditch. The work consists of re-establishing or constructing a drainage ditch that will provide efficient transport of stormwater run-off. The work consists of hauling, loading and disposal of materials. When this activity has been completed, the ditch should provide for good flow and for the filtration of the stormwater runoff. Appropriate temporary erosion controls will be installed and will remain in place until permanent vegetation is established. The ideal drainage system would be a two-foot road shoulder with 3:1 in-slope, one-foot flat bottom and a 4:1 back-slope. All disturbed areas will be re-vegetated with an appropriate species of ground cover. When working within an RMA, an appropriate erosion control plan will be developed, approved and implemented. Time of year may cause a restriction within these areas.

407	CULVERT MAINTENANCE	JANUARY - DECEMBER
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#### DESCRIPTION

This activity is to clear obstructions from inside culvert pipes such as gravel, silt and other types of debris in order to restore proper function. This may also include resetting culvert sections that have separated at the joints. Culverts need to be free of all obstructions so stormwater can flow easily. Culvert maintenance is often done using heavy equipment including a backhoe, a vactor truck or jet router (a machine with a high-pressure hose and a powerful vacuum), and hand shovels. Vegetation may be removed during cleaning. Culvert maintenance is done in all weather to prevent flooding and roadway failure and includes the removal of beaver dam materials that may plug culverts.

#### ADDITIONAL BMPS FOR CULVERT MAINTENANCE

- Install erosion and sediment controls during culvert or trash rack cleaning.
- Perform work at low flow; divert flow to minimize turbidity where possible.
- Inspect roadway culverts on a regular basis.
- Document repair or maintenance requirements.

408	EMBANKMENT REPAIR & STABILIZATION	JANUARY - DECEMBER
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## DESCRIPTION

Includes the repair of damage to roadways and fill-slopes through the importing and shaping of material to restore slope and grade-lines and the stabilization of embankments with rock, vegetation and bio-matting to prevent soil erosion. Includes the establishment of erosion control on banks that have failed. Permits may be required when working near wetlands and fish or wildlife habitat. In-water work covered by this action may include replacement of rip-rap, which has been lost due to erosion.

## ADDITIONAL BMPS FOR EMBANKMENT REPAIR

- Any installation of fill material that exceeds the volume of material removed by bank erosion (below bank-full stage) will constitute a significant action and will require permitting. Increases in the material profile will require additional coordination with the appropriate agencies.
- Replacement of existing rip-rap material will be scheduled within the ODFW in-water work periods in non-emergency situations. Situations that require expedited repair or restoration action, but which are not technically defined as “emergencies” (under the ORS, ESA or by the DSL) will be addressed with ODFW, and potentially with NMFS and USFWS, individually.
- Erosion repair work will employ bio-engineering solutions when practical and appropriate.
- Any erosion repair activity (response and clean-up, not the erosive action itself) which causes a significant change in the topography or vegetation within a Riparian Management Area will be coordinated with ODFW and with any other appropriate regulatory organizations.
- Maintenance or repair of embankments should be done in appropriate weather and soil conditions to prevent erosion of soil that could deliver sediment to protected waters or habitat.
- Maintain all cut-slopes and fill-slopes at a stable angle, no steeper than the angle of repose.
- Remove over-hanging material from cut-slopes and fill-slopes, round off slope tops if possible.
- Do not incorporate undesirable materials such as unsuitable slide debris, sediments from ditch excavations or woody debris into the roadway surfacing material while performing this activity.

409	PED PATH CONSTR & MAINTENANCE	MAY - DECEMBER
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#### DESCRIPTION

Excavation and grading in preparation for pathway surfacing. Work includes excavating, loading, hauling and disposing of excess material. Sediment fences, straw bales, bio-bags or other methods of temporary erosion control are used during construction, followed by vegetation establishment.

#### ADDITIONAL BMPS FOR PATHWAY MAINTENANCE

- Avoid construction during very wet weather.

411	ROADWAY INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

Investigate roadways to identify any safety or roadway structure concerns and to develop effective schedules for management activity. Work consists of cataloging surface conditions, shoulder type and condition, drainage concerns and vegetation obstructions on all types of roadways. Work should be accomplished year-round. When the activity is complete, the roadway conditions should all be accurately assessed and properly reported and any necessary follow-up is documented.

