5+ Years of Testing Smart Irrigation Controllers in Single Family Homes
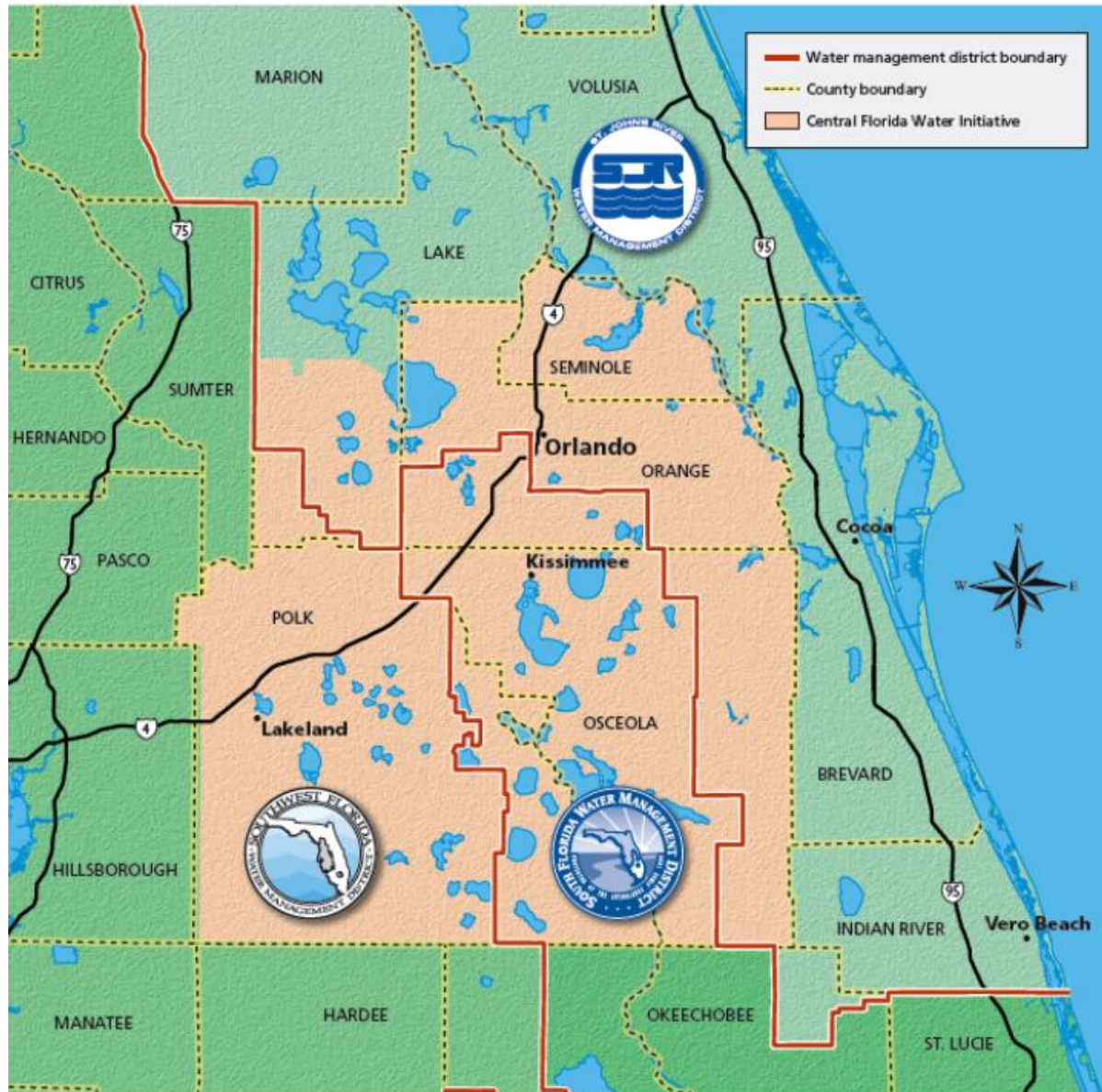
Irrigation Show and Education Conference
December 4, 2018

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Testing Smart Irrigation Controllers (SICs)

Questions

- Can *SICs* help conserve irrigation water in homes?

- How much water can they save?

- Would those savings have a negative impact on the turf grass quality?

- Are SICs reliable for a mid/long term period?

Objectives

- Evaluate if two types of smart controllers could reduce irrigation application of "excessive" irrigators

