



The TexasET Network and Website

<http://texaset.tamu.edu>

User's Manual

By

Charles Swanson and Guy Fipps¹

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**Texas AgriLIFE Extension Service
Texas A&M System**

¹Extension Program Specialist; and Professor & Extension Agricultural Engineer, Director, Irrigation Technology Program

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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>. 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 data 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 that 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

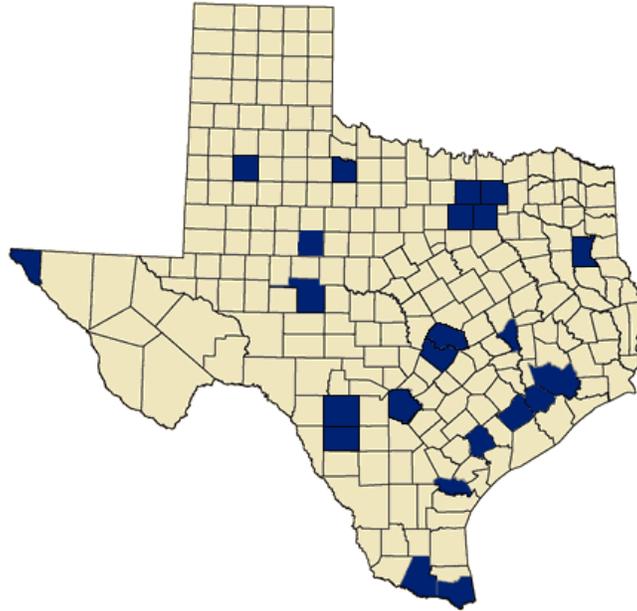
tall under well-watered conditions. Crop and plant coefficients are then used along with ETo to determine the actual irrigation requirement (i.e., the "ET") of specific crops and plants. The technical term for this is the "**Potential Evapotranspiration of a Grass Reference Crop**" or "**ETo**" for short.

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 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.

A screenshot of the TexasET website interface. The top navigation bar includes the Texas A&M AgriLife Extension logo, the title "Irrigation Technology Program Texas ET Network", and a search bar. Below the navigation bar, there are links for "Home", "Irrigation District Program", "School of Irrigation", and "TexasET Network". The main content area features a date "September 3, 2013" and a list of navigation links: "Home", "Login", "ET and Weather Data", "Weather Stations", "Coefficients", "Useful Information", "Irrigation Demonstrations", "Links", and "Contacts". The main content area also contains a description of TexasET, two dropdown menus for "Current Stations" and "Historic Stations", and a map of Texas with station locations highlighted in blue. A small text box below the map provides instructions on how to select a station.

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.

The screenshot shows the 'Irrigation Technology Program Texas ET Network' website. A map of the Lower Rio Grande Valley is displayed, showing weather stations in Hidalgo, Willacy, and Cameron counties. A legend indicates station statuses: Online (red diamond), Temporarily Offline (yellow diamond), and Discontinue (Historical Data Only) (blue diamond). A 'Select Station' dropdown menu is visible at the top of the map area.

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

The screenshot shows the 'Weslaco Annex Farm Weather Station' page. It features three images: Home Watering, Turf/Landscape Irrigation, and Crop Irrigation. Below the images is a table with the following data:

Date	ET _o ET (in)	T _{max} (F)	T _{min} (F)	RH _{min} (%)	Solar (MJ/m ²)	Rain (in)	Wind 4am (mph)	Wind 4pm (mph)
2013-08-27	0.18	91	75	32	17.49	0.26	0.63	5.74
2013-08-28	0.20	94	73	45	20.23	0.00	0.63	5.76
2013-08-29	0.18	92	74	54	18.62	0.00	0.63	5.34
2013-08-30	0.23	96	73	40	23.59	0.00	0.63	6.60
2013-08-31	0.27	97	74	37	23.61	0.00	0.68	6.59
2013-09-01	0.28	97	75	39	23.89	0.00	1.42	9.78
2013-09-02	0.20	94	76	47	17.27	0.08	2.24	7.81
7 Day Summary	1.54	94	74	45	20.67	0.34	0.98	6.94

Note: Reported are the average hourly values, not the absolute highs and lows.
[3 day summary](#) | [5 day summary](#) | [7 day summary](#) | [other day range](#)

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.


