STREAM NOTES

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Streambank Erosion

What is Erosion?

Stream stability is an active process, and while streambank erosion is a natural part of this process, we have often accelerated this erosion by altering the stream system. Altering the natural system can result in erosion rates hundreds of times greater than those seen in naturally stable streams. Streambank erosion in North Carolina has been measured at rates that ranged from fractions of an inch per year in a naturally stable stream to over 18 feet per year in an unstable stream where the streamside vegetation is gone. Streambank erosion increases the sediment that a stream must carry, results in the loss of fertile bottomland and causes a decline in the quality of habitat on land and in the stream.

Causes of Streambank Erosion

Determining the cause of accelerated streambank erosion is the first step in solving the problem. When a stream is straightened or widened, streambank erosion increases. Accelerated streambank erosion is part of the process as the stream seeks to reestablish a stable size and pattern. Damaging or removing streamside vegetation to the point where it no longer provides for bank stability can cause a dramatic increase in bank erosion. A degrading streambed results in higher and often unstable, eroding banks. When land use changes occur in a watershed, such as clearing land for agriculture or development, runoff increases. With this increase in runoff the stream channel will adjust to accommodate the additional flow, increasing streambank erosion. Addressing the problem of streambank erosion requires an understanding of both stream dynamics and the management of streamside vegetation.

Preventing and Repairing Streambank Erosion

Many of the traditional methods for dealing with streambank erosion have been expensive to install and maintain. Solutions such as rock riprap [fig. A] or gabions (wire baskets filled with rock) may solve the erosion problem, but do so at the expense of habitat and a streams natural beauty. Today

there are some promising developments in the area of streambank stabilization and stream restoration. Natural channel design principles look to nature for the blueprint to restore a stream to an appropriate dimension, pattern and profile. Soil bioengineering practices, native material revetments and in stream structures help to stabilize eroding banks. Together these techniques can be used to move a stream toward a healthy, naturally stable and self-maintaining system.

Soil Bioengineering Practices

Bioengineering uses plant materials in a structural way to reinforce and stabilize eroding streambanks. This technique relies on the use of dormant cuttings of willows, shrub dogwoods and other plants that root easily. [fig.B] Bioengineering practices range from simple live stakes to complex structures such as fabricated lifts incorporating erosion control blankets, plants and compacted soil.

Native Material Revetments

These practices use native materials, wood and stone, to armor streambanks and deflect flow away from them. Low rock walls and log cribwalls can be used to armor the bank. [fig.C] Rootwads armor the bank and provide protection downstream by deflecting the flow away from the bank.

In-Stream Structures

Rock and logs can be used to construct a variety of structures that stabilize the streambed and banks. Cross vanes are rock structures that stabilize the streambed while aiding in streambank stabilization. Rock or log vanes redirect stream flow away from the toe of the streambank and help to stabilize the bank upstream and downstream from the structure. [fig.D]

Where these practices are used, the protection should last long enough to allow appropriate vegetation to become established and provide for long-term bank stability. The streamside vegetation improves habitat on the land and in the stream by providing shade, cover and food. Several of the streambank stabilization structures, such as root wads, are also excellent fish habitat improvement structures. The benefits of proper streambank stabilization go far beyond preventing loss of land and keeping sediment out of our streams.

A. Riprap solves the erosion problem at the expense of the stream s natural beauty.

B. Bioengineering uses plant material in a structural way to stabilize eroding banks.

C. Rootwads armor the bank, deflect flow and create fish habitat.

D. Rock vanes deflect the force of the stream away from the streambank.

Find Out More About Solving Streambank Erosion Problems...

For assistance in evaluating stream related problems, designing a stream restoration system, information on permits and cost share, contact the following organizations:

North Carolina Wildlife Resource Commission
Natural Resources Conservation Service
Resource Conservation & Development Councils
Soil & Water Conservation Districts
United States Fish and Wildlife Service

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