- Compare the water applied to a theoretical irrigation requirement

- Determine the significance of water savings

Materials and Methods

Selection of Cooperators (excessive irrigators)
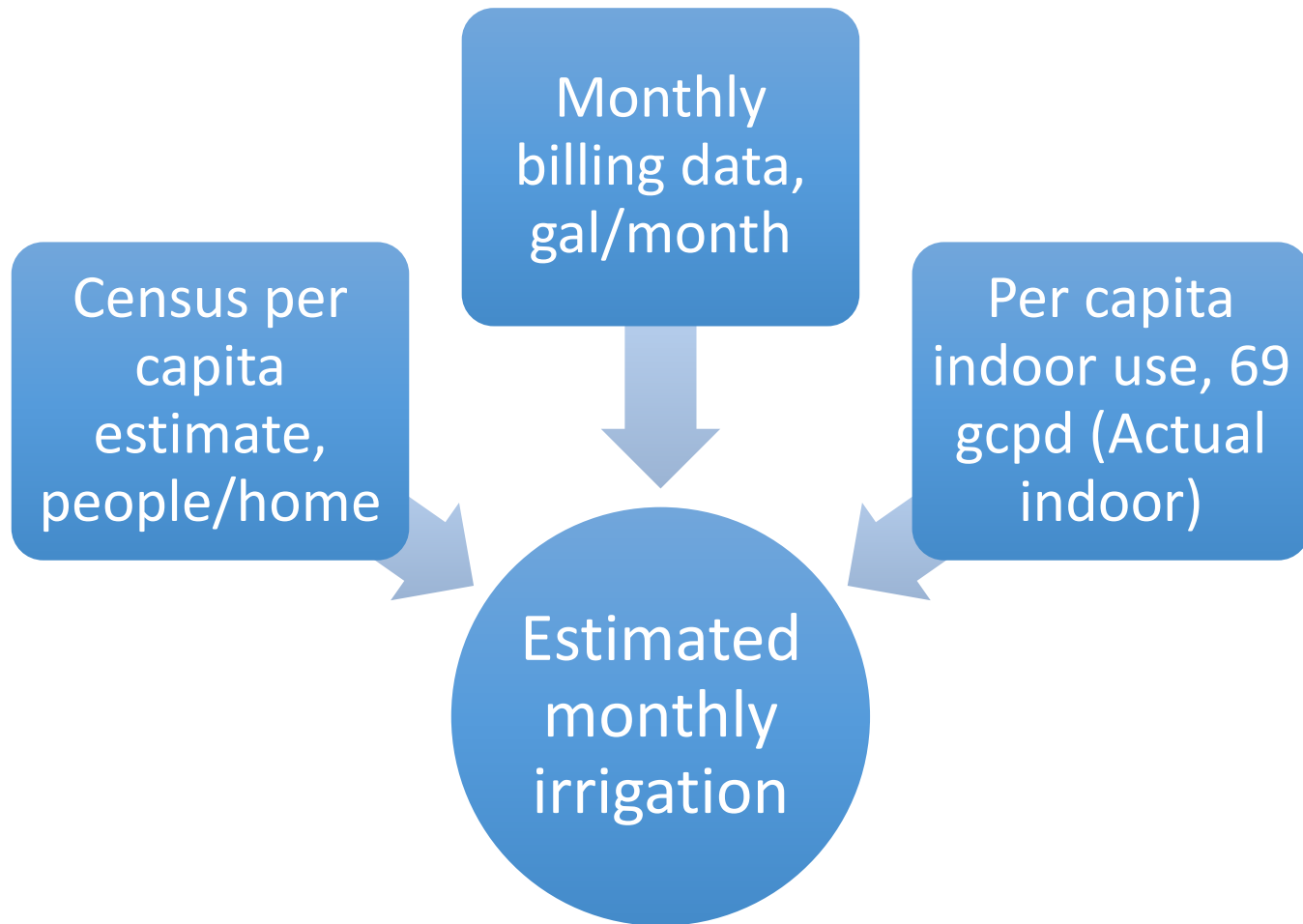
OCU sent to UF historical billing info

