

This presentation premiered at WaterSmart Innovations

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THE EFFICACY OF ET-BASED TECHNOLOGY IN URBAN LANDSCAPES

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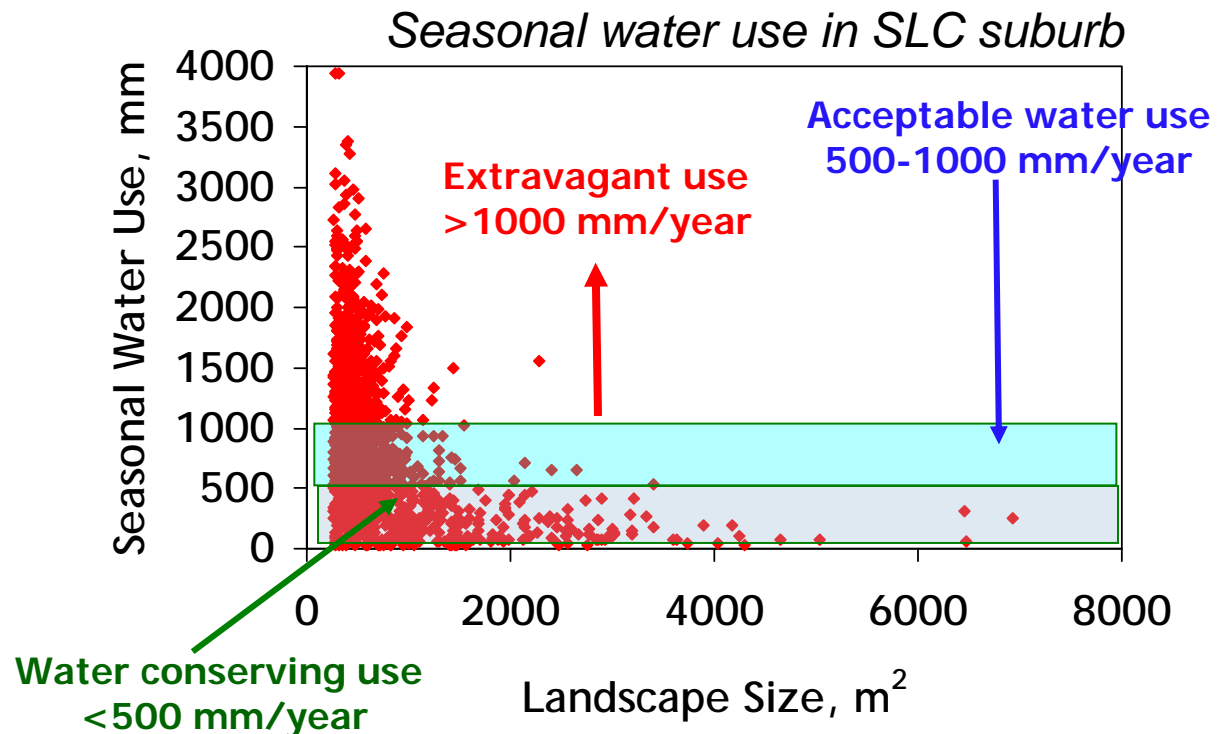
WATER CONSERVATION

- Sprinkler irrigated urban landscapes 50-70% of total water consumption in West
 - Often in excess of actual needs
- Water conservation in urban landscapes increasing social issue
 - Climate change
 - Drought
 - Growth



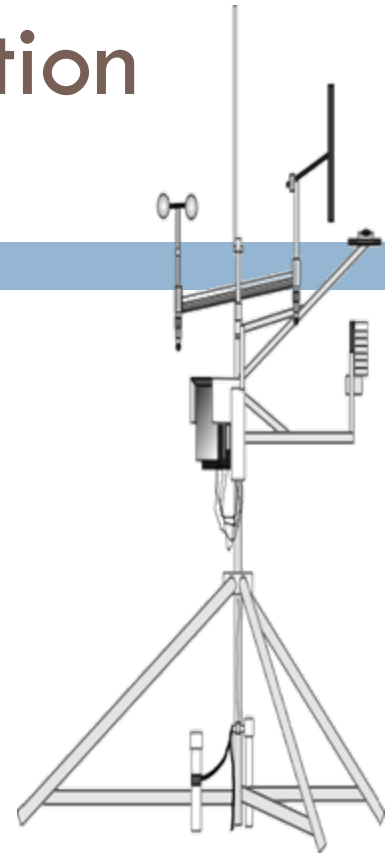
WATER CONSERVATION: Education versus Technology

