Water Rates as a Driver of Residential Water Demand
Scott Knight, James Heaney, and Miguel Morales
Department of Environmental Engineering Sciences, University of Florida

MOTIVATION
To improve the understanding and management of the impact of water rates on residential irrigation demand
- Applies high quality parcel-level water demand data
- Accounts for irrigable area of each parcel
- Employs an improved estimate of the landscape net irrigation demand

DATA SETS & METHODS

Water Demand Data (2008-14)
- 510 single family residential customers in Gainesville, Florida that received reclaimed water through a separate meter
- 610 single family residential potable water customers with dual meters in Gainesville, FL

Weather Data (2008-14)
- Daily soil water balance based on Dukes (2007)

ANALYSIS & RESULTS

- The irrigation application ratio (IAR) for free reclaimed water averaged 328%
- Offset credits (OC) were used to compare potable to reclaimed demand; reclaimed customers had an OC of 20%
- Reclaimed customers compared before and after a small commodity charge was added showed large decreases in use in the aggregate, but between 14 and 27% of customers increased use in each post-rate year
- Calculated the monthly net irrigation demand (NID) to determine the need for irrigation in each month
- Two annual efficiency metrics were applied: the irrigation demand satisfied (IDS) and effective irrigation application (EIA) using monthly demand data for each account

- By incorporating the potable dual meter customers, a model was developed to estimate the impact on demand as rates changed
- Estimated the normalized effect of a change in rates on the utility revenue generated

CONCLUSIONS
Changes in residential demand for irrigation do not occur in a vacuum, but rather are influenced by weather, customer preferences, and water rates.
- Knowing irrigable area and irrigation demand provides a better metric for determining irrigation efficiency
- Reclaimed customers improved efficiency with a small commodity charge
- Customers with smaller irrigable areas as over-irrigated to a greater extent
- 14-27% of reclaimed customers in each year increased their use despite the additional cost
- Changes in water demand are predictable at the aggregate level and can be estimated under increased rates
- Before developing a reclaimed system, utilities should determine the desired blend of water offsets and wastewater disposal
- When combined with water conservation efforts water rates can be an effective tool to manage demand

FUTURE WORK
- Increase the data sets to include a wider range of rates
- Evaluate demands elsewhere to improve the model
- Consider other price elasticity model formulations
- Estimate the potential for customers to convert to other water sources (private wells) as rates are increased