

Practices to reduce stormwater runoff are implemented for several primary purposes: to protect and improve water quality and hydromorphology in water bodies that receive stormwater runoff, to prevent soil erosion, to maintain groundwater recharge volume, and to prevent increasing risk from flooding. Along with these primary benefits, many stormwater management practices results in co-benefits, including carbon sequestration, water temperature regulation, air quality improvements, energy savings due to microclimate regulation, wildlife habitat, and aesthetic benefits of increased vegetation.

Low impact development (LID) encompasses a number approaches for retaining, slowing and filtering stormwater. LID developments may involve alternative neighborhood design, often referred to as environmental site design (ESD). One benefit of ESD is the potential increase in property values that may occur when vegetation replaces impervious surfaces. Often, ESD provides more open space, and greater access to and views of that open space, than conventional subdivision design. Numerous studies have shown that increasing the amount of open space leads to increases in residential property values. Therefore, the additional open space provided by ESD developments is likely to result in higher-valued properties, both within the new ESD developments and nearby.

This paper describes the use of a meta-analysis of open space hedonic property valuation studies to estimate benefits of ESD at the watershed scale. The meta-analysis includes 215 observations from 45 studies that evaluate general open space, vegetated open space, tree cover, riparian buffers, wetlands, and small water bodies. We did not include studies of golf courses and large parks. Based on the desired application, we measured open space as the percent open space within a radius of a property. The estimated meta-regression model allows one to account for both the type of vegetation used in ESD and distance decay factors.

As an illustration, we applied the meta-analysis model to a hypothetical, yet realistic, scenario for the Narragansett Bay Estuary watershed. We estimated the projected change in property values if ESD is implemented in all new residential developments, as compared to a baseline of more traditional subdivision design, using projected residential development in the watershed from 2013 through 2040, and anticipated reductions in impervious surfaces associated with ESD.

Very few studies directly measure property value effects of LID. Studies to date that have attempted to estimate these changes in property values using benefit transfer have generally drawn on ranges of point estimates from existing hedonic valuation studies that focus on various types of green space. Moreover, existing benefit transfers often use ad hoc assumptions regarding the how the distance to additional open space affects property values. We compare our results to typical point estimates used in other applications. While the most conservative of these point estimates fall within the range of our estimates, the higher point estimates grossly overestimate the effect of the marginal changes in greenspace expected to result from ESD on home prices. Over large geographic scales, these values can thus diverge by a large amount. Thus, use of point estimates in benefit transfer may provide erroneous information to decision makers.