



The Concept of Directly Connected Impervious Areas and Its Implication on Sustainable Development in Urban Catchments

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The concept of directly connected impervious area (DCIA) or efficient impervious areas (EIA) refers to a subset of impervious cover, which is directly connected to a drainage system or a water body via continuous impervious surfaces. The concept of DCIA is important in that it is regarded as a better predictor of stream ecosystem health than the total impervious area (TIA). DCIA is a key concept for a better assessment of green infrastructures introduced in urban catchments. Green infrastructure can help restore water cycle; it improves water quality, manages stormwater, provides recreational environment even at lower cost compared to conventional alternatives. In this study, we evaluated several methods to obtain the DCIA based on a GIS database and showed the importance of the accurate measurement of DCIA in terms of resulting hydrographs. We also evaluated several potential green infrastructure scenarios and showed how the spatial planning of green infrastructure affects the shape of hydrographs and reduction of peak flows. These results imply that well-planned green infrastructure can be introduced to urban catchments for flood risk managements and quantitative assessment of spatial distribution of DCIA is crucial for sustainable development in urban environment.