~130,000 Single Family Customers

Materials and Methods
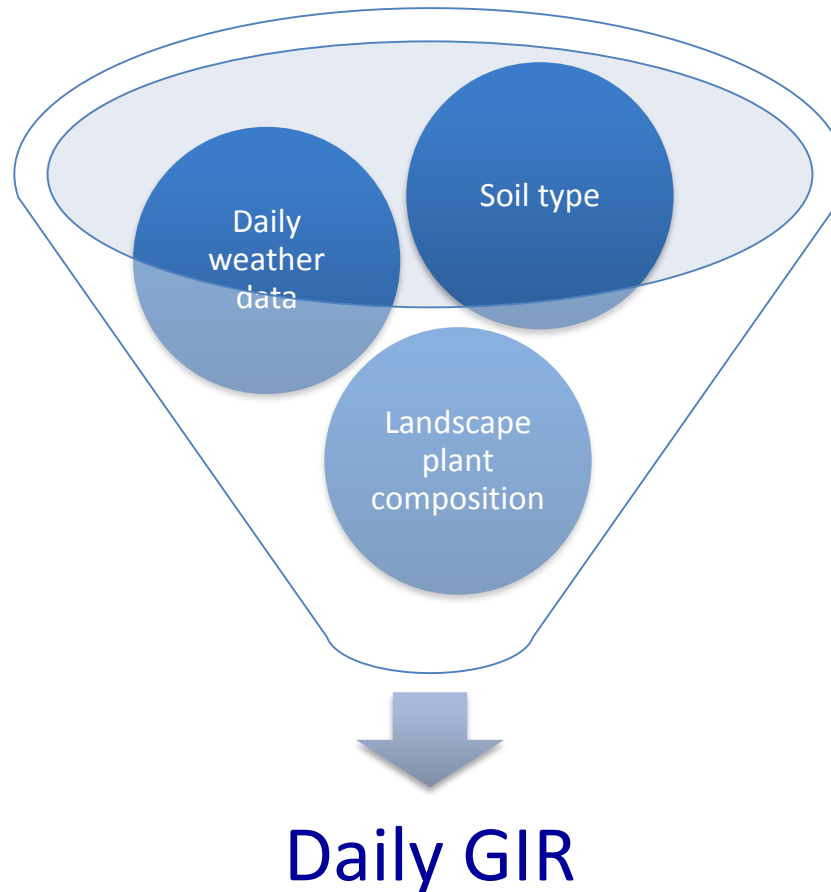
Selection of Cooperators (excessive irrigators)
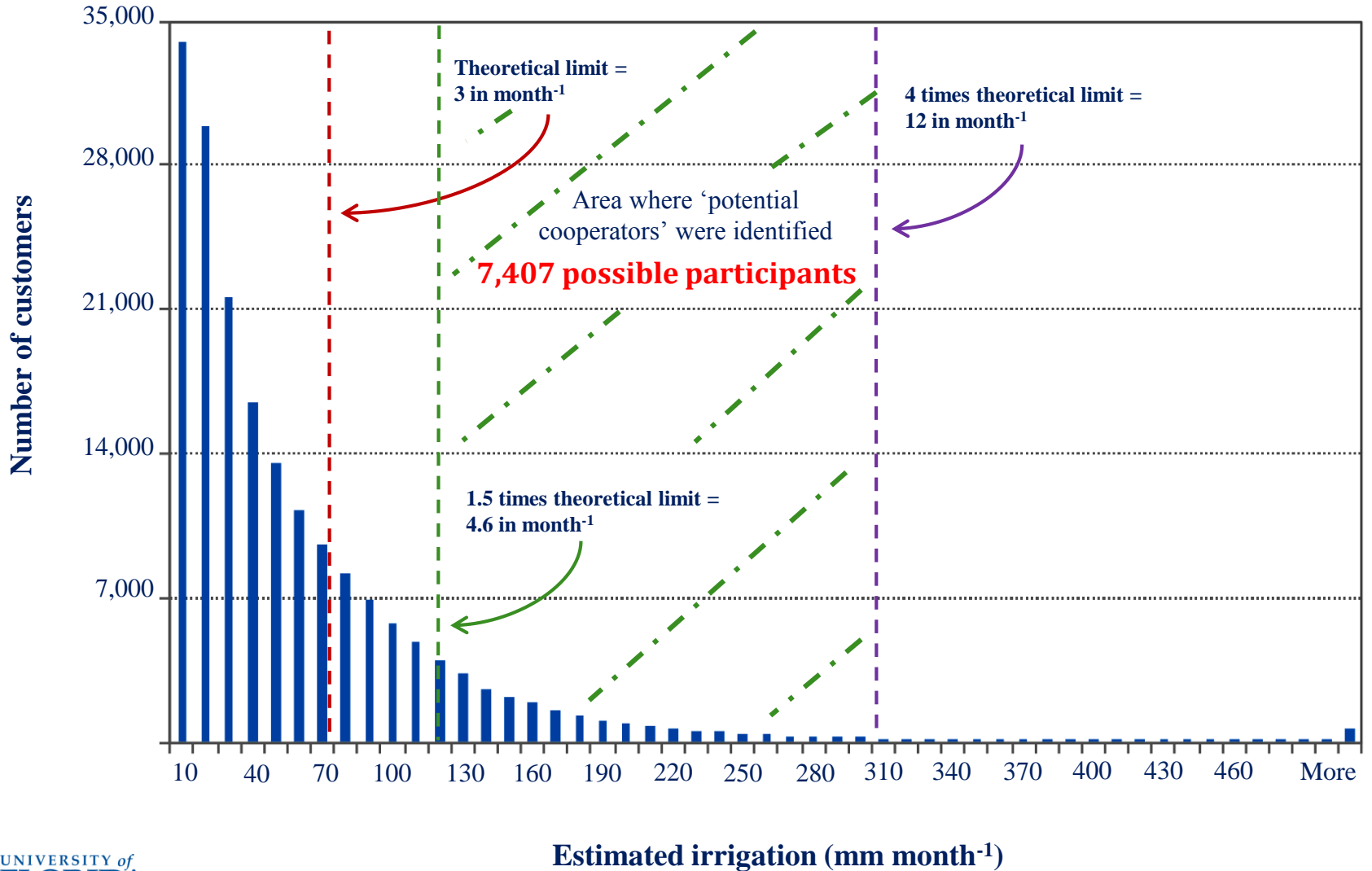
- Estimated Irrigation

Materials and Methods

Selection of Cooperators (excessive irrigators)

