

The University of Florida & Progress Energy partner to host the  
University of Florida Water Institute Symposium



**Sustainable  
Water Resources**  
*Florida Challenges, Global Solutions*

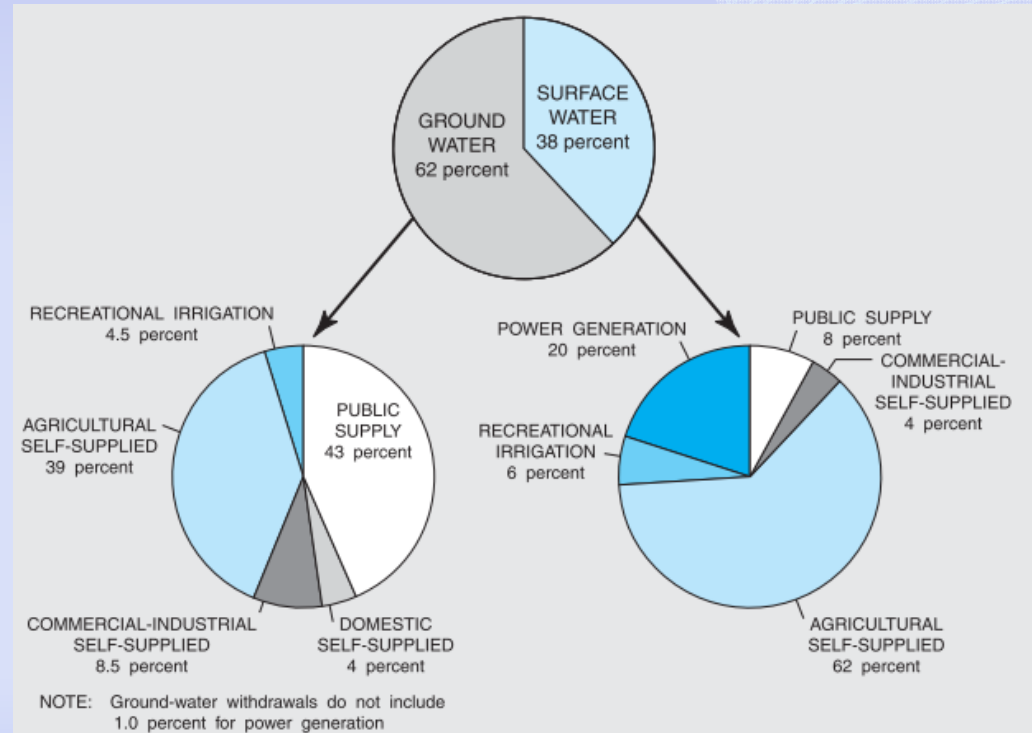
Feb. 27-28, 2008 - Hilton University of Florida Conference Center - Gainesville, FL

# Concurrent Panel: Water Conservation as an Alternative Water Supply

Michael D. Dukes, Ph.D., P.E.  
Agricultural & Biological Engineering Dept.  
Institute of Food and Agricultural Sciences  
University of Florida  
Feb 28, 2008

# Water Use in Florida, 2000

- 48% Ag. Irrig.
- 21% Non-Ag. Irrig.
  - ♦ Assuming:
    - 50% of total is irrigation
    - All recreational is irrigation
- 69% of freshwater use is irrigation



Source: Marella, 2004. Water Withdrawals, Use, Discharge, and Trends in Florida, 2000. USGS Scientific Investigations Report 2004-5151.

# Techniques to Reduce Water Use in the Landscape

- ❑ Landscape plant selection
- ❑ Reduction of irrigated area
- ❑ Efficient irrigation

# Landscape Plant Selection

- ❑ Irrigation systems improperly set now
- ❑ Are irrigators really watering in response to plant needs or by observation?
- ❑ Low water use plants need to be encouraged to prepare for the ultimate time when irrigation will be reduced

# Reduction of Irrigated Area

# Reduction of Irrigated Area

- ❑ Of course this works!
- ❑ Landscape ordinances fail to save water



T<sub>1</sub>



T<sub>1</sub> = Existing landscape and irrigation, only monitored, 75% turfgrass



T<sub>2</sub>



T<sub>2</sub> = T<sub>1</sub> landscape, **reduced**  
irrigation schedule, 75% turfgrass



T<sub>3</sub>



T<sub>3</sub> = T<sub>2</sub> irrigation  
schedule + 65%  
microirrigated  
ornamentals



