

Report for 2003TX88B: Predicting Water Use in Urban Residential Landscapes

- Conference Proceedings:
 - Havlak, R.D., White, R. H., Chalmers, D. R. Mackay, W. A., Thomas, J. C. PREDICTING WATER USE IN URBAN RESIDENTIAL LANDSCAPES, Texas A&M University, Texas Agricultural Experiment Station, Texas Cooperative Extension. Presented at 2003 Texas Water Summit.
 - Havlak, R., Are You Doing What You Can to Manage Turf Irrigation? Texas Cooperative Extension, San Antonio, Texas. Presentation to the 2004 Texas Nursery and Landscape Association Annual conference.
 - Havlak, Roger., "Water Use in Home Landscape," Texas Cooperative Extension. 2004 Annual Conference of the Texas Turfgrass Producers Association.
 - White, R., Havlak, R., Nations, J., Pannkuk, T. Thomas, J., Chalmers, D., and Dewey, D. 2004. How much water is enough? Using pet to develop water budgets for residential landscapes. Texas Water 2004. Proceedings of the Texas Section, American Water Works Association, Arlington, Texas. April 5-9, 2004.
- Other Publications:
 - Soil Water Dynamics in Urban Landscapes. Presentation given at the 2003 Annual Conference of the American Society of Agronomy.
 - Combined Water Use of Turf and Woody Ornamentals in an Irrigated South Texas Landscape. Masters. May 2004.

Report Follows

**TEXAS WATER RESOURCES INSTITUTE
U. S. GEOLOGICAL SURVEY GRANT**

**PROGRESS REPORT
2002—2004**

TITLE:

“Predicting Water Use in Urban Residential Landscapes”

PROJECT LEADERS:

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Roger D. Havlak, Extension Turfgrass, Texas A&M University

SUMMARY OF PROGRESS:

The focus of our research is to develop a water conservation guide for municipalities to use that will allow them to evaluate existing landscape water use data and provide a mechanism for evaluating conservation outreach programs. To reach this objective, landscape water use needed to be analyzed both as actual plant water use and homeowner water use.

Three methods were used to test and meet our objectives:

1. Instrument a multiple species landscape with moisture sensors to monitor actual water use and compare it to potential evapotranspiration.
2. Monitor demonstration sites of both xeric and mesic landscapes and compare homeowner water use for trained versus untrained participants.
3. Compare homeowner water use among 2-5 year old, 8-12 year old, and 20+ year old landscapes with potential evapotranspiration.

In November 2002, a multiple species landscape located at the Weslaco Extension and Research Center was instrumented with 192 ECHO moisture sensors. This site is comprised of a walnut tree, dwarf yaupon, ficus shrub, rose bushes, crepe myrtles, and St. Augustinegrass. Eight inch sensors were placed vertically in the sandy loam soil at 64 locations and in three depths—0 to 8 inches, 8 to 16 inches, and 16 to 24 inches. A grid pattern was used as well as line transects throughout the site and moisture data is being collected at half-hour intervals using multiplexers, data loggers, and modems. Data will be collected for a minimum of one year and is currently being analyzed to determine: soil moisture extraction patterns, differences in actual evapotranspiration rates among vegetation types, if correlations exist between actual and potential evapotranspiration for the research site, and monthly landscape coefficients. Analysis for this site will be

completed as well as a Master of Science thesis submitted by April 2004. A second site is being assessed in the College Station, Texas region, and plans are being made to have this site instrumented by June 2004.

Another method being used to determine landscape water use is a project named the 'Texas *ELITE* Water Conservation Project' ("ELITE" standing for Efficient Landscape Irrigation Through Education). In May 2003, 12 landscapes were identified for this project—6 being xeric type landscapes and the other 6 mesic (typical) landscapes. The Hidalgo County Master Gardeners have made a commitment to this project through 2004 and are responsible for the evaluations and monitoring of the sites. Participating homeowners are being categorized as either a response unit site (well trained homeowners—water use efficient site) or a standard practice site (untrained homeowners—site just being evaluated and water use documented). All sites had soil samples taken and totalizing water meters installed. Comparisons of landscape water use will be made between trained versus untrained homeowners and xeric versus mesic landscapes. Another analysis of this project will be to determine if water use totals from a group of similar landscapes can be used to predict and/or represent water use from other similar landscapes in a region.

The third method to achieve our objectives is to analyze actual homeowner water use data from a participating municipality having landscapes of 2-5 years old, 8-12 years old, and 20+ years old with similar lot sizes and values. Comparisons will be made between monthly potential evapotranspiration and actual water use per household per month for each neighborhood for the past 3-5 years. Evaluations will be made to determine if correlations exist between homeowner water use, age of landscape, and potential evapotranspiration. Currently, the data has been retrieved and is being analyzed. In addition, a presentation will be made at the Texas Water Works Association Conference in April 2004 focusing on our findings.