

Pervious Impervious Analysis for Stormwater Management using ESRI technology

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Abstract

Global population and urbanization is on the rise and so is the stress on water resources and its demand. The use of remotely sensed data for the water resource management and planning has been in place for a while. However the impact of impervious surfaces associated with rapid urban growth on the water resources and its quality has not been studied much. With the expected increase in urban growth, understanding the extent of impervious surface area and planning for storm water management need to be of high priority.

This paper is about creating a micro level impervious and pervious surface database for a public water supply and sanitation company in US for one of their water districts. The project used multispectral satellite imagery for classification of impervious and pervious features. The solution involved the Spatial Analyst tools and the image classification functionalities available with ArcGIS 10 and a custom solution developed by NeST for calculating the amount and percentage of pervious and impervious surface area within defined parcel units. Custom tools were developed to run on ArcMap for automating the feature editing and quality checking. The system would help managers to generate pervious-impervious reports on district-wise or selected AOI basis. The solution would also help to estimate the required amount of water for outdoor usage within a unit area. This information enables the managers to identify opportunities to reduce the difference between the water needed to efficiently irrigate landscape and the actual water used.

The study also recommends the use of alternative images with higher resolution and implementing advanced classification algorithms in order to develop a consistent land cover dataset that can support regional and local comprehensive land use and environmental planning and assist in developing legislations to comply with federal urban storm water management requirements.