Bridge Program Performance Standards for ODOT Bridge Repair and Replacement Regional General Permit (RGP) (Corps No. 200400035)

Only projects designed to meet the following Bridge Program Performance Standards are authorized by the RGP:

SPECIES AVOIDANCE

ODOT shall:

1. Fish Avoidance. Minimize adverse effects to fish species from in-water work activities.

    a. Timing of In-water Work. Complete work below the Ordinary High Water (OHW) elevation during the preferred in-water work period (See Appendix B, Enclosure 2), unless otherwise approved in writing by the Corps in consultation with appropriate resource agencies.

    b. Cessation of Work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

    c. Fish Screens. Have a fish screen installed, operated, and maintained according to NOAA Fisheries' fish screen criteria[1] on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

    d. Fish Passage. Provide passage for any adult or juvenile fish species present in the project area during and after construction, for the life of the project, unless otherwise approved in writing by the Corps in consultation with appropriate resource agencies[2].

    e. Isolation of In-water Work Area. If adult or juvenile fish are reasonably certain to be present, or if the work area is within 300 feet upstream of reasonably likely spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by the Corps in consultation with appropriate resource agencies. Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and re-watering activities, plan view of all isolation elements, as well as a list of materials to adequately provide appropriate redundancy of key plan functions (e.g., an operational, properly sized backup generator). Pile driving may occur without isolation during the in-water work period, providing compliance has been achieved with all other relevant performance standards.

    f. Capture and Release. Before, intermittently during, and immediately after isolation and dewatering to isolate an in-water work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

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[1] National Marine Fisheries Service, Juvenile Fish Screen Criteria (revised February 16, 1995) and Addendum: Juvenile Fish Screen Criteria for Pump Intakes (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/ 1hydrop/hydroweb/ ferc.htm).

[2] Ensure compliance with Oregon Revised Statutes (ORS) 509.585 regarding fish passage.

(1) The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all fish.

(2) Do not use electrofishing if water temperatures exceed 64°F, unless no other fish capture method is feasible or successful.

(3) If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[3]

(4) Handle all fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

(5) Ensure water quality conditions, including dissolved oxygen levels, within fish transport systems (e.g., buckets) are sufficient to promote fish recovery. Brief holding times; clean, cold, and circulated water; and aerators may be used to maintain water quality conditions.

(6) Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

2. Wildlife Avoidance (Bridge Demolition). Minimize injury and death to wildlife species from bridge demolition activities.

a. Migratory Birds. Avoid destruction of occupied nests (i.e., containing eggs or young) of birds protected by the Migratory Bird Treaty Act (MBTA).

(1) Prevent nesting by native birds[4] on structures to be removed.

(a). Inspect bridge for signs of nesting.

(b). Apply exclusionary methods prior to nest building (approximately March 15). Exclusionary methods may include noise cannons, power-washing (i.e., physical removal), netting (ensure proper mesh size and maintain the netting).

(2) Remove existing nests only if no eggs or young are found.

(3) If eggs have been laid and nest cannot be avoided, then consult with the U.S. Fish and Wildlife Service for compliance with the Migratory Bird Treaty Act.

b. Bats. Avoid destruction of bat maternity colonies.

(1) Inspect bridge for signs of a maternity colony.

(2) Apply exclusionary methods, prior to maternity roost activity, that prohibit access to colony space.

c. Wildlife Passage and Migration. Maintain existing and re-establish connectivity between aquatic habitats that were severed during the previous or current placement of roadway prism fills.

(1) For aquatic habitat (e.g., wetlands as defined by Cowardin 1979) within the construction project footprint, install an adequately sized crossing (36-inch pipe or larger) in the roadfill 1/3 below the soil surface.

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[3] National Marine Fisheries Service, Backpack Electrofishing Guidelines (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

[4] Exotic birds, such as European starling, rock pigeons, and house sparrows are not protected by the MBTA.

