

One Last Thought

... and now after carefully looking through this pamphlet the reader should be well prepared for his first attempt to protect a distressed bank...or at least understand why he cannot. Although the preceding pages have been filled with explanations, suggestions, and warnings the most important consideration is still that streambank protection is a complex subject. There are still more questions than answers. So what

should the studious reader have gained from this pamphlet? Hopefully, he now understands that the chances of planning, building, and maintaining a project will be greatly improved by following a systematic plan of action as suggested in this pamphlet. Any less logical approach will not only compromise the resources of the builder, but the success of the project. Good luck!

NOTE:

It is the landowners responsibility to obtain all local, state, and federal, construction and environmental permits prior to any construction activity. Due to the complex nature of individual state requirements and local building codes, some of the guidelines and recommendations contained in this pamphlet are outdated, and may no longer be applicable to your project site.

You are strongly advised to contact your state and local regulatory agencies early in the project planning stage, as they can provide guidance on streambank protection methods, materials, and construction practices that are approved in your state. They can also provide instructions on the submittal process for environmental permits you must obtain prior to construction.

Glossary

- Abrasion.** Removal of streambank soil as a result of sediment-laden water, ice, or debris rubbing against the bank.
- Backwater area.** The low-lying lands adjacent to a stream that become flooded during periods of high water.
- Bar.** A sand or gravel deposit found on the bed of a stream that is often exposed only during low-water periods.
- Bed.** The bottom of a channel.
- Bend.** A change in the direction of a stream channel.
- Bed slope.** The inclination of the channel bottom.
- Blanket.** Material placed on a streambank to cover eroding soil.
- Caving.** The collapse of a streambank by undercutting due to wearing away of the toe or an erodible soil layer above the toe.
- Channel.** A natural or man-made waterway that continuously or periodically passes water.
- Check dam.** A structure placed bank to bank downstream from a headcut.
- Clay.** Cohesive soil whose individual particles are not visible to the unaided human eye. Soil can be molded into a ball that will not crumble.
- Cohesive soil.** Microscopic soil particles that have natural resistance to being pulled apart at their point of contact.
- Current.** The flow of water through a stream channel.
- Cut bank.** The outside bank of a bend, often eroding and across the stream from a point bar.
- Cut off.** A channel cut across the neck of a bend.
- Deadman.** A log or block of concrete buried in a streambank that is used to tie in a revetment with cable or chain.
- Dike (groyne, spur, jetty, deflector).** A structure designed (1) to reduce the water velocity as streamflow passes through the dike so that sediment deposition occurs instead of erosion (permeable dike) or (2) to deflect erosive currents away from the streambank (impermeable dike).
- Discharge.** The volume of water passing through a channel during a given time, usually measured in cubic feet per second.
- Distressed streambank.** A bank that has (or is) suffering erosion or failure.
- Dredge material.** Soil that is excavated from a stream channel.
- Eddy current.** A circular water movement that develops when the main flow becomes separated from the bank. The eddy current may then be set up between the main flow and the bank.
- Erosion.** In the general sense, the wearing away of the land by wind and water. As used in this pamphlet, the removal of soil particles from a bank slope primarily due to water action.
- Failure.** Collapse or slippage of a large mass of bank material into a stream.
- Fill material.** Soil that is placed at a specified location to bring the ground surface up to a desired elevation.
- Filter.** Layer of fabric, sand, gravel, or graded rock placed between the bank revetment or channel lining and soil for one or more of three purposes: to prevent the soil from moving through the revetment; to prevent the revetment from sinking into the soil; and to permit natural seepage from the streambank, thus preventing buildup of excessive groundwater pressure. If a filter is used by a landowner or local government, technical assistance should be obtained to properly match the filter with the soil.
- Fine particles (or Fines).** Silt and clay particles.
- Flanking.** Streamflow between a structure and the bank, possibly occurring because the structure was not properly tied into the bank.
- Gravel.** Soil particles ranging from 1/5 inch to 3 inches in diameter.
- Greenbelt.** Strip of trees and shrubs growing parallel to a stream that prevents overuse of the top bank area by man, animals, and machinery. This strip of vegetation also retards rainfall runoff down the bank slope and provides a root system which binds soil particles together.
- Groundwater flow.** Water that moves through the subsurface soil and rocks.
- Groundwater table.** The depth below the surface where the soil is saturated; that is the open spaces between the individual soil particles are filled with water. Above the groundwater table and below the ground surface the soil either has

no water between the particles or is partially saturated.

Headcutting. The action of an upstream moving waterfall or locally steep channel bottom with rapidly flowing water through an otherwise placid stream. These conditions often indicate that a readjustment of a stream's discharge and sediment load characteristics is taking place.

