

Bioassessment of Benthic Macroinvertebrate Communities in Selected Springs of the St. Johns River Drainage

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The St. Johns River Water Management District requires baseline ecological data for identifying appropriate targets and making informed decisions to establish minimum flows and levels for springs within its jurisdiction. To provide such information for a group of springs, we characterized community composition and relative abundances of major benthic macroinvertebrate taxa. Springs and spring runs sampled were DeLeon, Green, and Gemini (2004); Apopka, Bugg, Rock, and Wekiwa (2006); and Alexander and Silver Glen (2007). Sampling was done quarterly for each set of springs surveyed per year. Community characterization was based on field sampling and laboratory protocols used by the Florida Department of Environmental Protection (FDEP) for determination of the Stream Condition Index (SCI), a multimetric biological indicator of aquatic ecosystem health. Diversity measures and density estimates were based on triplicate petite Ponar dredge grabs per sampling event. For all springs combined, over 200 operational taxonomic units were identified, i.e., including those to which the lowest practicable identification level was above the species category. Notable differences were found between springs and in some cases temporally within each spring for several key parameters, including taxon richness, evenness, dominance, and the Florida Index (a weighted sum of intolerant taxa). For all springs, SCI values generally fell well below optimal reference conditions and would fail bioassessment criteria from the legal perspective of the FDEP Impaired Waters Rule. Low scores for this index may relate in some cases to degraded conditions associated with nutrient inputs and/or other perturbations. However, it also appears that application of the SCI may not be fully appropriate to characterize reference conditions in springs, given that these normally oligotrophic systems represent ecotones between ground waters and surface waters, and the scoring index was devised primarily for the latter. Identifying benchmarks for maintaining or restoring optimal community conditions may require use of additional methods and criteria to characterize the benthic fauna, as well as determining how water quality and quantity interact in structuring these communities.

Keywords: groundwater; springs; bioassessment; macroinvertebrates; SJRWMD; MFL

Challenge: Public health, wildlife health, ecosystem health and water resource sustainability

Issue(s): Water availability and allocation; nutrient enrichment of surface, ground and coastal waters

