

Biological Importance of Streambank Stability

Carolyn Bohn

As the boundary between land and stream habitats, streambanks occupy a unique position in the riparian landscape. Bank and channel profiles affect stream temperature, water velocity, sediment input, and hiding cover and suitable living space for fish. In addition, the streamside vegetation on stable banks provides food and shade for fish and wildlife. Because streambank condition and the quality of fish habitat are closely linked, any change, such as erosion, can have large biological implications.

"Streambank stability" refers to a bank's resistance to change and its resilience after change, and is determined by the soil composition of the bank itself and the type, amount, and vigor of vegetative cover. "Bank erosion" describes both the movement of the channel across the floodplain and changes in bank shape. Of the two, bank shape may have the larger impact on the fishery resources. In a broad timeframe, channel profile appears to be formed by the quantity and timing of streamflows, type of sediment load, and the type of bank material. Most streams move back and forth across their floodplains in response to erosion-deposition processes. As a stream migrates across the floodplain, the outer bank usually assumes a concave form, worn by erosion, while aggradation at the inner part of the bend forms a more or less convex bank. Banks with a high silt-clay composition tend to form narrow, deep channels because the cohesiveness of the material resists erosion. As sand and coarser material increase, channels tend to be wide and shallower. Channels also tend to be wider in forests and narrower through sod, possibly because the sod-roots bind the soil. Channel shape is important because it affects water temperature and velocity and hiding cover.

Although stream systems respond to many naturally occurring factors, land management can also influence bank shape and stability. The impact of cattle grazing on bank shape, stability, and vegetation has been recognized in recent years. Excessive grazing along streams removes protective vegetation and tramples the banks into sloping profiles. Throughout the Northwest, there are examples which suggest that streambank vegetation and shape may recover when excessive grazing pressure is removed. Fish populations may increase also (Gunderson 1968, Dahlem 1979, Keller et al. 1979, Storch 1979, Platts 1981). Determining if the cause of change is management-related has become an important, but difficult, part of making land management decisions; changes due to management can occur too slowly to be well documented by most monitoring programs, but much faster than the natural processes which originally



Severe disturbance alters streambanks so that they are not biologically beneficial to aquatic life.



Healthy streambanks provide shade, cover, and nutrients for the aquatic system.

formed the channel and continue to work it.

Research has begun on "bank stability," but these studies usually describe the rate of lateral bank movement while disregarding the importance of the bank shape. Studies of bank movement alone do not recognize that in terms of aquatic impacts, a 1-foot loss of bank from the collapse of an overhang (as from ice floes or flooding) is not equivalent to a 1-foot change from a vertical to a sloping bank. When a streambank overhang collapses, there is a large soil loss, but a vertical wall results from which flowing water can carve

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another overhanging bank. Sloping banks may be more stable and more resistant to animal trampling, but do not shade the water or provide undercuts for fish cover, and form wide, shallow channels. Although the sloping of a bank may occur slowly and less dramatically than the collapse of overhangs, it represents a fundamental change in channel form which is not particularly beneficial biologically. For riparian and aquatic habitat, "stability" is important more in terms of the function of the bank than in absolute immobility. Function is more difficult to quantify than mobility, but by monitoring edge movement together with simply classifying bank shape, a more complete picture could be drawn for little extra cost. Bank profiling, of course, most accurately describes bank shape, but costs much more.

Sediment entering the streams from eroding banks also concerns managers. Large amounts of fine sediment can interfere with the feeding, reproduction, and survival of aquatic organisms and lower the quality of water for downstream users. Both the amount of sediment and the timing of the input may affect the stream system. Sediments entering the stream from bank failures during the winter may be flushed out of the gravels and transported to normal deposition areas by spring discharge. Low summer flows, however, are not capable of moving large quantities of sediment. Sediment particles which cannot be carried by the flow settle across the streambottom, burying food organisms and fish eggs. Consequently, large amounts of sediment entering a stream in the summer can stress aquatic organisms already contending with warm water temperatures and limited water space. The point at which the amount of bank loss begins to affect aquatic habitat, and also the complete role of the timing of this bank loss, is not well known but needs to be determined.

The growing interest in streambank stability stems from the influence streambanks have on a stream system and fish habitat. Streambank stability has traditionally been defined from an engineering perspective, but stability in terms of the biological function of a streambank means more than bank immobility—it means the maintenance of a channel shape suited to the native streambank vegetation and soils and the stream gradient. Streams naturally work slowly across a floodplain while the channel shape maintains regular patterns within a reach and sediment enters the water primarily when flows are big enough to carry it. As land stewards, we must understand the importance of the physical form of the stream to the biological resources and manage the stream system with a skilled, capable hand.

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President's Commission Seeks New Ideas for National Recreation Policy

The President's Commission on Americans Outdoors is looking for a few good ideas, and is asking recreation experts and the public for help to find them.

The 15 Commissioners want to open their doors to good ideas from any source, while conducting nationwide hearings on recreation issues in preparing a report to the president on recreation policy.

The President's Commission on Americans Outdoors was established by Executive Order in January, 1985. Commissioners will study recreation in America and recommend new policies to the President to meet recreation demand into the 21st century. Tennessee Gov. Lamar Alexander chairs the Commission. Gilbert Grosvenor, president of the National Geographic Society, is vice chairman.

PUBLIC HEARINGS AND FIELD TRIPS

Area	Date	General Topics*
Atlanta	Apr. 23	Water-based recreation; role of federal lands in the East; recreational use of private lands; coastal waters.
Great Smokies	Apr. 25-26	COMMISSION MEETING to review work to date, initiate next phase of activities.

Denver	May 14-15	Recreation role of multiple-use lands (national forests, Bureau of Land Management public domain); trail systems; water rights.
Cheyenne	May 16	Private sector recreation opportunities on public land; state, federal, private coordination; small business and recreation.
Anchorage	June 2-3	Multiple use management; native claims; funding/tax base.
Seattle	June 5-6	Federal, state, local, private sector roles; resource protection and visitor services; coastal waters.
Minneapolis	June 26-27	Communication/information systems; health and wellness value of recreation; agricultural land policy/wetlands.

*These topics are neither exhaustive or exclusive; there will be ample opportunity for other subjects to be added as needed; it will also be possible to cover subjects at hearings other than that designated. The focus is intended as a guideline only.

PLEASE NOTE: Circumstances may force the Commission to reschedule, continue or cancel any hearing or meeting with little notice. Unless ample time is available, notice of such changes may be distributed only to Commissioners and witnesses involved, and local media. Please feel free to call Commission offices to confirm times, dates and locations of meetings listed here.