

Reference 34

Liu, XM; Mang, XY; Zhang, MH 2008 Major factors influencing the efficacy of vegetated buffers on sediment trapping: A review and analysis JOURNAL OF ENVIRONMENTAL QUALITY, 37(5), 1667-1674. 10.2134/jeq2007.0437

Background and objective

Sediment is a major agricultural pollutant threatening water quality. Vegetated buffers, including vegetative filter strips, riparian buffers, and grassed waterways, are best management practices (BMPs) installed in many areas to filter sediments from tailwaters, and deter sediment transport to water bodies. Along with reducing sediment transport, the filters also help trap sediment bound nutrients and pesticides. The objectives of this study were: 1) to review vegetated buffer efficacy on sediment trapping, and 2) to develop statistical models to investigate the major factors influencing sediment trapping.

Search strategy and selection criteria

Various databases were used when we searched literature on vegetated buffer and sediment trapping efficacy. The key words sediment, buffer, vegetated ditches, riparian, grass waterways, filter strip, constructed wetland, etc., were used alone or a combination in the search. No selection criteria were reported.

Data and analysis

Box plots were used in this study to represent the efficacy of each of the buffers for sediment trapping. The authors used backward stepwise regression analysis to select the main factors affecting sediment trapping efficacy. Nonlinear regression models were fitted to the data to reveal patterns of percent sediment removal and buffer width and buffer slope, respectively. All analysis and model fitting were performed with SAS 9.1.2.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
31	Croplands	Outflow from grassed buffer strips (including vegetative filter strips, riparian buffer zones, and grass waterways).	Inflow into grassed buffer strips (including vegetative filter strips, riparian buffer zones, and grass waterways).	Metric: % of sediment removal; Effect size: Not applicable	37.5

Results

- Vegetated buffers in the studies exhibited an excellent potential for sediment removal, with an efficacy ranging from 45 to 100%.

Factors influencing effect sizes

- Buffer width : With increasing buffer width sediment trapping efficacy is improved.
- Buffer slope : On buffers with steeper slopes runoff tends to flow through the buffer too fast, thus reducing sediment trapping efficacy to unacceptably low values.

Conclusion

Authors found that vegetated buffers in the studies exhibited an excellent potential for sediment removal. Reviewers' note: We labelled the results as uncertain due to the lack of statistical testing.