Estimating impervious cover and riparian zone condition in New England watersheds

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Under EPA's Green Infrastructure Initiative, research activities are underway to evaluate the effectiveness of green infrastructure in mitigating the effects of urbanization and stormwater impacts on stream biota and habitat. Preliminary analyses, using impervious cover estimates from the 30-meter resolution National Landcover Dataset (NLCD), have indicated that biotic communities are impacted at lower levels of watershed imperviousness than those traditionally reported in the literature. However, NLCD data are likely underestimating impervious cover, particularly in suburban areas where impervious surfaces can be masked by tree cover. Concurrent analyses have found that the condition of forested buffer zones can help to mitigate the effects of urbanization, even when the natural functions of riparian zones are altered by stormwater drainage infrastructure. Higher resolution estimates of impervious cover and riparian zone condition may provide a more accurate depiction of stream ecosystem responses to urbanization. However, fine scale classifications are difficult at broad spatial extents.

Methodologies were developed to improve classification accuracy using imagery from the National Agricultural Imagery Program (NAIP) program, LIDAR data, GIS, and genetic algorithms. An accuracy assessment was conducted and compared to classifications of previously established estimates from state and local high-resolution data sets. These improved estimates will be used to evaluate riparian zone widths required for mitigation of urbanization effects at varying spatial resolutions, and to evaluate if prior biotic community thresholds change. This presentation focuses on a case study in Burlington, VT and highlights the challenges of working with high resolution spatial data over broad spatial extents.