Re-evaluating estimates of impervious cover and riparian zone condition in New England watersheds: Green infrastructure effectiveness at the watershed scale.

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Under EPA's Green Infrastructure Initiative, a variety of 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. Effectiveness of both site-scale stormwater best management practices and landscape-scale natural green infrastructure are being assessed. The percentage of impervious cover in a watershed is a commonly used metric for assessing the effects of urbanization 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 much lower levels of watershed imperviousness than previously reported in the literature. It is likely that the 30-meter resolution NLCD data are underestimating impervious cover, particularly in suburban areas where impervious surfaces can be masked by vegetation and trees. 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 response to urbanization. However, fine scale classifications of impervious cover and riparian zone condition at broad spatial extents have been difficult in the past, due to data processing constraints.

Methodologies were developed to improve estimates of impervious cover and riparian zone land cover classification in New England using 1-meter resolution 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 critical riparian zone widths required for mitigation of urbanization effects at varying spatial resolutions, and to re-evaluate macroinvertebrate, fish, and periphyton model and threshold accuracy. 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. The results of this project will help to better inform management strategies and regulation of development for suburban and urban areas.