

Mesonet Plant Available Water

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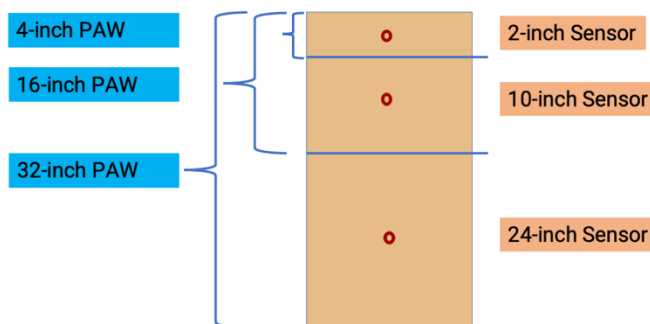
Plant available water (PAW) is the water stored in a column of soil that plants can use. After a large rainfall event, more water may percolate into the layer of soil where roots grow than can be stored. Excess water will drain or “leach” deeper in the soil than plant roots can reach. When the soil root profile is full after the excess water has drained, the soil is said to be at “field capacity.” After a prolonged dry growing season, plants can use up all the available water and reach the “permanent wilting point”. At this point, there may still be water in the soil, but it is held so tightly that plants can’t extract it.

“Available water capacity” is the water held in soil between its field capacity and permanent wilting point. Available water capacity is very site dependent and varies with soil type, soil structure and soil organic matter. Coarse sandy soils hold less plant available water. Clay soils hold more than sand, but less than loam soils. Higher levels of organic matter may increase plant available water. Soil compaction reduces plant available water by reducing soil pore space. The Mesonet Plant Available Water is based on soil properties from soil samples collected at each Mesonet site. Soil textures at each depth at each site is available using the “About” tab in the upper, blue header, then “Mesonet Sites”. To determine your soil type, refer to USDA Web Soil Survey, or Chapter Eight of Oklahoma Forage and Paster Fertility Guide OSU Extension publication (E-1021).

Maps are available in either inches of percent of PAW in a soil column from the soil surface down to **4 inches** (10 cm), surface to **16 inches** (40 cm), and surface to **32 inches** (80 cm). These depths correspond to the root areas for seedlings, shallow rooted plants, and most deep-rooted plants. PAW maps are updated daily between 7 and 8 am.

PAW is calculated by utilizing soil moisture sensors located at 2 inches (5 cm), 10 inches (25 cm), and 24 inches (60 cm). At some locations, soil sensors are not included at every depth due to local site conditions. Sensors are located under a grass sod cover. Because of the properties of the sensor used, values cannot be acquired during frozen soil conditions.

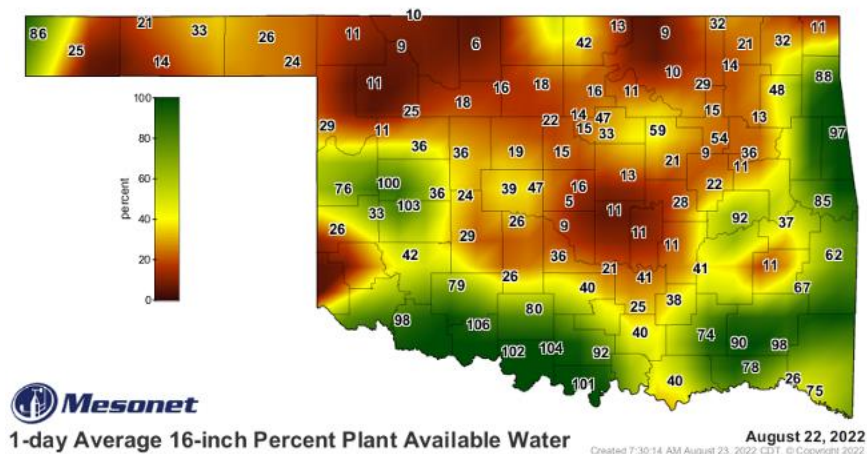
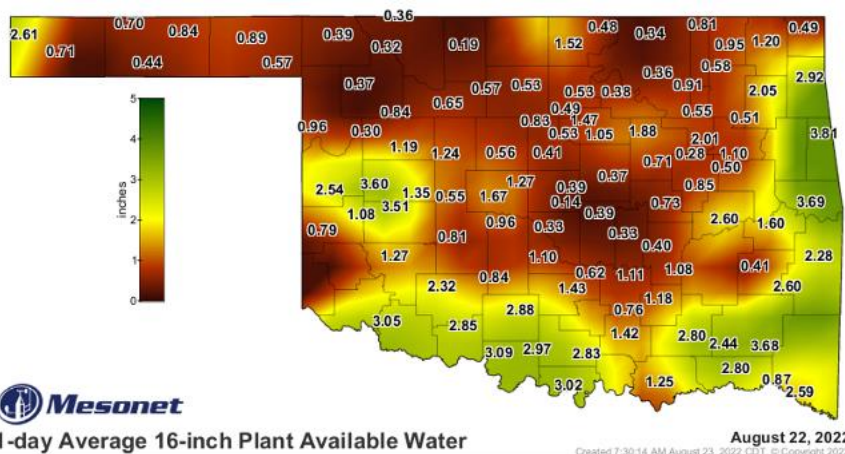
Plant Available Water



The diagram on the left shows the location of the 2-inch, 10-inch, and 24-inch soil moisture sensors. The 4-inch PAW uses data from the 2-inch sensor. The 16-inch PAW uses data from both the 2-inch and 10-inch sensors. The 32-inch PAW uses all three sensors with the deepest sensor at 24 inches.

Water Capacity of Soil Types

Soil Type	Unavailable Water (Wilting Point)	Available water, plant stress possible	Available water, no plant stress (Field Capacity)	Excess or gravitational water (Saturation)
Sand	1.1 in/ft	1.6 in/ft	2.1 in/ft	5.2 in/ft
Loam	1.8 in/ft	2.8 in/ft	3.8 in/ft	5.8 in/ft
Silty Clay Loam	2.6 in/ft	3.5 in/ft	4.4 in/ft	6.1 in/ft



For more information contact the Oklahoma Mesonet at **405-325-3231** or email us at operator@mesonet.org.

Edited: J. Wes Lee, Mesonet Ag Coordinator. Version date August 4, 2023.

Scott, B. L., T. E. Ochsner, B. G. Illston, C. A. Fiebrich, J. B. Basara, and A. J. Sutherland, 2013: New Soil Property Database Improves Oklahoma Mesonet Soil Moisture Estimates. J. Atmos. And Ocean. Tech., 30, 2585-2595. (<https://doi.org/10.1175/JTECH-D-13-00084.1>).

