Research Needs WATER EFFICIENT LANDSCAPES – Landscape Irrigation/Outdoor Water Use

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Research Agenda Discussion
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Water Use in Florida, 1995

- 45% Ag. Irrig.
- 24% Non-Ag. Irrig.
  - Assuming:
    - 60% of total is irrigation
    - All recreational is irrigation
- 69% of freshwater use is irrigation

Source: Marella, 1998
CFCC – Input

- Residential Indoor Water Use and Industrial-Commercial-Institutional Use
- Utility Management (Efficiency and Optimization)
- Water Efficient Landscapes
CFCC – High Priority Input

- Residential Indoor Water Use and Industrial-Commercial-Institutional Use
- Utility Management (Efficiency and Optimization)
- Water Efficient Landscapes
CFCC Summary

1. How much water is required in the landscape?
2. What is the minimum amount of water that can be supplied to the landscape for a given quality level?
3. Effect of current conservation programs – e.g. day of the week restrictions?
4. Evaluation of irrigation technologies for conservation
1. How much water is **required** in the landscape?
Current Knowledge

- Warm season turfgrass water needs
  - Stewart et al., 1967-1969
  - Zazueta and Miller, 1999
  - Jia, Dukes and Jacobs, 2007

- Landscape composition
  - Dukes, Haley and Miller, 2007
  - Gilman et al., results soon on shrub establishment

- Models
  - Augustin, 1983
  - Smajstrla et al., 1980’s -1990’s
Studies Underway

- Dukes, Sinclair, Miller, Beeson and Schieber: Landscape coefficient for mixed landscapes, SWFWMD
- Gilman, et al.: Shrub establishment water requirements
- Gilman, et al.: Water vs. quality for natives and common shrubs (6 types of each)
Knowledge Gaps

- Performance in the “real world”
  - Dukes, Haley and Miller, 2007

- How to translate plot scale research results
  to actual irrigation systems
2. What is the minimum amount of water that can be supplied to the landscape for a given quality level?
Current Knowledge

- Numerous turfgrass dehydration studies under controlled conditions (i.e. greenhouse)
- Many anecdotal reports
- Variable site/weather conditions may have a large influence on anecdotal reports
- Zazueta and Miller, 1999 reduced irrigation on St. Augustinegrass
- Dukes et al., soil moisture sensor studies on turfgrass
Studies Underway

- Gilman et al.: Shrub project
  - Supplemental water not required after 20 weeks shrub establishment period of 6L twice a week in N FL and three times a week in S FL

- Dukes, Sinclair, Miller, Beeson and Schieber: Landscape coefficient for mixed landscapes, SWFWMD
  - Last study year will water a “mixed landscape” at varying levels of ET replacement
Knowledge Gaps

- Systematic study results under Florida climate conditions not available
- Irrigation establishment requirement for turfgrass
- How to translate research results to “real world” applications
3. Effect of current conservation programs – e.g. day of the week restrictions?
Current Conservation Programs/Efforts

- **Day of the week (DOW) restrictions**
  - Not effective unless aggressively enforced
  - May incentivize over-irrigation on “my day”
  - Still depends on irrigator (i.e. homeowners)

- **Water budgeting?**
  - CUP process
  - Conducted at utility level?

- **Irrigation efficiency (audits)**

- **Rate structures**
Knowledge Gaps

- Effect of DOW restrictions on water application relative to landscape needs
- Level of DOW restriction enforcement
  - Statewide enforcement?
  - Economics of DOW restriction enforcement?
- Effectiveness of other conservation programs
  - Irrigation audits
  - Rate structures
4. Evaluation of irrigation technologies for conservation
Current Knowledge

- Haley, Dukes and Miller, 2007: Monthly time clock adjustment reduced irrigation by 30% on homes in Central FL
- Dukes et al., soil moisture sensor (SMS) Smart Controllers
  - Plot scale results during “normal” rainfall
  - Initial results on cooperating homes
Studies Underway

- Dukes et al., SMS Smart Controllers
  - Phase I, plots at UF
  - Phase II, homeowners in Pinellas Co.
  - Phase III, reuse water plots and homes

- Dukes et al., evapotranspiration (ET) Smart Controllers
  - Phase I, plots at GCREC
  - Phase II, homes in Hillsborough Co.
Knowledge Gaps

- Performance of new controllers
- Wide scale application of Smart Controllers (i.e. SMS & ET controllers)
- Conservation potential of centrally controlled irrigation
- Are there other control options?
  - e.g. FAWN assisted irrigation scheduling
- Water savings of other types of equipment
  - Pressure compensating heads
  - Higher uniformity, e.g. MP rotator
Much is known about landscape water requirements; some questions still exist.

How to translate small scale research results to irrigation application?

Effectiveness of current conservation programs?

Demonstration and application of advanced irrigation control at a large scale?