- Primary water conservation mechanism
 - Precision irrigation: when, how much to apply
 - Educating end user in precision irrigation difficult
 - Technology can substitute for education to automate precision irrigation
- Smart Water Application Technology
 - Measures environmental signal to approximate plant water needs of when and how much



WATER CONSERVATION: Education versus Technology

- Precision irrigation/SWAT technology surging
 - Root zone water status-time domain sensing
 - Evapotranspiration-plant water use estimating from weather data
- SWAT technology works only as good as the people and particular situation allows
 - Can technology actual substitute for education?



OBJECTIVE

To determine if an ET based irrigation controller is effective in saving water and gaining end user acceptance.



METHODS

- Suburban Salt Lake City water conservancy district, Weber Basin
 - Installed 270 Rainbird ET managers in volunteer residential landscapes
 - ET Manager add-in box, breaks common wire
 - Tracks cumulative ET through paging signal, triggers irrigation when depletion reaches soil-based threshold, default=0.5 inches





METHODS

- **Selected Target Population**
 - ~200 had secondary water, 60 using potable water
 - Selected 30 residential potable water users
- **System analysis**
 - Water check/audit: measure distribution uniformity (DU), precipitation rates (PR)
- **Measured Landscaped Area**
 - Used to measure actual water needed on landscape
- **Obtained & Compared Billing Data**
 - Cities provided history for culinary volunteers
 - Compared water usage from previous year
- **Surveyed Population**
 - Learn behaviors, watering practices, acceptance of ET Managers

DEMOGRAPHICS

Avg. year of irrigation install

2002

Avg. age of home

13 Years (1-44 Years)

Avg. year at residence

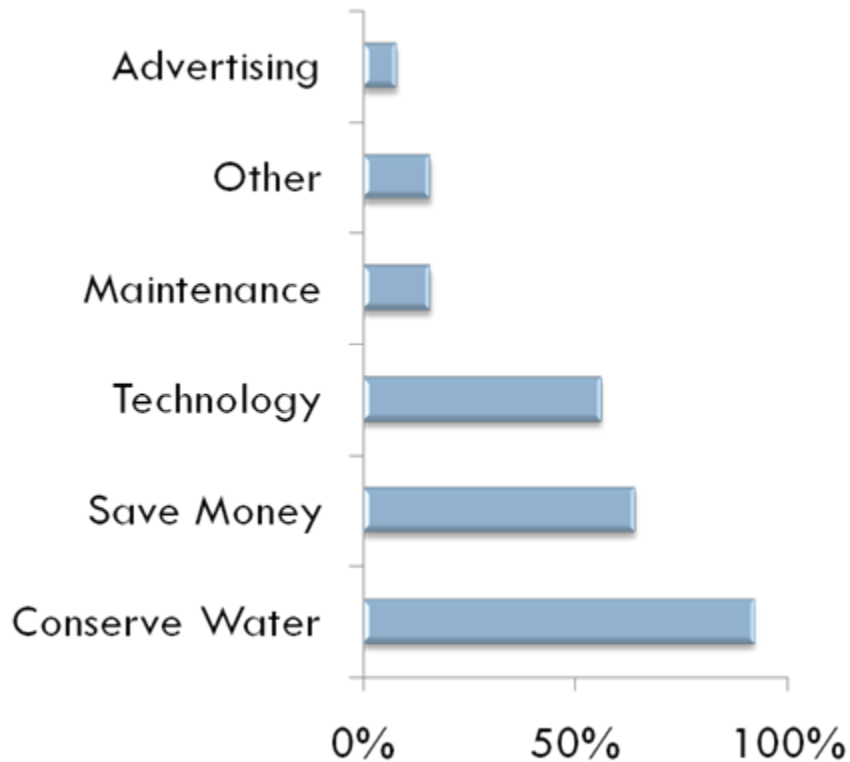
9 Years (1-41 Years)