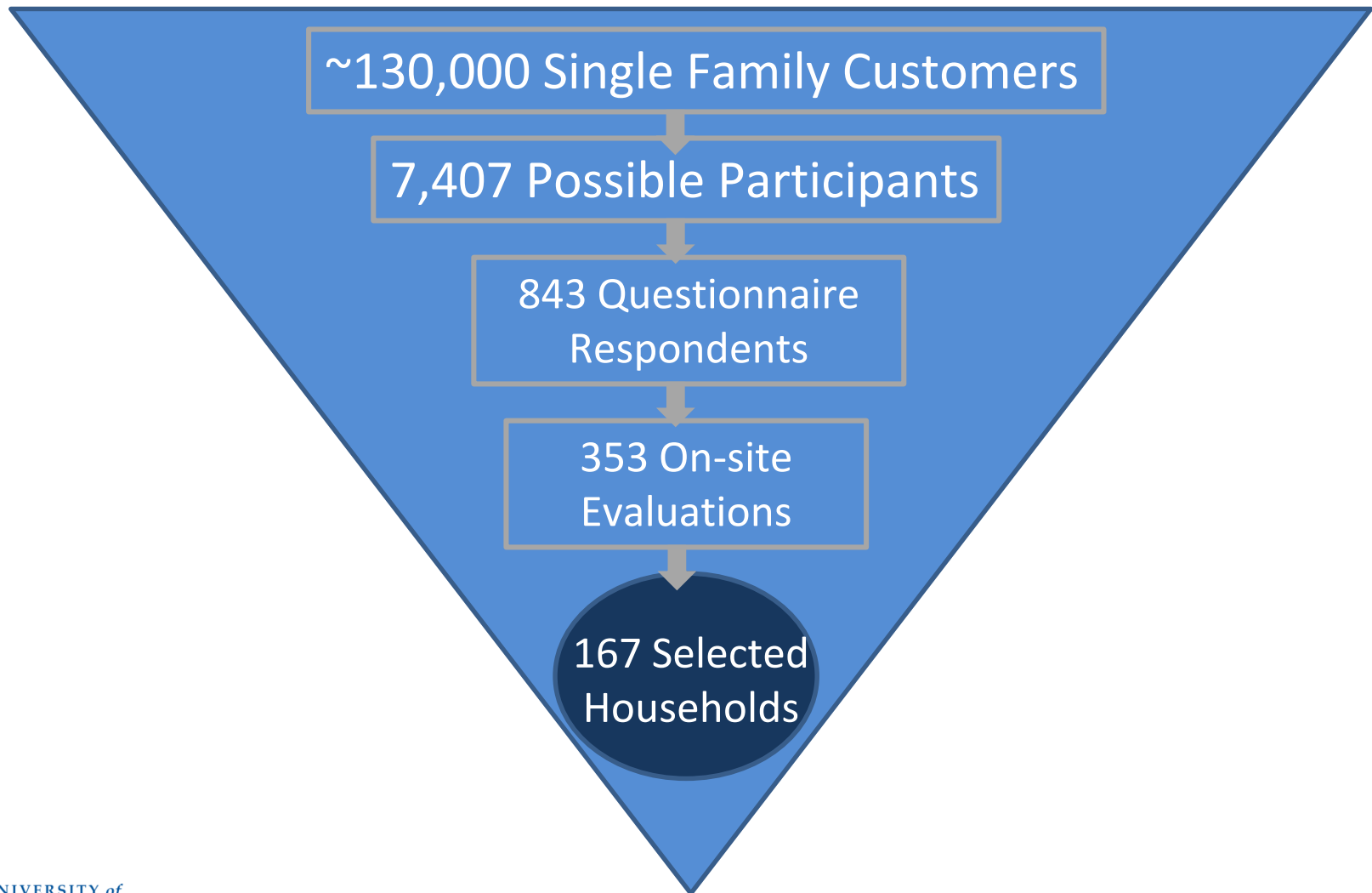- Estimated daily *Gross Irrigation Requirement* (GIR)

Daily weather data

Soil type

Landscape plant composition

Daily GIR

Materials and Methods

Selection of Cooperators (excessive irrigators)

Theoretical limit = 3 in month^{-1}

4 times theoretical limit = 12 in month^{-1}

Area where 'potential cooperators' were identified

7,407 possible participants

1.5 times theoretical limit = 4.6 in month^{-1}

Number of customers

Estimated irrigation (mm month^{-1})

Materials and Methods

Selection of Cooperators (excessive irrigators)

~130,000 Single Family Customers

7,407 Possible Participants

843 Questionnaire Respondents

353 On-site Evaluations

167 Selected Households

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Materials and Methods

Treatments and Installation

Materials and Methods

Treatments and Installation

Treatment	ET	ET+OPT	SMS	SMS+OPT	MO
Smart Irrigation Controller	Rain Bird ESP-SMT		Baseline WaterTec S100		--
Schedule	7 d/wk	3 d/wk	7 d/wk	3 d/wk (2/d)	2 d/wk
Programmed	Contractor	UF Site-specific settings	Contractor	UF (0.25"/event)	N/A

Materials and Methods
Treatments and Installation

Treatment	ET	ET+OPT	SMS	SMS+OPT	MO
Smart Irrigation Controller	Rain Bird ESP-SMT		Baseline WaterTec S100		--
Locations Installed	7	9	7	9	9
Number Installed	28	38	28	38	35

Materials and Methods

Treatments and Installation

- OPT Treatments:

  - Five minute Tutorial
  - Educational Brochure on controller features

Materials and Methods

Treatments and Installation

- All homes got:

  - Dedicated irrigation meters

  - Backflow devices

  - Minor repairs by contractor

  - Automatic Meter Recording devices (AMRs)

