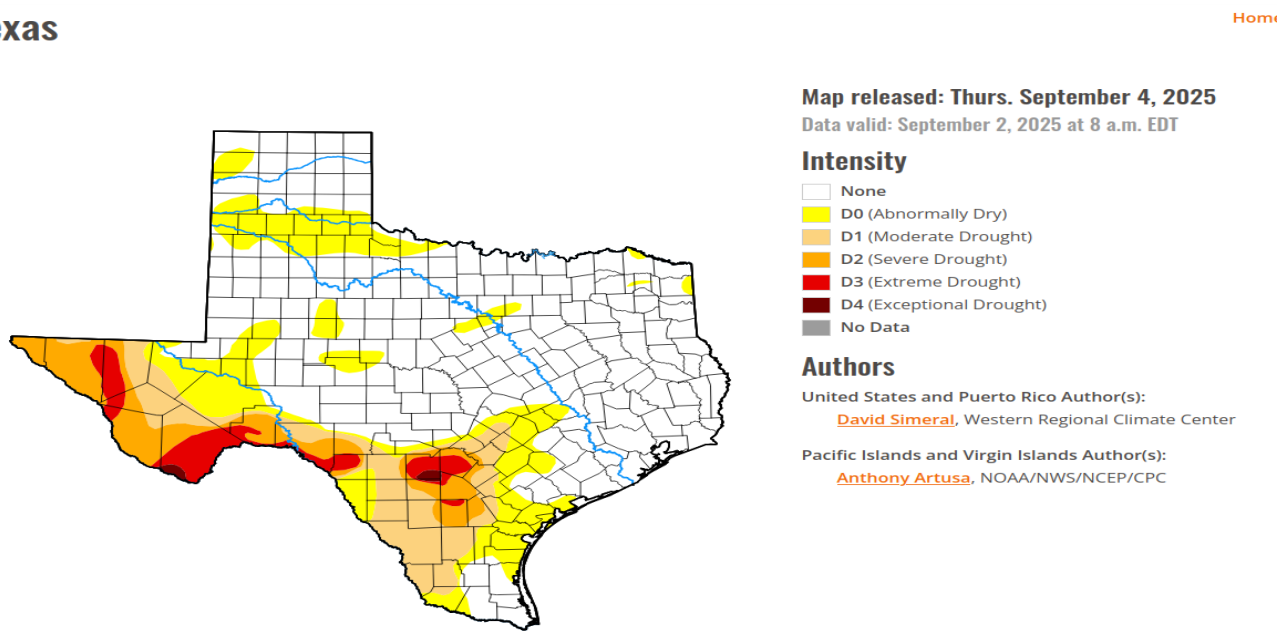
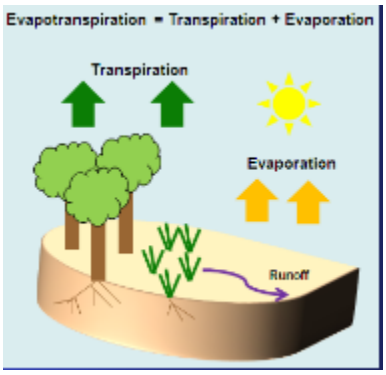
Bi-monthly Educational Topic #17 for CCGCD
by Texas Hill Country Weather Services, LLC
September 8, 2025

Current conditions:

As of September 4, 2025, approximately 50% of the county remains in drought, the southern half. The intensity of the drought ranges from D0 (abnormally dry) to D2 (severe drought). Despite our Summer rains in August, our drought continues. Even though this Summer has not been typical, we have entered into a more usual September weather pattern meaning increased rainfall frequency. Drought could be completely removed from Kendall County soon, at least, for a short-term duration in time. Our tropics are also expected to get active again, especially for the Gulf and Caribbean regions, and this weather pattern is going to still give us chances of more rainfalls through the rest of September and into at least the middle portion of October.



A while back we learned about reference (or potential) evapotranspiration (ET_o) and how the District uses such real-time calculated data for making decisions related to water restriction drought stages for Kendall County.