412	CULVERT INSTALL OR REPLACE 12"	JANUARY - DECEMBER
413	CULVERT INSTALL OR REPLACE 18"	
414	CULVERT INSTALL OR REPLACE 24"	
415	CULVERT INSTALL OR REPLACE 36"	

#### DESCRIPTION

This activity involves installing a new culvert or replacing an existing culvert. Before installing culverts, a drainage study should be completed to determine the proper culvert size. Excavate the trench to existing flow line of ditch to a depth necessary for at least one-foot of cover over the top. Tapered ends should be installed on the outlet and inlet of the culvert. Trench width should be enough for compaction on the sides of the culvert. Restrictions may include getting permits for fish-friendly streams, limiting installation to between July 01<sup>st</sup> and September 30<sup>th</sup> and limiting activity during high-water periods.

#### ADDITIONAL BMPS FOR CULVERT INSTALLATIONS

- Any culvert replacements that must be performed in flowing water will be accomplished during the established ODFW in-water work period for the system or as negotiated with ODFW.
- Closely coordinate with ODFW and other agencies on the removal of material (debris) from roadway culverts when this activity is performed in ODFW-identified resource stream reaches that support sensitive fish species or when working in significant and limiting habitat elements.
- Cleaning schedules, proposed work methods and the planned repair of culvert structures will be communicated to ODFW (by letter) at least two weeks prior to proceeding with the work when working within ODFW identified sensitive resource areas such as fish spawning grounds.
- Any in-water repair or structure replacement work activity will be first reviewed with ODFW (except during emergencies) to ensure that no fish stranding occurs, to minimize sediment impacts and to verify the appropriate in-water work periods for transitional stream reaches.
- Culvert replacements or extensions will frequently require permits outside the scope of this manual. Any culvert replacement or extension may be required to meet provisions for fish passage as required by ORS 498.268 and ORS 509.605. Culvert replacement projects requiring fish passage consideration will comply with guidelines outlined in ODFW Guidelines - Criteria for Stream and Road Crossings (1996), NOAA Salmon Passage Facility Guidelines and Criteria (2003), and in coordination with ODFW and other appropriate regulatory agencies.

416	CULVERT INSPECTION	JANUARY - DECEMBER
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## DESCRIPTION

This work consists of inspecting culvert conditions in the drainage system. Culverts should be free of any debris and water should flow without obstruction during rainstorms. During the inspection, separated joints should be identified. The inspector should observe the overall system including safety issues. Inspect approaches, embankments, waterways, end treatments and culvert barrels.

## ADDITIONAL BMPS FOR CULVERT INSPECTION

- Inspect and clean culverts routinely and immediately after significant storm events.
- Keep road ditches and drainage channels at outlets and inlets of culverts clear of obstructions.

- Remove brush to aid visual inspection and to reduce risk of blockage.
- During (winter) wet weather conditions, monitor and maintain the appropriate function of all roadway cross-drains, especially those within 250 feet of any down-slope stream crossings.

418	SHOULDER EROSION REPAIR	JANUARY - DECEMBER
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#### DESCRIPTION

The work consists of repairing erosion on roadway shoulder by adding aggregate to stabilize the shoulder. A minimum one-foot gravel shoulder is preferred. When placing rock on shoulder, the aggregate should be compacted. Other restrictions may require additional erosion control measures, for instance when working in close proximity to resource waters (within RMAs), or working on steep roadway grades or next to hillsides. When the activity has been completed, the aggregate should be level with the edge of the pavement and sloping down (away) and tightly compacted with a uniform width and straight edges. The pavement should be swept or flushed.

#### ADDITIONAL BMPS FOR SHOULDER REPAIR

- Control placement of materials to avoid migration into roadside drainage areas.
- Use silt fences or other sediment retention where appropriate.
- Consider repairing shoulder with asphalt pavement, when necessary and where practical.

419	MAINTAIN EROSION CONTROL	JANUARY - DECEMBER
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#### DESCRIPTION

The placement of appropriate (temporary and permanent) erosion control measures is required for project areas where the ground surface will be disturbed by clearing, grading, filling, excavating or other construction activities. Erosion control measures such as bio-filtration bags, sediment fences and straw bales should be monitored to ensure continued effectiveness. Temporary erosion control devices should be checked daily or weekly depending on the type of activity being performed.

#### ADDITIONAL BMPS TO MAINTAIN EROSION CONTROL

- Establish permanent erosion controls as soon as possible after construction activity.



