

Water WoRDs

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Woody Materials in Michigan Streams

Woody materials, also referred to as woody structure, woody debris, or log jams, play important roles in maintaining healthy streams. Benefits of stable woody structures include increasing channel stability by absorbing flood flow energy; increasing pool formation, backwater habitat, and general habitat diversity; creating sites for riparian vegetation colonization; providing “refuges” during floods and nursery habitat for juvenile fish; and increasing aquatic insect and fish production and diversity.

Wood in streams can also be controversial. Excessive amounts can clearly interfere with canoeing and fish passage and increase upstream water levels during floods, and even normal amounts can collect floating trash and cause local stream bank erosion (Figure 1).

Unfortunately, we don't fully understand what constitutes a “normal” amount of wood in streams. One study found that undisturbed streams will contain 1 to 10 cubic yards of wood per 1,000 square feet of stream bed, and another study found that natural streams will contain 20 percent of the volume of timber growing on the adjacent stream banks. Few woody material inventories have been performed on Michigan streams, though one was recently completed on the lower Belle River in St. Clair County, and another was performed on the Kalamazoo River in conjunction with the Enbridge oil spill cleanup.

Trash behind log jam



Dense wood accumulation



Figure 1.

The negative impact of woody material on upstream flooding is often overestimated. Studies have shown that a 50 percent blockage only causes a 1 percent rise in water levels under ordinary stream flows, and that even at higher flood-stage slows, a 30 percent blockage only raises upstream water levels by 5 percent.

While removing “log jams” is a common component of river cleanups, indiscriminate removal of woody materials can negatively impact a stream in multiple ways, including decreased channel stability, decreased number of pools and general habitat diversity, release of sediment held behind wood structure, and reduced aquatic insect and fish production. Alternatives to complete removal have been developed by our partners at the Wayne County Environmental Services Group (WCESG) and include [Woody Debris Management 101 or the clean and clear method \(1 MB PDF\)](#), in which collected trash is removed, the center of a log jam is cut away to allow canoe passage, and logs embedded in the stream banks and bed are left in place (Figure 2). Similarly, Australia has developed guidance for moving logs against the bank to reduce erosion and provide shelter to fish, in an orientation that often occurs naturally (Figure 3).

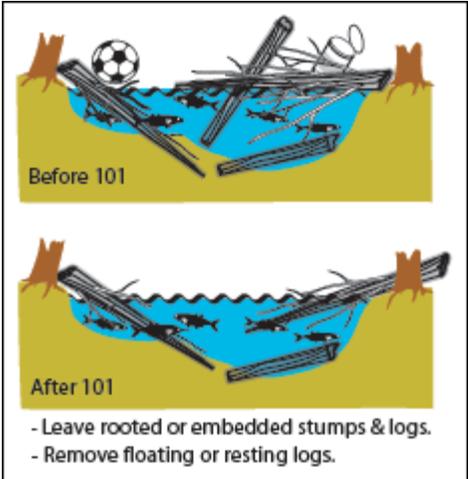
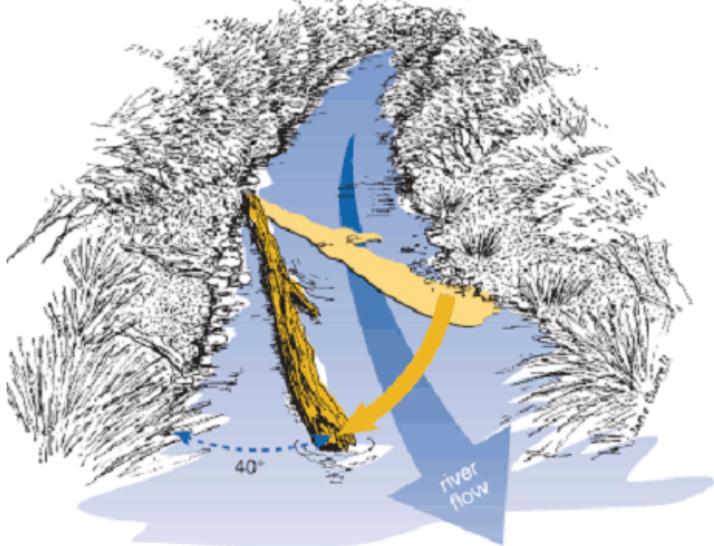


Figure 2.