Avg. number of residents

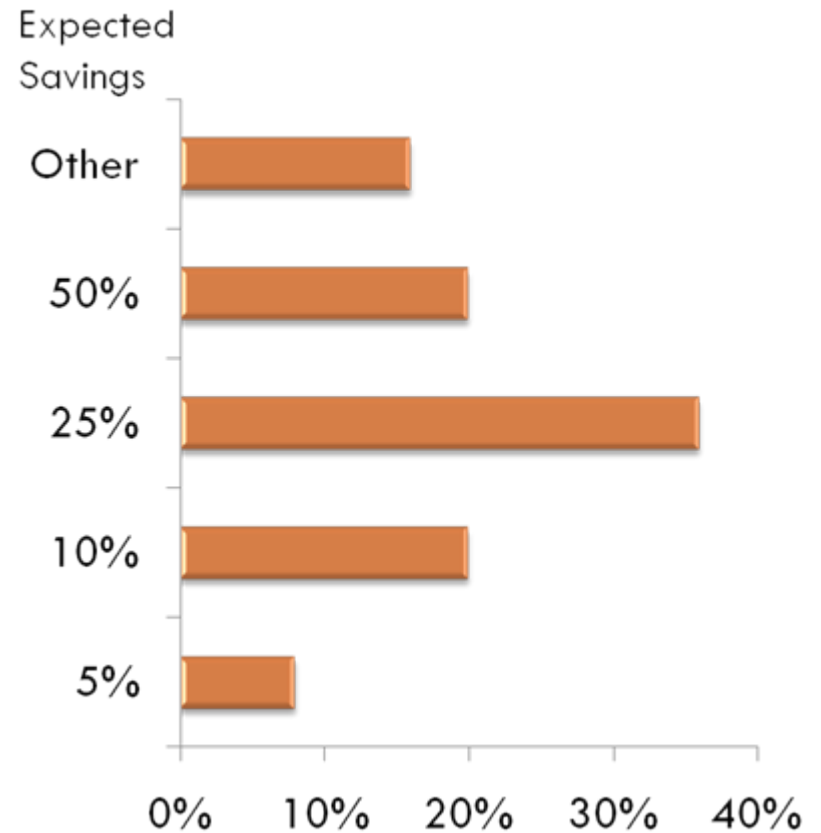
3 (1-5)

SURVEY RESULTS

“What influenced your decision to participate in the WBWCD ET controller program?” (check all that apply)

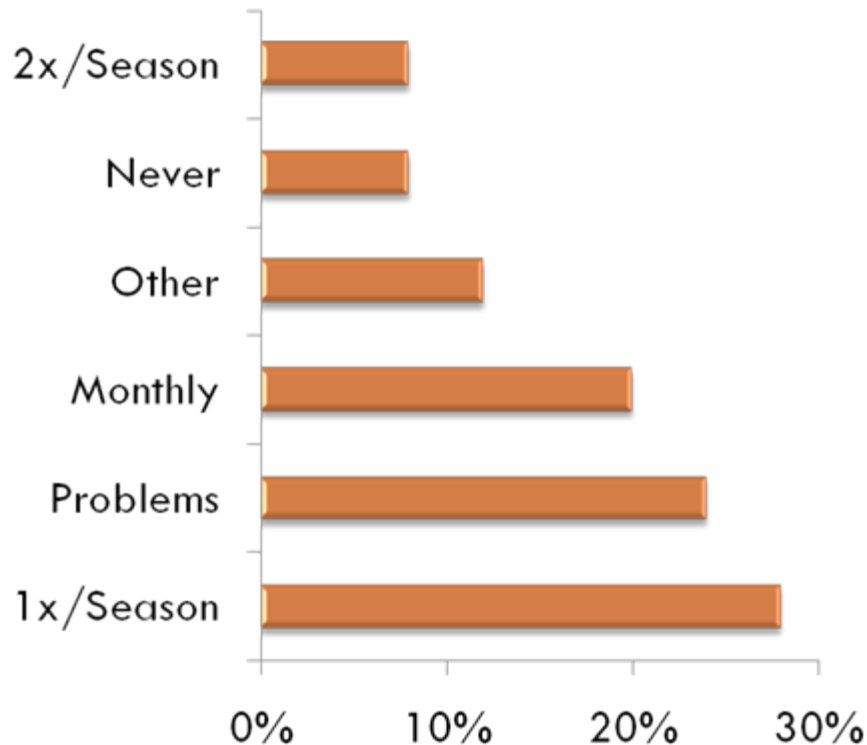


“How much water do you expect to save with the ET controller?”

