

Stormwater BMP Effectiveness Assessment Toolkit

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US EPA has identified the effectiveness of Stormwater Best Management Practices (BMPs) as a priority research need. Effective protection of biotic integrity requires that processes maintaining the diversity of physical habitats be protected. Methods are needed to evaluate the effectiveness of existing BMPs (including conservation measures) and to predict the relative effectiveness of proposed stormwater management plans in maintaining the habitat and biotic integrity of streams in New England. This research project is developing a suite of tools for assessing the effectiveness of stormwater BMPs. The toolkit includes ecological classification, predictive models of community composition, empirical derivations of species optima and tolerances, and the construction of community- and habitat-response curves along development gradients by ecological region and watershed class. These components will help define habitat expectations for New England watersheds under natural conditions and evaluate the effect of watershed development on selected habitat features. The toolkit will facilitate both the assessment of BMP and conservation effectiveness, as well as the extrapolation of outputs from mechanistic models predicting BMP effects on water quality and quantity to predict ecological impacts and to guide remediation. The project is creating macroinvertebrate-, fish- and habitat- (flow, thermal and substrate) expected response functions along watershed development gradients. Available monitoring data for sites downstream of existing green-infrastructure stormwater BMPs and Low-Impact Development (LID) projects in New England will be plotted against response functions to determine the degree to which habitat and biotic integrity have been protected. Species presence/absence models and tolerance or optimum values will be used to assess the rate of species loss along development gradients that can be attributed to habitat degradation.

Keywords: Stormwater; BMP effectiveness; Fish; Habitat