

Meta-Analysis of Riparian Zone Width Effects on Instream Processes and Taxa Richness

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Riparian ecosystems have been studied globally to determine the effects of buffer width on instream and ecological functions. This study conducts a meta-analysis of buffer width efficacy to resolve competing width recommendations for the protection and restoration of riparian areas. We compiled original scientific research that observed the effect of varying riparian buffer widths on instream outcomes (i.e., removal efficacy of various constituents) and taxonomic outcomes (i.e., species richness). More than 450 worldwide studies were identified that quantify the relationships between the width and these response variables. Preliminary results indicate that a 30-m width corridor is sufficient to retain more than 90% of sediment and nutrient inputs (n = 27), also riparian areas with grass as vegetation and slope less than 15% present a better retention. However, a 100-m width corridor is required to reach 60% of taxonomic outcomes (n = 29 with mixed vegetation surroundings). Few studies were available for emergent contaminants and habitat outcomes, indicating a potential area for future research. Meta-analysis results revealed a positive correlation between widths and the instream/ecological process observed, suggesting that riparian protection and restoration is crucial to improving biological processes and diminishing instream impacts.

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