    - Records hourly irrigation volumes

    - Bi-monthly downloads

Materials and Methods

Turf quality

- Measured seasonally
- Scale: 1 - 9

2

5

9

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Materials and Methods

Data collection & Statistical analysis

- Data Collection Period:

    Nov 2011 – Feb 2017 (62 months)

- Weekly irrigation application

    - Fixed effects of treatment, soil type, and rainfall
    - Random effects of location and week

- Tests treatment differences

- Tests significance of soil type
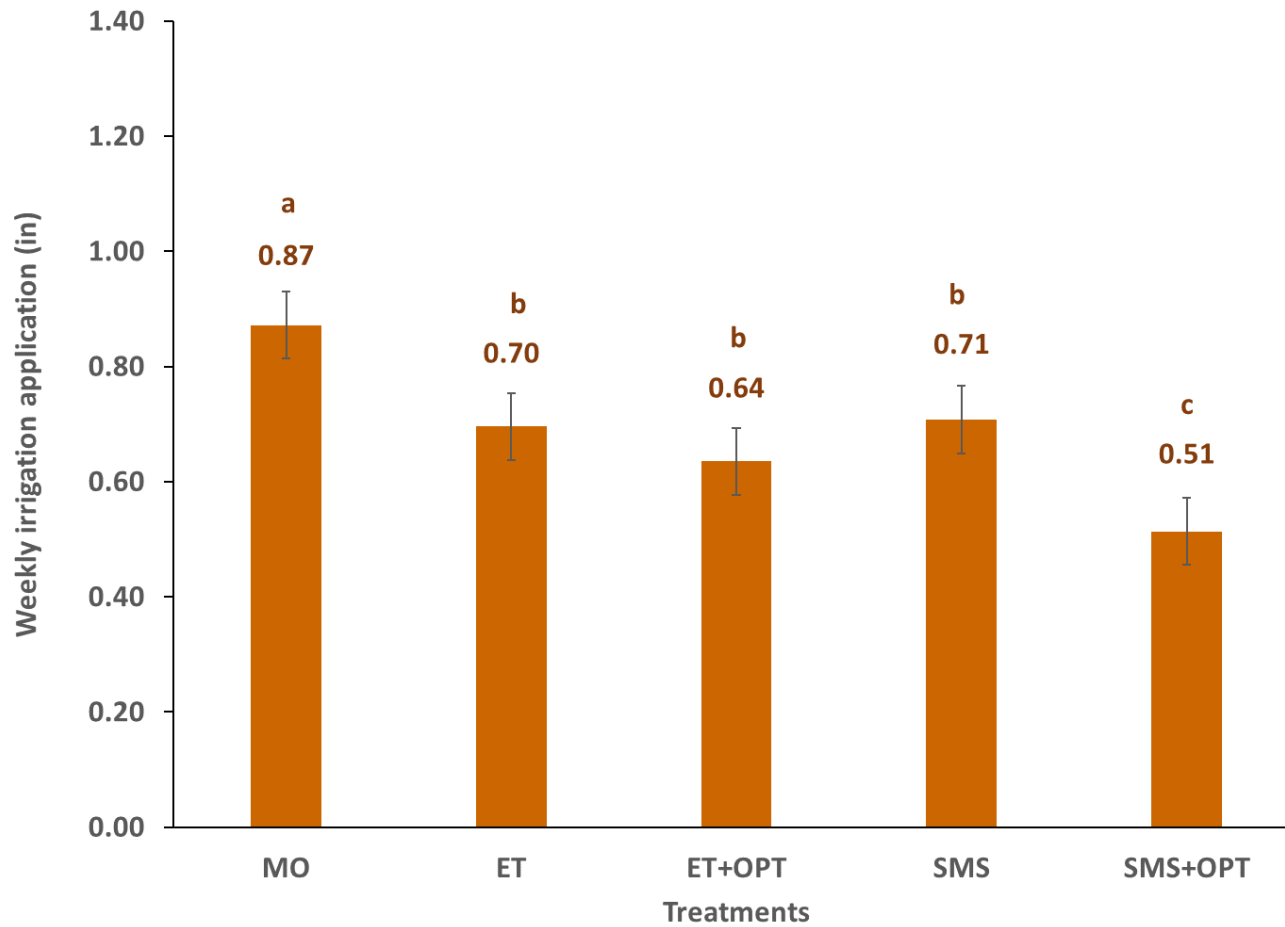
- Means procedure

