

Water Use Compliance in Austin, Texas

INTRODUCTION: The City of Austin's Water Utility is responsible for the enforcement of the City's Water Conservation Code, Austin City Code, Chapter 6-4. This Code, adopted in response to the Texas Commission on Environmental Quality's requirement to provide a Drought Contingency Plan for all Texas public water supply systems servicing 3,300 or more connections, contains drought response regulations mandating an outdoor watering schedule and a prohibition of water waste.

The prohibition of water waste is in effect year round while the watering schedule is determined by the drought stage. In accordance with the Code, water waste is identified as failure to repair an existing leak and operating a permanently installed irrigation system with a broken head, a head out of alignment or a head misting due to high water pressure. Water waste also includes allowing water from irrigation to form a stream greater than a distance of 50 feet or to pond to a depth greater than 0.25 inches. The Code regulates the time of day during which watering can occur and the day as determined by the last number of the address. Stage 1 specifies that customers are allowed to water their lawns twice a week unless watering is done by hand.



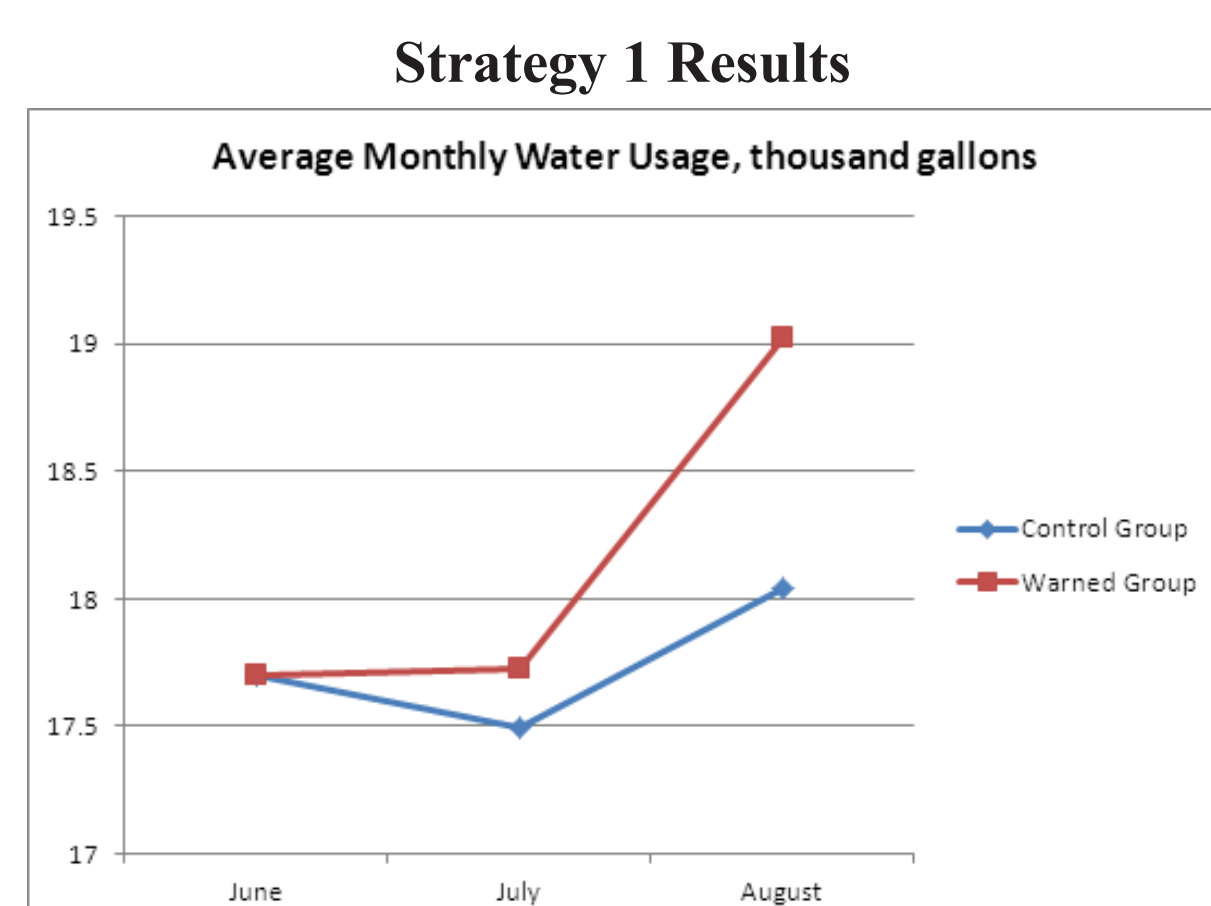
PROCEDURES: Two full-time staff members are dedicated to enforcement of the Code. However, during the summer watering season, additional staff are utilized to augment enforcement efforts. Inspectors patrol jurisdictional areas for violations and respond to citizen complaints processed through the Austin 311 information system. The majority of patrols are conducted during the early morning hours when automatic irrigation systems are more likely to be operating, but daytime patrols are also a vital part of enforcement.

