

# *Evaluation of California Smart Controller Programs*

## *Results and Perspective on a Large Field Study*

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**DOCKET**

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# Project Team

## Researchers

Aquacraft, Inc., National Research Center  
Dr. Peter Bickel, Statistician

## Utility Partners

MWD & 26 S. Cal Providers  
EBMUD & 5 N. Cal Providers

## Evaluation Project Management

Marsha Prillwitz & Chris Brown – CUWCC

## Funding and Supervision

Bekele Temesgen – Cal DWR



# What are Smart Controllers?

Smart irrigation controllers – aka “weather-based irrigation controllers” utilize prevailing weather conditions, current and historic evapotranspiration, soil moisture levels, and other relevant factors to adapt water applications to meet the estimated needs of plants.

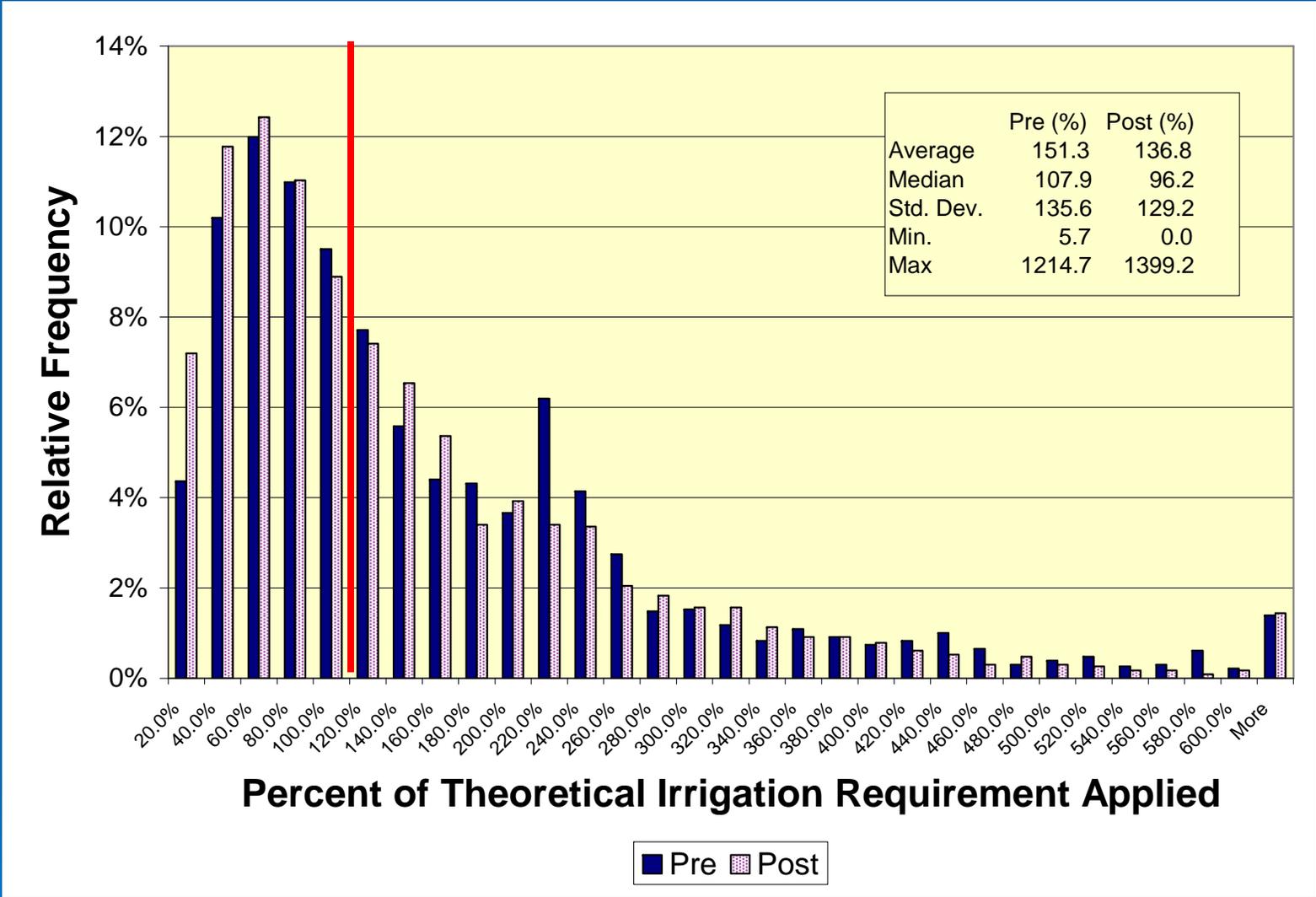
The bottom right corner of the slide features a decorative graphic of several concentric, light blue circles that resemble ripples on water, set against the dark blue background.

# Evaluation Project

- 4 year research study
  - Process Evaluation
  - Impact Evaluation
  - Customer Survey
  - Agency Survey
  - Water Savings Analysis
    - Weather-normalized consumption data (pre and post)
    - Irrigated area
    - CIMIS ET data
  - Cost-Effectiveness Analysis
- 

