

Efficacy of ET-Based Watering Schedules on Turf: Conserving water through lawn watering assessments

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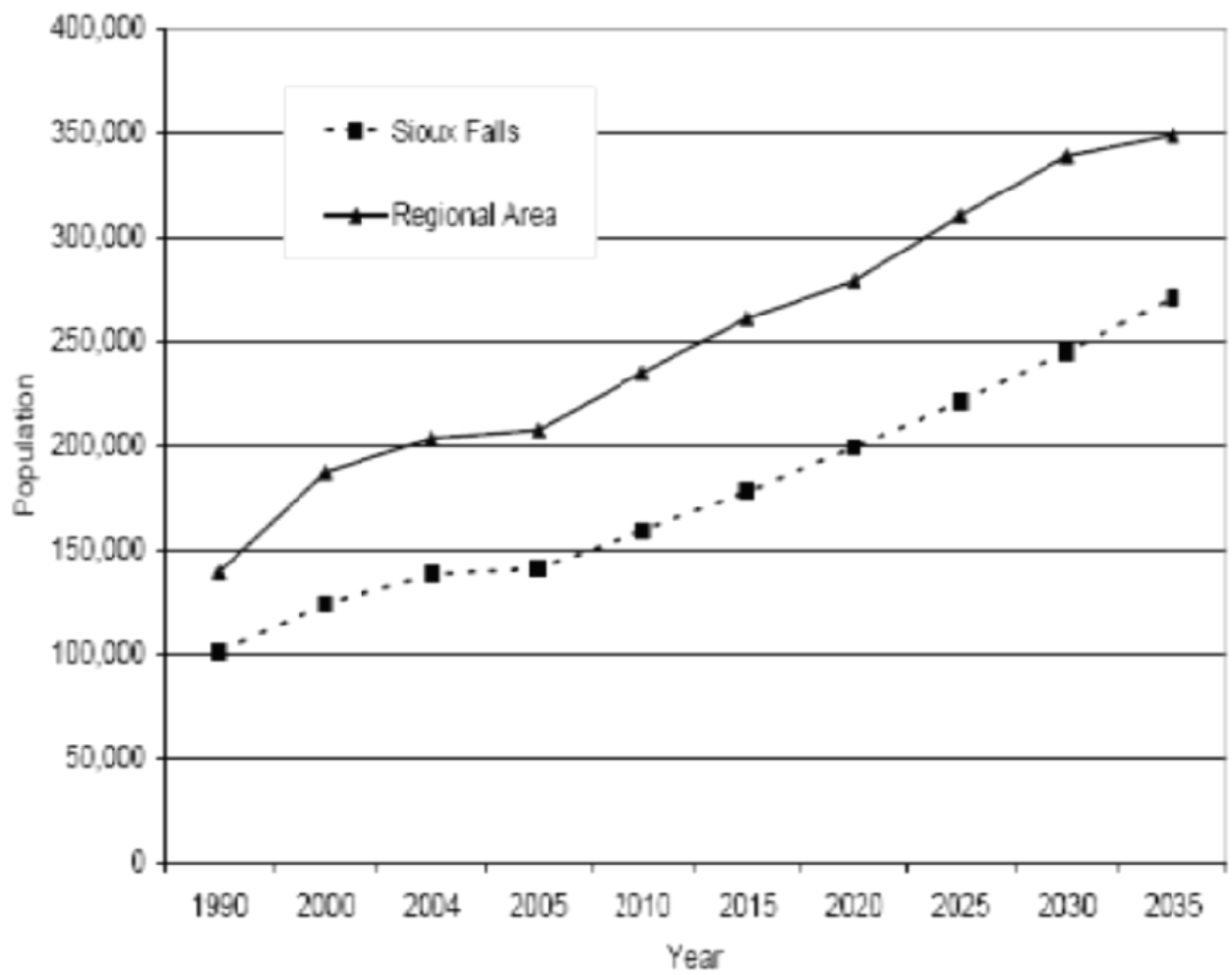
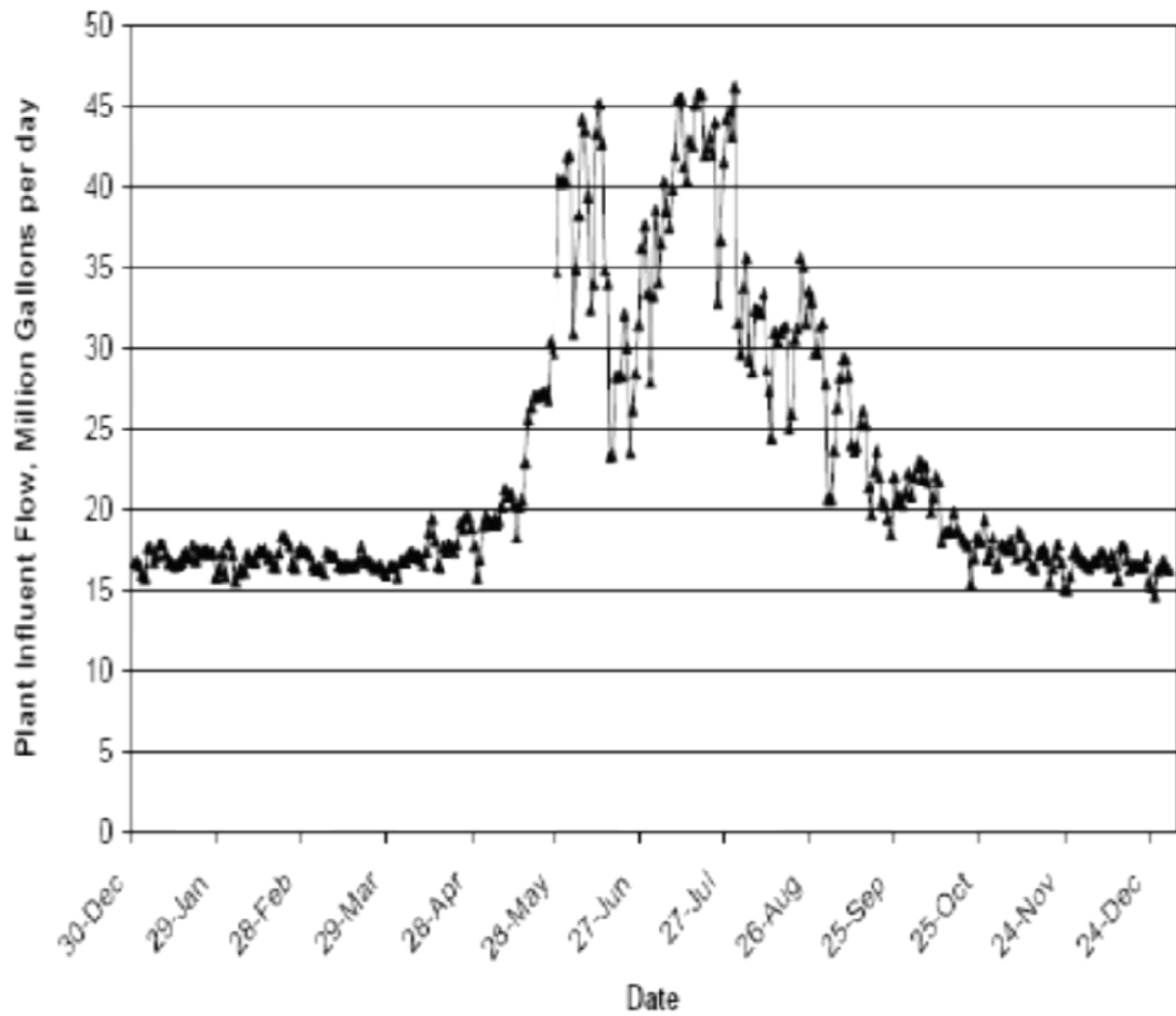