(2) Design bridges and approach fills to provide wildlife passage.[5]

(3) Replace existing fencing with "wildlife friendly" livestock fencing in areas where native ungulate crossing is likely.[6]

(4) Refer to the "Critter Crossing" guidance provided by the Federal Highway Administration to identify potential problem situations and solutions.[7]

STREAMBANK PROTECTION

ODOT shall:

Streambank Protection. Avoid and minimize adverse effects to natural stream and floodplain function by limiting streambank protection actions to those that are not expected to have long-term adverse effects on aquatic habitats. Whether these actions will also be adequate to meet other streambank protection objectives depends on the mechanisms of streambank failure operating at site- and reach-scale.[8]

1. Choice of Techniques. The following bank protection techniques are approved for use individually or in combination:

   a. Woody plantings and variations (e.g., live stakes, brush layering, facines, brush mattresses).

   b. Herbaceous cover, where analysis of available records (e.g., historical accounts and photographs) shows that trees or shrubs did not exist on the site within historic times, primarily for use on small streams or adjacent wetlands.

   c. Deformable soil reinforcement, consisting of soil layers or lifts strengthened with fabric and vegetation that are mobile ('deformable') at approximately two- to five-year recurrence flows.

   d. Coir logs (long bundles of coconut fiber), straw bales, and straw logs used individually or in stacks to trap sediment and provide growth medium for riparian plants.

   e. Bank reshaping and slope grading, when used to reduce a bank slope angle without changing the location of its toe, increase roughness and cross-section, and provide more favorable planting surfaces.

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[5] Refer to ODFW-ODOT liaison biologists for appropriate passage designs.

[6] Project design criteria are available from the U.S. Fish and Wildlife Service, Oregon State Office, 2600 SE 98th Ave., Suite 100, Portland, OR 97266.

[7] Federal Highway Administration (FHWA). (2000). Critter Crossings: Linking Habitats and Reducing Roadkill. Available URL: http://www.fhwa.dot.gov/environment/ wildlifecrossings.

[8] For guidance on how to evaluate streambank failure mechanisms, streambank protection measures presented here, and use of an ecological approach to management of eroding streambanks, see, e.g., Washington Department of Fish and Wildlife, Washington Department of Transportation, and Washington Department of Ecology, Integrated Streambank Protection Guidelines, various pagination (April 2003) (http://www.wa.gov/wdfw/hab/ahg/ispgdoc.htm), and Federal Interagency Stream Restoration Working Group, Stream Corridor Restoration: Principles, Processes, and Practices, various pagination (October, 1998) (http://www.usda.gov/stream_restoration/).

f. Floodplain roughness (e.g., floodplain tree and large woody debris rows, live siltation fences, brush traverses, brush rows, and live brush sills) used to reduce the likelihood of avulsion in areas where natural floodplain roughness is poorly developed or has been removed.

g. Floodplain flow spreaders, consisting of one or more rows of trees and accumulated debris used to spread flow across the floodplain.

h. Flow-redirection structures known as barbs, vanes, or bendway weirs, when designed as follows, and as otherwise approved in writing by the Corps in consultation with appropriate resource agencies.

(1) No part of the flow-redirection structure may exceed bankfull elevation, including all rock buried in the bank key.

(2) Build the flow-redirection structure primarily of wood or otherwise incorporate large wood at a suitable elevation in an exposed portion of the structure or the bank key. Placing the large woody debris near streambanks in the depositional area between flow direction structures to satisfy this requirement is not approved, unless those areas are likely to be greater than 3 feet in depth, sufficient for target-species rearing habitats.

(3) Fill the trench excavated for the bank key above bankfull elevation with soil and topped with native vegetation.

(4) The maximum flow-redirection structure length will not exceed 1/4 of the bankfull channel width.

(5) Place rock individually without end dumping, unless approved in writing by the Corps in consultation with appropriate resource agencies.

(6) If two or more flow-redirection structures are built in a series, place the flow-redirection structure farthest upstream within 150 feet or 2.5 bankfull channel widths, from the flow-redirection structure farthest downstream.

(7) Include woody riparian planting as a project component.

2. Use of Large Wood and Rock. Whenever possible, use large wood as an integral component of streambank protection treatments.[9] Avoid or minimize the use of rock, stone, and similar materials.

a. Large wood will be intact, hard, and undecayed to partly decaying with untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable.

b. Rock may be used instead of wood for the following purposes and structures. The rock may not impair natural stream flows into or out of secondary channels or riparian wetlands. Whenever feasible, place topsoil over the rock and plant with woody vegetation.

