
ENVIRONMENTAL Fact Sheet



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WD-R&L-21

2019

Managing Large Woody Material in Rivers and Streams

Large woody material, referred to in this document as LWM, is an essential part of life for rivers and streams. The end of life for a riverside tree is a source of nutrients for the diverse species living in the river ecosystem. River and stream habitat is preserved when the natural cycle of disturbance deposits LWM in a particular location within its corridor. Development of floodplains and property along waterways requires informed decisions and proactive stewardship with regard to preserving river health. One way we can help preserve river health is by giving streams and rivers a chance to preserve themselves when appropriate, without human interference. We can do this by not disturbing LWM in a river or stream. Removing LWM from a river or stream should only be performed if it poses an imminent threat to human health, human safety, river integrity or public infrastructure, e.g., a blocked stream crossing.

Ecological Importance of Large Woody Material

- **Provides Habitat:** LWM provides fish with shelter from high velocity flows, creating habitat for spawning, nurseries and foraging. These calmer glide and pool areas are ideal for fish to take refuge from predators and often serve as markers for migratory fish. Microbial life in the river, the crucial base of the aquatic food web, uses LWM as a colony habitat. In low flows, LWM provides twisted surfaces and hollows for these tiny organisms to proliferate, waiting to be released to the river as food for aquatic invertebrates and fish.
- **Improves Water Quality:** The presence of LWM in a river or stream provides surface area for water to flow over and around, increasing oxygenation of the water, which is vital for supporting aquatic life. LWM crevices and twisted branches serve as a bench for collecting silt, which increases the aeration in the river and assists in decreasing silt in gravel beds and river bottoms. The LWM's capacity to retain sediments and nutrients (phosphorus) reduces the potential for downstream water quality degradation from nutrient and sediment overloads.
- **Supports Invertebrate Life Cycles:** A log or limb protruding from a river or stream provides an excellent surface for many aquatic invertebrates such as mayflies and stoneflies to emerge from their river juvenile life stage to their terrestrial adult life stage. Some juvenile and adult aquatic insects rely on LWM as a source of nutrients and shelter during their life cycles. LWM is an excellent leaf and organic matter trap, which establishes ideal habitat for aquatic invertebrates.
- **Creates Physical Complexity:** When LWM is introduced into the river system, it alters the water flow, resulting in formations such as deep pools and rushing riffles. This increase in physical habitat variety increases the diversity of plants and animals that can populate the river. Biological diversity is essential in maintaining a healthy river ecosystem.

- Stabilizes Banks and Bed: LWM deposited in a river or stream can dissipate a rushing flow that could lead to the erosion of a stream or river bank. LWM deposited along the river bank collects and holds sediments and debris, reducing the weathering effects of these materials on the river bank. By slowing down the water, LWM may lead to an increase in the height of floodwaters; however, if this increased height of peak flow will not result in hazards to human property, safety or infrastructure, it has the potential to improve habitat while decreasing erosion and sedimentation.

If the large woody material is not a threat to human health, human safety or river integrity:

Let the Sleeping Log Lie

Managing Large Woody Material

Considering the multiple ecological benefits that LWM provides to rivers and streams, it is important to retain LWM in the waterbody unless there is a well supported case for its removal. LWM removal should only be considered when there is strong evidence that there is a safety hazard to public infrastructure, human health is at risk or if navigational safety is compromised. **If erosion of the bank is documented, LWM should only be removed if it is determined that the removal of LWM will not considerably increase the potential of further erosion.**

If it has determined that LWM needs to be removed, then removal must be done in the least intrusive way possible. If you wish to remove LWM from a river or stream, you must first document a need to remove LWM and evaluate LWM conditions. In some instances, complex and extensive LWM removal projects may require professional assistance due to large stream areas impacted and access requirements.

Documenting the Need to Remove Large Woody Material

A need for LWM removal must be established prior to removing any LWM from a river or stream. The LWM-laden river reach or stream of concern should be evaluated over time, using the following guidelines.

- Inspect the river reach or stream on a regular basis several times a year, especially after high flows or flood events.
- Observe and record the types of LWM that may be accumulating and the locations where it is found. Note the locations where there is evidence of scouring or sediment deposition.
- Identify those locations where LWM may have obstructed the passage of floodwaters to the point of creating hazardous conditions. Use any photographs of flood conditions to assist in that effort.
- Note those locations where flooding does not threaten human safety or structures. In such locations, some of the smaller woody material may be left behind.

Evaluating Large Woody Material Conditions

Before deciding whether it is necessary to remove LWM from a waterway, please evaluate your findings appropriately.

- Is there potential for LWM build-up to affect public and structural safety?

- Does LWM build-up have the potential to cause upstream or downstream flooding?
- What kind of effect will LWM removal have on plants, fish and wildlife?
- How would the removal affect water quality and public and private land?

Woody material provides food and shelter for many organisms within river and stream ecosystems. It should not be removed unless it is absolutely obstructing the waterway and posing a threat to public and structural safety. In most cases, accumulation of LWM will not cause impacts to infrastructure such as stream crossings, and will eventually become mobile, change course and float downstream without incident. Situations that would require evaluation include: a crossing that is either undersized compared to the channel upstream of it, or a bridge with a center pier. If a debris jam already exists in these situations, then the additional debris could potentially move en masse downstream and impact bridge piers.

Choosing Large Woody Material Removal

- Review those locations where LWM may have obstructed the passage of floodwaters.
- Identify the methods by which the LWM can be removed.
- Consider using manual equipment or motorized equipment from beyond the top of bank before selecting other more intrusive methods. Intrusive methods may require a **wetlands permit**. If LWM removal will alter the stream or river bank and/or sediment, a wetlands permit will be needed prior to removal.

Permitting Large Woody Material Removals

Activities in surface waters and their banks are regulated under state law. RSA 482-A governs New Hampshire wetlands and surface waters. The law states that no person shall excavate, remove, fill, dredge or construct any structure in or adjacent to surface waters, wetlands or their banks without first obtaining a permit from the NHDES Wetlands Bureau. A wetlands permit is generally not required for removal of LWM, provided no tracked or wheeled vehicles enter the streambed or banks, only manually-operated equipment or larger equipment that is operated from the top of the bank (such as winch or excavator) is used, streambed and bottom are not disturbed, dredged materials are placed out of areas protected under RSA 482-A, and removal is done gradually to prevent a sudden release of impounded water that causes erosion or siltation. To obtain specific information about permitting requirements, please contact the NHDES Wetlands Bureau at (603) 271-2147.

General Information on Emergency Impacts

Flooding and other emergency situations arise from time to time. In the event of an emergency, it is possible to obtain authorization from NHDES to work in wetlands prior to receiving a wetlands permit to temporarily address or stabilize areas where there is a threat to public health and safety, or which threaten significant damage to private property, provided that the emergency event occurred within the last five days. Refer to NHDES fact sheet [WD-WB-9 Obtaining Authorization for Emergency Wetlands Impacts](#). If NHDES offices are closed, notify the local conservation commission and/or selectmen prior to stabilization and notify NHDES during the next working day.

For More Information

For further information about the New Hampshire Rivers Management and Protection Program, visit the NHDES website at <http://des.nh.gov/organization/divisions/water/wmb/rivers/index.htm> or contact the Rivers Coordinator, PO Box 95, Concord, NH 03302-0095; (603) 271-2959; riversprogram@des.nh.gov.