

# EVALUATING LONG TERM WATER USE EFFICIENCY AT THE FIELD SCALE FOR PHYTOREMEDIATION MANAGEMENT

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REFERENCE: *Proceedings of the 2011 Georgia Water Resources Conference*, held April 11–13, 2011, at the University of Georgia.

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**Abstract.** A series of model simulations were conducted to evaluate the impact of various irrigation management scenarios (i.e., application rates and timing) on water-use efficiency and pore-water leaching below the root zone of a forested field site. Efficiency estimates were modeled using a soil water balance based leaching model and the more mechanistic HYDRUS1D numerical code.

A reference input data set derived from several weather stations near the study site was used in defining the atmospheric boundary conditions for a 34 year period from 1975 through 2007. Management scenarios included daily irrigation at daily levels to address 20 to 130 % of the potential evapotranspiration (PET) deficit as estimated by the Penman-Montieth method. The impact of root distribution on water use efficiency was also evaluated. Results indicated that water use efficiency, i.e., the percentage of applied water that was evapotranspired, decreased linearly with increasing application rate for rates > 60% of the estimated evapotranspiration deficit. However, water use efficiency estimates leveled off at 95% efficiency at low application rates.