What are the Texas Evapotranspiration (ET) Networks?

What is evapotranspiration (ET) and why is it important to groundwater users?

Evapotranspiration (ET) measures the amount of water needed to grow plants and crops. Different plants have different water requirements. This means they have different ET rates. When water users like farmers and homeowners use evapotranspiration data to understand the true water requirements of their plants, they may be able to reduce their water use. This information is useful for homeowners and businesses that water landscapes and can be especially impactful for farmers that use groundwater to irrigate their crops.

What is reference evapotranspiration (ET_0)?

The term *reference evapotranspiration* (ET_0) means the water requirements of a cool season grass growing four inches tall under well-watered conditions. ET_O is used along with crop coefficients and plant factors to determine the actual water requirements (or ET) of crops and plants.

ET_O depends on the climate and varies from location to location. The climatic data used in calculating ET includes:

- Temperature
- Dew point temperature (relative humidity)
- Wind speed
- Solar radiation

What is an ET Network?

An ET Network is a collection of weather stations that use special sensors and methodologies to calculate ET and provide watering recommendations to end users.

While there are many existing weather station networks, not all meet the criteria for ET_O data collection. For example, the National Weather Service stations do not have solar radiation sensors and cannot be used to directly determine ET. Another factor that is important for data collection is the location of the stations. ET stations are sited in large open grassy areas, receive full sun, and the wind is not blocked by trees or buildings.

How does an ET Network operate?

- Special weather stations (see Figure 1) measure the parameters needed for the calculation of reference evapotranspiration (ET_O).

- The network calculates ET_o, which is used to determine plant water requirements and irrigation needs.

- The network disseminates the plant water requirements and irrigation needs to end users. This is accomplished through on-line access, on-line tools, emails, push notifications, and other methods.

Figure 1. ET Weather Station

What is the TexasET Network?

The TexasET Network is the only network in Texas that meets all of the ET Network criteria listed above. This network began in 1994 and consists of 88 weather stations statewide. Currently, TexasET Network is incorporating data from 26 stations of the Texas Water Development Board's (TWDB's) TexMesonet that meet ET station sensor and siting requirements. Additional TexMesonet stations are being evaluated for future

incorporation into the TexasET Network. Funding for the TexasET Network comes from short courses, contracts, grants, and fees. Much of the funding for the weather stations depend on local sponsors. Sustainable funding is necessary to continue TexasET Network.

The TexasET Network website displays daily weather and ET_o data, heat units, and other data. It also offers interactive, easy-to-use calculators that allow users to determine the irrigation water requirements of crops and landscapes. Users can download data directly from the website or set up automatic email notifications of customized weather data and irrigation recommendations.

What is *WaterMyYard* and how does it relate to the TexasET Network?

The *WaterMyYard* (WMY) program uses stations in the TexasET Network to calculate ET data and delivers watering recommendations to residents of 11 participating cities, water districts, and public utilities. The program focuses on home landscapes of warm season grasses such as St. Augustine, Bermuda, Zoysia, and Buffalo grass. Users can receive weekly texts, emails, and push notifications with recommendations for irrigation system runtimes, along with any applicable information on local watering restrictions.

The Irrigation Technology Program of the Texas A&M AgriLife Extension Service partnered with the North Texas Water Municipal Water District and piloted WMY in 2013. This program received the Blue Legacy Award for responsible management of water resources in 2015 and released Android and iOS apps in 2020.

Even with little understanding of ET, residents in sponsored areas can set up a personal profile and configure their yard and notification preferences. Users are encouraged to use “catch can” tests to determine precipitation rates, or they can select their precipitation rate based on their equipment and spacing.

With continued support and growing interest from new partners of the *WaterMyYard* program, the TexasET Network has added 44 stations to its ET network to provide accurate data for the urban areas participating in *WaterMyYard*.

Are there any discontinued ET Networks in Texas?

At one time, Texas had five ET networks operating in different regions of the state. Due to funding issues, there is currently only one ET Network. The discontinued networks had been programs of Texas A&M AgriLife Research.

- In 1994, the North High Plains Potential Evapotranspiration (PET) Network launched, and the South High Plains PET Network launched a few years later. These two networks were merged to form the Texas High Plains PET Network, which ceased operation in 2013.

- In 2000, the Crop Weather Program for South Texas launched. This program focused on the Coastal Bend region and aimed to provide data for use by cotton farmers. This network ceased operation in 2017.

- There are also two smaller regional ET networks that are no longer are in operation. These are the Precision Irrigators Network from Uvalde and the South Texas Weather Network from Weslaco.

Are there any other related weather station networks?

There are two ET-related weather station networks in Texas. While these do not meet the definition of an ET Network, some of their stations have all the required sensors and are sited properly for determination of ET_0:

- The West Texas Mesonet (WTM) project provides free real-time data for residents of the South Plains region of western Texas. Established in 1999, the network covers 54 counties in Texas and New Mexico with 77 surface meteorological weather stations. The WTM posts daily ET_0 values, but it is not considered an ET network. WTM does not have a notification program or tools for determining irrigation requirements and not all stations are sited properly for ET determination.

- In 2016 the Texas Water Development Board launched the TexMesonet. TexMesonet is unique because it consists of its own weather stations and serves as a "network of networks." This means that TexMesonet includes its own data as well as data from other stations and networks. There are currently 85 rural area stations in the Network that are maintained by TWDB. Many of these stations measure all the parameters needed for calculation of ET_0 and are sited properly for ET determination. The TexMesonet does not offer a notification program or tools for determining irrigation requirements for end users.

Resources and Useful Links

- TexasET Network, https://texaset.tamu.edu/

- *WaterMyYard*, https://watermyyard.org/

- West Texas Mesonet, https://www.mesonet.ttu.edu/

- TexMesonet, https://www.texmesonet.org/

Other Frequently Asked Questions (FAQs)

To find additional FAQs visit the Texas Groundwater Protection Committee's FAQ webpage at https://tgpc.texas.gov/frequently-asked-questions-faqs.