

The water budget as an educational tool to reduce outdoor water use

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Introduction:

- The city of College Station has used multiple educational interventions in order to reduce outdoor water use among residential customers.
- College Station has 24,000 residential customers.
- Interventions were targeted at 5,600 residential customers that used more than 100,000 gallons for outdoor irrigation. These customers comprise 20 percent of residential users but consume 40 percent of residential water use.

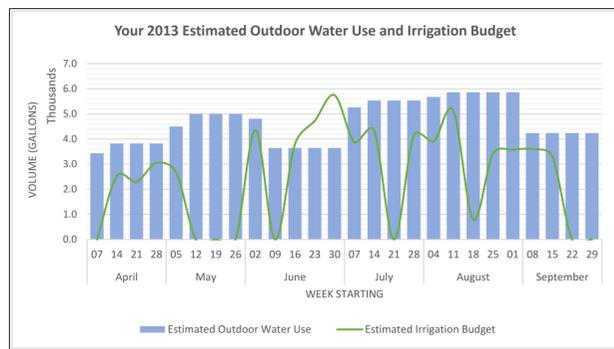


Figure 1. Water Budget sample.

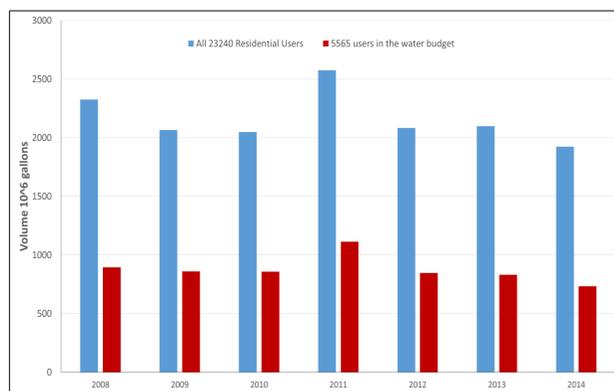


Figure 2. Annual water use by all the 23240 residential users in College Station compared with the 5565 selected for the water budget program. These users' consumption represent about 40% of the total use each year.

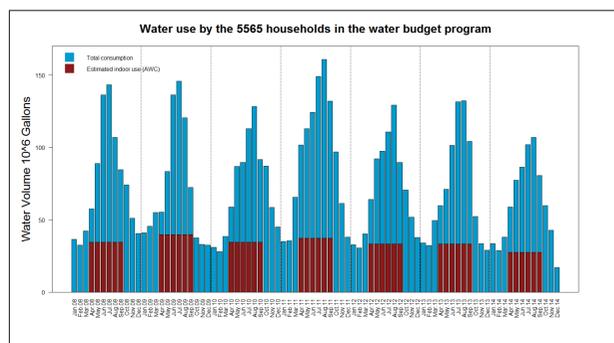


Figure 3. Monthly water use by the 5565 selected for the water budget program and the estimated Average Winter Consumption (AWC) which is considered indoor use in this study from 2008-2014.

Analysis and findings:

- Historically landscape overwatering is a problem in College Station among some customers.
- Larger landscapes use more water but generally conform with budgets
- Smaller landscapes over water more but use less water.

Times over budget	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Number of customers	33	56	115	211	278	395	357	340	373	410	463	426	420	421	409	334	272	185	67

Table 1. Distribution of the number of times that customers in the water budget program are over the water budget during growing season from 2012 to 2014 (18 months).

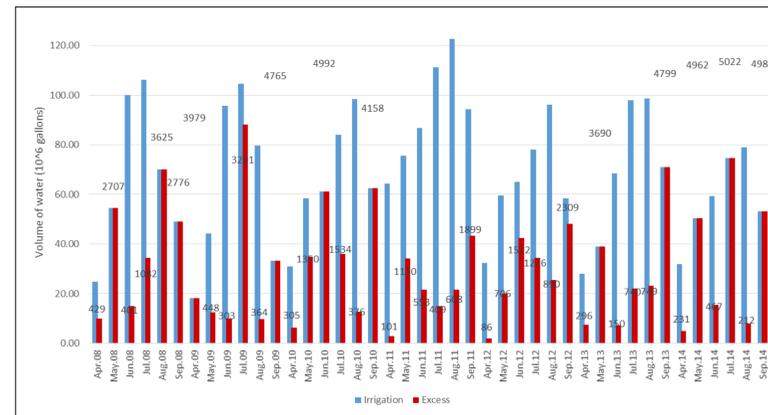


Figure 4. Amount of water used for irrigation for the 5565 Customers (blue) in the Water Budget program and volume overwatered (orange) for each month with the number of households that overwatered (label) from April 2008 to September 2014

