StreamGuide

NO. 2

Guide to Large Woody Debris Management

What is Large Woody Debris?

Many people move to the Catskills to enjoy the beauty of a landscape created by wild rivers. One of the defining elements of this landscape is the wood—trees, branches, and rootballs—visible in the stream and floodplain. Large woody debris (LWD) is the term used by river engineers and biologists to describe these tree branches, limbs, stumps or whole trees that fall into a stream or river. Other terms that you may hear that refer to LWD include: logjams, snags, strainers, or large woody material.

Because trees are such a key component of the riverine landscape, during larger floods, erosion will bring some trees into the river, and they will end up being deposited downstream along streambanks, in floodplains, and sometimes in the middle of shallow channels. Sometimes trees fall into the stream with their rootball intact. In many cases a number of trees become entangled forming a logjam (Photo 2) which may force water to go around the trees, causing erosion along streambanks and sediment deposition, possibly changing the course of the stream channel.

Photo 1: Fallen trees provide ecological benefits to the entire stream ecosystem. The entire tree provides shade, slower moving water, and protection which fish prefer.

LWD is often seen as a nuisance and a hazard to be removed from streams—to protect infrastructure, help aid in the navigation of rivers, to prevent flooding, and to protect boaters, swimmers, tubers and other recreationalists from getting entangled in the LWD.

Today river managers know that, despite these problems, LWD plays a vital role in the overall ecology of the stream and in stream stability. LWD often adds roughness to stream flow, slowing the speed of the water. This is especially important in the floodplain. LWD also provides important habitat to many insect, fish and plant species (Photo 1).

The purpose of this guide is to help you understand LWD and better manage it on your property.

ASHOKAN WATERSHED STREAM MANAGEMENT PROGRAM

Cornell University Cooperative Extension Ulster County | SOIL & WATER Conservation District | NYC Environmental Protection

Guide to LWD Management:

- What Is Large Woody Debris?
- What Causes LWD?
- What Is LWD's Ecological Function?
- What Should I Do About LWD On My Property?
- Do I Need A Permit To Remove LWD From My Property?
- Agency Contact Information

This StreamGuide was produced by Cornell Cooperative Extension of Ulster County in collaboration with Ulster County Soil & Water Conservation District.

Photo 2: An example of a logjam on the Beaverkill in Woodstock, NY. In this case, the logjam covers more than an acre of land and has blocked the stream channel splitting the flow into two directions.

What Causes LWD?

Large trees and other woody debris entering the creek are a natural consequence of stream erosion; however, this process is often accelerated by human development. Infrastructure along the stream, like roads and bridges, can increase streambank erosion, which consequently increases the amount of LWD entering the stream system. Certain land practices, such as developing streamside land, channelizing the stream and dredging, may increase the amount of LWD in the stream system. Where streams run through valleys with steep hillslopes, erosion at the bottom of the bank can cause a whole hillside to enter the stream. This can result in a large number of trees falling into a stream at once (Photo 3).

As trees along a streambank die and decay they eventually fall over and some will naturally enter the stream. Diseases, insects and other stresses that cause many trees to die at once can make this problem worse. The saturation of soil from heavy rains, which make the trees less secure, can also increase the volume of trees entering the stream. Floods, because they increase erosion, soil saturation and stress to trees, can result in an extremely large amount of LWD entering a stream system in a short amount of time.

Some areas of a stream tend to be places where LWD will accumulate. These include: areas where the slope of the stream decreases; overwidened channels; bends in the stream; constrictions to the stream (like culverts and bridges); gravel bars; and places where there is already preexisting LWD.

Photo 3: LWD near a steep eroding hillslope. Hillslope failures such as this are a prime source of LWD recruitment in streams.

What Are LWD's Environmental Benefits?

Downed trees and logs play a critical role in the health and vitality of streamside and aquatic habitats. Far from being simply rotting wood, LWD has a multitude of functions which help maintain healthy ecosystems and vibrant stream habitats. Many species of insect eat the decaying wood and algae growing on the dead wood. These insects and algae are a primary food source for many species of fish. Fish also like large woody material because it provides for slower, cooler water and protection from predators.

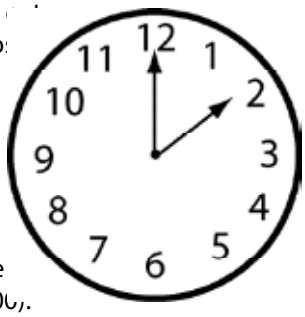
In addition, LWD helps to provide grade control to stream systems. In steep mountain streams, large woody debris often helps to stabilize the stream channel and keeps it from eroding away too much sediment (Photo 4).

Photo 4: In this example a tree trunk has fallen across the stream and has been buried in the streambed (bottom of stream channel). A red outline has been drawn to help illustrate the orientation of the LWD. This picture shows LWD stabilizing the streambed holding back sediment to create a step, forming a pool downstream of the log. The mini-waterfall effect it creates forces the water to slow down as it passes and creates prime habitat.

What Should I Do About LWD On My Property?

It depends on the situation. Many people believe they need to immediately remove any woody debris on their property including in the channel or on the floodplain. If there is flooding or streambank erosion on your property caused by downed trees in the stream channel then it is probably best to address LWD. This could include cutting it up into small sections and leaving it in place, completely removing the trees or repositioning the wood to help stabilize the bank.