- Regularly monitor temporary controls to ensure continued effectiveness.
- Remove sediments and debris collected by erosion controls and dispose of properly.
- Replace controls or place additional measures when necessary.
- Remove temporary controls when permanent controls become established.
- Document performance of controls and any maintenance performed upon them.

## **7. TRAFFIC OPERATIONS (SERIES 500)**

The Traffic Operations program is responsible for the installation, monitoring and maintenance of all roadway pavement markings, roadway striping, traffic control signs and advisory signs.

**Environmental Concern to be Addressed: Traffic Operations have the potential to impact the following:**

- Use of grinders to remove markings can cause increase in Total Suspended Solids.
- Accidental chemical spills can impact water quality.

**BMPs for All Series 500: The following Best Management Practices will be employed for all Traffic Operations Activities described below:**

- Re-fuel all equipment outside of the (250 foot) Riparian Management Area.
- Clean all liquid material spills with absorbent materials and dispose of properly.
- Use brooms or vacuums to clean up grindings or abrasives and dispose of properly.
- Collect all broken sign parts and fasteners and dispose of properly.
- Appropriately dispose of excess materials and debris.
- Avoid working in wet weather when pavement marking or striping.

501	ROADWAY INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

The regularly scheduled inspection of the condition of traffic control signs and pavement markings, including crosswalks, school crossings and painted pavement striping. There are no restrictions.

502	SIGN FABRICATION	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the fabrication of traffic control signs in compliance with the Standard Highway Signs Manual, using computer graphic equipment to produce letters or symbols that are then applied to sign blanks.

504	BARRICADES - TYPE III	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the installation and repair of traffic barricades, typically at the end of a roadway, pathway or sidewalk.

510	SIGN INSTALLATION	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the installation of new traffic signs within road rights-of-way to enhance public safety.

511	SIGN REPAIR & REPLACEMENT	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the repair and replacement of existing traffic sign installations.

512	SIGN INSPECTION	JANUARY - DECEMBER
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#### DESCRIPTION

This work involves the routine inspection of traffic sign installations for placement or condition.

514	CLEAN SIGNS	JANUARY - DECEMBER
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#### DESCRIPTION

The routine cleaning of traffic signs to ensure proper visibility and reflection. DLUT uses non-toxic cleaning agents such as *SIMPLE GREEN*. There are no environmental restrictions.

515	RAISED PAVE MARK - INST & REMOVE	MAY - SEPTEMBER
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#### DESCRIPTION

The installation of reflective pavement markers using heated adhesive material. The pavement surface must be dry to allow proper adherence. Caution must be used when placing adhesive and re-loading heating kettle on roadways near resource waters. When removing pavement markers, all construction debris must be contained and collected to prevent contamination of waters.

#### ADDITIONAL BMPS FOR **ALL** INSTALLATION OF PAVEMENT MARKERS

- Avoid working in wet weather.

516	PAVEMENT MARKING - PAINTED	MAY - SEPTEMBER
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#### DESCRIPTION

The installation of painted pavement markings (school crossings, bicycle stencils) on roadways using water-borne, non-toxic paint, covered by glass reflective beads. Caution must be exercised when placing markings or loading materials to prevent accidental discharge to resource water.

517	PAVEMENT MARKING - THERMAL	MAY - SEPTEMBER
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#### DESCRIPTION

The placement of thermal-plastic pavement markings (crosswalks and railroad warnings) using heated resin-based material and reflective glass beads. Caution must be exercised to prevent spills.

518	PAVEMENT MARKING - TAPE	MAY - SEPTEMBER
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#### DESCRIPTION

This work is the placement of pavement markings using pre-formed tape, applied under direct heat to secure the materials to roadway surface. Pavements must be dry to allow for proper adherence.

519	PAVEMENT MARKING - SCHOOL CROSSING	JULY - AUGUST
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#### DESCRIPTION

This work is the placement of pavement markings using paint, thermal-plastic or durable tape.

520	PAVEMENT MARKING - RAIL CROSSING	MAY – SEPTEMBER
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#### DESCRIPTION

This activity is the placement of pavement markings using paint, thermal-plastic or durable tape.

528	STRIPING 4" YELLOW	MAY - SEPTEMBER
529	STRIPING 4" WHITE	
530	STRIPING 8" WHITE	

#### DESCRIPTION

This activity involves the placement of roadway striping (centerline or edge-line) using air-delivered, water-borne, non-toxic paint and reflective glass beads. The roadway surface must be dry and reasonably warm to allow paint to dry quickly. The loading of materials will be performed at corporation yards to preclude any chance of accidental discharge to resource waters.