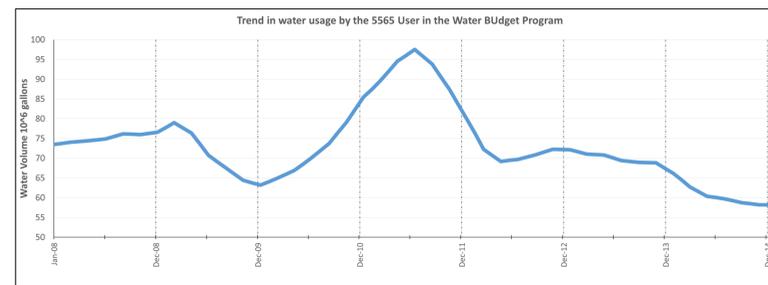


Figure 5. Trend in the total water use by the 5565 households in the water budget program after applying a seasonal and trend decomposition using Loess.

Irrigable Area. (1000 Sq ft)	Volumes of water and frequency of excess by lot size						
	<4	> 4 & < 5	> 5 & < 7	> 7 & < 10	> 10 & < 14	> 14 & < 18	≥18
Average annual excess volume (10 ³ Gallons)	59.5	62.9	83.5	106.9	121.2	166.5	173.4
Frequency of overwatering	57%	53%	56%	56%	51%	53%	46%
Average excess every time they overwater. (10 ³ Gallons)	4.9	5.5	7.2	9.2	11.2	15.3	17.6

Table 2. Volumes and frequency of overwatering from 2012 to 2014 by lot size for the 5565 users in the water budget program.

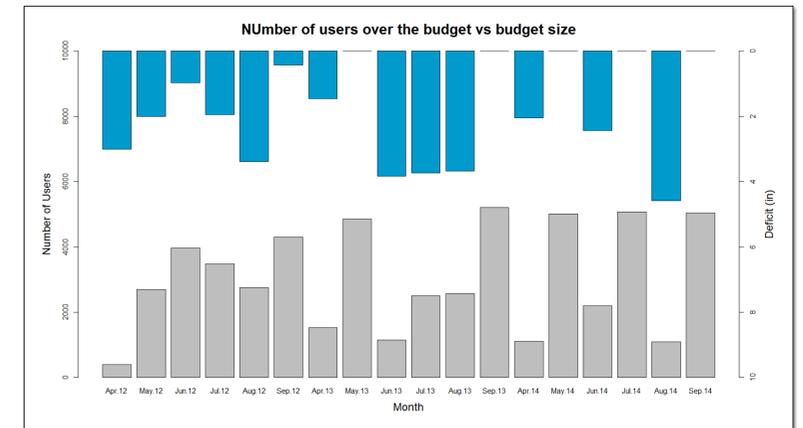


Figure 6. Number of users that were over the budget compared to the budget size for every month from 2012 to 2014.

Discussion:

- Most households overwater when the budget is small, this is in months where rainfall provide all the water your lawns needs and this can be an indicator that users set their irrigation system and let it run regardless of the climate conditions.
- The trend in total water use in this group of households is decreasing after the 2011 drought when we have the maximum consumption for this period.

Final Remarks:

- Water budgets have a positive effect on reducing water consumption.
- Many socio economic factors, including income have an effect on consumption.
- Water budgets offer a low cost way to educate users on outdoor water efficiency.
- Visit: <https://bwwatersmart.tamu.edu/> to receive weekly notifications about the water requirements of your landscape.

References:

Wolf, A., Boellstorf, D.E. and Berthold, T.A. (2015) Utility Customer Profile Guide for Water Conservation Planning, Texas Water Resources Institute, http://twri.tamu.edu/media/616423/em-120_utility-guide.pdf.

Lewis, A.C. (2014) Assessing Urban Residential Irrigation Performance Using a Water Budget Approach, Texas A&M University.

Glenn, D.T., Endter-Wada, J., Kjelgren, R. and Neale, C.M.U. (2015) Tools for evaluating and monitoring effectiveness of urban landscape water conservation interventions and programs. Landscape and Urban Planning 139, 82-93.

White, R., Havalak, R., Nations, J., Thomas, J., Chalmers, D. and Dewey, D. (2004) How Much Water is Enough? Using PET to Develop Water Budgets for Residential Landscapes, Texas A&M University.