

Best Management Practices

helping aquatic species at risk

Bioengineering for Streambank Stabilization

The Sydenham River in southwestern Ontario is the only major watershed which lies completely within the Carolinian Life Zone and is relatively undisturbed by industrial development. This has made the river a biological treasure. The Sydenham River supports an incredible variety of aquatic life, or what we call biodiversity. At least 82 species of fish and 34 species of freshwater mussels have been found here, making it one of the most species rich watersheds in all of Canada. Several species in the Sydenham River are found nowhere else in Canada, and some remain at only a few locations globally. Many of these species at risk have been nationally listed as endangered, threatened, or of special concern by the Committee on the Status of Endangered Wildlife in Canada. You can help too. By adopting Best Management Practices (BMPs), you can help protect the Sydenham River and its tributaries. This series of fact sheets will assist you in deciding which BMPs are right for your property.

There are many different methods of using natural materials to help stabilize eroding streambanks. This fact sheet provides information on four stabilization techniques and refers to websites that provide more details and other options. Before you begin your project, you must obtain approvals from the appropriate agencies. Any removal of fill or work done on a watercourse requires the approval of the Conservation Authority and Department of Fisheries and Oceans.

- Technical advice and grants may be available to assist in implementing Best Management Practices on your property.
- If your project involves work in or near a watercourse, you may require a Fill, Construction or Alteration to watercourse permit from the Conservation Authority.
- Call before you begin your project.

Fascines

Fascines are an excellent method of stabilizing slopes. A fascine is a bundle of live cuttings that is placed into a trench along the streambank and grows to provide vegetative cover and stability to the slope. Cuttings are taken during the dormant season from shrubs of dogwood and willow. They are assembled by alternating basal ends of the cuttings and constructing them into 6-8 inch diameter bundles. The bundles are secured with rope or twine at 12-15 inch intervals along the bundle. Once they are finished being constructed, they are placed in cold storage or water until the time they are planted. The fascines must be installed in the dormant season. The bundle is placed in a shallow trench that has been dug along the toe of the bank. Once there, the bundle is anchored with live plant stakes or construction stakes placed directly through the



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bundle at distances of 3 feet from one another. After anchoring, soil is placed in and around the branches of the bundle and compacted. A fascine is a permanent structure in the streambank and it will provide excellent habitat for fish and wildlife as well as shading for the water. The shade will stabilize the water temperatures and increase the aquatic life in the stream. The fascine will also fulfil its main purpose of stabilizing the slope, reducing erosion of the channel banks.

Brush Layers

Brush Layers are another means of stabilizing banks. They consist of a layer of live plant material lain horizontally in a slope. These materials provide root structure as they grow into the slope and hence provide some resistance to sliding and other types of erosive processes that occur on slopes. Cuttings 4 to 8 feet long, and .75 to 2 inches in diameter are taken from woody plants and are soaked for at least 24 hours. The cuttings are layered in a criss-cross or overlapping pattern to a thickness of 3 to 8 inches. They are placed as a row in the slope with the cut ends deep in the slope wall and the growing tips protruding 6 to 12 inches from the slope face. Layers are then filled in with soil and compacted. The next layer is installed 3 to 8 feet above the previous row. The brush layers are also installed in the slope in the dormant season.

Brush mattress

A brush mattress is a combination of vegetation used to form a protective cover over the streambank. It consists of fascines, live stakes and branch covers to form the protective layer. In the installation of a brush mattress, the first step is to dig a trench at the base of the bank and place in it fascines through the method described above. Then

Helpful Internet Sites

www.opdr.ci.portland.or.us/inspect/sitedev/Erosion%20Control%20Manual.pdf
www.wcc.nrcs.usda.gov/wtec/soilbio.html
www.usda.gov/stream_restoration/PDFFILES/APPENDIX.pdf

live stakes are installed across the slope face in a square grid pattern. The branch material is lain between these stakes with the growing tips directed up-slope with wire or twine used to secure the material to the stakes. The branch material cuttings are 6-10 feet long and .5 to 1 inch in diameter. All live materials are covered with soil. Installation occurs during the dormant season.

Live Crib-wall

A live crib-wall is used in stream bends where high flow velocity occurs. It is an interlocking framework of logs or timber. They are constructed during low or normal flow conditions in the stream. The procedure begins with the installation of the anchor logs. Excavate 2 to 3 feet below the streambed. The anchor logs are placed parallel to the water flow at the front and back of the wall sections. These logs are anchored with a 6 foot section of rebar. The next layer is placed in the bottom of the excavated area, the logs are buried back into the bank until stable and then they are secured with rebar at each crossing point and back filled with rock. Continue the layering of logs in a cross-hatched pattern until the wall is at the height of the original bank. Each level is secured to the one lower with rebar and backfilled with a rock/fill mix. Live stakes can be added to the top layer with a length long enough to allow growth into the bank and add stability.

Species used for Cuttings

In the region of the Sydenham River, the species of shrubs that work well for the above methods of soil bioengineering are willow and dogwood.

The species of willow that can be planted are:

- Sand bar willow
- Beaked (Bebb's) willow
- Pussy willow
- Laurel willow

The species of dogwood that can be planted are:

- Red-osier dogwood
- Silky dogwood



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