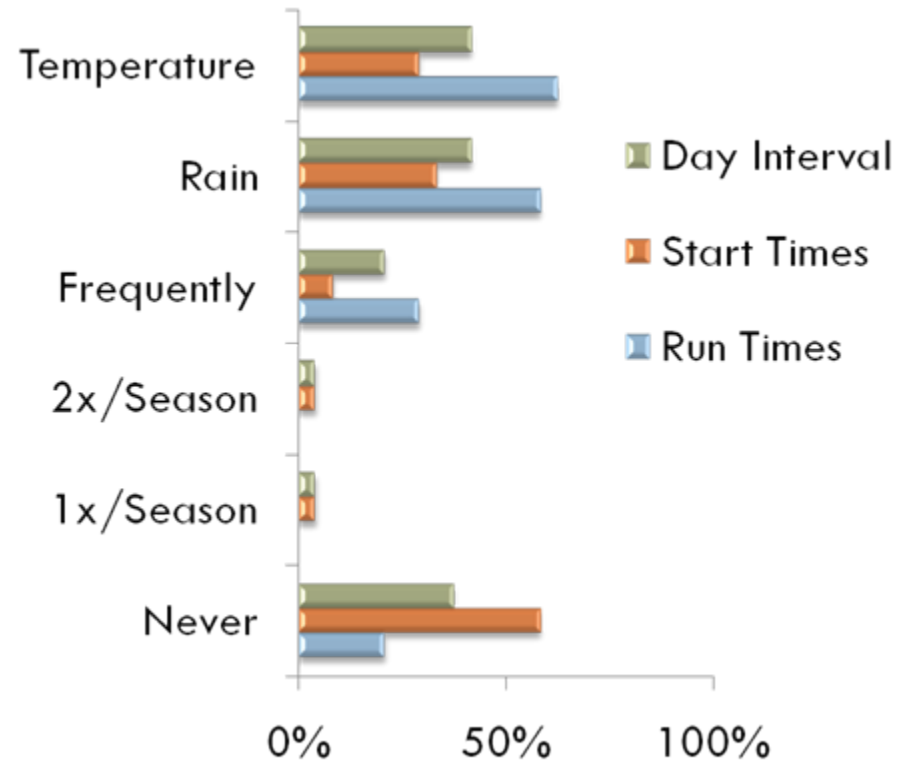


SURVEY RESULTS

“How often do you check for problems such as leaks, broken heads, etc?”

