



Residential Weather Based Irrigation Controller Fact Sheet: Pilot Study, Phase 1

Project Overview

Stanford University has one of the most progressive water efficiency programs in the Bay Area. Throughout the years, the Water Planning & Stewardship (WP&S) team has completed many projects with different groups on campus. In 2014 they seized the opportunity to work with large water users within Stanford Campus Residential Leaseholders (SCRL) to study potential residential outdoor water savings. Stanford partnered with OnPoint EcoSystems (OPE) in a pilot study to determine if the WaterSage, weather based irrigation controller (WBIC) would achieve long term water savings in a residential environment. Past studies have been completed at large institutional landscape sites and showed up to 26% water savings. The goal of this pilot study was to determine what potential water savings could be realized for campus residents by using new WBIC technology while maintaining healthy, high quality, decorative landscapes. The pilot study began in July 2014 and had 19 participants.

What is a Weather Based Irrigation Controller?

Weather based irrigation controllers (WBICs) use a technology that utilizes weather conditions to more efficiently irrigate the landscape. A standard “clock” irrigation controller (previous technology) has a set number of minutes it will irrigate, as set by the user. Because a “clock” controller waters the same schedule regardless of changing weather conditions, unless changed by the user, it is usually not very efficient. On the other hand, WBICs take into account weather patterns, using evapotranspiration (which combines temperature, with the amount of sunlight, humidity, and wind), and site characteristics (plant type, slope, soil type, and type of irrigation equipment) to adjust the amount of water applied to meet the actual needs of plants on a daily basis. WBICs are able to keep the landscape healthy while using less water because they modify each irrigation session to the plants’ water needs. When selecting a WBIC, there are many factors to consider, including: the proximity, accuracy and maintenance of the weather source; the ease of use and accessibility (including web access) of the controller; and the effectiveness of irrigation algorithms in saving water while keeping landscaping healthy.

Pilot Study Selection Process

Because the Pilot Study was specifically targeted at the top 30% of residential water users on campus, the WP&S team developed the following criteria to select qualifying participants. Participants must:

- 1 Live on campus
- 2 Have used >1,000 gallons per day, during main irrigation months: June – Sept 2013
- 3 Complete a landscape irrigation survey and repair observed irrigation issues
- 4 Have Wi-Fi signal at controller location
- 5 Attend a training session on WBIC controller technology
- 6 Agree to provide monthly feedback via online surveys

Features of the OnPoint EcoSystems WaterSage Controller

WBICs have been used on campus for many years and new installations have shown water savings of 26% over standard “clock” controllers. The WP&S team chose the WaterSage WBIC for the pilot study because it was user friendly, used local weather data to update irrigation watering amounts, and did not have any ongoing subscription fees. This WBIC controller was also eligible for a rebate from the Santa Clara Valley Water District (SCVWD). The WaterSage is an internet-based irrigation controller that is easy to use and connects directly to a home’s internet (via the Wi-Fi router). This allows users to manage their irrigation system from almost anywhere by using a smartphone or computer. For residents on campus, the controller uses weather data since the last water day from Stanford’s weather station and landscape site information to automatically calculate how much water plants need each day.

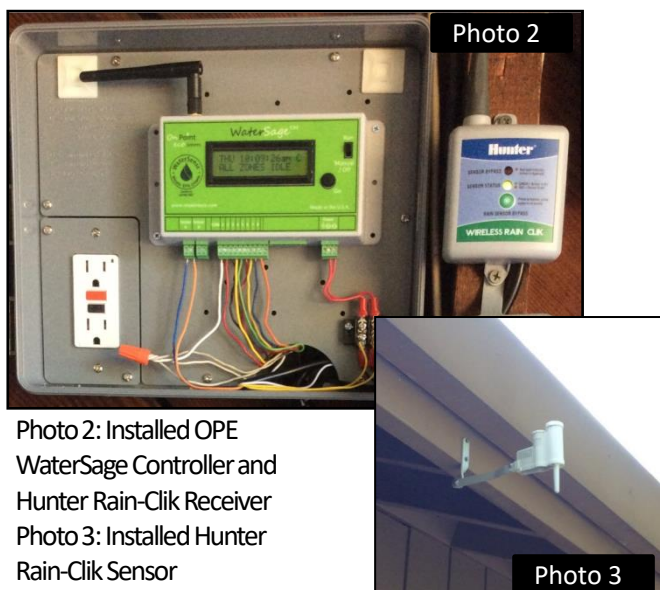


Photo 1: OPE WaterSage Controller

Photo 1

Partnership with Santa Clara Valley Water District

The SCVWD provided rebates for residential water users who upgraded their standard “clock” irrigation controller to a WBIC. To help motivate homeowners to participate in the pilot study, the WP&S team worked with the SCVWD to provide a joint rebate to the participants. For the rebate, participants also had to install a rain sensor (provided by Stanford at no cost as part of the Pilot Study). A rain sensor shuts off the irrigation system immediately when rain is detected, otherwise the controller will not shut off until receiving an update from the Stanford weather station (updates are once every 24 hours).