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[9] See, e.g., Washington Department of Fish and Wildlife, Washington Department of Transportation, and Washington Department of Ecology, Integrated Streambank Protection Guidelines, Appendix I: Anchoring and placement of large woody debris (April 2003) (http://www.wa.gov/wdfw/hab/ahg/ispgdoc.htm); Oregon Department of Forestry and Oregon Department of Fish and Wildlife, A Guide to Placing Large Wood in Streams, May 1995 (http://www.odf.state.or.us/FP/RefLibrary/RefsList.htm). For the purposes of the RGP, Engineered Log Jams are considered to meet the definition of Large Wood and Rock.

(1) As ballast to anchor or stabilize large woody debris components of an approved bank treatment.

(2) To fill scour holes, as necessary to protect the integrity of the project, if the rock is limited to the depth of the scour hole and does not extend above the channel bed.

(3) To construct a footing, facing, head wall, or other protection necessary to prevent scouring or downcutting of, or fill slope erosion or failure at, an existing structure (e.g., culvert, utility line, or bridge support) to be repaired. New and replacement structures shall comply with the Fluvial Performance Standard.

(4) To construct a flow-redirection structure as described above.

FLUVIAL

ODOT shall:

Fluvial. Allow normative physical processes[10] within the stream-floodplain corridor.

1. Channel Processes. Design water crossings other than overflow crossings[11] that (1) promote natural sediment transport patterns for the reach, (2) provide unaltered fluvial debris movement, and (3) allow for longitudinal continuity and connectivity of the stream-floodplain system. If one of the three objectives cannot be restored at the project site, then locate an alternate, non-Bridge Program project within the same project watershed that will achieve an equal or greater function. Temporary fill below the bankfull elevation that results in embedded streambed material is not allowed, unless approved in writing by the Corps in consultation with appropriate resource agencies.

   a. Ensure the functional floodplain is absent of roadway, embankment, or approach fills.

      (1) For purposes of this project, the functional floodplain will be determined using the following process, unless another process (e.g., channel migration zone) is more appropriate for site conditions and is approved in writing by the Corps in consultation with appropriate resource agencies:

         (a) Step 1: Determine the bankfull width, depth, and elevation.

         (b) Step 2: Determine the floodprone elevation and width.[12]

         (c) Step 3: Determine the Entrenchment Ratio (E).[13]

            (i) If $E < 2.2$, then the floodprone area is considered the functional floodplain.

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[10] If existing conditions, exclusive of highway structures (e.g., built environment, hydrologic control), will likely preclude normative physical processes during the life of the proposed crossing (e.g., 100 years), then design crossing to existing conditions.

[11] Overflow crossings will be designed to pass the 50-year flood event or ODOT's most up-to-date design standards.

[12] Floodprone Width (FPW) is defined as the width at the elevation of twice the maximum bankfull depth or three times the average bankfull depth.

[13] Entrenchment (E) is defined as the ratio between the floodprone width and bankfull width ($E = FPW/BFW$). Values of less than 1.4 indicate a stream with a relatively small floodplain, while values over 2.2 indicate a system with high floodplain connectivity.

(ii) If E > 2.2, then 2.2 times the bankfull width is considered the functional floodplain.

(d) <u>Process Considerations</u>:

(i) The bankfull discharge level (elevation)[14] can be located using field indicators as defined by Dunne and Leopold (1978). Bankfull indicators include: (1) topographic break from vertical bank to flat floodplain, (2) topographic break from steep slope to gentle slope, (3) change in vegetation from bare to grass, moss to grass, grass to sage, grass to trees, or from no trees to trees, (4) textural change of depositional sediment, (5) elevation below which no fine debris (needles, leaves, cones, seeds) occurs, and (6) textural change of matrix material between cobbles or rocks (Dunne and Leopold 1978).

(ii) Surveys of the bankfull discharge elevation should be conducted upstream and/or downstream of the bridge, outside of the area influenced by the bridge. Five to seven channel widths (one average meander wavelength; 10 widths is preferred) is often used as a minimum distance to survey upstream and downstream, however, site conditions will dictate the appropriate distance for surveying.

(iii) Bankfull width (BFW) is the active channel width at the bankfull discharge elevation as defined above. Averaging several width measurements (taken at riffle sections, if available) are preferable to a single measurement. Comparing upstream and downstream measurements is valuable for determining various physical processes in operation at specific sites. Avoid measuring widths where bank stabilization structures are located. Vast disparities in upstream and downstream bankfull widths may indicate stream instability and should be further investigated.