Figure 1. Current and projected growth for Sioux Falls and surrounding area from 1990-2035.

Sioux Falls Water Issues

- Growing area
- Finite water source
- Limitation to growth
- Linking to Missouri River
- Climate transition area ($\sim 24''/\text{yr}$)

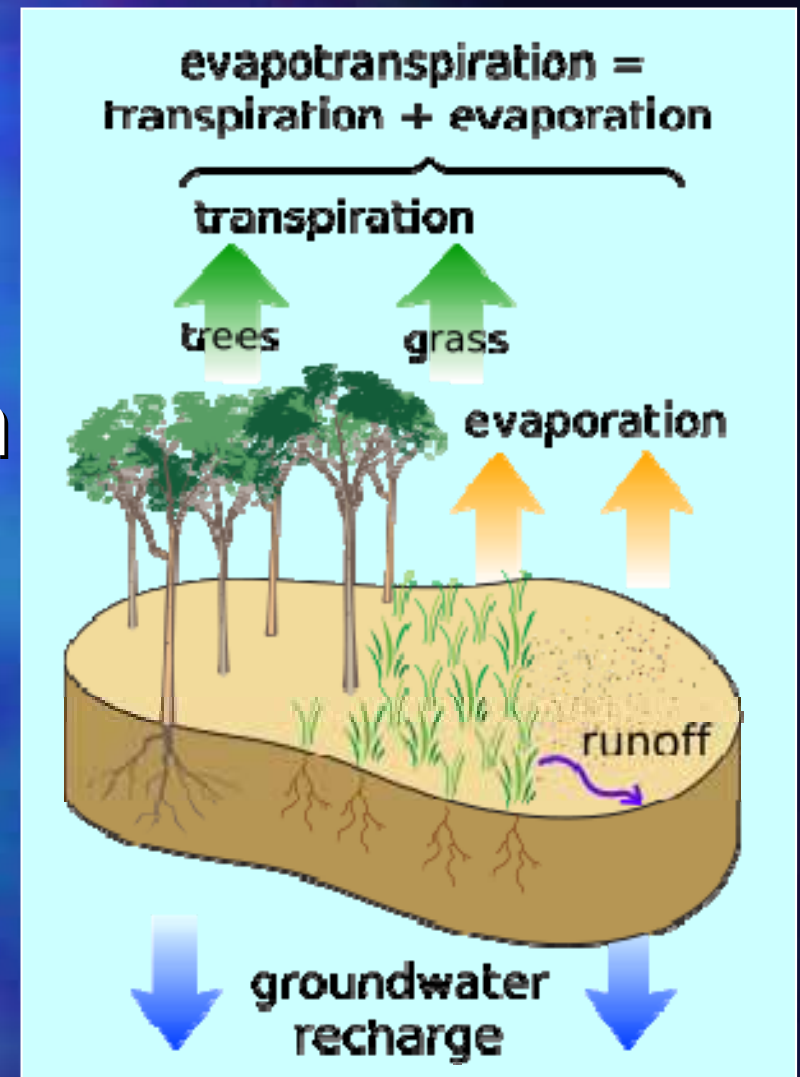


Problems with irrigation

- Difficult to manage watering time
- Requires information and frequent monitoring to do optimally
 - when to water?
 - how much?
 - oops! Watering just after rain.
- “set it and forget it”
- Rain sensors offer limited water savings

Can we do better?

- ET = Evapotranspiration



- ET determines water needs—not always 1"/week

Can we do better?

- Objective: To determine water savings, if any, if irrigation schedule is based on real time weather data.
- Current schedules typically “set it and forget it”—no/few adjustments made during growing season

The Project

- In coop. with City of Sioux Falls
- 60 volunteer homeowners
- In-ground irrigation system
- On city water metering system
Hexagram