To prevent the rootball from being torn out of the bank, trees along the bank at risk of falling in—those with more than half of their rootball exposed from stream erosion and that are leaning towards the stream—may be [illegible] leaving the stump in place. One rule of thumb is to cut trees that are leaning more than 45 degrees (this is a little less than the angle made by the hands of a clock at 2:00). Stumps and rootwads left intact in the bank add protection to the streambank from erosion (Photo 5).



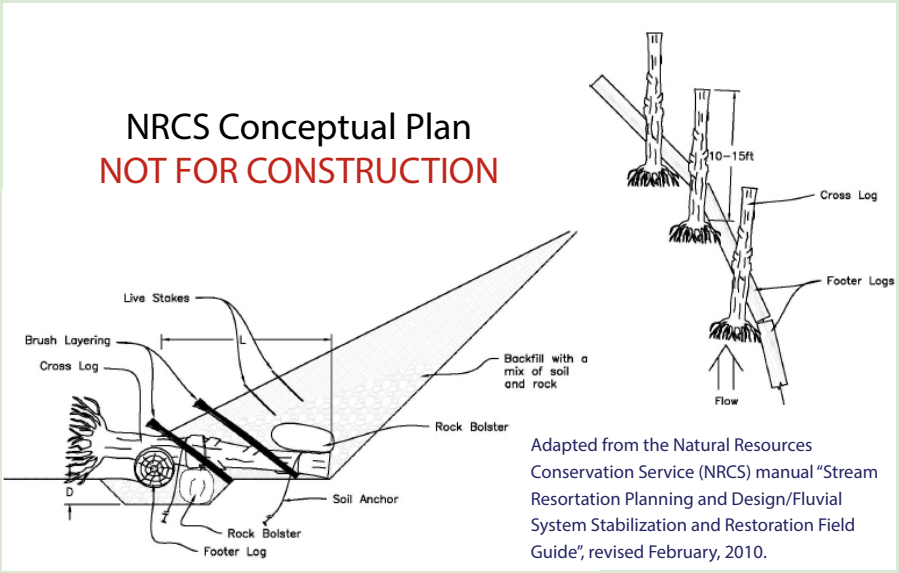
It is also recommended that you leave downed trees, and other LWD, in the floodplain as long as the LWD is not blocking the stream's access to the floodplain. Floodplains are inundated at least every few years, and these overbank flows are slowed by the increased roughness added by downed wood on the floodplain, reducing the risk of floodplain erosion.

For more information on these and other techniques to manage LWD please contact the local Soil and Water Conservation District for your area.

Using LWD In Stream Stabilization Projects

Following major flood events, such as those associated with Tropical Storms Irene and Lee, there tends to be a large amount of LWD in and around streams. Sometimes this LWD can be used in stream stabilization projects.

In the example below, LWD is buried along a new streambank which helps to give support and stability. Burying trees along a streambank during a restoration project can be a useful (and cheaper) alternative to rock.



Adapted from the Natural Resources Conservation Service (NRCS) manual "Stream Resortation Planning and Design/Fluvial System Stabilization and Restoration Field Guide", revised February, 2010.

"For a tree to become tall it must grow tough roots among the rocks."

- Freidrich Neitzsche

Photo 5: This photograph illustrates the best management practice (BMP) of removing the leaning trees and leaving the stump in place to maintain streambank stability.

Agency Contact Information

Ashokan Watershed Stream Management Program
6375 State Route 28
Phoenicia, NY 12464
Phone: (845) 688-3047
Website: www.ashokanstreams.org

Ulster County Soil & Water Conservation District (Highland Office)
Times Square Professional Office Park
652 State Route 299
Highland, NY 12528
Phone: (845) 883-7162 ext. 5
Website: http://www.ucswcd.org
Phoenicia Field Office: (845) 688-3047

New York State Department of Environmental Conservation Region 3 Offices [serves Ulster & Sullivan Counties]
21 South Putt Corners Road
New Paltz, NY 12561-1696
Permitting Office Phone: (845) 256-3054

New York State Department of Environmental Conservation Region 4 Offices [serves Delaware & Greene Counties]
1130 North Wescott Road
Schenectady, NY 12306-2014
Permitting Office Phone: (518) 357-2069

Do I Need a Permit to Remove LWD on My Property?

If You Plan on Using Heavy Equipment in the Stream:

If you plan to use any heavy equipment (such as a bulldozer, excavator, skidders, etc.) in the stream to remove snags and logjams, you will be required to obtain a permit from the New York State Department of Environmental Conservation (DEC). If you plan to disturb a streambank or streambed during the removal of LWD, you should contact the DEC to discuss your plans. Typically you will have to fill out an application form (which can be found online at http://www.dec.ny.gov/permits/6042.html. DEC permitting staff can answer specific questions about your project.

If You Do Not Plan on Using Heavy Equipment in the Stream:

If you can remove LWD using hand tools (such as chainsaws) you may not need to obtain a DEC permit. Remember, it is not recommended to remove LWD from the floodplain because it helps keep erosive forces in check. Also keep in mind local building codes may apply to your project. If you are uncertain be sure to contact your local town code enforcement officer and state permitting agency (NYS DEC) to determine if you are required to obtain a state or local permit.

NYS DEC Website for Stream Permits: https://www.dec.ny.gov/permits/6335.html

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