#### ADDITIONAL BMPS FOR STRIPING

- Extra caution must be used when applying the materials near resource waters to prevent accidental discharge to those waters.

531	PAVEMENT MARKING REMOVAL	MAY - SEPTEMBER
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#### DESCRIPTION

This activity involves the removal (grinding) of pavement markings from durable surfaced roads.

532	PAVE MARKING - PATHWAYS	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the installation of pavement markings on pedestrian or bicycle pathways.

## **8. EMERGENCY RESPONSE (SERIES 900)**

Emergency Response includes the stabilization, repair and restoration of roadways, rights-of-way and structures damaged by windstorms, floods, earthquakes and other extreme events. These events may not be technically defined as an emergency under the Endangered Species Act (Presidential Declaration). Failure to perform these activities in a timely manner; however, may result in an immediate hazard to life or damage to the structural integrity of the roadway system.

The distinction must be made as to when the emergency event is over and the restoration process begins. It is during the restoration and permanent repair activities that greater consideration must be given to the disposal of material in an approved manner and in an approved location and to providing for fish passage. An emergency operation typically ends when the threat of loss of life, injury, suffering or financial loss is mitigated and a pre-emergency level of service is restored.

**Environmental Concern to be Addressed: Emergency Response activities have the potential to impact the following:**

- Fixing damage to roadways and structures during an emergency event can cause erosion and sediment loading to riparian areas.

- Disposal of materials during emergency events can cause impact to wetlands and streams
- Fuel spills may impact water quality and wetlands.
- Calcium magnesium acetate (CMA) and gravel deposition during ice events may impact water quality.

**BMPs for Winter Roadway Operations: Best Management Practices for Winter Roadway Operations are supplemented by the adopted “Winter Roadway Operations” standard operating procedures. This document is found in Appendix C of the Routine Road Maintenance Limit 10 submittal to NOAA Fisheries. This satisfied the following broad-based BMP:**

- Develop a comprehensive management and operational plan to identify critical areas and levels of service for roadways and the methods for sustaining those levels during winter weather.

**BMPs for All Series 900: The following Best Management Practices will be employed for all Emergency Response Activities described below:**

- Repair any damage to fishery or water resources occurring from response to the emergency.
- Avoid additional impacts to wetlands or streams where possible.
- Provide, where and when possible, the appropriate erosion control devices or bank stabilization measures necessary to keep undesirable materials from entering a protected resource area.
- Coordinate response efforts with NOAA, ODFW and other appropriate regulatory agencies.
- Identify and plan for slide debris disposal sites as part of the Material Disposal Plan.
- Remedial actions to address concerns arising from an emergency response activity may include bio-engineering and fish-friendly designs and structural stability and public safety measures.
- Perform operations to ensure that sediment and other materials do not enter waterways.

901	ROADWAY EMERGENCY INSPECTIONS	JANUARY - DECEMBER
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#### DESCRIPTION

Response to roadway emergency inspections is a three-step process – 1) Assessment - includes identifying the location, type of incident, cause and extent of damage, 2) Communication of the information to the Communications Supervisor (Operations Dispatcher) who will inform a Road Operations Supervisor or another DLUT manager of the situation, and 3) Determination by the Road Operations Supervisor to respond immediately with appropriate personnel and equipment or to close the roadway or structure due to public safety concerns.

902	DEBRIS REMOVAL - STORM	JANUARY - DECEMBER
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#### DESCRIPTION

This involves the removal of materials that have been deposited upon roadways or onto rights-of-way through weather-related events. Specific response activity may vary depending upon the type of debris - organic or vegetative, roadway structure materials or soils.

903	HAZ MAT RESPONSE	JANUARY - DECEMBER
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#### DESCRIPTION

Hazardous materials response may include the removal of vehicle collision debris and may also include response to a release of hazardous materials. Upon notification of an incident, DLUT will focus upon the safety of the public and of DLUT employees, while ensuring that clean-up activity is performed as provided for in emergency response procedures. In the event of a release of hazardous materials, DLUT will respond within established operational guidelines.

