Climate Based Irrigation Controller Protocol

Karen Guz, SWAT
Technology Promotions Group Vice Chair
April 19, 2007

Topics

- SWAT History & Membership
- Goals of SWAT
- How SWAT functions
- Accomplishments toward goals
- Smart Controller Protocol
- Next Efforts

SmartWater APPLICATION TECHNOLOGIES

SWAT 2002-2007

Idea Started In 2002:

From a need for water utilities and irrigation industry to establish a working relationship.

Who & What:

Smart Water Application Technology (SWAT) is an international initiative to achieve exceptional landscape water use efficiency through the application of irrigation technology.

How:

SWAT identifies, researches and promotes technological innovations and related management practices that advance the principles of efficient water use.

SWAT Committee

- Our working group volunteers represent manufacturers, contractor/consultants, distributors, water purveyors and the Irrigation Association.
- Membership rotates with term limits.
- Monthly phone conferences and annual meetings.
- Funding comes from diverse contributions & is managed through Irrigation Association.
- SWAT Working Guidelines, meeting notes, major donors, annual reports, draft protocol etc. are all OPEN to any interested parties.

SmartWater APPLICATION TECHNOLOGIES

Road Map Since 2002

- 2003: First Education Plan on Smart Controllers
- 2004: First SWAT Website developed & Climatological Protocol approved
- 2005: First SWAT Education Materials created; Soil Moisture Sensor Protocol approved
- 2006: Updated Website with SWAT Education Toolkit & Selection of rain sensors as next technology to review & test.
- 2007: Many controller protocol reports posted on IA web site!

Controller Protocol Topics

- Why a bench test?
- Questions protocol set out to answer.
- Basic methodology of protocol.
- Protocol Policy & Common Questions
- Limits to this method..what are we NOT answering at this time?

Bench Testing; Start with Basics

- Climatological controllers should process real-time weather data and produce appropriate (efficient) irrigation schedules.
- When programmed for hypothetical plant material, and given weather data they should produce efficient schedules.
- How do we know if the schedules are appropriate?
  - Model theoretical output of controller and model water balance that would result.

Bench Test Advantages

1. Quick; no need to establish landscapes over and over.
2. Can program zones differently to test for variety of plant material.
3. Can program zones for variety of soil types and slopes.
4. Establishes a minimum controller should be able to accomplish before use in real world landscape.

CIT Test Set-Up

- Set-up program for virtual landscape by controller directions.
- No further intervention during test period.
- Test administrator at CIT monitors input for minimum time period, rainfall and ETo requirement.

SmartWater APPLICATION TECHNOLOGIES

Zone Parameters

- Soil Types
  - Loam, silty clay, loamy sand, sandy loam, clay loam and clay
- Slope Percent: 2%-20%
- Root Zone Storage: .55 inches-2.25inches
- Plant Types: cool/warm grass, woody, groundover
- Irrigation Type: pop-up, drip, rotors
- Irrigation Efficiency: 55-80%
- Precipitation Rate: .35 in./hr – 1.6 in./hr

SmartWater APPLICATION TECHNOLOGIES

Bench Test Duration

- Testing duration is 30 days.
- Controller must adjust for a minimum of 2.50 ETo and at least .4 inches of rainfall during test period.
- The moisture balance is developed and deficit and surplus for each zone calculated.

Irrigation Adequacy

- This represents how well irrigation met the needs of the plant material. Was enough water applied?
- No pass or fail score has been established by SWAT. But it has been acknowledged that a score between 80-100% will result in good landscape health.
- Most landscape plants maintain acceptable aesthetic appearance on significantly less than 100% replacement of ET.

Irrigation Excess

- This represents how much water was applied beyond the needs of the plant material.
- SWAT has not established a pass or fail score for Irrigation Efficiency.

What Doesn't Bench Testing Do?

- It does not tell us if each product is easy to use in every setting.
- It does not determine how the controller might function if the "smart signal" is not paid for anymore or the weather module is cut off.
- It does not tell us how a variety of plants might respond in the ground to irrigation plus rain in a variety of climate conditions.
- This list goes on….there are obviously a lot of questions for people to work on.

Policies for Testing

- Manufacturers have confidentiality during testing process. Only test administrator knows which products are being tested and their results.
- Test administrator determines appropriate time frame for completion of controller test.
- Test results do not have to be released if manufacturer does not wish to release them.
- Irrigation adequacy and irrigation excess are performance metrics reported on SWAT reports.
- The only official SWAT results are those posted on the IA web site.

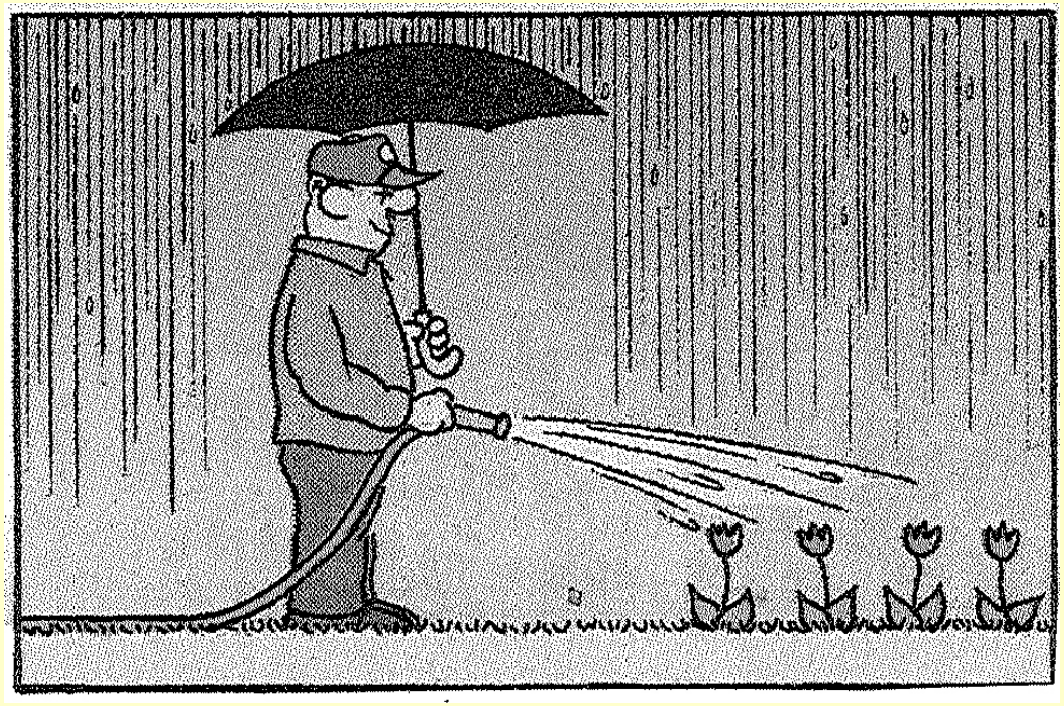
Testing Protocol Evolution

- Protocol can be found on the Irrigation Association SWAT web site.
- The SWAT Committee has reviewed our policies for updating testing protocol.
- We are sensitive to the need to post any potential changes are aware of the need for a comment period before implementation.

Frequent Questions

- Why only one test site? Why in Fresno?
- Why are test results confidential to manufacturers?
- Why no score that says what is passing?
- Can manufacturers test more than one time?
- Who provides the product to CIT for testing?

More Questions?



April 19, 2007