

Critical Relationships between Streams and their Floodplains: Implications for Stream Restoration Project Design

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The establishment of an effective connection between a stream and its floodplain is a critical and frequently overlooked element in stream restoration project design and implementation. A lack of awareness of floodplain functions and the high cost of excavating and trucking fill both contribute to this situation which limits the effectiveness and stability of many stream improvement works. Bank stabilization is often addressed through construction of a veneer of rock or live cuttings designed to provide toe protection for graded 3:1 slopes extending to the edge of the stream. If these toe protection works become undermined or outflanked several years after the project is completed, the stream can erode rapidly into unconsolidated soils below the rooting depth of the established vegetation. Conversely, the excavation of a low floodplain complex adjacent to the stream provides an opportunity to develop a broad corridor of riparian vegetation with roots consolidating bank soils below the erosion plane of the stream. In this situation the toe protection works may only need to persist through one growing season until the riparian floodplain vegetation takes over the function of bank stabilization. The construction of a floodplain also provides an opportunity spread high flows out into a wide shallow pathway which reduces flow velocity and shear stress. This strategy helps address the root causes of erosion as opposed to a "bandaid" approach which armours the eroding bank without reducing high flow velocities. In addition to bank stabilization, floodplain construction also provides for establishing stream reaches which exhibit very stable water depths and velocities, well sorted gravels providing high quality salmonid spawning habitat, and, optimal contributions to aquatic habitat diversity from riparian vegetation. This presentation examines stream and floodplain habitat restoration projects using case studies from the Nottawasaga River Watershed and explores the potential for constructed floodplains and riffles to serve as natural water quality improvement infrastructure.