The TexasET Network and Website
http://texaset.tamu.edu

User’s Manual

By

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TexasET Network and Website

The TexasET Network and Website access and displays daily weather and ETo (potential evapotranspiration) data from over 30 weather stations across the State of Texas. The web address is [http://texaset.tamu.edu](http://texaset.tamu.edu). In addition to daily weather and ETo data, the website also displays weather parameters useful for crop management, including:

- heat units for cotton, corn, and sorghum
- heat units in terms of 50, 55 and 60 degrees
- daily wind run (miles per day)
- dew point temperature

Users can display sums of weather date over any date range desired and calculate irrigation runtimes.

The website also has interactive, easy to use calculators that allow users to determine the irrigation water requirements of crops and landscapes with drop down menus of Texas High Plains and all FAO crop coefficients. Users can also sign up for automatic email notifications of customized weather data and irrigation recommendations to be sent anytime from once a week to every day. Other tools allow users to download weather and ETo data as well.

The website offers many features at users can access such as:

- Long-term averages of weather data and ETo for 19 locations in Texas
- Bulletin 6019 of Texas crop consumptive water data (useful for certain water planning and permitting activities)
- Weather station maintenance and wiring guidelines

TexasET Network and Website was established in 1994 by Guy Fipps to support agricultural and landscape irrigation in the State of Texas. TexasET is a program of the Irrigation Technology Program and the Texas AgriLife Extension Service administered through the Biological and Agricultural Engineering Department at Texas A&M University in College Station, Texas.

What is Evapotranspiration?

Evapotranspiration (ET) is a measurement of the total amount of water needed to grow plants and crops. This term comes from the words evaporation (i.e., evaporation of water from the soil) and transpiration (i.e., transpiration of water by plants). Different plants have different water requirements, so they have different ET rates.

To simplify the calculation of ET rates for individual plants and crops, the website reports the potential Evapotranspiration, ETo or PET (note: the potential evapotranspiration is referred to as both ETo and PET). ETo is the water requirements for a cool season grass growing 4-inches
tall under well-watered conditions. Crop and plant coefficients are then used along with ETo to determine the actual irrigation requirement (i.e., the “ET”) of specific crops and plants. The technical term for this is the "Potential Evapotranspiration of a Grass Reference Crop" or "ETo" for short.

The TexasET website uses the standardized Penman-Monteith method to calculate ETo from the weather station data. This is one of a number of methods that can be used to determine ETo and ET. Several organizations, such as the International Committee on Irrigation and Drainage, the FAO (Food and Agricultural Organization) of the United Nations, and the American Society of Civil Engineers, have proposed establishing the Penman-Monteith method as a world-wide standard. Such a standard would help facilitate the sharing of ETo data and development of crop coefficients.

ETo depends on the climate and varies from location to location. Special weather stations are used to collect the climatic data for calculating ETo, including temperature, dew point temperature (relative humidity), wind speed, and solar radiation.

The water requirements of specific crops and turf grasses can be calculated as a fraction of the ETo. This "fraction" is the called the crop coefficient (Kc) or turf coefficient (Tc). Crop coefficients vary depending on the type of plant and its stage of growth. Detailed information on crop and turf coefficients and how to use them is presented at other locations on this Web Site.
Using the TexasET Website

Viewing the ET and Weather Data

Step 1. To Access the daily ET and Weather nearest to you click on the County (highlighted blue) nearest to you or use the Current Stations drop down menu.
Step 2. Some counties contain multiple weather stations. In this case a second map will appear for you to choose from. Once you have chosen a station, click on the name.

Step 3. After you have clicked on a weather station, a 7 day ETo and weather summary will be displayed.

Other day summary periods such as 3 day, 5 day and 7 day can be selected using the link under the weather summary.
Step 4. By clicking on **Detailed Weather and Heat Units** under the weather summary, the following table comes up which gives detailed information on heat units and other weather data.