**See also Appendix D of Routine Road Maintenance Limit 10 submittal to NOAA Fisheries - Hazardous Materials Response Procedures.**

904	EMERGENCY TRAFFIC CONTROL	JANUARY - DECEMBER
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#### DESCRIPTION

DLUT will respond to requests for mutual assistance from the County Sheriff's Office, or other public emergency response teams, to situations requiring emergency traffic control including vehicle collisions, traffic detours, roadway closures and other law enforcement actions. In the event of a release of potentially hazardous materials, DLUT will respond as identified in Activity #903.

907	SNOW PLOWING	OCTOBER - MARCH
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#### DESCRIPTION

The removal of snow and ice from bridges and roadways. With the typically limited amount of snowfall and accumulation in Washington County, measurable deposit on roadways is a relatively rare occurrence. Many winter events are responded to effectively by the timely placement of anti-icing materials that may preclude the need for snow and ice removal activity, activity that may have more of a potential impact on environmental quality than the prevention of ice accumulation.

#### ADDITIONAL BMPS FOR SNOW PLOWING

- Reduce plowing (truck) speed in identified resource-sensitive areas.
- Clean culvert inlets prior to the on-set of winter weather conditions.
- Modify snowplow blade angles in identified resource-sensitive areas.

908	ICE CONTROL - ANTI-SKID	OCTOBER - MARCH
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#### DESCRIPTION

The application of crushed, graded aggregate on roadway surfaces to provide for motorist safety.

#### ADDITIONAL BMPS FOR ICE-CONTROL AND ANTI-SKID

- Follow Winter Roadway Operations procedures.
- Recycle anti-skid material into roadway shoulders, except within RMAs.
- Capture anti-skid materials from around bridges and near streams where possible.
- Vacuum sweepers will be employed in RMAs to capture anti-skid materials, whenever possible.



- Use anti-icing techniques whenever possible to reduce the application of anti-skid materials.
- Reduce application rates for anti-skid materials (aggregates).
- Use anti-icing materials on bridges and roadways rather than anti-skid aggregates. Adjacent protected resource waters should support a 100:1 dilution factor. Desirable conditions include a vegetative buffer between the roadway and the protected water with no idle, shallow water.

909	ICE CONTROL - ANTI-ICING	OCTOBER - MARCH
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#### DESCRIPTION

Weather conditions are monitored to anticipate winter weather potential. DLUT acts within the Winter Roadway Operations plan to attempt to prevent ice and snow build-up whenever possible, reducing the necessity of a post-event response. Initial response efforts are concentrated on traditional (public safety) problem locations and in areas (on bridges and within RMAs) where the application of anti-icing agents is preferable from an environmental perspective to other methods.

DLUT currently applies Magnesium Chloride as the primary anti-icing agent, a material that helps to prevent ice and snow from adhering to the pavement surface. Magnesium Chloride has been proven to be effective and has been demonstrated to have fewer impacts to resource waters and habitat.

See also “Dust Abatement Program” for analysis of Magnesium Chloride and resource waters and habitat impacts.

911	ESTABLISH DETOUR	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the establishment of roadway detours or closures in the event of emergency situations.

912	FLOOD CONTROL	JANUARY - DECEMBER
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#### DESCRIPTION

Immediate response may include the mitigation of a problem (blocked culverts, bridges or ditches). More extensive flood events may require advanced emergency response or emergency management action. Roadways are often closed until the high waters subside. Materials, usually vegetative matter, may remain on the roadway after waters recede, requiring disposal pursuant to VEGETATION MANAGEMENT PROGRAM standards. In the event that soils are deposited onto roadways or rights-of-way, the appropriate slide management standards will be implemented.

#### ADDITIONAL BMPS FOR EMERGENCY RESPONSE – FLOOD CONTROL

- Follow Drainage Operations procedures.
- All appropriate management prescriptions will be followed.
- Environmental (regulatory agency) clearances may be required.

913	DISASTER PLANNING	JANUARY - DECEMBER
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#### DESCRIPTION

This activity involves the planning process for enacting response to emergency events.

915	SETTLEMENTS AND SLIDES	JANUARY - DECEMBER
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#### DESCRIPTION

Includes the prevention, stabilization, repair and restoration of roadway settlements and slides by placing fill or removing material and through alternative measures designed to preclude an emergency when a roadway is in danger of failure or public safety is threatened. All activity near a resource water should be first coordinated with the appropriate regulatory agency. Operational procedures are provided in the FHWA “Guidelines for Slope Maintenance and Slide Restoration”.