Australian guidance



Natural example



Figure 3.

Finally, in the course of working with Wayne County on their woody debris management guidance, Southeast Michigan District staff developed an informal flow chart with recommended actions depending on the threat to nearby infrastructure and the percent of the stream blocked (Figure 4). Examples of imminent threats would be a log jam that’s been flanked by the river, resulting in erosion that threatens someone’s house, or a major jam on the upstream side of a bridge that could result in bridge failure under high flows. This flow chart may be useful for managing woody materials in streams elsewhere in the state.

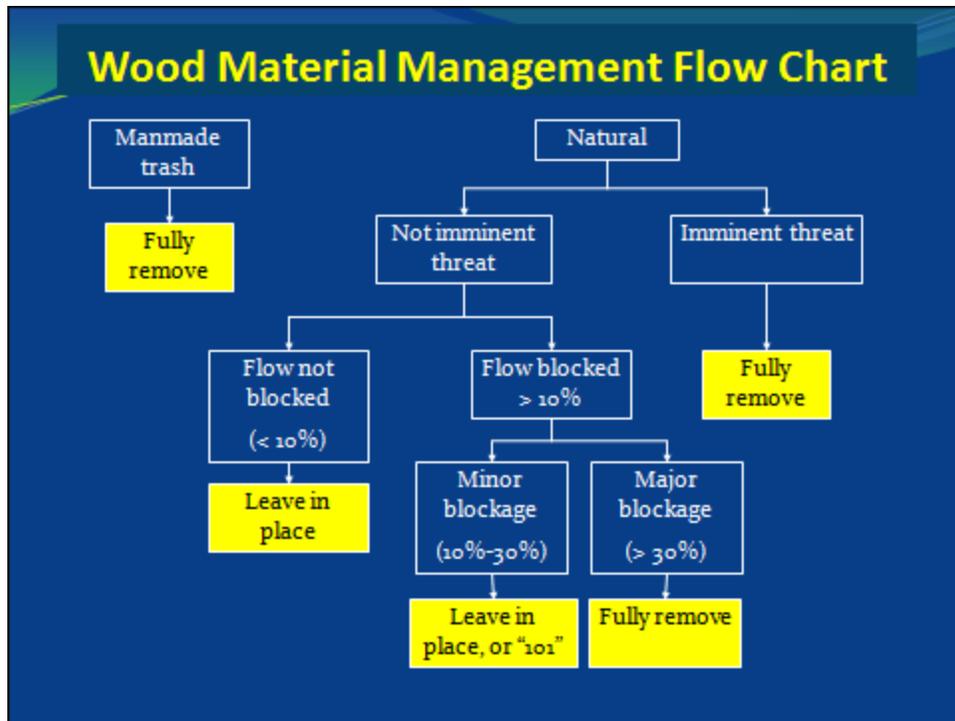


Figure 4.

WRD Partner Profile

Matt Best of WCEGS was instrumental in developing the woody debris management 101 strategy, and has worked on several woody debris management projects in Wayne County. As the Drains Manager for the Wayne County Drain Office, he currently manages, maintains, and improves over 1,500 miles of County Drain System, including open channel and enclosed storm systems as well as sanitary drainage systems. Mr. Best also is responsible for the Wayne County Sanitary Interceptor Collection system. In his 17 years at Wayne County, he has been part of efforts in Southeastern Michigan to provide sustainable environmental services to the residents of Wayne County and the region. Mr. Best has a BS from Central Michigan in Biology, Environmental Science and Geology and an MS from Eastern Michigan in GIS and Urban Planning. Mr. Best has been on the forefront of communicating the importance of green and blue infrastructure, such as Large Woody Debris, Tree Canopy Cover and Low Impact Development. He can be contacted at 734-285-7322 or at mbest@waynecounty.com.