Drip Irrigation + Scheduling

Ken Futrell
4-5-2018
Topics Today

- Why do we irrigate?
- What is drip irrigation?
- Basic controller programing?
Water, Water Everywhere!

- The earth is 70% covered in Water...
- Only 2% of the water on earth is Potable...
- Of this 2%, 55% is used for Agriculture
- Of the remaining 45%, Landscape use 30-60%
Las Cruces is in the Chihuahuan Desert

8-9 in. rainfall per year/ 60-70 in. P.E.T.

Plants need water to grow

We must provide water for the plant growth

N.M.S.U. recommends 1-1.5 in of water per week on common Bermuda grass, summer
DESERTS OF NORTH AMERICA
Chihuahuan Desert
Learn To Conserve
So Where Does Las Cruces get it’s WATER?
Current Las Cruces Water Usage

- Average yearly production of 6.5 Billion gallons
- Daily production of approx. 18,000,000 gallons
- Per person daily average of 158 gallons per day per 115,000 people
- E.P. daily average 105 million gallons, 135 per person ,750,000
- A wall to wall grass golf course with 270+ rotors at 100 gpm can use
- 600,000-1,000,000 gallons of water per watering
- Plans for Rio Grande River Water usage.
WATER CONSERVATION IS THE NEW “HOT TOPIC”

- Water conservation affects everyone in this room
- Water conservation affects everyone in the world
- Water professionals must lead the movement
- Water will be the cause of future concerns and conflicts
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm
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http://droughtmonitor.unl.edu/
U.S. Drought Monitor

CONUS

January 13, 2015
(Released Thursday, Jan. 15, 2015)
Valid 7 a.m. EST

Drought Conditions (Percent)

<table>
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<tr>
<th>Current</th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3</th>
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<tr>
<td></td>
<td>55.38</td>
<td>44.62</td>
<td>27.97</td>
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<td>Last Week</td>
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<td>1/6/2015</td>
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<td>44.15</td>
<td>28.10</td>
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<td>3 Months Ago</td>
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<td>10/1/2014</td>
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<td>44.41</td>
<td>29.78</td>
<td>18.14</td>
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<td>Start of</td>
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<td>Water Year</td>
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<td>9/30/2014</td>
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<td>30.57</td>
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<td>47.43</td>
<td>52.57</td>
<td>34.39</td>
<td>19.03</td>
<td>6.3</td>
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Intensity:
- Yellow: Abnormally Dry
- D0: Abnormally Dry
- D1: Moderate Drought
- D2: Severe Drought
- D3: Extreme Drought
- D4: Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text statements for forecast statements.

Author(s):
Richard Tinker
CPC/NOAA/NWS/NCEP
North American Drought Monitor

June 30, 2011

Released: Friday, July 8, 2011

Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- Arrows delineate dominant impacts
- A = Agriculture
- H = Hydrological (Water)

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Regions in northern Canada may not be as accurate as other regions due to limited information.
Learn To Conserve
Plants transpire water

Water evaporates from surfaces, soils etc.

Evaporation + transpiration = Evapotranspiration

E.T. or P.E.T. Usually expressed in inches.

Las Cruces historic E.T. 67 in. Yr. vs 8” in rain

July 9.24, December 1.10

July on a hot day, .30-.40 in. E.T.
Basic Plant / Water Relationship

Basic Photosynthesis

- **Light Energy**
- **Carbon Dioxide**
- **Water**
- **Oxygen**
Water Conservation, City of El Paso

Water conservation methods:
• odd/even days. times 7-10
• Turf rebates
• Water audits
• Citations for runoff and mis-use
• Use of xeriscaping techniques
  native and low water use plants
• More usage of reclaimed and gray water
• Desalinization
• Tiered water rates.
• Toilet, swamp cooler rebates
How do we apply water?

- Spray Heads
- Impacts/Gear Drive Rotors
- Sub Surface
- Drip Irrigation
DRIP IRRIGATION SYSTEMS

Both reliable and simple to use, drip irrigation has stood out for years as an ultra-efficient watering method. By using a drip irrigation system, homeowners and farmers alike can enjoy next to zero water loss from evaporation or runoff as they satisfy their watering needs.

