This presentation premiered at WaterSmart Innovations

watersmartinnovations.com
Water Savings of ET vs. Timed Water Applications

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PURPOSE

➢ To compare and measure the water conservation capabilities of a conventional timer based control system operating on a set duration and frequency versus a weather driven evapotranspiration derived control system that utilizes a computer based algorithm to determine the frequency and duration of the irrigation cycle.

➢ Commenced in 2010, 3 year study.
METHODOLOGY
**METHODOLOGY**

- St. Augustine – Floratam
- Twelve 15' x 15' plots
  - 4 control
  - 4 weather based
  - 4 time based
- Spray Sprinklers
  - Toro 570Z-6PRXCOM
    - Pressure Regulating
    - Check Valve
    - Flow Stop
  - 15Q Precision Nozzles
- Irritrol 700-01 Valve
- 40 psi In-line Regulator
METHODOLOGY

- Rain Bird ESP-LX field controller
- Rain Bird MaxiCom central control
- Campbell Scientific weather station
  - 30 feet away
  - Same turf
- 8 Individual 5/8 inch water meters
- Effective rainfall first 0.5 inches of storm
METHODOLOGY

- **Time Based Plots**
  - 0.75 – 1 inch of reclaimed water per week as mandated
  - Tuesdays and Thursdays per existing South Florida Water Management District statute

- **ET Based Plots**
  - Time based on ET reading from the weather station
  - 0.8 landscape coefficient
  - As needed basis with no restriction on how many days per week
METHODOLOGY

Control Plots

- Watered for establishment
- Received only direct rainfall
- Maintained (mowing, fertilization, etc.) with same frequency and same strategy as irrigated plots
Each time based irrigation zone programmed to apply net of 0.875 inches/week using RTM (1.26) between the $D_{ULH}$ and $D_{ULQ}$ resulting in 77 minutes per week, 39 minutes per day

November through March halved to 0.438 inches per week (20 minutes per day)
RECORDING & REPORTING

- Weather (rainfall), ET and run times tracked daily
- Water meters read and recorded monthly
- Photos of each plot taken monthly and a brief description of observed turf quality using the University of Florida protocol
- Log of mowing, fertilization, pest management, irrigation schedules and system maintenance
# IRRIGATION TEST PLOT STUDY

**WATER METER READINGS**

**1-Jul**

**31-Jul-12**

<table>
<thead>
<tr>
<th>Meter #</th>
<th>Zone number</th>
<th>Endng reading 31-Jul-12</th>
<th>Beginng reading 1-Jul-11</th>
<th>Total gallons</th>
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</table>

**ET irrigated test plots average total run time (min) per zone**

1 July 12:01am to 31 July 11:59pm:

- **154**

**Time irrigated test plots**

<table>
<thead>
<tr>
<th>Meter #</th>
<th>Zone number</th>
<th>Endng reading 31-Jul-12</th>
<th>Beginng reading 1-Jul</th>
<th>Total gallons</th>
</tr>
</thead>
<tbody>
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</table>

**Timed irrigated test plots average total run time (min) per zone**

1 July 12:01am to 31 July 11:59pm:

- **273**
As expected the irrigated plots have a higher quality than the control plots by a visible amount.

The irrigated plots track close to the same but the ET plots at times show a slightly higher quality rating.

In reality, both irrigation schedules provide acceptable turf quality.
TURF QUALITY TRENDS

Average Turf Quality Trends

- ET
- Time
- Control
RUN TIME COMPARISON

- In all but one month the average monthly run time showed that the time scheduled irrigation operated longer than the ET based schedule.
- In May, June and July the two schedules are closer together time wise compared to rest of the year.
- In some months, the timed plots are operating over a 100 minutes more.
RUN TIME COMPARISON

ET / Time monthly average run time comparison

Minutes/month
WATER USE COMPARISON

- Except for two months in the spring of 2011 (April and May – typical of Florida) the ET based schedule used less water than the time based schedule.

- This was not unexpected as the ET based controllers are designed to match the weather.
WATER USE COMPARISON
CUMULATIVE WATER USE

- ET based plots have applied approximately 64.3 inches of water and used approximately 9,548 gallons
- Time based plots have applied approximately 101 inches of water and used over 15,082 gallons
- Represents over a 36.3% water savings over the 27 month study period (reduced from 36 months)
- Some months savings have been more than 50%
CONCLUSIONS

- Study shows that the ET based control system saves significant water over the mandated schedule.
- Rarely does the ET based schedule use more water than the time based schedule.
- The quality of the turf is similar between the two schedules.
- Overall operating time on the ET based schedule is much lower which reduces the overall water window and wear and tear on equipment (study basis).
- Even though a weather station is used, could surmise that most ET based control should have similar water savings.