Post card reminders are sent to customers reported for code violations through the Austin 311 system. These reminders provide a subtle nudge to customers who may not be aware of watering restrictions or may not realize that their irrigation systems are malfunctioning. If during staff patrols, violations of the code are witnessed, an Official Warning Letter is sent to the utility account holder describing the violation and requiring the return of a form documenting corrections to the irrigation system. Failure to return the form, suggesting the violation is on-going, or observations of continued violations escalates the case to a Citation issued by the Municipal Court.

RESEARCH QUESTIONS: The majority of Austin Water customers comply with watering restrictions, however, a significant number continue to water in violation. The questions to be asked: 1) Does enforcement reduce the overall water usage of those customers who have violated the Code? 2) If so, how long do the water savings last? To answer this question, two research approaches were used. The research hypothesis was that properties which received a warning in July would exhibit lower water usage in August than properties which did not receive any warnings.

RESEARCH STRATEGY 1: Using a matched two-group design, properties with identical June water use were divided accordingly: properties receiving a Warning Letter in July 2010, identified as the Experimental Group, and properties that had not received a Warning Letter, identified as the Control Group. The August water usage of the two groups was compared.

Using the t test for paired groups, $n=206$, $p=0.57$, there was no statistical difference in the August water usage of the two groups. In fact, on average, the Experimental Group participant used approximately one thousand gallons more in August than the average Control Group participant.

