

Project Review of the Irvine ET Controller Residential Runoff Reduction Study

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Abstract

The Irvine Residential Runoff Reduction Study (R3) showed that ET controllers, which provide proper landscape water management, in combination with horticultural information (education) resulted in water savings of 41 gallons per day (gpd) in typical residential settings and 472 gpd for larger dedicated landscape irrigation accounts. The observed reduction in runoff from the controller test area was 49% when comparing pre and post intervention periods and 71% in comparison to the control group. Another residential group, which received only educational materials and a suggested irrigation schedule, saw reductions in water use of 28 gpd per residence, but a 36% increase in runoff following intervention. However, relative to the control group the educational program resulted in a 21% reduction in runoff. Water quality parameters in both study areas were highly variable and very few differences in the level of monitored constituents were detected. In terms of water savings per controller (and cost-effectiveness) the study clearly indicates that larger landscape areas (parks and street medians) should provide the initial targets for the expansion of similar programs.

The Residential Runoff Reduction Study

Purpose

The R3 study had four primary purposes. The initial purpose was to develop and expand the application and use of pager-signal technology to manage irrigation water for residential homes and larger dedicated landscape areas. Secondly, the study was intended to evaluate the effectiveness of an education program consisting of landscape maintenance information and a suggested irrigation schedule on both water use and runoff. The third study goal was to determine the connection between proper water uses in the landscape and the quantity and quality of dry weather runoff that enters the urban storm drain system and subsequently creeks, streams, rivers and other water bodies. Finally, the study was intended to gauge the acceptance of water management via the ET controllers and whether this style of water management affected the overall appearance of the landscape.

Study Area

The study area included five similar neighborhoods in Irvine, California, each with its own single point of drainage in the urban storm drain system. At these points of drainage, the runoff volume was monitored and water quality samples were taken. The five neighborhoods were divided into three separate categories: an ET controller group, an education only group and three control groups.

The participating ET controller retrofit group homes received a site evaluation and installation of an ET controller to manage the irrigation system. Additionally, the residents of these homes received information regarding environmentally sensitive landscape practices. The controllers were installed in 112 residential homes, two condominium associations' landscapes, two homeowners association's landscapes, one pool/park setting and 12 city street landscapes.

The second group was referred to as the education group. This group received the same environmental landscape practice information as the ET controller group, plus a suggested watering schedule each month. The educational materials went to 223 homes in this neighborhood. Both the ET controller and education groups received educational information monthly in the form of a letter, including tips to improve the appearance of their yards in an environmentally sensitive manner.

The remaining three neighborhoods became control groups that were unaware of the study and served as a comparison during the testing period.

Results

After the initial 18-month study period was completed, the data was gathered and evaluated for water conservation savings, dry season runoff changes and changes in the quality of the dry season runoff water.

a) Water Conservation Savings

Water conservation savings from the typical participant in the ET controller group was 41 gallons per day or approximately 10% of total household water use. The bulk of the savings occurred in the summer and fall (Exhibit 1). The education group residential customers saved 26 gallons per day or about 6% of total water use. The savings from this group was more uniform year round (Exhibit 2).

The 15 dedicated landscape accounts (landscape sizes ranged from 0.14 acres to 1.92 acres) in the ET group showed average water savings of 472 gallons per day. The net result was 8 times more water savings per controller than the residential controller, with a strong correlation that the larger the landscape the better the savings per controller.

b) Dry Season Run-off Reduction Savings

There was a 49% direct reduction in water runoff (pre and post) in the ET controller area during dry-season periods. When the ET controller group is compared to the control group areas, the dry season run off shows a statistical reduction in runoff of approximately 71%. In contrast, direct pre and post runoff from the education group increased 36% while runoff increased 72% in comparison to the control group. Other than the presence of an ET controller, the primary difference between these groups is the participation of the 15 landscape accounts in the ET controller area. These accounts irrigated approximately 12 acres of landscape versus between 4- 5 acres of total irrigated area for the 112 residential homes.

c) Runoff Water Quality Changes

While the study gathered a great deal of information on the water quality constituents present in urban runoff, in almost all cases the data showed no changes in the concentration of these constituents in the runoff. The most significant fact to come out of the urban runoff water quality data is that the decrease in runoff volume from the ET controller group did not appear to result in an increase in the concentration of pollutants in the runoff. Thus, it is probable that a change in total pollutant migration could be achieved by reducing total dry season urban runoff.

d) Customer Acceptance of Water Management

The last issue is the acceptance of water management by a third party. While there were some customer service-related issues, the response to the ET controller was generally positive with 72% of participants indicating that they liked the controllers. This group also found that the controller irrigation either maintained or improved the appearance of the landscape. This is a classic win-win situation. The water district customers receive a desired benefit of a healthy landscape and the community receives several important environmental benefits from the conservation of valuable and limited water resources and the reduction in dry season urban runoff.

