

# MNTU'S STREAM HABITAT WORK

## Part 3 - Bank Stabilization Using Toe Wood and Other Methods

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In Part 1 we explained that every stream is a balance of stream flow (energy), sediment transport, stream slope and sediment size. To maintain good in-stream habitat we need to design projects to handle the energy of stream flow. A primary step on every project is to lower and slope back stream banks to allow high flows quicker access to the stream's floodplain and reduce water's erosive stress (erosive energy) on the outer bends.

Altering a bank's shape is the first step to reduce the erosive force of water acting on the bank. But with this alone we cannot eliminate all erosive forces on stream banks, only reduce them. Instead we take additional steps to further reduce erosive energy on outer bends. Methods and materials are tailored to each site based on a hydraulic assessment of energy levels. Streams or stream segments with higher energy levels, notably those with steeper slopes or very high flows, may require that we secure the bottom or "toe" the bank slopes with rock and other techniques.

### Why toe wood?

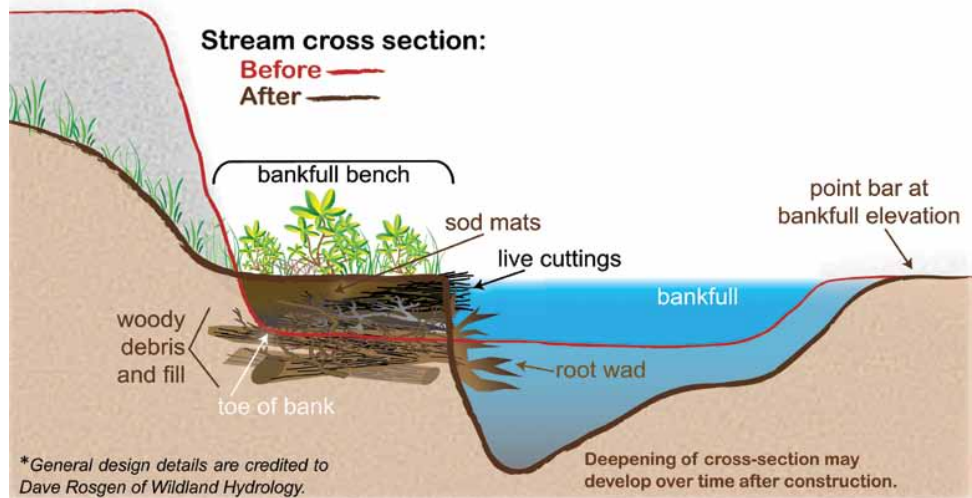
In many locations bank shaping reduces sheer stress (ability to erode soil) to levels where the bank can be held in place by the root systems of live vegetation. Vegetation is Nature's erosion control, to dissipate the energy of water and reduce its ability to erode soil. To accomplish this, we often need to use woody material and/or biodegradable erosion control netting to hold banks and soils in place for 3 to 5 years until the root systems of live vegetation become well established and can continually secure the bank into the future.

### What is toe wood?

Toe wood is a collection of woody material placed at the bottom or "toe" of a stream bank to both resist and dissipate the erosive energy of water hitting the bank. Often times we create a terrace or "bench" in front of what was a vertical cutbank. The bench consists of a bottom layer of logs, branches, brush, roots and soil as fill. Root wads placed below the water line are sometimes incorporated to provide large trout habitat and additional roughness (to dissipate more energy).



TOE WOOD ON THE STEWART RIVER WILL DISSIPATE ENERGY OF HIGHER FLOW, KEEPING BANK FROM ERODING. BROOK TROUT TAKE UP FEEDING LINES UNDER FOAM LINE IN PICTURE, ADJACENT TO COVER PROVIDED BY SUBMERGED WOODY HABITAT.



The fill can be covered with a layer of live cuttings (in forested areas such as the Stewart River above) or sod mats and transplants. Since most southeast MN sites lack existing prairie grasses for sod mats, biodegradable fabric netting and cover crops are used to secure soils until these grasses become established.



THIS BANK ON LEFT SIDE OF HAY CREEK HAS A BANKFULL BENCH BUILT OUT 20 FEET FROM A TALL, VERTICAL ERODING BANK. THE FORMER BANK EDGE WAS WHERE THE NEW GRASSY SLOPE MEETS THE TREE LINE.



A VERTICAL CUT BANK WAS REPLACED WITH AN UNDERWATER WOOD "CRIB WALL" AND THE BANK SLOPED BACK TO DISSIPATE FLOOD ENERGY. THIS ANGLER CAUGHT PLENTY OF BROOK TROUT FROM THIS DEEP HOLE ON EAST INDIAN CREEK.