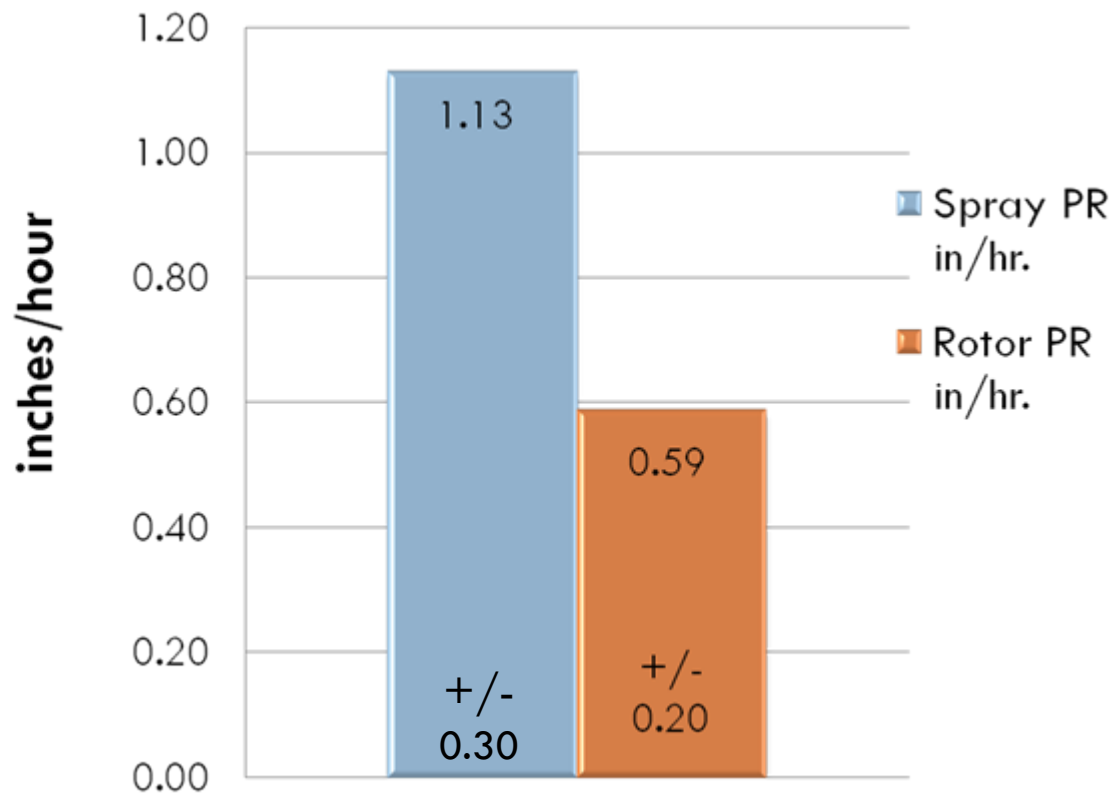


“How often do you change duration, start times, days?”