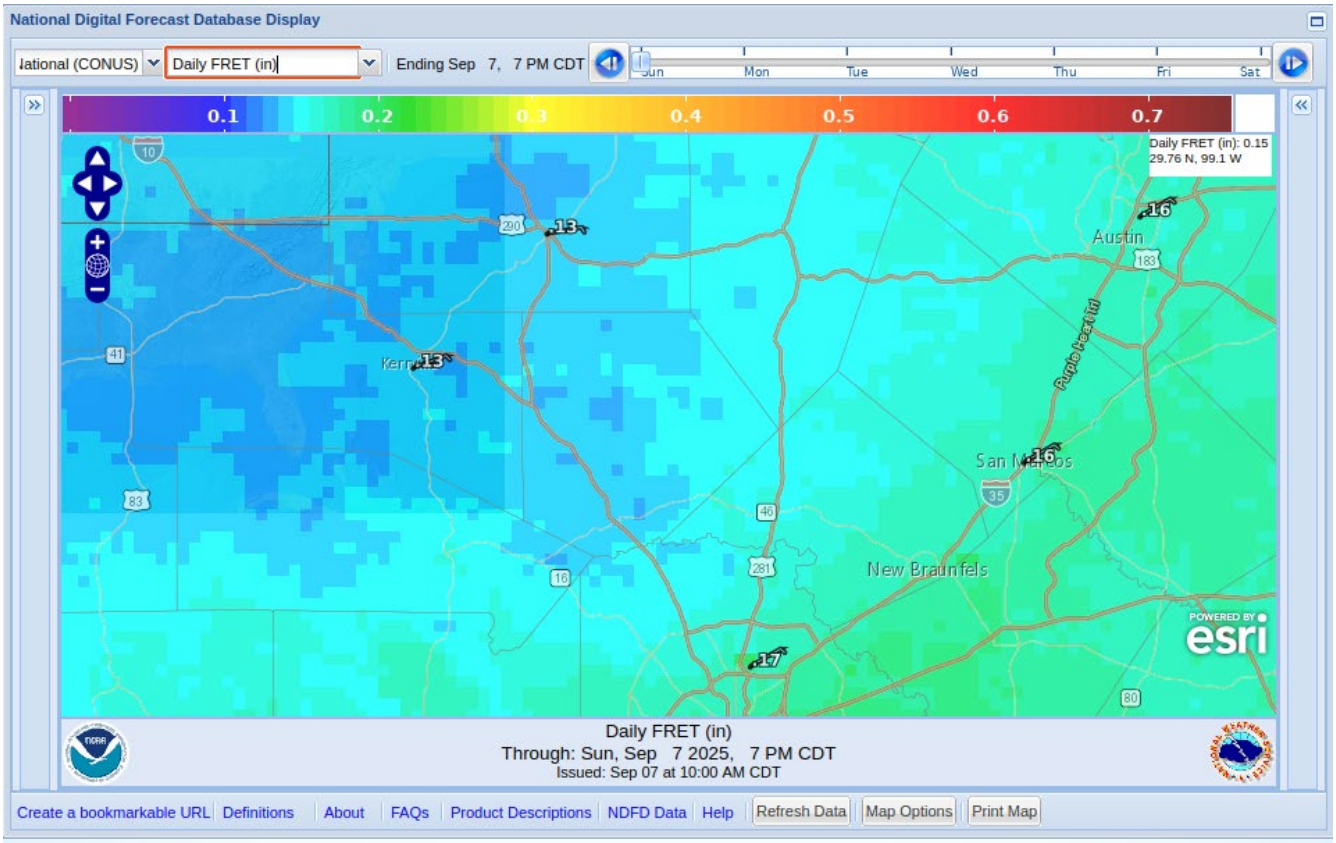


This topic goes one step further. We will now look at future predictions of ET_o.

What is FRET? FRET is Forecast Reference Crop Evapotranspiration. Spatial and temporal future/expected values of FRET are now produced by the National Weather Service (NWS)[1]. This forecast system assumes a well-watered reference crop (grass or alfalfa) under established conditions for a 24-hr period is present and absolute for each model run. This assumption is a limitation of the forecast system which may produce over-estimates during dry drought conditions, but it must exist in order for the system to produce the future expected values. This system uses both the Penman-Monteith (PM) equations (with 12 cm grasses as the reference crop) and the Kimberly Penman (KP) equations (with alfalfa as the reference crop) to produce the expected values of FRET.

What goes into FRET to develop it's forecast values? The FRET model is first populated with NWS forecast surface-level temperature, wind speed and relative humidity and also the amount of sky cloud cover. This forecast data is then used within the PM and KP equations to produce gridded daily and weekly FRET values for locations across the Contiguous United States. Applications for FRET are water management, soil model input, drought mitigation, research and irrigation management (agriculture, golf courses and public works departments).

Here is an example of an image below of daily FRET output for Kendall County and surrounding locations. The image has a legend showing increasing values of FRET in units of inches. This specific image shows that the expected FRET values for Sunday, September 7th, 2025 range from around 0.10 of an inch up to around 0.15 of an inch.



The NWS has analyzed FRET's performance. Without getting into significant details, the NWS has found that FRET performs well when compared to observed real-time calculated ET_o values.

Where can you find FRET values? Daily and weekly FRET and daily FRET departure from normal values, can be viewed at the interactive NWS Graphical Forecasts website https://digital.weather.gov/, then choosing National (CONUS) and then scrolling down the next tab for Water Resources on the menu option bar. On that same bar, to the right, there are forward/backward arrows to maneuver through the daily and weekly forecast values. It would be useful to the District if the NWS could provide a monthly forward in time FRET, but such functionality is not currently available. On the bottom portion of this interactive tool, there are additional buttons that provide more information, FAQs and mapping options to customize your map. You can even print a map.

What is spectacular about this tool is that you can also download geospatial-temporal gridded forecasts of all kinds of data including FRET at vlab.noaa.gov/web/mdl/ndfd. This functionality allows you to expand your analysis as you see fit.

[1]Reference: https://ams.confex.com/ams/FRET_AMS2013.pdf

Stay tuned into CCGCD's website page, as TXHCWS will soon be providing more educational materials.