#### ADDITIONAL BMPS FOR SETTLEMENTS AND SLIDES

- Coordinate any slide management activity within Riparian Management Areas or adjacent to other resource waters with ODFW, USACOE, DSL and other appropriate regulatory agencies.
- See Drainage Operations performance standards, particularly Embankment Repair.

920	EXTRAORDINARY RESPONSE	JANUARY - DECEMBER
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## DESCRIPTION

An “extraordinary response” includes a roadway management activity that may be extraordinary but is not specifically identified as a separate action. Examples may include law enforcement operations, forest fire and other fire response assistance and the failure of manufactured structures.

## ADDITIONAL BMPS FOR EXTRAORDINARY RESPONSE

- Perform operations to ensure that sediment and other materials do not enter waterways.
- Repair any damage to fish habitat that may occur during a response activity.

## **9. FISH PRESERVATION AND ENHANCEMENT (SERIES 1000)**

DLUT will advise and consult with NOAA Fisheries, ODFW, DSL and other appropriate regulatory agencies at the earliest possible time of an activity that may impact fish habitat and streams. During emergency events, DLUT will make a reasonable effort to consult with those agencies as necessary to facilitate a timely response prior to beginning any work activity within fish-bearing waters.

The following standards will be applied to project design and construction activity in a manner that is determined to be the most appropriate, given the specific conditions encountered at each project site. Design and construction activity will be implemented in the manner that provides the greatest measure of consistency with these standards. Project conditions will vary greatly from location to location, requiring the professional judgment of County employees to make those determinations, closely coordinated with NOAA Fisheries, ODFW and other appropriate regulatory organizations.

### **Environmental Concern to be Addressed: The following concerns are to be protected by Series 1000 activities:**

- During in-water work, such as culvert repair, replacement, bridge operations, fish may be impacted through displacement.
- Riparian area habitat can be disturbed or destroyed during culvert installation, bridge repair or reconstruction.
- In-stream flow may be temporarily disturbed by in-water work.

- Sediment loading can occur during work in a riparian area, causing high oxygen demand.

**BMPs for All Series 1000: The following Best Management Practices will be employed for all Fish Preservation and Enhancement Activities described below:**

- During significant in-water work, the work area will be isolated from the active flowing stream.
- No ground or substrate disturbing action will occur within the Ordinary High Water (OHW) mark up to 300 feet upstream of potential spawning habitat without isolation of the work area from flowing waters.
- Fish trapped in the isolation pool will be removed by a permitted ODFW biologist before de-watering, following NOAA Fisheries' guidelines.
- In-water work will be completed during the period July 1 to September 30, unless otherwise approved in writing by NOAA Fisheries.
- Project operations will temporarily cease under high flow conditions that may result in inundation of the project area, except for those efforts taken to avoid or minimize resource damage.
- Brush cutting will not occur within Riparian Management Areas (RMAs) unless doing so interferes with sight distance, compromises drainage systems or public safety, causes fire hazards, involves noxious weeds, or impacts the proper functioning of roadway structures.
- Maintain shade trees along streams or wetlands unless they have been identified as hazard trees, or could potentially impact bridge structures or line of sight.

1001	WORK AREA ISOLATION	JULY - SEPTEMBER
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**DESCRIPTION**

Temporary water management techniques to isolate the work area are used during in-water work, work within the ordinary high water mark (OHW), and if the project involves either significant channel disturbance or the use of equipment within the wetted channel. Methods of achieving this may include working within a cofferdam (constructed of sandbags, sheet piling or other approved materials) or similar structure to minimize the potential for sediment delivery.

1002	POLLUTION AND EROSION CONTROL PLANS	JULY - SEPTEMBER
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#### DESCRIPTION

Best Management Practices are necessary to prevent any construction materials and debris from entering a stream or any other water body and to remove any material that does enter the water with a minimum disturbance to the streambed and water quality. During in-water work, pollution and erosion control plans for the work area will include practices to prevent the erosion and sedimentation associated with access roads, stream crossings, construction project sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and project staging areas. Pollution practices will also be employed to confine, remove and dispose of excess asphalt, concrete, cement and other mortars or bonding agents, including measures for washout facilities.

#### ADDITIONAL BMPS FOR POLLUTION AND EROSION CONTROL FOR IN-WATER WORK AREA

- A spill containment and control plan with emergency notification procedures, specific clean-up and disposal instructions for materials used on the project and quick-response containment and clean-up provisions will be available at the project site.
- Spill containment training will be provided to all employees working on the project.