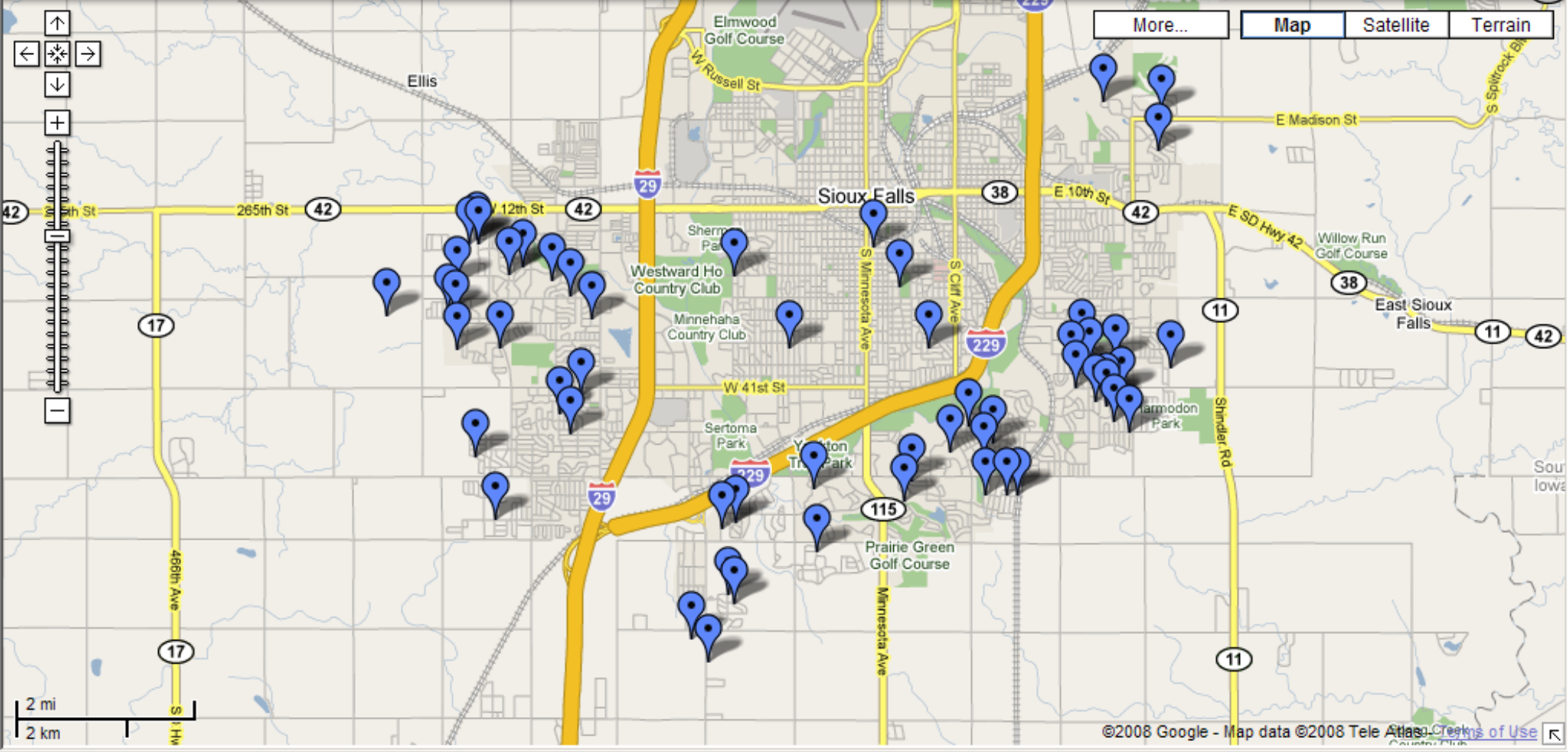


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The Project

- Three treatments:
 - 100% ET replacement
 - 70% ET replacement
 - Control

The Project

- Audits conducted on each irrigation system
- Efficiency is used in programming ET controller









The Project

- Controller from ET Water
- Like other controllers
- Requires phone connection
- Receives weather data (SDSU weather stations)
- Transmits watering schedule