(iv) Average bankfull depth can be determined by either averaging the measured depths across the stream channel at the bankfull width level, or by dividing the cross-sectional area by the bankfull width.

(v) The floodprone width (FPW) is determined by finding the elevation at twice the maximum bankfull depth at a riffle or three times the average bankfull depth. The width of the floodplain, or floodprone area, is then measured at this elevation. Using three times the average depth is a more robust approach because it is not as sensitive to the exact location of the cross-section.

(2) As a means of evaluating bridge placement, appropriate span length, and overall program goals, perform scour analysis to:

[14] As general consideration, in western Oregon, bankfull discharge is approximately a 1.1 to 1.2-year flow event, while in eastern Oregon it more closely corresponds to a 1.5-year event (Janine Castro, Pers. Comm. 2003).

(a) Evaluate the bridge length so that there is equivalent contraction scour at the bridge crossing as in the area upstream of the bridge crossing or would be expected under natural conditions up to the 10-year flood event.

(b) Ensure that the discharge at which incipient motion[15] begins under the bridge is similar to the discharge at which incipient motion begins upstream of the bridge.

(c) Ensure scour through the bridge opening is equivalent to reach conditions outside of the influence of the bridge structure and road prism.

b. Remove man-made constrictions within the functional floodplain of the project area.

(1) Reduce existing fill volumes in the functional floodplain: Possible measures to reduce fill volumes could include removing existing approach fills, installing relief conduits through existing fill, or removing other floodplain fill volumes located within the project area.

(2) Avoid increases and decrease, as feasible, net fill volumes[16] within the floodprone area.

(3) Remove vacant[17] bridge support structures in the functional floodplain: Possible measures may include removing structures to below the modeled scour depth[18] or removing structures located within debris transportation corridors.

c. Design and locate bridge support structures with the following considerations:

(1) Avoid inducing localized scour of streambanks and reasonably likely spawning areas.

(2) Bridge supports will avoid supplemental[19] scour prevention (e.g., riprap) and incorporate scour protection (e.g., drilled shafts, piles driven below critical scour depth).

(3) Bridge supports will allow the fluvial transport of large wood through the project area.

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[15] Incipient motion is defined as the velocity at which bed material becomes mobile.

[16] Fill volumes will be calculated from the existing soil surface to the floodprone elevation.

[17] For purposes of this project, "vacant structures" include unused, unnecessary, or abandoned structures that are no longer fulfilling their intended purpose, except for those structures that are potentially eligible for, eligible for, or listed on the National Register of Historical Places.

[18] For purposes of this performance standard, the scour analysis shall be performed according to methodology developed by the Federal Highway Administration: Hydraulic Circular No. 18, Evaluating Scour at Bridges, Third Edition (FHWA-IP-90-017, November 1995) or equivalent. The focus of this fluvial scour review is to ensure that the new bridge will have a sufficient span over the waterway and functional floodplain area to prevent scour from occurring differentially at the bridge site than would occur in natural stream reference sections up to the 10-year flood event.

[19] For purposes of this project, "supplemental scour protection" can also be referred to as "active scour protection"

(a) Avoid the need for removal or modification (e.g., cutting, limbing) of large wood resting against bridge support structures.

(b) Design span length to facilitate potential large wood movement through the project area with the following considerations:

(i) The site-potential tree height[20] and the large wood transport capacity[21] of the project watershed upstream of the bridge.

(ii) The orientation of the bridge crossing and bent locations relative to stream flow in order to capitalize on the orientation of drift material relative to the bridge structure.

2. Floodway Processes. Design crossings that allow lateral connectivity between the stream and floodplain.

a. Bridge the functional floodplain.

b. Accommodate potential flow pathways at multiple flood stages by:

(1) Locating bridge opening to maximize floodplain function;

(2) Providing flood-relief conduits (bottomless arch and embedded culvert design only) within existing road fill at potential flood flow pathways based on analysis of flow patterns (or floodplain topography) at multiple flood stages, as necessary;

(3) Locating bridge abutments with consideration of channel migration patterns over the designed lifetime of the bridge.

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[20] For purposes of this project, the site potential tree height can be obtained in the county-specific Natural Resource Conservation Service (NRCS) soil surveys.

[21] For purposes of this project, the "large wood transport capacity" is the maximum capability of the stream to move large wood under historic, current, and future land use activities and is a product of the channel morphology, stream power, and site potential tree height.