Irrigation Technology Program
Texas ET Network

[Home](#) | [Irrigation District Program](#) | [School of Irrigation](#) | [TexasET Network](#)

September 3, 2013

[Home](#)
[Login](#)
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Weslaco Annex Farm Weather Station

Date	ET _o PET (in)	Temp (F) Avg	DewPoint (F)		Heat Units (F)					Wind Run miles per-hour	
			Max	Min	Corn	Cotton	Sorghum	50 degree	55 degree		60 degree
2013-08-27	0.18	82	77	66	30	23	28	33	28	23	84
2013-08-28	0.20	83	77	65	30	24	29	34	29	24	68
2013-08-29	0.18	82	77	67	30	23	28	33	28	23	67
2013-08-30	0.23	83	76	65	29	24	29	34	29	24	78
2013-08-31	0.27	84	75	64	30	25	30	35	30	25	116
2013-09-01	0.28	85	75	66	30	26	31	36	31	26	137
2013-09-02	0.20	83	75	66	31	25	30	35	30	25	105
7 Day Summary	1.54	83	76	66	210	170	205	240	205	170	655

[3 day summary](#) | [5 day summary](#) | [7 day summary](#) | [other day range](#)

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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.


Irrigation Technology Program
Texas ET Network

[Home](#) | [Irrigation District Program](#) | [School of Irrigation](#) | [TexasET Network](#)

September 3, 2013

[Home](#)
[Login](#)
[ET and Weather Data](#)
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[Home Watering](#) [Turf/Landscape Irrigation](#) [Crop Irrigation](#)



Weslaco Annex Farm Weather Station
Station Sponsored by : Texas AgriLife Research

Date	ET _o PET (in)	Tmax (F)	Tmin (F)	RHmin (%)	Solar (MJm ²)	Rain (in)	Wind 4am (mph)	Wind 4pm (mph)
2013-08-27	0.18	91	75	52	17.49	0.26	0.63	6.74
2013-08-28	0.20	94	73	46	20.23	0.00	0.63	5.76
2013-08-29	0.18	92	74	54	18.62	0.00	0.63	5.34
2013-08-30	0.23	96	73	40	23.59	0.00	0.63	6.60
2013-08-31	0.27	97	74	37	23.61	0.00	0.68	6.59
2013-09-01	0.28	97	75	39	23.89	0.00	1.42	9.76
2013-09-02	0.20	94	76	47	17.27	0.08	2.24	7.91
7 Day Summary	1.54	94	74	45	20.67	0.34	0.98	6.94

Note: Reported are the average hourly values, not the absolute highs and lows.

[3 day summary](#) | [5 day summary](#) | [7 day summary](#) | [other day range](#)

Detailed Weather and Heat Units

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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 ETo 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

ETo(pet)

1. ETo value from weather data (in)

Crop Selection

2. Select a crop coefficient

FAO Coefficients

Or

Texas High Plains Coefficients

Growth Stage

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 = (%)

Effective Rainfall

6. Effective Rainfall Effective Rainfall = (in)

Calculate your total watering requirement

7. Total Water Requirement (ET) = (in)

Precipitation Rate	<input type="text" value="0"/>	(in/hr)
Total Run Time	<input type="text" value="0"/>	(min)
Irrigations/Week	<input type="text" value="1"/>	(count)
Run Time/Irrigation	<input type="text" value="0"/>	(min)

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.