# Impact on Irrigation Water Use

- ❑ Scheduling in response to historical net irrigation requirements: 30% savings
- ❑ Scheduling + effective reduction of the irrigated area: **50% savings**



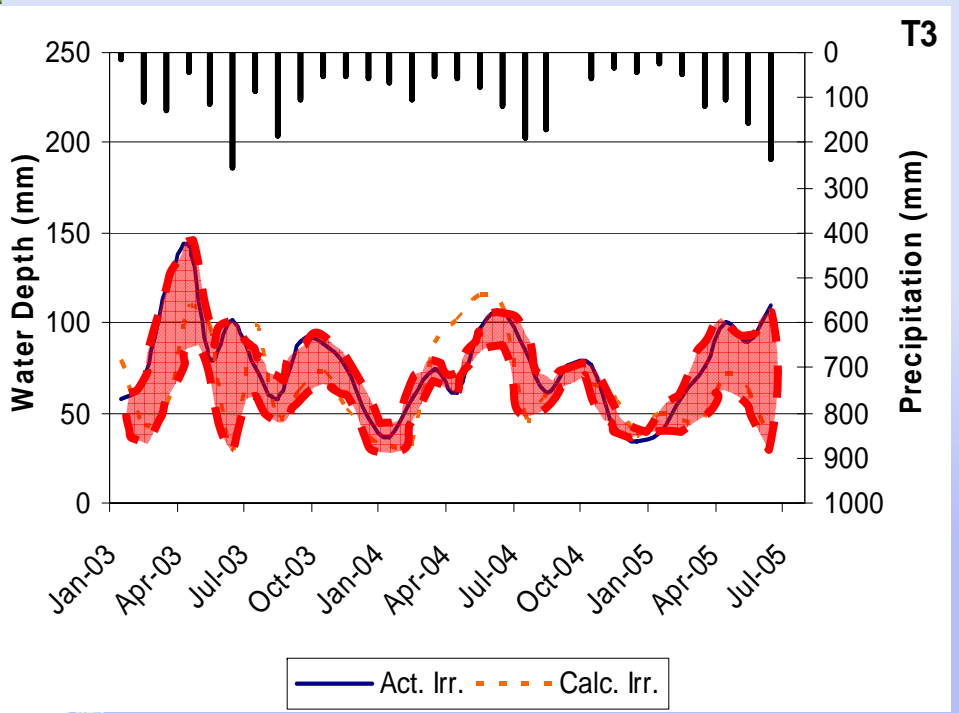
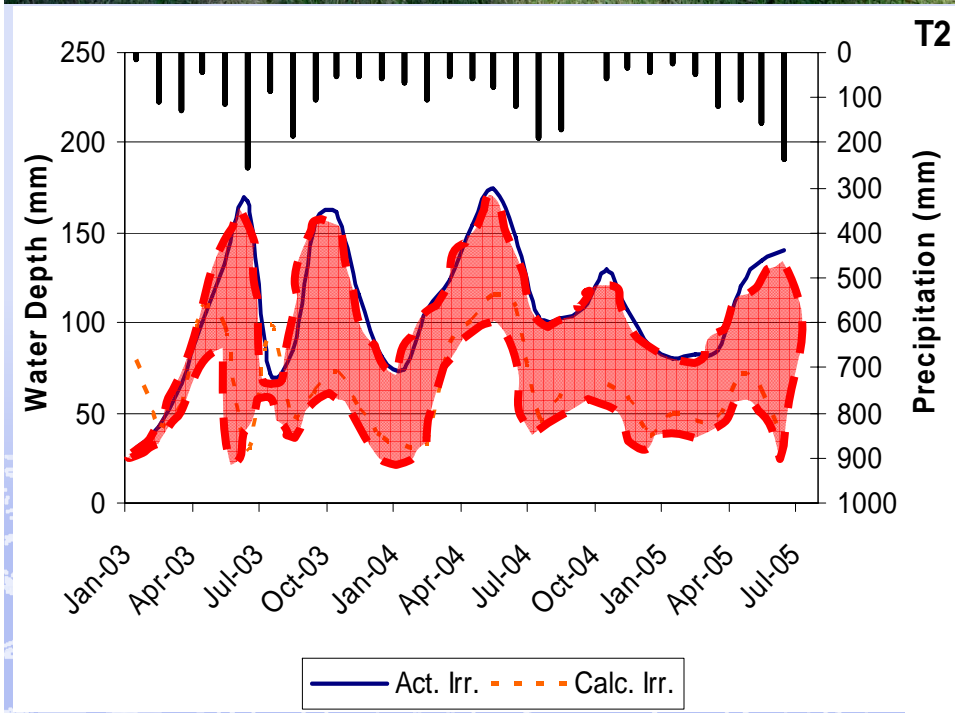
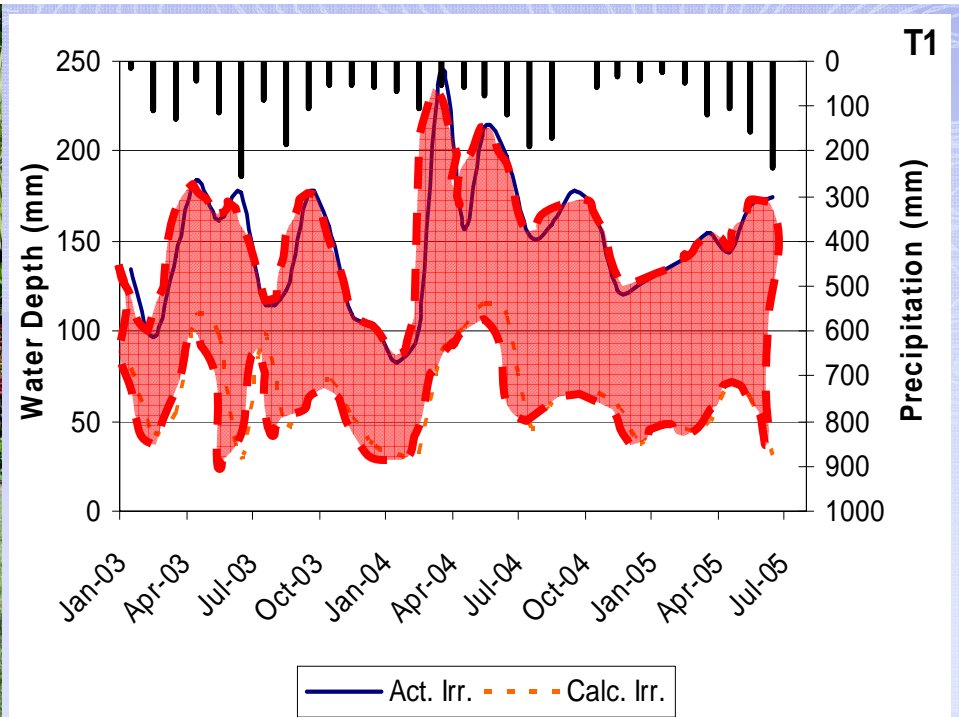


