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AQUATIC MACROINVERTEBRATE DIVERSITY IN CONSTRUCTED STORMWATER WETLANDS

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ABSTRACT Aquatic macroinvertebrates were collected from a total of 25 constructed stormwater wetlands across North Carolina, USA using the sweep net method. Metrics of biotic integrity (macroinvertebrate community richness and evenness, percent tolerant taxa, and functional feeding group composition) were then determined for each wetland and related to wetland design features, including temporary storage depth and wetland to watershed area ratio, and watershed characteristics. Macroinvertebrate surveys were similarly conducted in naturally occurring reference wetlands and statistical analyses were conducted to compare the macroinvertebrate communities observed in stormwater and reference wetlands. Although impacted by stormwater runoff, some stormwater wetlands supported a diverse macroinvertebrate community similar to that observed in reference wetlands. Measures of macroinvertebrate richness and evenness in stormwater wetlands varied widely but were loosely correlated to wetland storage depth and the ratio of the wetland to watershed area, two factors that dictate stormwater wetland hydrology and which may play a role in the establishment of aquatic macroinvertebrate communities. Macroinvertebrate diversity is presented as one of the suites of ecosystem services provided by constructed stormwater wetlands and can be used as a means by which to supplement the more traditional chemical and hydraulic analyses used to assess stormwater wetland performance.

Keywords: Stormwater, Wetland, Aquatic macroinvertebrate, Biotic integrity, Ecosystem service.