# Study Site Summary

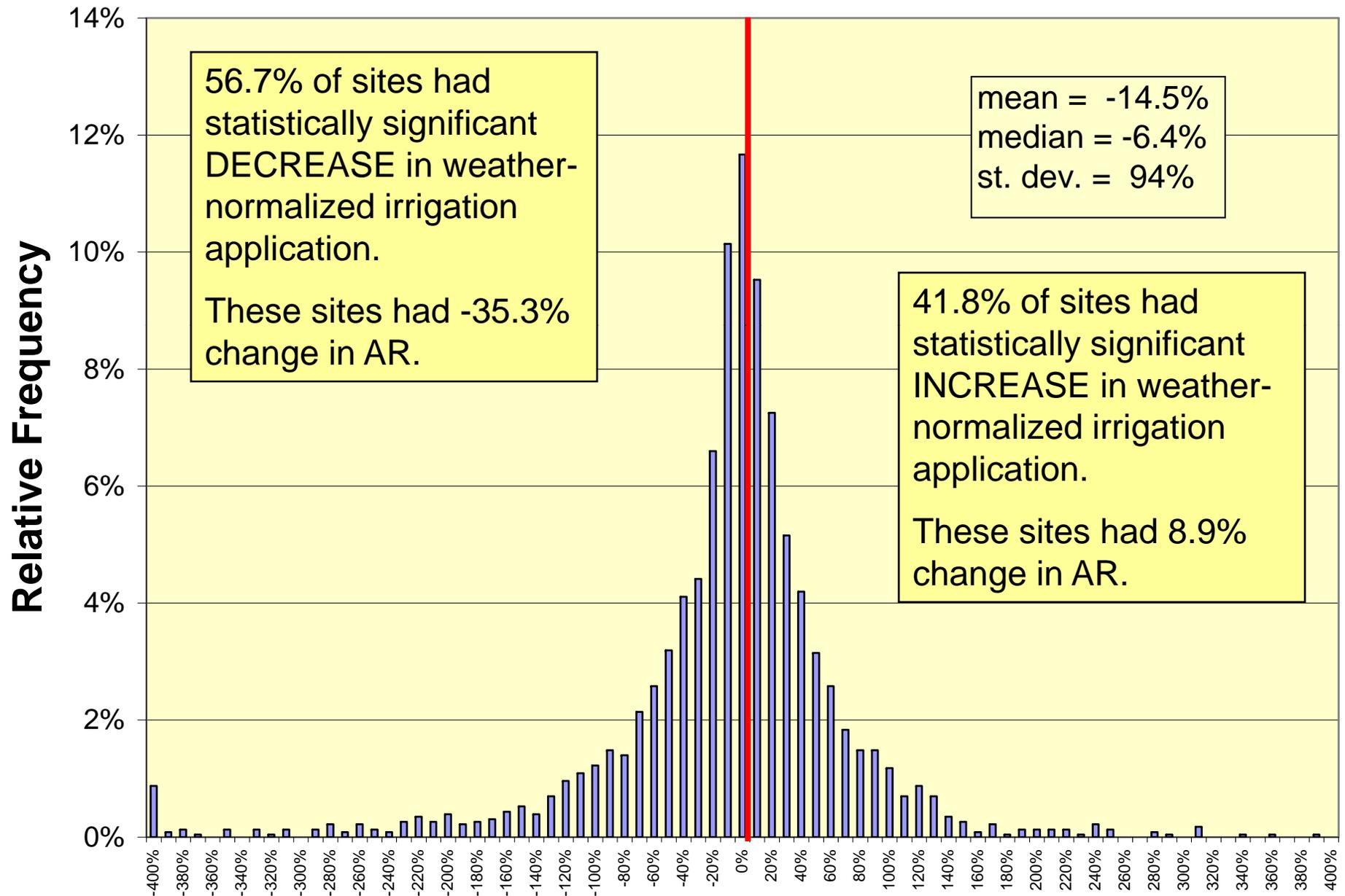
Category	All Sites	Northern Sites	Southern Sites
Total	2,294 (100.0%)	411 (17.9%)	1883 (82.1%)
<b>Customer Category</b>			
Single-Family Residential	1,987 (86.6%)	295 (12.9%)	1,692 (73.8%)
Multi-Family, Commercial, and Other Non-Residential	296 (12.9%)	105 (4.6%)	191 (8.3%)
Irrigation only	11 (0.5%)	11 (0.5%)	
<b>Installation Method</b>			
Self-Installed	1,374 (59.9%)	182 (7.9%)	1193 (52.0%)
Professional/Utility	919 (40.1%)	229 (10.0%)	690 (30.1%)
<b>Climate Zone</b>			
Coastal	655 (28.6%)	67 (2.9%)	588 (25.6%)
Intermediate	1,444 (62.9%)	330 (14.4%)	1114 (48.6%)
Inland	195 (8.5%)	14 (0.6%)	181 (7.9%)



**Pre-Smart Controller – 52.1% of sites applied in excess of TIR, 12.7% applied >3x TIR**

**Post-Smart Controller – 47.8% of sites applied in excess of TIR, 11.4% applied >3x TIR**

# Change in Application Rate = weather-normalized % change in water use



# Factors that Influenced Water Savings

- Pre-smart controller Application Ratio – the level of over (or under) irrigation before installation of smart controller
- Installation method (self vs. professional)
- Participating agency (sometimes significant)



# Factors that Did Not Influence Water Savings

- Site classification (residential vs. non-residential)
  - Region (northern vs. southern California)
  - Climate zone (coastal, intermediate, inland)
  - Smart irrigation control methodology (historical ET, on-site readings, remote readings, soil moisture sensor)
- 

# Conclusions

- Smart controllers *reduce* water use – at sites that have historically over-irrigated.
- Smart controllers *increase* water use – at sites that have historically under-irrigated.
- Weather-normalized change in usage averaged -14.5% across all 2,294 sites.

# Conclusions 2

- Water savings can be maximized by:
  - **Improved programming**
  - **Targeting over-irrigators**
- Smart controllers are cost-effective for water providers and customers in many cases but not for all utilities and customers.
- All smart control brands and technologies reduced demands on average, but not all reductions were statistically significant.

# Final Report Available Now

- [www.cuwcc.org](http://www.cuwcc.org)
- Agencies will monitor performance for 5 years.
- Contact Peter Mayer with questions.



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