

June 8, 2023

TO: WSDOT Project Development Engineers

FROM: Mark Gaines, Development Division Director, State Design Engineer *mg*

SUBJECT: Project Delivery Memo #23-01 – Use of Slash, Small Woody Material, and Mobile Woody Material within the structural limits of Water Crossings

Purpose

This memorandum provides direction for the use of slash, small woody material, and mobile woody material for stream or aquatic habitat restoration as a contextual need within the structural limits of water crossings, including the limits of structural components such as walls and foundations. Fish Passage projects shall continue to provide full stream restoration efforts both upstream and downstream of water crossing structures. This memorandum only addresses the use of Slash, Small Woody Material, and Mobile Woody Material, as defined in the Hydraulics Manual.

Wood that is used to stabilize the streambed to minimize the impacts of long-term degradation is not limited to the details in this memorandum and will be designed as approved by the State Hydraulics Engineer; this includes wood that is used to hold a stream gradient throughout the design life of the water crossing structure, deformable grade controls, step-pool configurations, or other such stable complexity features.

Background

Woody material plays a critical role in Washington streams through its influence on stream geomorphic processes and aquatic habitat formation. Installation of instream wood has therefore become a common restoration practice in Washington State. Simulation of stream channel processes through water crossing structures, especially buried structures, has been a challenge. This is because riparian vegetation provides much of the stability for stream banks and beds but can't grow inside or underneath water crossing structures. Most technical guidance recommends avoiding placement of woody material around bridges and structures, to avoid additional risk to infrastructure. As an example, the *WDFW 2013 Water Crossing Design Guidelines* recommends against placing large wood in stream simulation culverts. FHWA's guidance is to avoid the use of large woody material in the immediate vicinity of bridges and culverts. *The American Association of State Highway Transportation Officials (AASHTO) Manual for Bridge Evaluations* indicates that in-stream debris accumulation around substructures introduces more risk to bridges. Previous versions of the *WSDOT Hydraulics Manual* indicated that large woody material shall not be placed within fifty feet of water crossing structures. Incorporating a more thorough understanding of the beneficial role of wood in providing stabilizing streambed elements, the 2022 version of the *WSDOT Hydraulics Manual* allows stream designers to conduct a risk assessment to determine the applicability of providing mobile woody material through bridges. However, there is still hesitation to include wood due to the risk of unknown scour impacts.

This memorandum provides guidance on when slash, small woody material and mobile woody material can be used through water crossing structures in a way that minimizes risk to transportation infrastructure and the traveling public.

Direction

The information below applies to all water crossing projects. Any variance from the direction given in this memo will require a Hydraulic Deviation approved by the State Hydraulics Engineer prior to project implementation.

When considering Slash, Small or Mobile Woody Material for stream or aquatic habitat restoration as a contextual need within the structural limits of water crossings, the following shall apply:

- Slash should be considered for all water crossings that have the minimum freeboard available.
- Any increase in the Structure Free Zone to accommodate woody material is not allowed.
- Coordination with co-managers is required to place scour countermeasures, within the minimum hydraulic opening and shall be documented in a Hydraulic Deviation.
- Mobile Woody Material that could result in flood risks is not allowed.
- Additional coordination with maintenance is required for awareness of intended use of wood.
- Small or Mobile Woody Material shall not be included if there are downstream constraints that could be compromised such as under sized culverts, bridges, or other structures.
- Mechanical devices for anchors such as cables, chains, or others are not allowed.
- Mobile Woody Material shall be designed based on the 10-year design flood event and shall be a maximum length of 75% of the Structure Free Zone span or width
- Definitions:
 - Slash – small trees and parts of trees where the trunk is less than 2 inches in diameter
 - Small Woody Material – small trees and parts of trees where the trunk is 4 inches in diameter or smaller
 - Mobile Woody Material – large woody material that is designed to move at target design flood events
- Refer to chapter 720.03 (5)(b)(iv) of the *WSDOT Design Manual* for additional information on maintenance clearance, [Design Manual | Manuals | WSDOT \(wa.gov\)](#)
- Refer to chapter 7 and 10 of the *WSDOT Hydraulics Manual* for additional information on stream restoration, [Hydraulics Manual | Manuals | WSDOT \(wa.gov\)](#)
- Refer to the *WSDOT Bridge Design Manual* for additional information on scour, [Bridge Design Manual LRFD | Manuals | WSDOT \(wa.gov\)](#)

Table 1: Water Crossing Structures		
	Small Woody Material	Mobile Woody Material
Required Maintenance Clearance	6-feet min	10-feet min
Scour Countermeasure (in addition to the scour design policy per the Bridge Design Manual and Hydraulic Manual)	not required	May be required as determined by the State Hydraulics Office
Flood Risks (specifically for the use of wood)	no additional risk assessment needed beyond the Flood Risk Assessment (FRA)	Additional risk assessment may be needed as determined by the State Hydraulics Office

Questions

For questions regarding this direction, please contact Julie Heilman, State Hydraulics Engineer at Julie.Heilman@wsdot.wa.gov.

MG:jh

cc: Assistant State Design Engineers
Megan Cotton, Tribal and Federal Relations Director
Evan Grimm, State Bridge and Structures Engineer
Julie Heilman, State Hydraulics Engineer
Kim Rydholm, Fish Passage Delivery Manager