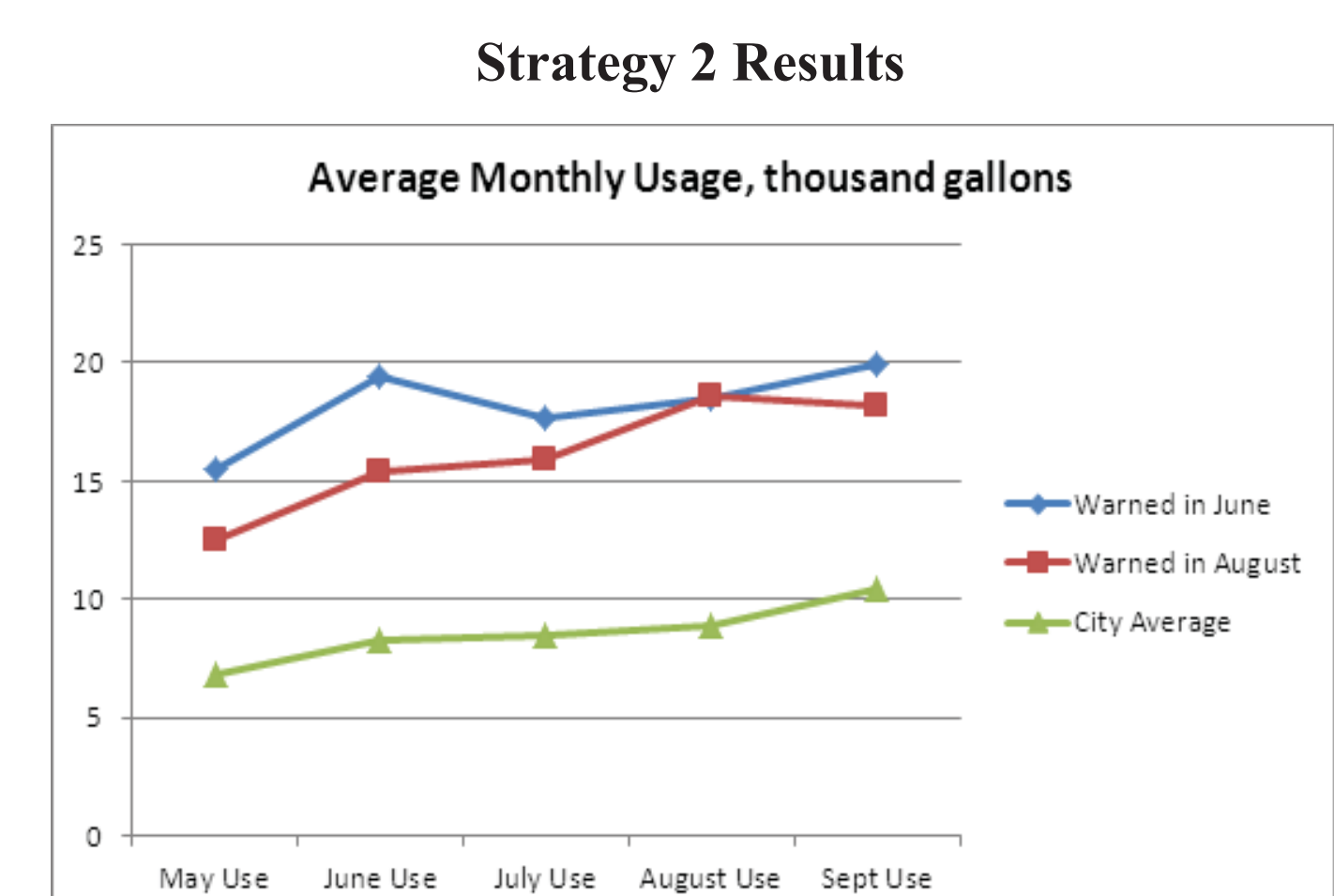


How can we account for these results? One possible explanation is that violators exhibit different watering behavior than non-violators and are determined to keep their lawns lush and green



RESEARCH STRATEGY 2: The second phase of our research recognized that violators of the code may have different attitudes than those of non-violators. Perhaps these violators are generally more inclined to break the rules or maybe they place greater utility into having lush lawns. This research design compared violators with other violators and used the average served area usage as a baseline. This is how it worked:

- 1) Two groups of violators were selected: Group 1 received Warning Letters in June 2010 and Group Two received Warning Letters in August 2010.
- 2) Their July water usage was then compared.
- 3) The results were statistically tested using analysis of covariance (ANCOVA) with June use being a covariate. ANCOVA was used to account for differences in starting (June) use.



The results are unequivocal—warnings indeed work. Violators who were warned in June lowered their usage in July while the group warned in August showed an increase in their July usage. After being warned in August, the same group decreased their September usage, seeming to adhere to the warning. However, those warned in June increased their September usage. We can deduce that while warnings indeed work, their effect seems to wear off rather quickly. It appears that enforcement must be constant.

FUTURE RESEARCH: While the above research suggests that warnings are an effective way of reducing water consumption in the short term, many other questions remain. These include the effectiveness of Citations over Warning Letters and the speed at which violators make the required adjustments to their watering schedule. Since this research was based on monthly billing data, the Water Conservation Division of Austin Water has plans for a new study to use data loggers attached to customer meters to capture detailed water usage information. After a watering violation is observed, a data logger will be attached to a customer's meter without notification. A customer will then be sent a Warning Letter. Usage of data loggers will answer the following questions:

- 1) Do customers adjust their watering schedule in response to a warning?
- 2) If yes, how fast?
- 3) Do they use more or less water?

Our Water Use Compliance Program has established its presence, but its practices will evolve as it determines through research the most efficient ways to augment the activities of Austin Water's Conservation Division.