

## **Influence of Volumetric Water Content Sensor Configuration in Evaluating Bioretention Planter Retention and Evapotranspiration**

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### **ABSTRACT**

Water content reflectometers (reflectometers) are increasingly used to measure volumetric water content in engineered media during green infrastructure monitoring. This paper uses a data-driven analysis to propose guidance on where to install reflectometers and the number of sensors necessary for monitoring runoff retained and evapotranspiration from bioretention planters. Estimates from a planter with 14 reflectometers were compared to alternatives calculated using data from sensor subsets. Data were analyzed from 90 rain events and 69 dry periods from July 2019 through October 2021. Sensors in the middle of the vertical media profile agreed most closely with the average value of all sensors in the planter. Among the four sensors in the middle of the vertical profile, the configuration closest to the average value of all sensors included one sensor near the inlet and one nearest the planter outlet. Observed data suggest that a nonlinear draining/drying vertical profile occurs in the bioretention planters that warrants additional investigation. The results provide initial insights on an alternative approach to the field monitoring of green infrastructure hydrologic performance, particularly where conventional water balance methods of influent-effluent hydrographs are infeasible.

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