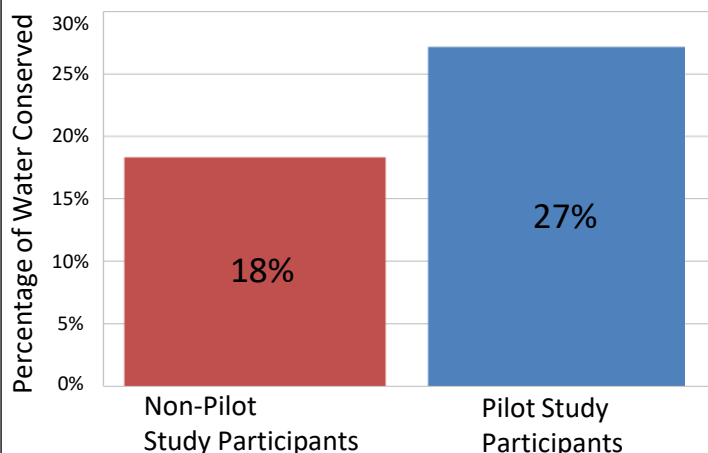


Results of the Residential WBIC Pilot Study, Phase 1

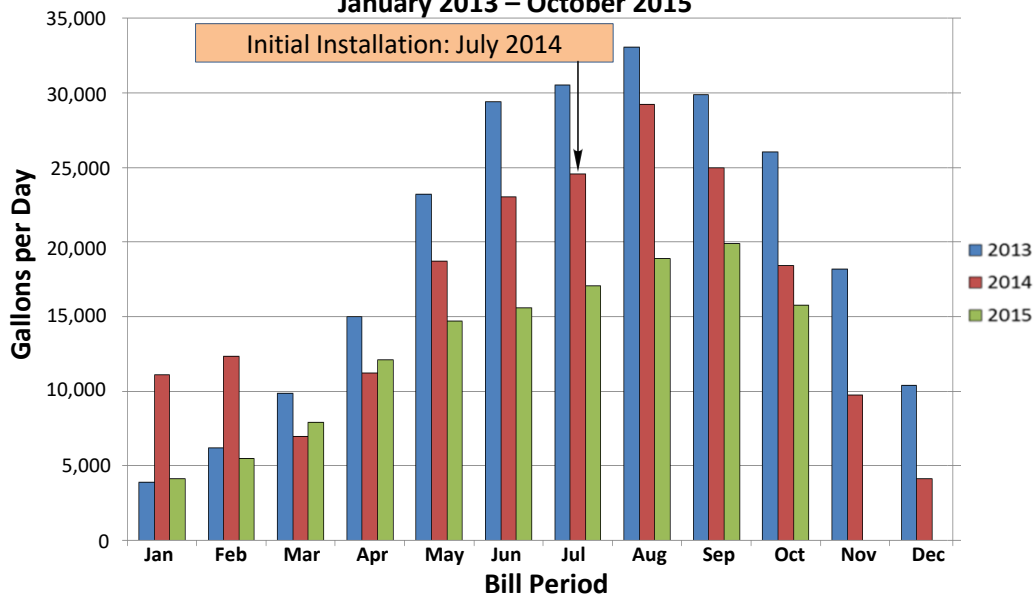
Due to the unprecedented drought, Stanford University asked SCRL homeowners to reduce their landscape irrigation to 2 days per week for lawns in 2014. Non-pilot study participants in SCRL achieved 18% water savings due to drought messaging and conservation efforts. While the group as a whole saw large water savings, pilot study participants saved 50% more water than non-pilot study participants during the first year using the WBICs (July 2014-June 2015 compared to July 2013-June 2014). The sites using OPE controllers saw measurable water savings; participants reduced their water use by an average of 27%.

Not only did pilot study sites have a higher percentage of water savings compared to sites not in the pilot study, with savings from drought measures, but these savings are predicted to continue in the long term. Once drought restrictions are lifted, the water use for non-pilot study participants may rebound, while the pilot study participants’ water savings are expected to be maintained in future years.

Water Conserved July 2014- June 2015 vs. July 2013- June 2014 Comparing Residential Pilot Study Participants and non-Pilot Study Participants with lot sizes > 0.25 acre



Residential Pilot Study (Phase 1) Participants’ Water Consumption January 2013 – October 2015



Conclusions Drawn

Pilot Study Participants saw, on average, a 27% reduction in water use during the first year (from July 2014 - June 2015 compared to July 2013 - June 2014). Even after the pilot study wrapped up, the OPE controllers have continued to save water for the people who participated in the pilot study.

Due to the success of this pilot study, a second phase was implemented in July 2015, Phase 2.