Leveraging the Power of Publicly Available Weather Information to Elicit Behavioral Change, a Key Element in Sustainable Mass Scale Outdoor Water Use Reduction

WaterDex™

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ROCKROSE TECHNOLOGY

California – Water Use Crisis

From 2007 to 2009 California experienced drought conditions and in 2010, below normal runoff. During this period, the Governor proposed "a plan to achieve a 20% reduction in *per capita* water use by 2020." The final plan, released in February 2010 targets methods of saving more than 1.59 MAF of water.

One key means of achieving these savings includes the implementation of "Residential weather-based irrigation controllers." Previous studies have shown weather-based irrigation controllers save only 6.1% of average outdoor water use[1]. In fact more than 41% of the test sites had an ***increase*** in water use. Can we do this in a more cost effective method and demonstrate water savings?

Figure 2. Seasonal Landscape Water Use[3]

California Irrigation Management Information System (CIMIS) – Public Data for Smart Irrigation

The CIMIS system consists of 130 weather monitoring stations throughout California. Most of these stations produce evapotranspiration (ETo) estimates for their immediate surroundings. Because of the state's diverse geography, an improvement to this system has been recently implemented to couple remotely sensed satellite data to this network of terrestrial monitoring stations. The system provides a two square kilometer data resolution.

Spatial CIMIS allows a user to determine ETo values by map coordinates, address, or zip code and have this data displayed or emailed on a daily or weekly basis[2]. Because it is a free system, it could also be incorporated into future weather based irrigation controllers to eliminate service charges.

Spatial CIMIS Report

Rendered in English Units.
August 17, 2010 - August 23, 2010
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Zip Code - (92618)

Date	ETo (in/day)	Rs (Ly/day)
08/17/2010	0.21	576.90
08/18/2010	0.20	504.18
08/19/2010	0.20	593.46
08/20/2010	0.20	595.14
08/21/2010	0.20	599.71
08/22/2010	0.20	585.23
08/23/2010	0.23	587.12
Totals/Avgs	1.44	577.39

Figure 1. Spatial CIMIS Sample Data

The Watering Index – ETo for Everyone

For our use the Spatial CIMIS system has also implemented "back-end" access for custom applications and data reporting. Because the average homeowner has no idea how to implement ETo data into regular landscape watering schedules, we have simplified the process by converting ETo values into "Watering Index" values. By simply adjusting peak season watering cycles to reflect the current watering index value homeowners can easily save water – *as much as 40%!*
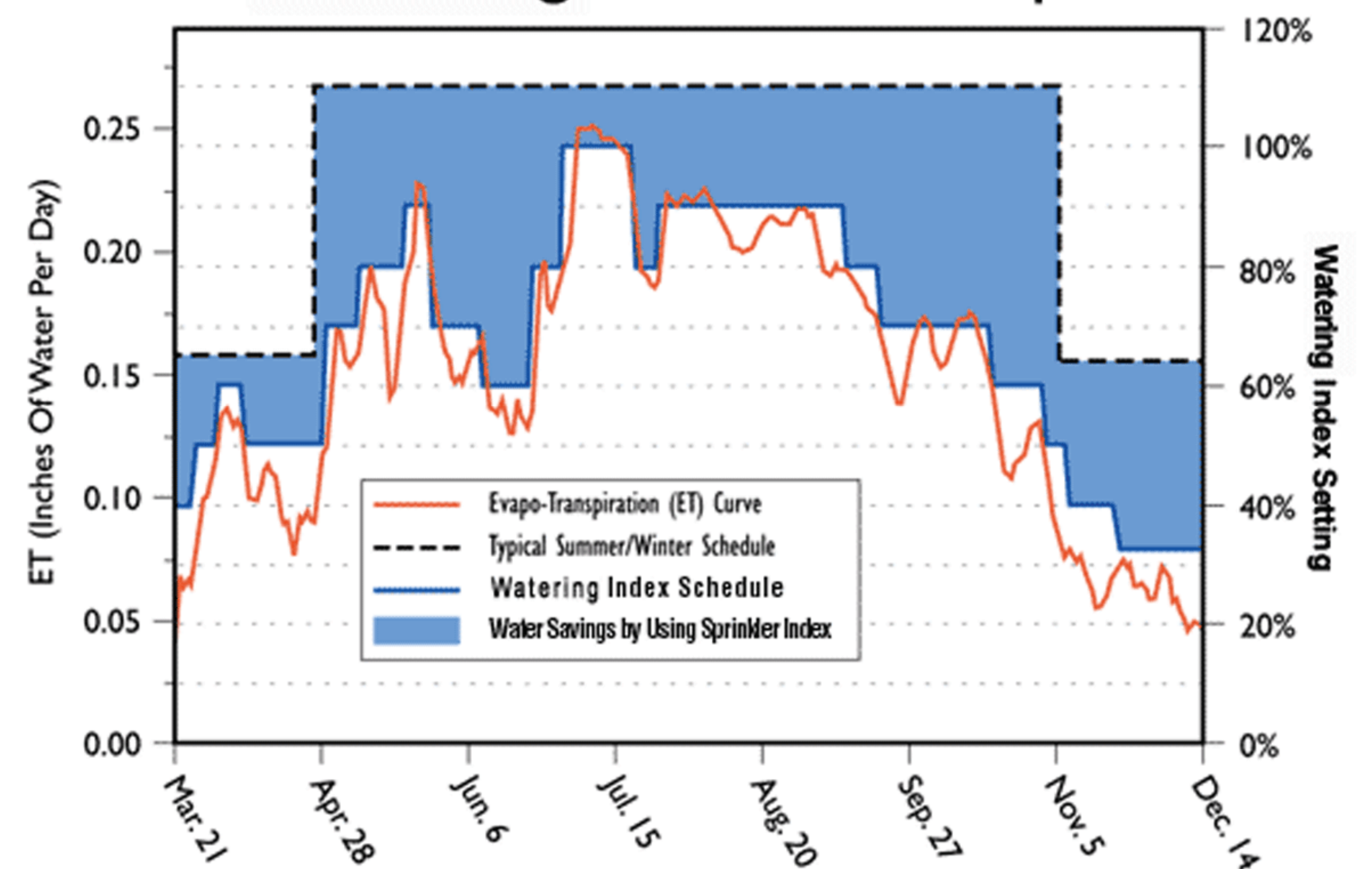
A Simple Retrofit Solution

A simple solution may be found in a retro-fit device that adds weather intelligence to any irrigation controller. The WaterDex™ system consists of a receiver that connects to your existing controller with 4 wires (2 power + 2 common interrupt) and receives "watering index" values from a ***wireless*** remote control placed conveniently in your home. Watering index values can be obtained from the company's website or from recommended monthly settings from your local water agency.

In a sample installation at a single family residence in Orange County, CA, the homeowner saw a 21% reduction in ***total*** water use during the first year – a savings of more than 33,000 gallons! A Pilot study of 100 homes is currently underway.

Figure 3. WaterDex Wireless Remote Control

Conclusions

WaterDex presents a simple, retro-fit means of bringing "smart" irrigation methods to households across the West. By specifically including human interaction and behavioral adjustment, this device may also provide secondary water saving benefits.

Acknowledgments

References

1. Evaluation of California Weather-Based "Smart" Irrigation Controller Programs, July 1, 2009, P. Mayer, W. DeOrero, et al.
2. http://www.cimis.water.ca.gov/cimis/cimiSatSpatialCimis.jsp
3. http://www.bewaterwise.com/wat_index_02.html