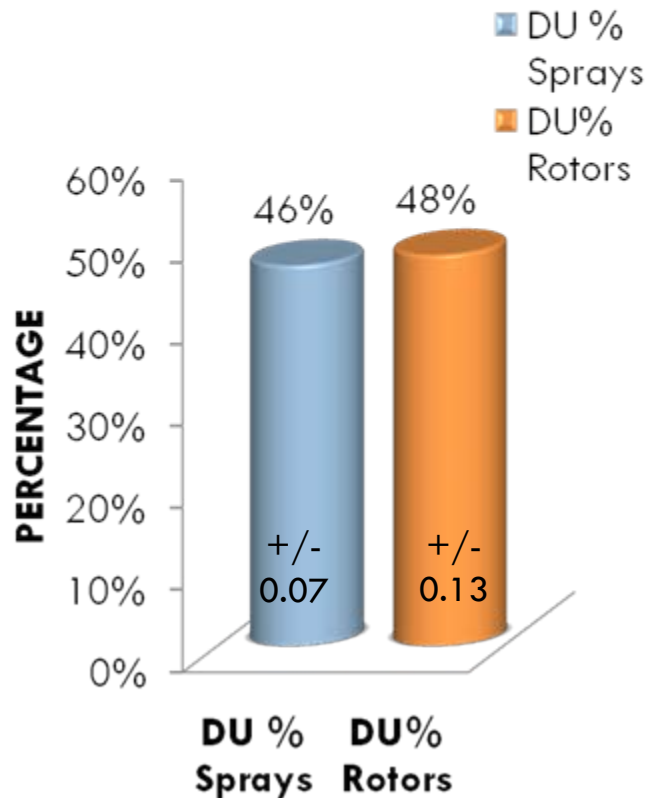
DATA FINDINGS-WATER CHECK

Average PR in/hr For Spray & Rotor Heads



DATA FINDINGS-WATER CHECK

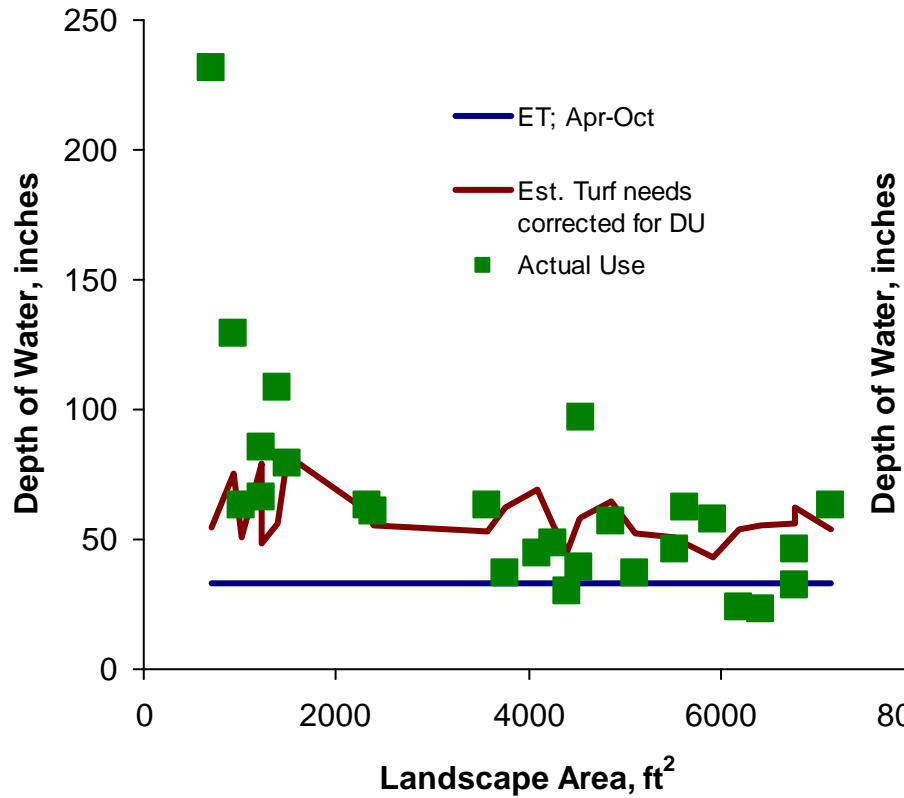
Average DU% For Spray & Rotor Heads



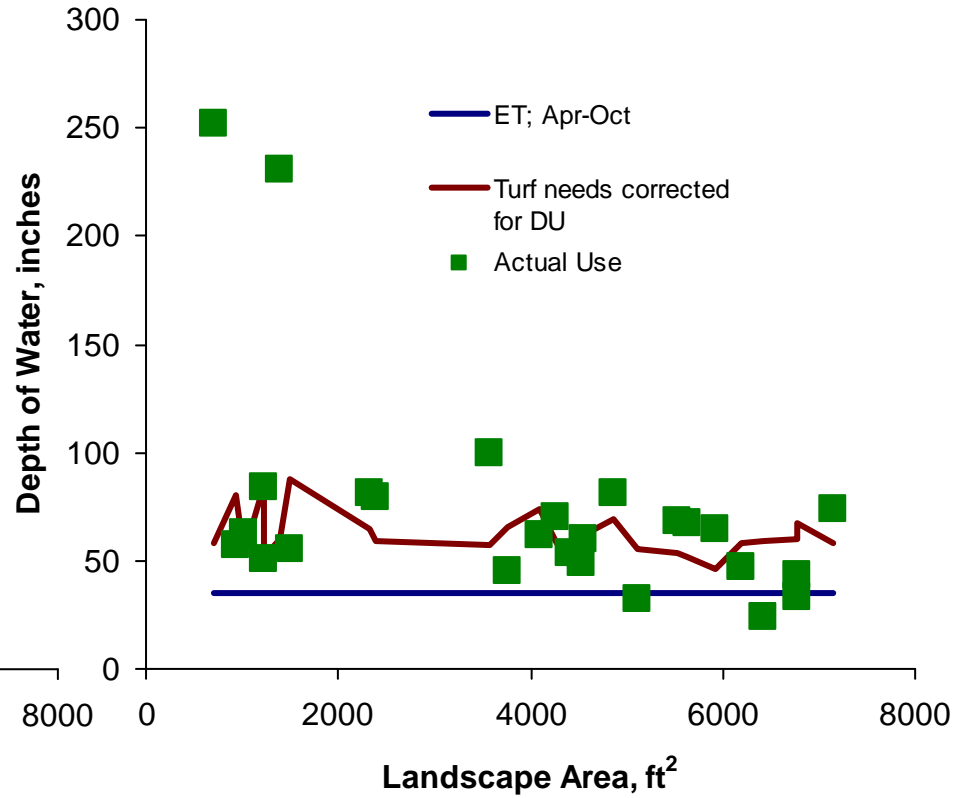
DU range	Spray number	Rotor
11-20%	0	1
21-30%	0	1
31-40%	4	1
41-50%	15	2
51-60	6	5
>61	1	1

RESULTS

2006-Pre ET Manager



2007-ET Manager Installed



RESULTS-

USAGE AND SAVINGS

- 9 reduced use by average 21 inches
 - Four houses with 2006 extravagant use reduced by average 44 inches
 - Four houses with 2006 non-extravagant use reduced average 4 inches
- 17 increased by average 21 inches
 - Minimal reduction due to low distribution uniformity

CONCLUSIONS

- ET Manager works: track water applications based on local ETo
- Potential water savings limited by uniformity
 - End users actually irrigating below needs based on low DU
- Installation critical; improper wiring, incorrect time clock setting problems
- For installation problems, end user baffled and frustrated
 - Distrust future technological fixes