Impermeable material. A soil that has properties which prevent movement of water through the material.

Infiltration. That portion of rainfall or surface runoff that moves downward into the subsurface rock and soil.

Launching. Process where stone stockpiled along top bank is undercut and slides downslope thus protecting the bank against future erosion.

Lower bank. That portion of the streambank below the elevation of the average water level of the stream.

Microscopic soil particles. Clay and silt; particles that cannot be observed by the unaided human eye.

Navigable streams. Waterways of sufficient depth and width to handle a specified traffic load.

Noncohesive soil. Soil particles that have no natural resistance to being pulled apart at their point of contact, for example, silt, sand, and gravel.

Overbank drainage. Water flow over top bank and down the slope.

Permit. Written authorization issued by the U.S. Army Corps of Engineers approving the construction of a streambank protection project.

Piping. Flow of groundwater through subsurface conduits in the bank.

Place. Synonym for construct; for example, to say that "a riprap revetment was placed on the streambank" is the same as saying "a riprap blanket was constructed on the streambank."

Point bar. The bank in a bend that has built up due to sediment deposition.

Project. As used in this pamphlet, the planning, construction, and maintenance of a revetment or river training works placed to protect a streambank.

Rapid drawdown. Lowering the elevation of water against a bank faster than the bank can drain leaving a pressure imbalance that may cause the bank to fail.

Reach. A section of a stream's length.

Revetment. A facing of stone, bags, blocks, pavement, etc., used to protect a bank against erosion.

Rill erosion. Removal of soil particles from a bank slope by surface runoff moving through relatively small channels.

River training works. Structures placed in a stream to direct the current into a predetermined channel.

Rock. Soil particles greater than 3 inches in diameter.

Rooted. Expression indicating that a bank has been excavated and the end of a structure (check dam, dike, etc.) has been placed in the cavity, thus retarding future streamflow around the end of the structure (flanking).

Sand. Soil particles ranging from 3/1000 inch to 1/5 inch in diameter; 3/1000 inch is the normal lower limit at which the unaided human eye can distinguish an individual particle.

Scour. The erosive action of flowing water in streams that removes and carries away material from the bed and banks.

Sediment. Soil particles that have been transported away from their natural location by wind or water action.

Sediment deposition. The accumulation of soil particles on the channel bed and banks.

Sediment load. The soil particles transported through a channel by streamflow.

Seepage. Groundwater emerging on the face of a streambank.

Shear. Force parallel to a surface as opposed to directly on the surface. An example of shear would be the tractive force that removes particles from a streambank as flow moves over the surface of the slope; on the other hand, a floating log that directly strikes the bank would not be a shear force.

Sheet erosion. The removal by surface runoff of a fairly uniform layer of soil from a bank slope.

Sill. See check dam.

Silt. Noncohesive soil whose individual particles are not visible to the unaided human eye. Soil will crumble when rolled into a ball.

Sloughing (or sloughing off). Movement of a mass of soil down a bank into the channel (also called slumping). Sloughing is similar to a landslide.

Streambank. The side slopes of a channel between which the streamflow is normally confined.

Streambank protection works. Structure(s) placed on or near a distressed streambank to control bank erosion or to prevent failure.

Streambed. See bed.

Streamflow. The movement of water through a channel.

Streambank erosion. Removal of soil particles from a bank slope primarily due to water action. Climatic conditions, ice and debris, chemical reactions, and changes in land and stream use may also lead to bank erosion.

Streambank failure. Collapse or slippage of a large mass of bank material into the channel.

Surface runoff. That portion of rainfall that moves over the ground toward a lower elevation and does not infiltrate the soil.

Texture. Refers to relative proportions of clay, silt, and sand in soil.

Tied in. An expression used to indicate that a revetment or dike is constructed to prevent or

minimize streamflow between the structure and the bank.

Toe. The break in slope at the foot of a bank where the bank meets the bed.

Top bank. The break in slope between the bank and the surrounding terrain.

Tractive force. The drag on a streambank caused by passing water which tends to pull soil particles along with the streamflow.

Unravel. To lose material from the edges of a revetment.

Upper bank. That portion of the streambank above the elevation of the average water level of the stream.

Velocity (of water in a stream). The distance that water can travel in a given direction during an interval of time.

Waters of the United States. Includes all dry land and water-covered areas below the ordinary high water marks on navigable and nonnavigable streams.

Watershed. An area confined by drainage divides usually having only one streamflow outlet.

Wave attack. Impact of waves on a streambank.

Weathering. Physical disintegration or chemical decomposition of rock due to wind, rain, heat, freezing, thawing, etc.

Weephole. Opening left in a revetment or bulkhead to allow groundwater drainage.