Optimizing estimates of impervious cover and riparian zone condition in New England watersheds: A green infrastructure analysis.

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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 known stressor 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. Other 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. The purpose of this research is to improve EPA's assessments of impervious cover and riparian zone land cover classifications by conducting high resolution image analysis using GIS, genetic algorithms, and 1-meter resolution imagery from the National Agricultural Imagery Program (NAIP) program. Ancillary data sets such as road networks, National Wetlands Inventory (NWI) data, the National Hydrography Dataset (NHD), LiDAR, and E911 data will be utilized to optimize estimates of riparian zone condition and impervious cover.

Classification accuracy assessment will compare the improved classifications to previously established impervious area and riparian zone 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, as well as to evaluate macroinvertebrate, fish, and periphyton model and threshold accuracy. The results of the project will help to better inform management strategies and regulation of development for suburban and urban areas.