### Detailed Weather and Heat Units

<table>
<thead>
<tr>
<th>Date</th>
<th>Mean Temp (°F)</th>
<th>High Temp (°F)</th>
<th>Low Temp (°F)</th>
<th>Heat Units (DH)</th>
<th>Wind Speed (Mph)</th>
<th>Wind Direction (Degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-01-21</td>
<td>32</td>
<td>40</td>
<td>24</td>
<td>12</td>
<td>10</td>
<td>270</td>
</tr>
<tr>
<td>2011-01-22</td>
<td>33</td>
<td>41</td>
<td>25</td>
<td>15</td>
<td>12</td>
<td>240</td>
</tr>
<tr>
<td>2011-01-23</td>
<td>34</td>
<td>42</td>
<td>26</td>
<td>18</td>
<td>14</td>
<td>210</td>
</tr>
<tr>
<td>2011-01-24</td>
<td>35</td>
<td>43</td>
<td>27</td>
<td>21</td>
<td>16</td>
<td>180</td>
</tr>
<tr>
<td>2011-01-25</td>
<td>36</td>
<td>44</td>
<td>28</td>
<td>24</td>
<td>18</td>
<td>150</td>
</tr>
</tbody>
</table>

### Using the Irrigation Scheduling Tools

**Step 1.** To use the Crop Irrigation Scheduling Tool, Click on the **Crop Irrigation** Button displayed above each weather summary.
The Crop Water Requirement Calculator will appear. (Note: to continue viewing the weather data click on **Show Weather Data** above the calculator). The calculator will automatically contain the total ET_{0} for the last 14 days or the period chosen (i.e. 3 day summary, 7 day summary).

**Weslaco Annex Farm Weather Station**  
**Station Sponsored by:** Texas Agrilife Research  
**Show Weather Data**

### Crop Water Requirement Calculator

<table>
<thead>
<tr>
<th>ETo(\text{pet})</th>
<th>[1.54 \text{(in)}]</th>
</tr>
</thead>
</table>

#### Crop Selection

1. **ETo value from weather data**

#### Growth Stage

2. **Select a crop coefficient**
   - **FAO Coefficients**
   - **Texas High Plains Coefficients**

3. **Select a crop growth stage**

#### Crop Coefficient

4. **Crop coefficient from growth stage**
   - **Crop Coefficient =**

#### System Efficiency

5. **Enter your system efficiency**
   - **System Efficiency = 100 \text{%}\)**

#### Effective Rainfall

6. **Effective Rainfall**
   - **Effective Rainfall =**

#### Calculate your total watering requirement

7. **Compute**
   - **Total Water Requirement (ET) =**

### System Parameters

- **Precipitation Rate**
- **Total Run Time**
- **Irrigations/Week**
- **Run Time/Irrigation**

### Calculations

- **Calculate Run Time**

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Step 2. The next step is to select the crop that you are irrigating. The TexasET Website offers a variety of crop coefficients compiled by the Food and Agriculture Organization (FAO) as well as a short list of crop coefficients developed in the Texas High Plains.

![Crop Water Requirement Calculator](image)

Step 3. Once the crop is selected, choose the growth stage of the crop. In this example we will use Full Season Corn from the Texas High Plains Coefficients at the tassel stage of growth.

![Crop Water Requirement Calculator](image)
Step 4. After selection of the stage of growth, the crop coefficient appears in the calculator.

Step 5. Next enter the efficiency of your irrigation system. Some common efficiencies can be found by clicking on system efficiency.

Typical Overall On-Farm Efficiencies For Various Types Of Irrigation Systems.

