

RIPARIAN VEGETATIVE CONDITION STRONGLY AFFECTS CHANNEL MORPHOLOGY AND HABITAT STRUCTURE

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Abstract. As part of the Coweeta Long Term Ecological Research (LTER) program, we investigated the effects of riparian vegetative conditions on a suite of channel morphological variables: active channel width, the variability of width within a reach, large wood frequency, mesoscale habitat distribution, median particle size, and percent fines. We measured channel characteristics on 47 wadeable streams throughout the Upper Little Tennessee River Basin in the Southern Appalachians. The data indicate that conversion of riparian forests to grass or pasture has reduced active channel width, wood frequency, and the variability of channel width, simplified habitat, and reduced median particle size. Channel width of forested channels was better predicted by the ratio of drainage area to local channel slope (A/s) rather than drainage area alone. When channel widths were evaluated against this width predictor, the relative effect of riparian conversion on channel width was nearly invariant across the range of A/s . Channels with grassy riparian zones were about one-third the width of channels with forested riparian zones. Channels with a minimal forested riparian buffer (1-3m wide) were significantly wider than channels with grass or pasture to the stream bank. Riparian forest conversion also increased maximum daily stream temperatures by several degrees. By most measures of stream habitat quality, riparian forest conversion to grass degrades habitat for native coldwater species. Even modest increases in the extent and width of forested riparian buffers would improve stream habitat conditions for native aquatic species.