The screenshot shows the 'Crop Water Requirement Calculator' interface. The 'ETo(pet)' field is set to 1.54 (in). Under 'Crop Selection', the 'Texas High Plains Coefficients' dropdown is open, showing a list of crops including Cabbage, Carrots, Cauliflower, Celery, Garlic, Lettuce, Onions dry, Onions green, Onions seed, Spinach, Radish, Egg Plant, Sweet Peppers (bell), Tomato, and Cucumbers. The 'Calculate your total watering requirement' section shows a 'Compute' button and a 'Total Water Requirement (ET) = ' field.

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.

The screenshot shows the 'Crop Water Requirement Calculator' interface with 'Corn (Full Season)' selected in the 'Texas High Plains Coefficients' dropdown. The 'Growth Stage' dropdown is open, showing options like 2-Leaf, 4-Leaf, 6-Leaf, 8-Leaf, 10-Leaf, 12-Leaf, 13-Leaf and above, Tassel, Silk, Blister, Milk, Dough, Dent, 1/2 Mat, and Black Layer. The 'Calculate your total watering requirement' section shows a 'Compute' button and a 'Total Water Requirement (ET) = ' field.

Step 4. After selection of the stage of growth, the crop coefficient appears in the calculator.

Crop Water Requirement Calculator

ETo(pet)

1. ETo value from weather data (in)

Crop Selection

2. Select a crop coefficient
 FAO Coefficients
 Or
 Texas High Plains Coefficients

Growth Stage

3. Select a crop growth stage

Crop Coefficient

4. Crop coefficient from growth stage Crop Coefficient = 1.20

System Efficiency

5. Enter your system efficiency System Efficiency = (%)

Effective Rainfall

6. Effective Rainfall Effective Rainfall = (in)

Calculate your total watering requirement

7. Total Water Requirement (ET) = (in)

Precipitation Rate (in/hr)

Total Run Time (min)

Irrigations/Week (count)

Run Time/Irrigation (min)

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

Crop Water Requirement Calculator

ETo(pet)

1. ETo value from weather data (in)

Crop Selection

2. Select a crop coefficient
 FAO Coefficients
 Or
 Texas High Plains Coefficients

Growth Stage

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 (%)

Effective Rainfall

6. Effective Rainfall Effective Rainfall = (in)

Calculate your total watering requirement

7. Total Water Requirement (ET) = (in)

Precipitation Rate (in/hr)

Total Run Time (min)

Irrigations/Week (count)

Run Time/Irrigation (min)

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

System	Overall Efficiency
Surface	0.5-0.8
- average	0.5
- land leveling and delivery pipeline meeting desing standards	0.7
- tailwater recovery	0.8
- surge	0.6-0.9 ¹
Sprinkler	0.55-0.75 ³
Center Pivot	0.55-0.90 ³
LEPA	0.90-0.95
Drip	0.80-0.90 ²

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 (<100ft) 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.

Crop Water Requirement Calculator

ETo(pet)

1. ETo value from weather data 1.54 (in)

Crop Selection

2. Select a crop coefficient

FAO Coefficients Select a crop...

Or

Texas High Plains Coefficients Corn (Full Season)

Growth Stage

3. Select a crop growth stage Tassel

Crop Coefficient

4. Crop coefficient from growth stage Crop Coefficient = 1.20

System Efficiency

5. Enter your system efficiency System Efficiency = 90 (%)

Effective Rainfall

6. Effective Rainfall Effective Rainfall = 0.34 (in)

Calculate your total watering requirement

7. Compute Total Water Requirement (ET) = 1.71 (in)

Calculate Run Time

Precipitation Rate 0 (in/hr)

Total Run Time 0 (min)

Irrigations/Week 1 (count)

Run Time/Irrigation 0 (min)

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.

Calculate your total watering requirement

7. Compute Total Water Requirement (ET) = 1.71 (in)

Calculate Run Time

Precipitation Rate 1.5 (in/hr)

Total Run Time 69 (min)

Irrigations/Week 1 (count)

Run Time/Irrigation 69 (min)

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.

