

Proposal to Study the Effects of Woody and Herbaceous Vegetation on Streambank Erosion

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Justification for Study

Streambank erosion can be a large source of sediment, as much as 80% of the total watershed sediment yield [1, 2].

Sediment is the primary pollutant of rivers [3, 4]

Streambank erosion also causes

- Increased flooding
- Increased need for dredging
- Undermining of in-stream structures
- Degradation of reservoirs



Collapse of near vertical bank after high flows have scoured the toe of the bank.

Objectives of Proposed Research

Compare the effects of woody and herbaceous vegetation on

- Stream hydraulics at bankfull discharge
- Soil moisture and temperature regimes
- Soil strength

Methods

(1) Perform monitoring at two field locations on a stream near Blacksburg, Virginia. Locations will have sections with herbaceous and wooded riparian buffers.

(2) Continuously monitor the following:

- Air temperature and precipitation
- Stream stage
- Soil moisture and temperature

(3) Sample the following:

- Suspended sediment (weekly)
- Bank material (texture, friction angle, root area ratios)

(4) During two storms with 1-2 year return periods, measure the following:

- Stream velocity and discharge
- Sediment concentration
- Bedload

Background: Grass Versus Trees

Research has shown that streams are significantly narrower with grass buffers than with forested buffers [5, 6]. The photos below support this finding.



Two adjacent stable reaches of Spruce Run, an alluvial stream near Newport, Virginia: (top) riparian buffer of meadow grass; (bottom) buffer dominated by trees and shrubs.

References

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- [3] US EPA. *National Water Quality Inventory: Report to Congress* (USEPA: Washington, DC.: US EPA, 1990).
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