Rather simple to design and construct, there’s no reason why a drip irrigation system won’t work for you! Here’s a diagram of what it will take to get started.

Keep your plants watered and healthy without wasting water! Contact W.P. Law today to learn more about how you can enjoy the efficiency of drip irrigation on your property!
Backflow Prevention Device - Any approved device which prevents backflow or back siphonage by the introduction of air, use of check valves, or a combination of both principles.
Atmospheric Vacuum Breaker - A backflow prevention device which introduces air into the piping system to prevent back siphonage. No back pressure can exist for proper operation. Cannot be under constant pressure for more than 12 hours. Must be installed 6” higher than the highest sprinkler head or downstream outlet.
Spray heads

- Typically 10-18 ft. radius
- Many various nozzles
- .4 gpm to 4 gpm per minute
- P.R. .3 to 2.0 inches per hour
- 20-50% efficiency
Rotor Heads

- Gear drive, impact or ball driven
- Pop up, various heights or static
- .3 to 110 gallons per minute
- .45 to 1.2 in. P.R.
- 50-70% efficiency
Drip Irrigation Creation
How to Save Water
Low-volume Drip Basics

Spray systems deliver water at a rate of **gallons per minute (GPM)**

Drip systems deliver water in **gallons per hour (GPH)**
Drip emitters generally deliver water $\frac{1}{2}$ to 2 GPH
5, 7, 10, 12 and 24 GPH

Drip irrigation is perhaps the most efficient means of irrigating landscape plants if it is designed and installed correctly.
DRIP IRRIGATION ADVANTAGES

- Reduces loss through evaporation
- Eliminates runoff
- Does not spray leaves, petals, trunks thus reducing fungus potential
- Does not waste water irrigating surrounding areas (discourages weeds)
Drip valve assembly
Filters:
Pressure Regulators
Poly tubing and fittings
Compression Fittings
Types of sprayers
In line drip emitter
Drip (trickle) irrigation waters crops efficiently.
Credit: Nova Scotia Agriculture and Fisheries
Tree ring irrigation
How Long do we Irrigate?

- Turf type
- Et and climate data
- Precipitation rate of our sprinklers
- Soil type
- Water days or limits
We can waste water other ways.
Typical Controller

- 1. On/off switch
- 2. Program button
- 3. Valve run times
- 4. Toggle, time button
- 5. Start times
- 6. Day of week set
- 7. Seasonal adjust
Program to match calendar
Et and Climate data

Average Temperatures

- Daily high
- Average
- Daily low
- US average

Temperature ranges:
- Max: 100°F
- Min: 20°F

Months:
- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec
What is a “SMART” Irrigation Controller?

It is a controller that automatically adjusts irrigation watering times in response to environmental changes.

Generally done by ET data, stored, weather stations.

Smart controllers can reduce landscape watering by an Average of 15-30 per cent.

green-building-alliance
How much water do my plants need?

:Type of plant?
  Species
  Native or Non-native
  Water Requirements

:Soil conditions
  Type
  Compaction
  Depth and barriers

:Location of plants in landscape
  Exposure
  Slope
  Mass plantings
  Root depth and locations
Typical emitters per trees and shrubs

- Trees, typically 6-8 each 2 gph emitters equally spaced or 1 multi outlet emitter device per.

- Shrubs or groundcovers
  - 15 gallon typically 4-6 each 2 gph emitters
  - 5-7 gallon typically 2-3 each 2 gph emitters
  - 1 gallon typically 1-2 each 2 gph or 1 gph emitters
Soil Types can affect Irrigation...

Relative soil particle sizes:
- **Gravel**
- **Sand**
- **Silt**
- **Clay**

**Legend:**
- **mm**
- **inches**
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 1/16
  - 2/16
  - 3/16

Note: Clay is invisible at this scale.
Popular 21" model or unique 36" model available.

Handle is pliant and will not break in your hands.

Exclusive Drawn Probe cup cuts a soil core slightly smaller than the diameter of the tube, enabling the core to rise in the tube without breakage as the sampler is pushed into the soil.

Cutting edge won't bend when it strikes hard objects. Sampler is tempered to tool steel hardness to increase rigidity and strength.
Efficient

- Good Timing
- Depth of Water

Not Efficient

- Poor Timing
- Depth of Water
Questions ?