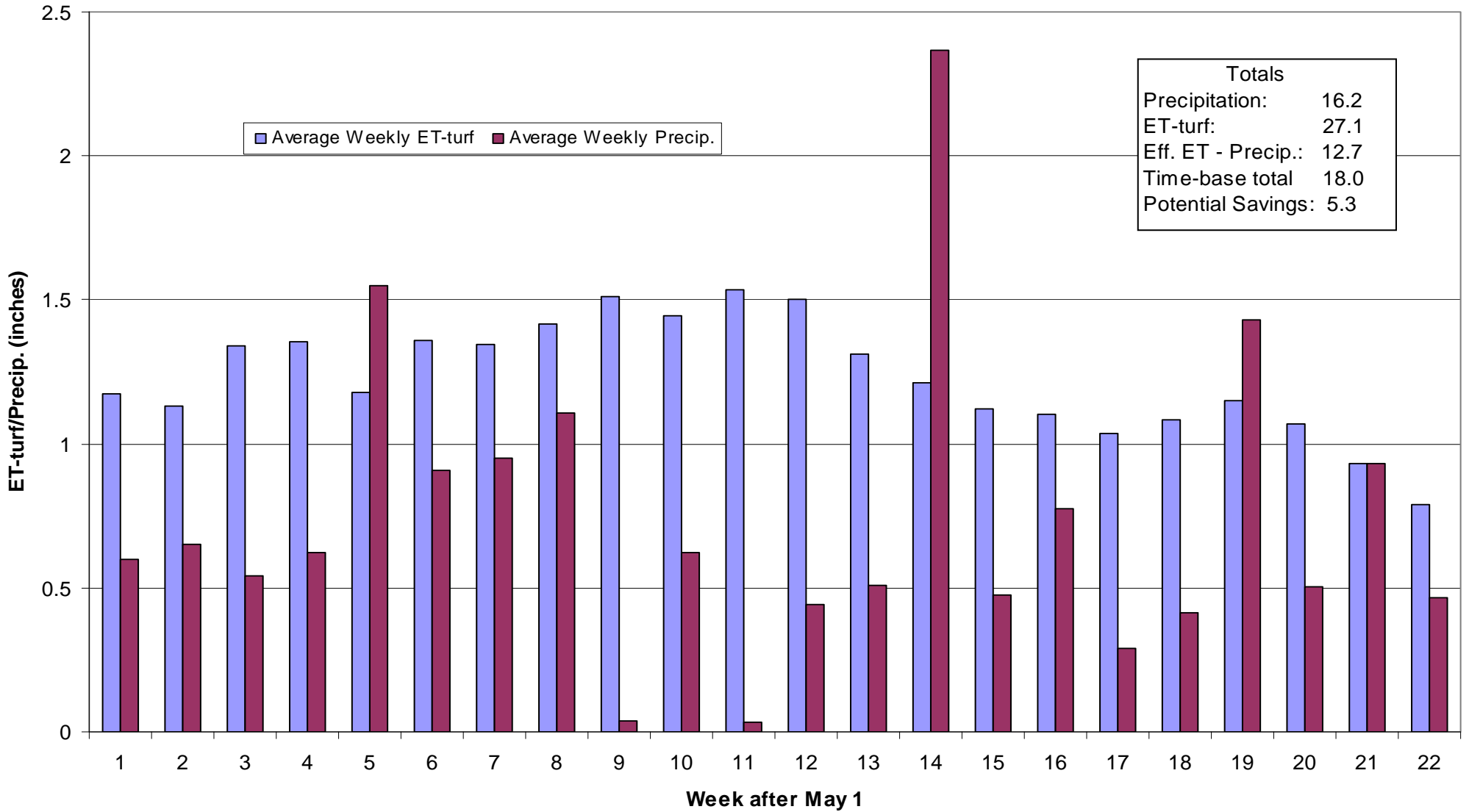
ET Water controller

- Each zone microclimate programmed in:
 - Exposure
 - Slope
 - Soil Type
 - Plant Type
 - Sprinkler Type
 - Est. Efficiency
 - Est. Precip Rate

Data Analysis

- Water use
- Turf quality survey
- Homeowner satisfaction survey

Where can savings be made?



Potential water savings of an ET-based controller system versus a time-based controller system

Year	ET	Precipitation	Weekly Deficit	Time-Based Irrigation Total	Potential Water Savings
2003	26.5	14.05	15.1	18	2.9
2004	24.3	11.8	16.1	18	1.9
2005	27.9	24.1	10.8	18	7.2
2006	30.2	14.2	21.3	18	-3.3
2007	26.6	17.0	16.3	18	1.7
Avg.	27.1	16.2	12.7	18	5.3

Impact

- Assess lawn watering savings
- Demonstration of turf differences
- Web page with water information
 - Current river stage
 - ET recommendations
 - Rainfall
 - Water information

Observations

Common problems in home
irrigation systems

Broken heads







Throwing
over hard
surfaces



Heads in borders,
blocked by plants



**Watering faster than soil can
absorb it=runoff and waste**



Other Issues (poor maint.!) ---

- Tilted heads
- Heads obstructed by fences, plants, etc.
- Low/high pressure
- Sunken heads
- Leaky/clogged heads
- Broken lines
- Arc misalignment
- Compaction/thatch/runoff

Acknowledgements

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Collaboration potential

- Readily move anywhere else – interest in SD already, Fargo, Grand Forks?
- Water quality specific
- Run-off issues from watering?
- Missouri River/drought