Results

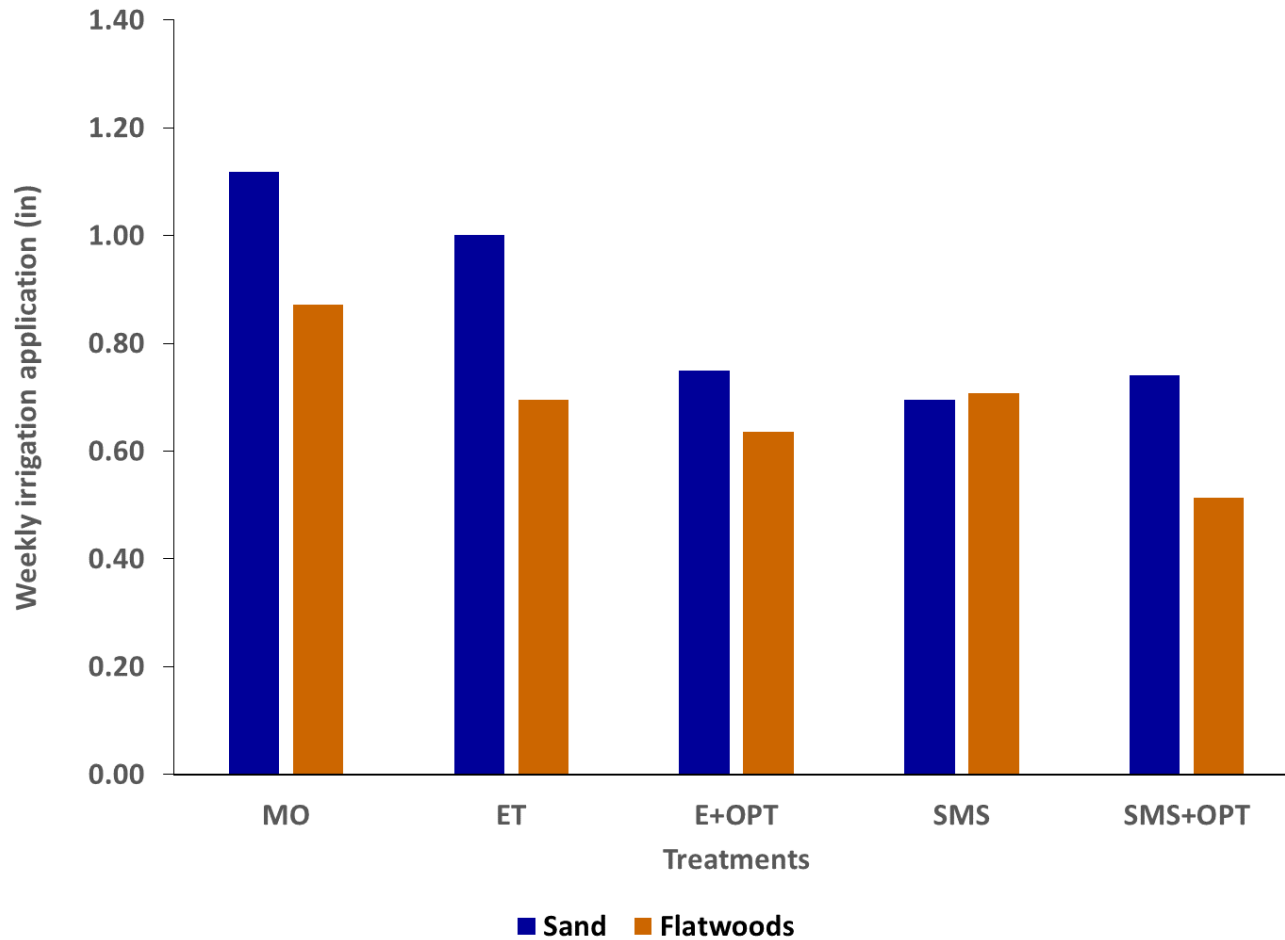# Weekly irrigation application
Sand locations
