Topic: EFN policies - opportunities and barriers

Title:
Optimization of urban stormwater management strategy to support environmental flow needs

Description:
Urbanization has a direct impact on the environmental flows of a watershed. Pre- and post-development runoff hydrographs vary in quantity, duration, and intensity. Along with changes to hydrology, urbanization also increases the pollutant loads transported to aquatic ecosystems. To address impacts of urbanization on environmental flows, stormwater management planners have adopted low impact development and stormwater reuse strategies to better manage urban stormwater runoff. A runoff footprint is a commonly-used metric for representing annual surface runoff from a site, but does not account for pollutant loads.

More recently, water footprinting has been adopted by many industries to provide a quantitative metric for assessing a product/service's impact on water resources in terms of both quantity and quality (pollutant loads). In this research, the concept of water footprinting is adopted to assess a community's impact on environmental flow needs. A community's stormwater footprint is dependent on volume and temporal distribution of precipitation, community water use requirements, soil characteristics, pollutant loads, and land use practices.

Life cycle cost estimates for various stormwater management strategies are often used to identify the most cost-effective stormwater management strategy. An Excel-based decision support tool was created to perform a holistic and customizable assessment and optimization of various modern stormwater management strategies. The decision support tool accounts for uncertainty in precipitation patterns, climate change, and life cycle costs. The developed tool identifies the most cost-effective mix of these stormwater management strategies to reduce a community's stormwater footprint. Based on the results, a customized approach to stormwater management can significantly reduce a community's impact on environmental flow needs.

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