

## **Extended Abstract for 2014 ISA Conference**

### **The State of the Science and Practice of Using Urban Trees as a Stormwater Control Measure**

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Type of presentation: individual presentation

Preferred session: general education session

Length: 60 minutes

Foresters have been studying and growing urban trees for centuries, and stormwater professionals have been studying stormwater control measures for decades. But combining the two - using trees as a Stormwater Control Measure (SCM) - is in its infancy and the potential of these trees to provide significant stormwater benefits is largely untapped to date. This presentation will present the cutting edge research, policy, and case studies related to using trees and the soil they grow in as SCMs.

#### **Research**

More and more stormwater regulations require maintaining pre-development hydrology and on-site stormwater management. Bioretention is used more and more as the demand for on site stormwater management is rapidly growing. With new techniques to provide rootable soil/bioretention volume under paved areas, finding space for tree SCMs is generally much easier than finding space for traditional (above ground) bioretention in ultra-urban areas. Research to date confirms that tree SCMs can provide benefits equal to or greater than traditional bioretention systems. For example, monitoring results by William Hunt's North Carolina State group study of 2 tree/soil/Silva Cell systems in Wilmington, North Carolina, show that the Silva Cell systems performed better or about the same as the mean for bioretention systems in peer reviewed literature for TSS and heavy metals. Unlike some bioretention systems, which leach nutrients, these 2 tree/soil/Silva Cell systems also provided nutrient removal.

## **Policy**

While trees have always provided stormwater benefits, they are just recently starting to be recognized by regulators as viable SCMs. A number of cities have recently started to allow a portion of impervious cover underneath tree canopy to be subtracted from the site impervious cover (exact amount varies from city to city). To our knowledge, Minnesota is one of the first states, if not the first, to add a chapter on trees into its stormwater manual, as well as add the stormwater benefits of tree/soil systems (including evapotranspiration, interception, and soil storage) to its stormwater crediting calculator. Key design, installation, and management recommendations and requirements presented in this manual to maximize tree health and stormwater benefits will be summarized in this presentation. The discussion of the calculator will include an overview of:

- The literature review and collaborative process used to develop the calculator
- Calculator inputs and outputs
- How to use the calculator

## **Case Studies**

Lastly, this presentation shows examples of how to put this research and policy into practice by showing a number of North American case studies of various scales that successfully use trees as SCMs.