The screenshot shows the TexasET website interface. At the top left is the Texas A&M AgriLife Extension logo. The main header includes the text "Irrigation Technology Program" and "Texas ET Network". A search bar is located at the top right. A navigation menu on the left lists various options, with "Login" highlighted in a green box. The main content area features a "Create a free Login Profile" section with a sub-header "TexasET Account Login". Below this, there are three radio button options: "I already have an account" (selected), "I need to create an account", and "I forgot my password". There are also input fields for "Email Address:" and "Password:" with "Go" buttons next to them. A "Login" button is positioned below the password field. The footer contains copyright information and links for "Search", "Contact", and "Webmaster".

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.

This is a close-up of the "TexasET Account Login" form. It features a title bar "TexasET Account Login" in an orange box. Below the title are three radio button options: "I already have an account", "I need to create an account" (which is selected), and "I forgot my password". Below these options is an "Email Address:" label followed by a text input field with a "Go" button. A horizontal line separates this section from a "Create New Account" button, which is highlighted with a green border.

Step 2. If your email address is accepted, the following information is required.

Your email has been accepted.

STEP 2: FILL IN ALL INFORMATION

Email	<input type="text"/>
Password	<input type="text"/>
First Name	<input type="text"/>
Last Name	<input type="text"/>
Address	<input type="text"/>
City	<input type="text"/>
State	<input type="text"/>
Zip	<input type="text"/>

Agriculture and/or Landscape Agriculture Landscape

receive ET/weather summary by email

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.

[modify your user profile](#)

Agriculture Sites - add site

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.

EDIT AN AG SITE

Description	<input type="text"/>
Station	<input type="text" value="Select a Station ..."/>
FAO Crop Coefficients	<input type="text" value="Select A Crop Type"/>
Or	
Texas High Plains Coefficients	<input type="text" value="Select A Crop Type"/>
Growth Stage	<input type="text" value="Initial"/>
System Efficiency	<input type="text"/> ex. 0-100
Day(s) in online weather summary	<input type="text"/> ex. 0-30
Day(s) to receive emails	<input type="checkbox"/> Mo <input type="checkbox"/> Tu <input type="checkbox"/> We <input type="checkbox"/> Th <input type="checkbox"/> Fr <input type="checkbox"/> Sa <input type="checkbox"/> Su
Would you like a weather summary in your emails?	<input type="radio"/> Yes, receive weather summary <input checked="" type="radio"/> No, only watering recommendations

Below is an example of the email you will receive.

From: TexasET Network <no-reply@texaset.tamu.edu> Sent: Mon 9/2/2013 8:00 AM
To: Charles L. Swanson
Cc:
Subject: TexasET Network Landscape Watering Recommendations - "San Antonio"

[Login to your TexasET profile](#)



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

Date	ETo	Max Temperature	Min Temperature	Min Humidity	Total Rainfall
08-26-2013	0.21	88	74	49	0.02
08-27-2013	0.2	91	74	44	0
08-28-2013	0.21	94	75	37	0
08-29-2013	0.23	98	74	30	0
08-30-2013	0.31	100	77	27	0
08-31-2013	0.28	99	77	32	0
09-01-2013	0.26	98	76	30	0

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 Fipps](#). 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 clswanson@aq.tamu.edu by [Texas A&M AgriLIFE Extension](#)
Texas A&M AgriLIFE Extension 600 John Kimbrough BLVD, Suite 509 7101 TAMU College Station, TX 77843-7101

Contacts

If you have any questions about the TexasET Network contact:

Charles Swanson

Extension Program Specialist
Texas AgriLife Extension
2117 Texas A&M University
College Station, TX 77843
Phone: (979) 845-5614
clswanson@ag.tamu.edu

Dr. Guy Fipps

Professor & Extension Specialist - Irrigation
Department of Biological and Agricultural Engineering
Texas A&M University
College Station, TX 77843-2117
(979)845-7454
g-fipps@tamu.edu