

Developing Landscape Level Indicators for Predicting Watershed Condition

Anne Kuhn, James Lake, Jonathan Serbst, Nathan J. Smucker and Michael A. Charpentier

Drainage basins (watersheds) exert a strong influence on the condition of water bodies such as streams and lakes. Watersheds and associated aquatic systems respond differently to stressors (e.g., land use change) or restoration activities depending on the climatic setting, bedrock geology, soils, topography, hydrologic connectivity, and wetland distribution. This research focuses on developing landscape level watershed indicators that incorporate information on natural infrastructure and stressors (human and natural) and relate these to indicators of aquatic condition. The Narragansett Bay Watershed (NBW) located in Rhode Island and Southeastern Massachusetts, has been chosen as an intensively monitored case study watershed for this research. The NBW is one of the most densely populated watersheds in the United States, with almost 1,000 people/mi². This presentation will describe the development of landscape indicators reflecting aquatic condition specifically in streams. We used stable isotopes of $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$, in periphyton, macroinvertebrates and fish to examine their potential use as aquatic indicators of the sources and effects of nutrients and carbon from urban areas on stream ecosystems. An additional area of focus examines the effects of riparian buffer condition in reducing (intact highly vegetated) or exacerbating (degraded buffers) urban effects on stream ecosystems.

Note: For submission to US International Association of Landscape Ecology as an oral presentation categorized under the following two topics: Riparian Landscapes; Urban Landscapes