STREAMBANK AND SHORELINE PROTECTION

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Description
Structural and/or vegetative measures are used to protect streambank and shoreline from erosion [1]. These protective measures include vegetative plantings, soil bioengineering systems (living plant materials used as structural components), and structural measures, such as rock riprap, piling revetments, jacks, gabions etc. [2].

Rationale, mechanism of action
Streambank and shoreline protections restore the system hydrology and avoid the detachment of soil particles [3], decreasing the delivery of P to streams, lakes, reservoirs and estuaries. In fact, P is often attached to soil particles presents in the surface runoff [1] and features encouraging infiltration and sediment trapping may reduce P loss in surface runoff [4].

Applicability
Streambank and shoreline protections need to be adapted to the local geologic, climatic, vegetative, and hydraulic conditions. The dimension and the type of vegetation depend on the amount and temporal variability of the surface runoff and on the hydraulic characteristics of the water body. Maintenance plans need to be set beside the operational one to assure the effectiveness of the measure [1].

Effectiveness
Streambank stabilisation methods are effective at the local scale already in the short term. They can reduce loading of sediment by 90% and of P by 50-70% when combined with a riparian area, and by 30-90% when combined with a grass filter strip [3].

Time frame
The measure has an immediate effect on reducing erosion, and can last several years, however it can not be considered a long-term strategy as the P accumulated in the soil bank can reach the saturation level, or the hydrological conditions can change [5].

Environmental side effect
Streambank and shoreline protections are targeted on P transport, not on its sources. If not consumed by vegetation, P can accumulate in the streambank and be released when conditions became favorable, for example during or following runoff events if soil is saturated in P or if anoxic conditions occur in the streambank. Additionally, streambank and shoreline protections shall be constructed in a way to enhance the ecological habitat, respect the landscape feature and fulfill the recreational use when required.

Relevance
The measure can be relevant for regions characterized by soil erosion, and especially for those where agricultural fields are close to the surface water bodies, as near stream surface runoff and soil P contributes more to the P export from the watershed [6].

Costs: investment / labor

The costs of implementation vary according to the erosion process targeted, the area equipped and the type of measure introduced [1]. Besides the investment, some additional costs for the maintenance have to be foreseen.

References

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