# on Water Use

o historical net  
30% savings









# Efficient Irrigation

# Efficient Irrigation: Hitting the Target





# Efficient Irrigation: The Right Amount at the Right Time

soil sensor  
based  
irrigation

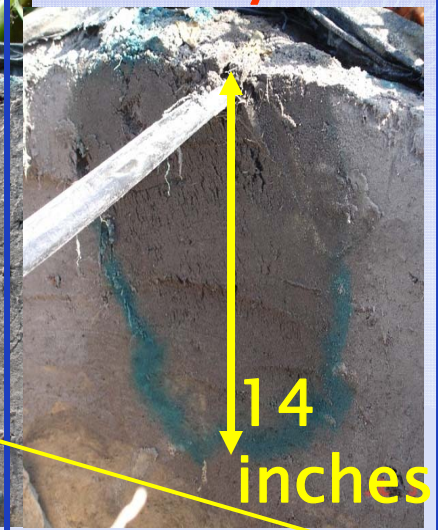
24 hrs



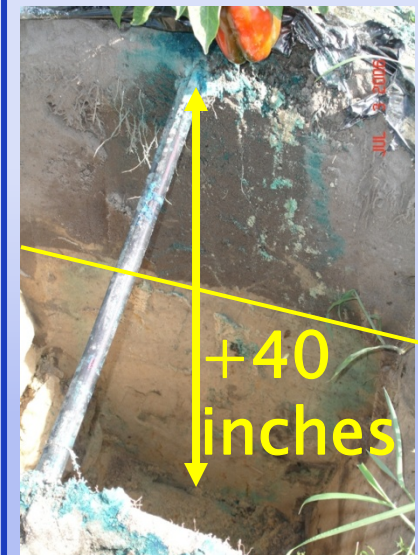
3 days



7 days

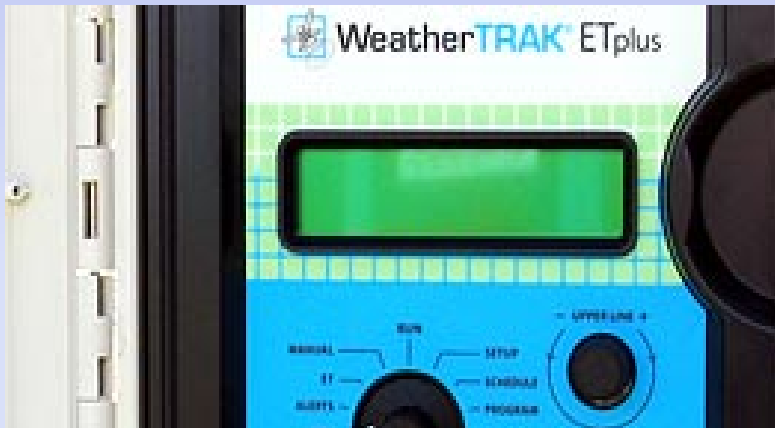


fixed time  
irrigation  
schedule

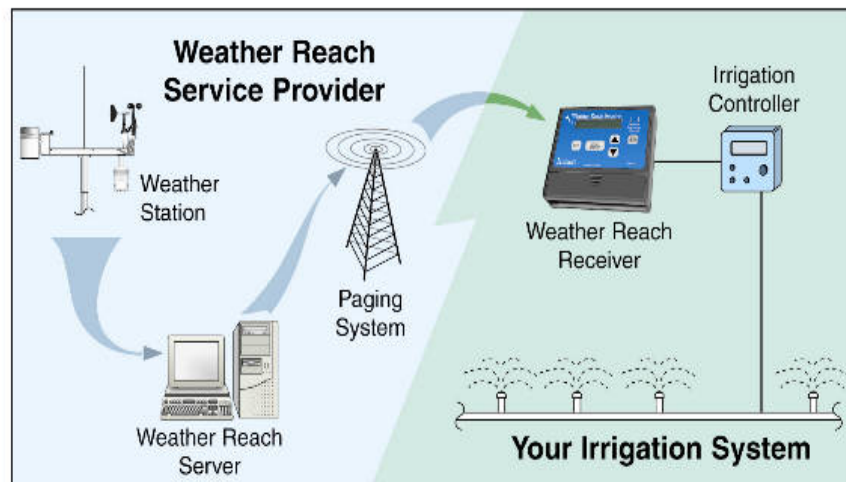




# Smart Water Application Technologies (SWAT)



Soil moisture sensor systems





# Summary of Smart Water Application Technology Savings Research

- ❑ Soil moisture sensor irrigation reduction compared to 2 d/wk seasonal adjustment & no rain sensor
  - 70-90% during normal to rainy conditions
  - 15-40% during dry conditions
  - 50% on cooperating residential homes
- ❑ Rain sensors (MiniCLIK) irrigation reduction compared to 2 d/wk seasonal adjustment & no rain sensor
  - 15-35% dry to normal rainfall conditions
- ❑ ET controller irrigation reduction compared to 2 d/wk seasonal adjustment & no rain sensor
  - Depends on time of year
  - 9-60% predominantly dry conditions

# Irrigation Technology Caution

- ❑ When implemented in housing developments
  - ET controllers fail to show savings
  - SMS controllers fail to show savings

# Irrigation Technology Caution

- ❑ When implemented in housing developments
  - ET controllers fail to show savings
    - 2 sites in California
    - 1 site in Texas
  - SMS controllers fail to show savings
    - 1 site in Florida

# Irrigation Technology Caution

- ❑ When implemented in housing developments
  - ET controllers fail to show savings
    - 2 sites in California
    - 1 site in Texas
  - SMS controllers fail to show savings
    - 1 site in Florida
- ❑ Implementation is key!
- ❑ Set it and forget it implementation will not work



# Summary

- ❑ Irrigation control technologies show great promise, but care must be taken in proper implementation
- ❑ Irrigation technologies such as micro-irrigation should be encouraged
- ❑ Low water use plants need to be encouraged
- ❑ Water rates may help drive these issues

# Funding Partners

- ❑ Irrigation efficiency study
  - SJRWMD
- ❑ Soil moisture sensor research
  - Pinellas Anclote Basin Board, SWFWMD
  - Florida Dept. Ag. and Consumer Services
  - Florida Nursery Growers & Landscape Association
  - Florida Turfgrass Association
- ❑ ET controller research
  - Hillsborough County Water Dept.
  - Florida Dept. Ag. and Consumer Services
  - Florida Nursery Growers & Landscape Association
  - Florida Turfgrass Association