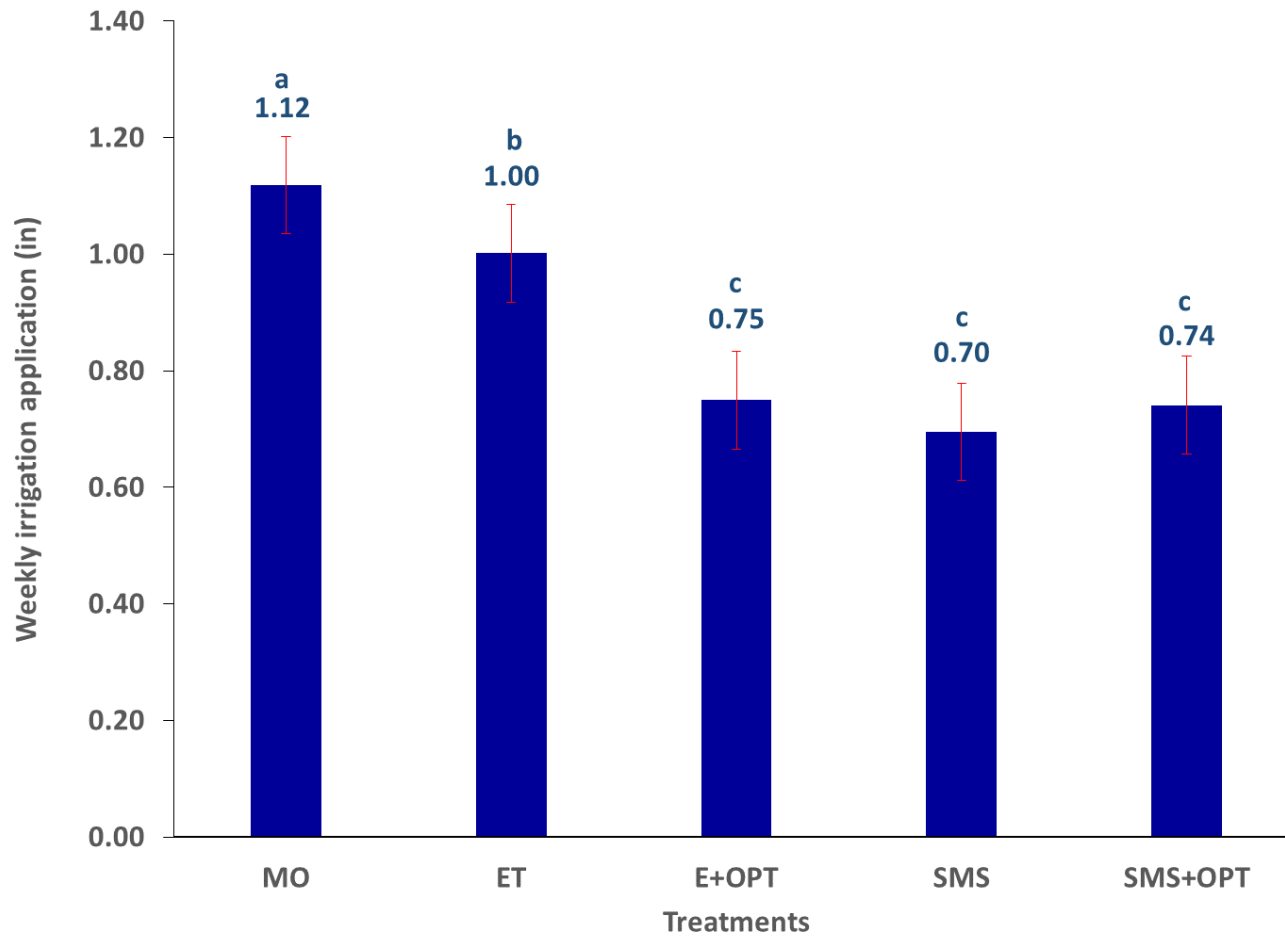
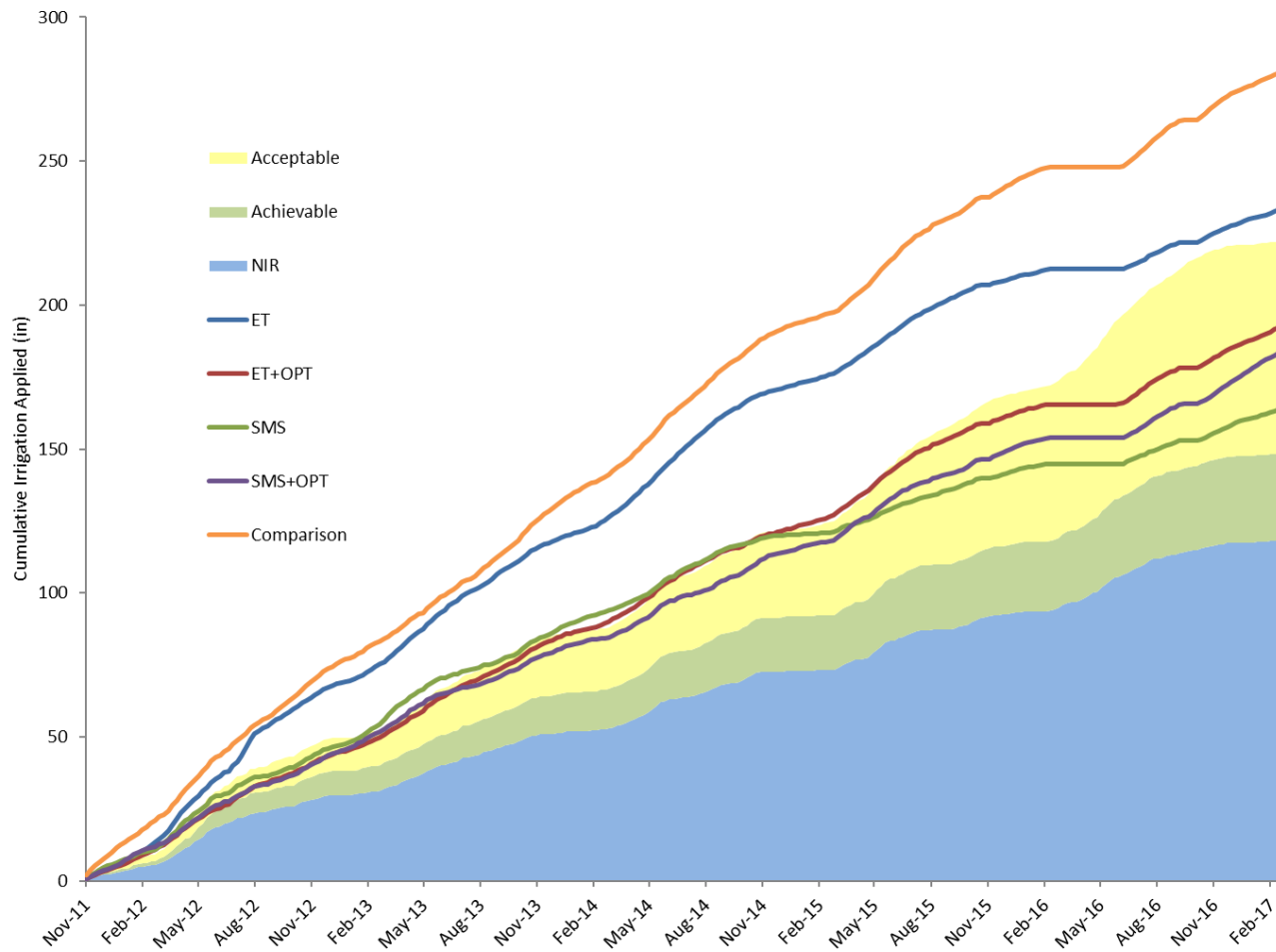# Weekly irrigation application
Flatwoods locations

