Looking at riverbanks in new ways

FLORSHEIM ET AL. (2008) SHOW NEW WAYS OF LOOKING at riverbanks, bank erosion, channel bank infrastructure, and management response to bank erosion, but does the article provide new alternatives? Perhaps the statement in the article's abstract—"Here, we … suggest that alternatives to current management approaches are greatly needed"—is an invitation for managers of riparian resources to question their assumptions, take a broader (watershed) look, and think beyond conventional approaches. However, two of the four alternatives the authors provide seem like "floodplain management" repackaged in new terms: "dynamic-process conservation areas" and "erosion easements." Furthermore, the checkerboard ownership of riparian corridors makes the use of these alternatives seem challenging at best. Examples of where and how these alternatives have been (or could be) applied would have added verity to the suggestions. The other two alternatives—"elimination of direct stressors" (e.g., grazing) and "nonstructural approaches" (e.g., planting native vegetation without the inclusion of hard structures such as riprap, gabions, or concrete)—seem practical; that is, simple and effective ways to enhance bank stability (albeit in the short term).

Although alternatives are still needed, the discussion of riverbanks, bank erosion, and channel bank infrastructure in Florsheim et al. (2008) is enlightening. The authors suggest that the pervasive construction of infrastructure to control bank erosion is a result of the assumption that bank erosion is "bad." This notion and the response to it have "greatly diminished natural channel banks, geomorphic processes, and ecology" (p. 527). The authors identify the main geomorphic and ecological effects of channel bank infrastructure, the potential habitat or ecosystem services lost, and examples of organisms affected. The authors highlight riverbanks as ecotones, vital centers of biodiversity in the zone between water and land. These areas, including the dynamic process of erosion within them, provide habitat gradients, setting up

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trophic cascades that offer "a greater variety of food sources and physical habitats than do simple plant communities of uniform age and species, which are characteristic of stabilized banks" (p. 523). The authors also point out that bank erosion includes both fluvial (stream-driven) and mass-wasting (gravity-driven) processes, the latter often overlooked at the detriment of engineering solutions. Mass wasting creates both vertical banks and slump deposits, the combination of which increases the heterogeneity of the channel, creating microtopography (for a variety of species) and bare surfaces (for recruitment) at varying elevations above the channel.

Florsheim et al. (2008) suggest that construction of channel bank infrastructure should not be an immediate response to bank erosion, particularly in watersheds with a low level of urban development or where development is in progress. Bank erosion is a necessary process that may bring about eventual channel stability in urbanizing areas, and hard structures may prevent the adjustments required for a channel to stabilize on its own and limit future restoration options. Significantly, the authors point out the general lack of monitoring done to assess the effects or the effectiveness of projects that use channel bank infrastructure, which is ironic in light of the pervasive nature and quick-response applications of riprap, gabions, and concrete. Finally, the authors illustrate that as a management strategy, construction of channel bank infrastructure addresses only one component of watershed management (bank erosion) while ignoring a full spectrum of habitat degradation and environmental problems (e.g., channel incision, removal of riparian vegetation, changes in hydrology, and pollution), as well as the values provided by preserving natural riverbanks.

Reference

Florsheim, J. L., J. F. Mount, and A. Chin. 2008. Bank erosion as a desirable attribute of rivers. BioScience 58(6):519–529.

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