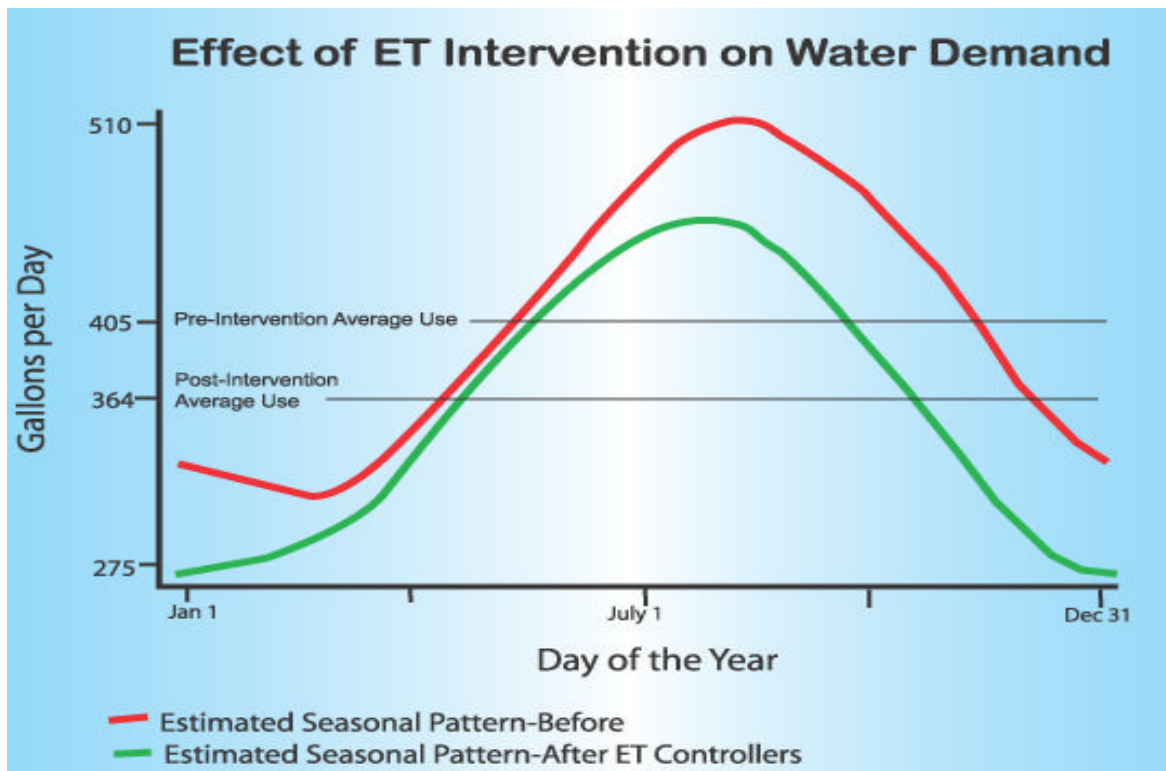


Exhibit 1: Annual average water savings = 41 gpd or 10%

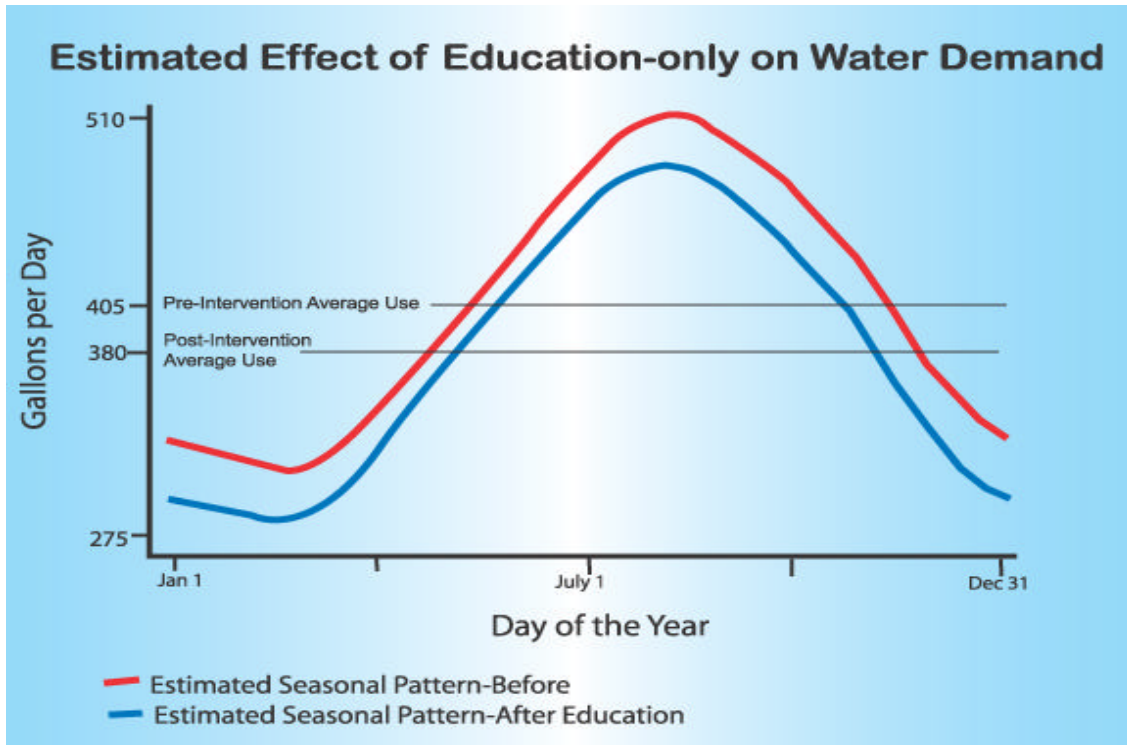


Exhibit 2: Annual average water savings = 26 gpd or 6%