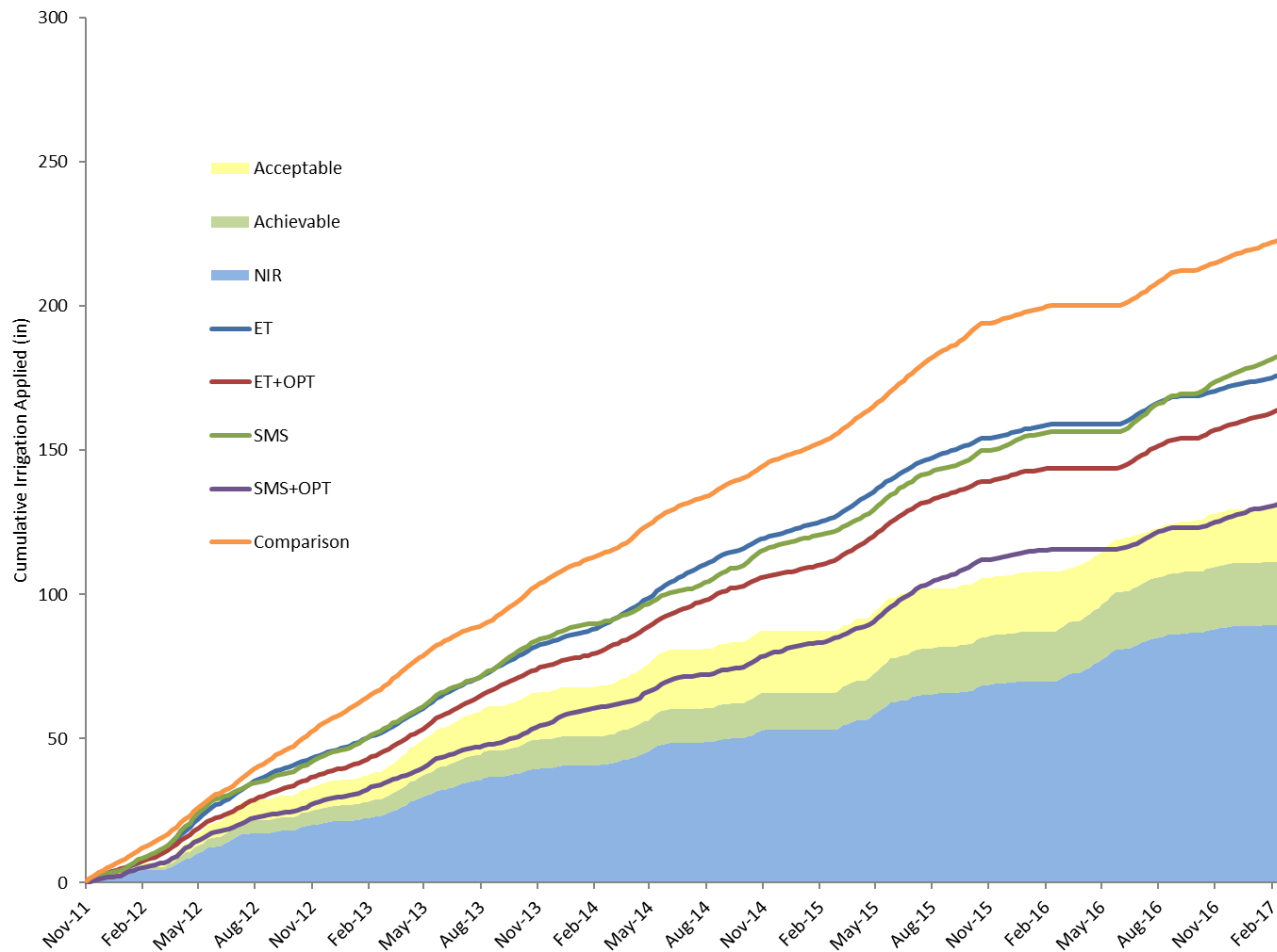# Weekly irrigation application
Both soil types

Cumulative irrigation vs irrigation requirement
Sand locations

Cumulative irrigation vs irrigation requirement
Flatwoods locations

Results
Turf quality

- Almost every home averaged above a 6.2 rating

- During the whole study time frame

- No TQ differences between treatments

Conclusions

- After 62 months: all treatments with SIC significantly decreased irrigation compared to MO

ET	: 19%	ET+OPT	: 32%
SMS	: 30%	SMS+OPT	: 43%

- No difference on turf quality between treatments

- Water savings achieved did not result in a negative turf quality impact.

Conclusions

- These results demonstrate the ability of SMSs and ET-controllers to regulate irrigation based on real-time soil moisture/weather conditions, on the tested soils.

Acknowledgements

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