Water-Efficient Irrigation Technologies: Florida, North Carolina, and Oklahoma extension programs

Water Conservation: half-empty or half-full?

Regional Webinar Series
Extension Education on Irrigation Efficiency & Smart Irrigation Controllers

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Water Conservation: half-empty or half-full?
Webinar, Feb 8, 2011
Partnerships

- Southwest Florida Water Management District
- Hillsborough County Water Dept.
- Orange County Utilities
- Miami-Dade Water & Sewer Dept.
- St. Johns River Water Management District
- US EPA, WaterSense
- Trade groups: FL Turfgrass Assoc., FL Nursery Growers & Landscape Assoc.
- Industry: Rain Bird, Hunter, Toro
Irrigation Inefficiency: Design & Maintain.
Central Florida - Typical Irrigator

- **Irrigation:**
  - Actual, 70 inches/yr
  - Max need, <30 inches/yr
- **Rainfall, 50 inches/yr**
Central Florida - Monthly Time Clock Adjustment

- 30% savings by adjusting time clock monthly
Irrigation controllers that respond to conditions in the irrigated system to automatically adjust to plant needs

Soil moisture controllers (SMS)

Evapotranspiration (ET) based controllers

Rain sensors (RS)
Congratulations!

WaterSense honors the 2009 Partners of the Year. Learn more about their efforts to increase water efficiency and promote the WaterSense label.

DID YOU KNOW?

You can save 11,000 gallons a year by updating your bathroom with a WaterSense labeled toilet. Learn more.

Save water and protect the environment by choosing WaterSense labeled products in your home and business and taking simple steps to save water each day.

Learn more about WaterSense and what you can do to help make every drop count.

Test Your WaterSense

Calculate Your Water Savings

Save Water, Save Energy, Save Money

Find Rebates Near You

Start At Home

WaterSense For Kids

LOOK HERE

Information for Commercial, Education Government, Professional and more.

Hear a message about the new homes specification
EXAMPLE EXTENSION EDUCATION: SOIL MOISTURE SENSOR (SMS) CONTROLLERS
How Does It Work?

SMS Controller

Soil Moisture Sensor (SMS)

Timer

Switch

Common

Hot

Water

Valve

Water
Where Should The Sensor Be Buried?

Dry area, full sun

Away from:
- sloping areas or depressions
- paved or compacted surfaces
- roofline of the house

Center of an irrigation zone

Credit: Mary Shedd McCready
Sensor Burial

- Place sensor in the root zone of the plants
- Cover with soil to ensure good contact
- Replace grass
- Saturate the soil around the sensor
  - Using irrigation or a large bucket of water
SMS CONTROLLER RESEARCH
### Water Savings 2004+05, Normal Rainfall Frequency

<table>
<thead>
<tr>
<th>Treatment</th>
<th>TOTAL (in)</th>
<th>Savings compared to 2-WOS (%)</th>
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</thead>
<tbody>
<tr>
<td>2-WOS</td>
<td>59.6</td>
<td>0</td>
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<tr>
<td>SMS Based</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg</td>
<td>16.5</td>
<td>72</td>
</tr>
<tr>
<td>1-d/w</td>
<td>16.5</td>
<td>72</td>
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<tr>
<td>2-d/w</td>
<td>18.8</td>
<td>68</td>
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<td>7-d/w</td>
<td>14.3</td>
<td>76</td>
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</table>

WOS = without sensor  
Avg = average  
SMS = soil moisture sensor
SMS & RS TESTING ON COOPERATING HOMES, PINELLAS CO.
Experimental Design

- 59 residential cooperating homes
  - 4 locations
  - 4 treatments
Treatments

• SMS, Current irrigation system **without** rain sensor and **with** a soil moisture sensor controller

• EDU+RS, Current irrigation system **with** rain sensor & seasonal run time guidelines

• RS, Current irrigation system **with** rain sensor

• WOS, Current irrigation system **without** a sensor
Pinellas County Homes, Irrigation
Nov 06 - Dec 08

Monthly Effective Precipitation (inches)
Irrigation Application (inches)
Effective Rainfall

SMS  EDU+RS  RS  WOS

0
2
4
6
8
10
12
14
16
18
20
0
10
20
30
40
50
60
70
Nov-06 Feb-07 May-07 Sep-07 Dec-07 Mar-08 Jul-08 Oct-08 Jan-09

Irrigation Application (inches)
Monthly Effective Precipitation (inches)

Pinellas County Homes, Irrigation
Nov 06 – Dec 08

Irrigation Application (inches)
Monthly Effective Precipitation (inches)

Effective Rainfall  SMS  EDU+RS  RS  WOS
Pinellas County Homes, Irrigation
Nov 06 - Dec 08

Monthly Effective Precipitation (inches)
Irrigation Application (inches)
Effective Rainfall

- SMS
- EDU+RS
- RS
- WOS

Improvement: 65%
### Irrigation Frequency
(# Irrig. Events per Month)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean (#/month)</th>
<th>Std. Dev. (#/month)</th>
<th>Max (#/month)</th>
<th>Min (#/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS</td>
<td>2.1 b</td>
<td>2.8</td>
<td>11</td>
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<tr>
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<td>WOS</td>
<td>5.2 a</td>
<td>6.5</td>
<td>29</td>
<td>0</td>
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</table>
IMPLEMENTATION ISSUES WITH “SMART” CONTROLLERS
SMS Controller Installations

- Original “indoor” controllers installed outside
The Reason for DBY Connectors.....
EDUCATIONAL PROGRAM EFFECTIVENESS
Projects in Florida

- **Research & demonstration**
  - Pinellas Co. SMS, UF/SWFMD research and demonstration
  - Beazer Homes Duval Co. SMS, UF/SJRWMND research and demonstration
  - Orange County Smart Controllers, UF/OCU research and demonstration
  - Miami Dade County, UF/County demonstration

- **Developers**
  - Lake Jovita, Pasco Co. SMS
  - The Villages,

- **Government/Utility**
  - Manatee Co. Smart Controllers, rebate program
  - City of Stuart SMS, rebate program
  - Toho Water Authority SMS, rebate program

- **Senate Bill 494, 2009** encourages Smart Controllers
Challenges

- Waning interest during non-drought periods
- Economic recession
  - Utility revenues are down
  - “Cost neutral” solutions
  - Irrigation industry hard hit
  - Government revenues are down
Agency Benefits

- Research based extension information
- Unbiased third party
- Experience (benefit from our mistakes!)
See Videos & Narrated Power Point

- [http://abe.ufl.edu/mdukes/](http://abe.ufl.edu/mdukes/)
- Video
  - Irrigation controllers
  - Rain sensors
  - Soil moisture controllers
  - Weather based (ET) controllers
  - Smart Water App. Tech. (virtual turf field day)
- Narrated ppts
  - ET controllers
  - Irrigation scheduling
  - Irrigation components
  - Irrigation myth busters
  - Soil moisture sensor controllers
Thank you!

Southwest Florida Water Management District, Pinellas Co. Utilities, St. Johns River Water Management District, Florida Department of Agriculture and Consumer Services, Hillsborough Co. Water Dept., Florida Nursery Growers and Landscape Assoc., Florida Turfgrass Assoc., Florida Sod Growers Co-op.

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http://abe.ufl.edu/mdukes/