- **Surface**
  - average: 0.5
  - land leveling and delivery pipeline meeting desiging standards: 0.7
  - tailwater recovery: 0.8
  - surge: 0.8-0.9

- **Sprinkler**
  - overall efficiency: 0.55-0.75

- **Center Pivot**
  - overall efficiency: 0.55-0.95

- **EPA**
  - overall efficiency: 0.90-0.95

- **Drip**
  - overall efficiency: 0.80-0.92

**Footnotes:**
1. Surge has been found to increase efficiencies 8 to 28 percent over non-surge furrow systems.
2. Trickle systems are typically designed at 90 percent efficiency; short laterals (<100 ft) or systems with pressure compensating emitters may have higher efficiencies.
3. Under low wind conditions.
Step 6. For our example we will use an efficiency of 90%. To calculate the total watering requirement, click on the **Compute** button. The Total Water Requirement for our crop is 1.71 inches.

The Crop Water Requirement Calculator will also calculate the run time for your irrigation system. To calculate your systems run time enter the Precipitation Rate (in inches per hour) and the number of irrigation per week you will perform; then click the **Calculate Run Time** button and the Total Run Time and Run Time Per Irrigation will be Calculated.
Frequent TexasET Users

Frequent TexasET Users have the ability to create a profile to setup multiple sites to have the option to receive automated emails with personalized watering recommendations.

Creating a Login Profile

To create a profile, click on Login on the left menu of the TexasET website.

Step 1. Select the option I need to create an account, the next screen will ask for an email address. Enter your email address and click Create New Account.
Step 2. If your email address is accepted, the following information is required.

Step 3. Once you have entered all the user information and clicked that Agriculture box, Submit the information. The following box will appear. Go ahead and click on add site to continue.

Step 4. To Create an Ag Site, enter-select the criteria for your site. The criteria are the same for using the online scheduling tools. Once everything is entered, click on Add Site and you will begin receiving emails on your selected days.
Below is an example of the email you will receive.

From: TexasET Network <no-reply@texaset.tamu.edu>
To: Charles L. Swanson
Cc: 
Subject: TexasET Network Landscape Watering Recommendations - "San Antonio"

Login to your TexasET profile

IRRIGATION TECHNOLOGY PROGRAM

Texas ET Network Landscape Watering Recommendations - "San Antonio"

Watering recommendation for "San Antonio" for the past 7 days: 0.61 inches*

<table>
<thead>
<tr>
<th>Date</th>
<th>ETo</th>
<th>Max Temperature</th>
<th>Min Temperature</th>
<th>Min Humidity</th>
<th>Total Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-26-2013</td>
<td>0.21</td>
<td>88</td>
<td>74</td>
<td>49</td>
<td>0.02</td>
</tr>
<tr>
<td>08-27-2013</td>
<td>0.2</td>
<td>91</td>
<td>74</td>
<td>44</td>
<td>0</td>
</tr>
<tr>
<td>08-28-2013</td>
<td>0.21</td>
<td>94</td>
<td>75</td>
<td>37</td>
<td>0</td>
</tr>
<tr>
<td>08-29-2013</td>
<td>0.23</td>
<td>98</td>
<td>74</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>08-30-2013</td>
<td>0.31</td>
<td>100</td>
<td>77</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>08-31-2013</td>
<td>0.28</td>
<td>96</td>
<td>77</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>09-01-2013</td>
<td>0.26</td>
<td>98</td>
<td>76</td>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>

NOTE: These reported values are hourly averages, not absolute highs and lows.

* Recommendations based on the following parameters (assuming no rainfall):
Adjust this watering recommendation for any rainfall that you have received during this time period.

TexasET Weather Station: San Antonio North
Plant Coefficient: Warm Season
Adjustment factor: Normal

This information is provided by the "Irrigation Technology Program" under the direction of Dr. Guy Singh. If you would like to discontinue service please click on the link above to log into your TexasET profile. To discontinue service for only this station select "modify" from your site list and delete the site. To discontinue all TexasET emails select "Modify your user profile" and uncheck "Receive watering recommendations by email."

This email was sent to charleslswanson@tamu.edu by Texas A&M AgriLife Extension

Texas A&M AgriLife Extension 600 John Kimbrough BLVD, Suite 500 7101 TAMU College Station, TX 77845-7101
Contacts

If you have any questions about the TexasET Network contact:

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