1003	FISH ISOLATION TECHNIQUES	JULY - SEPTEMBER
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#### DESCRIPTION

Once the work area is isolated, and after the cofferdam is in place, any fish trapped in the isolation pool are removed by a permitted ODFW biologist before de-watering, following NOAA Fisheries' guidelines. Before and intermittently during de-watering, an attempt must be made to capture and release fish from the isolated work area to minimize the risk of harm.

#### ADDITIONAL BMPS FOR FISH ISOLATION

- Complete the transfer of the fish using a sanctuary net that holds water during the transfer to prevent the additional stress to the target fish, possible during an out-of-water transfer.
- If fish salvaging activity requires use of seine equipment, it must be accomplished as follows -

- Seining will be conducted by or under the supervision of a fishery biologist experienced in such efforts and all staff working with the seining operation must have the necessary knowledge, skills and abilities to ensure the safe handling of all ESA-listed fish.
  - ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during seining and transfer procedures.
  - Seined fish must be released as near as possible to capture sites.
  - Obtain any applicable Federal, State and local permits and the authorizations necessary for the conduct of the proposed seining activities.
  - DLUT will allow NOAA Fisheries or its designated representative to accompany field personnel during the seining activity and will allow such representative to inspect any seining records and facilities DLUT may have.
- If a sick, injured or dead specimen of a threatened or endangered species is found, the finder or supervisor must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360-418-4246. The finder must take care in the handling of sick or injured specimens to ensure effective treatment and in handling dead specimens to preserve biological material in the best possible condition for subsequent analysis of the cause of death. The finder also has the responsibility to carry out instructions provided by NOAA Fisheries Law Enforcement to ensure that evidence intrinsic to the threatened or endangered specimen is not unnecessarily disturbed.
  - The transfer of any ESA-listed fish from Washington County to another party other than NOAA Fisheries personnel requires written approval from NOAA Fisheries.
  - Any project using “electro-shocking” of fish during the transfer process will have a site-specific analysis completed and included in the project plans, which will be submitted for approval to NOAA Fisheries, ODFW and other regulatory agencies prior to beginning work.

1004	IN-WATER WORK REPORTING	JANUARY - DECEMBER
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## DESCRIPTION

Any capture and release effort will be described in a post-project report. The report will include the name and address of the supervisory fish biologist, the methods employed to isolate the area and to minimize the disturbance of target species, the stream conditions before and after the placement and removal of barriers, the means of fish removal, the

number of fish removed by species, the condition of all fish released and any incidence of observed injury or mortality.

#### ADDITIONAL BMP FOR POST-PROJECT REPORTING

- A post-project report will be available to federal and state agencies upon request. Reports will include the items described above.

1005	FISH HABITAT RESTORATION	JULY - SEPTEMBER
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#### DESCRIPTION

This activity may involve planting vegetation along a stream corridor to facilitate slope stabilization and/or the re-establishment of vegetation that has been removed. Also included is any work activity that incorporates bio-engineering into existing rip-rap placements or any work that modifies an existing drainage ditch for better water quality control, where no major construction is involved.

#### ADDITIONAL BMPS FOR HABITAT RESTORATION

- Mowing widths are limited to no more than eight (8) feet from the edge of pavement in Riparian Management Areas (RMAs), unless necessary to maintain the proper functioning of roadway facilities.
- Only brush within twenty (20) feet of, and under bridge structures will be removed. All other brush not within the clear zone will be left in its current condition, unless it interferes with sight distance, shades the structure, or if the brush is a noxious weed.
- On culverts of six-foot or greater diameter, ten (10) feet of brush on both sides of the culvert (upstream and downstream end) will be removed, unless the brush is a noxious weed. If other brush removal is needed, it should be coordinated with ODFW.
- Within RMAs, whenever removing trees over six-inch 'diameter-at-breast-height', replace those trees at a one-to-one caliper ratio. Check if permits are required for these removals, and obtain permits if necessary.
- Replacement of existing rip-rap material will be scheduled within the ODFW in-water work periods in non-emergency situations.

1008	FISH PASSAGE AND ENHANCEMENT	JULY - SEPTEMBER
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## DESCRIPTION

Passage will be provided for any adult or juvenile salmonid species present in the project area during construction and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist. This activity includes the installation in roadway culverts of culvert baffles or weirs, or the installation of new culverts or jump pools to enhance fish passage.

**See also BMPs 412 through 415 for practices relating to culvert installations or repair.**