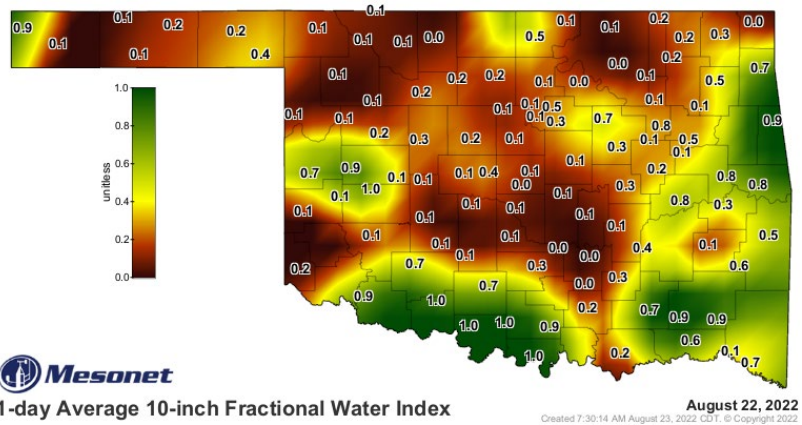


# FRACTIONAL WATER INDEX

Fractional Water Index (FWI) maps and graphs are available on the [Oklahoma Mesonet website](http://mesonet.org), [http://mesonet.org], in the “Weather” section, under “Soil Moisture.” FWI values are displayed in statewide maps and time-series graphs for individual Mesonet sites.

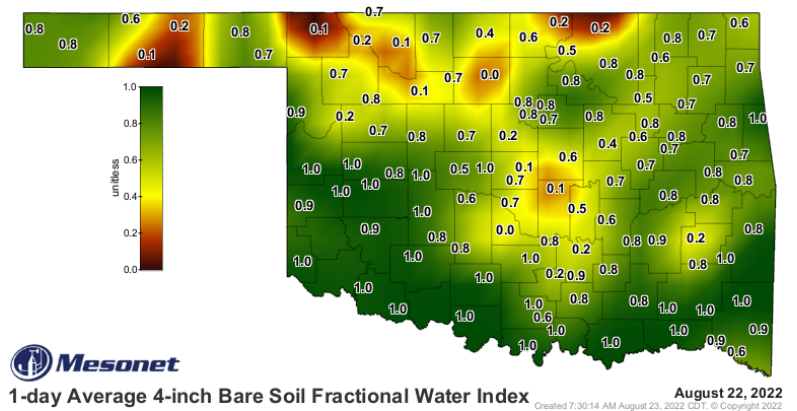
The FWI is an indicator of soil moisture at four depths. It is essentially a point measure at 2-inch (5 cm), 4-inch (10 cm), 10-inch (25 cm), and 24-inch (60 cm) depths under a grass sod cover. At some locations, soil sensors are not included at every depth due to local site conditions. The index scale ranges from 0.0 (as dry as the sensor can read) to 1.0 (as wet as the sensor can read).

There is also a chemically treated bare soil plot with a 4-inch (5 cm) sensor at every Mesonet site.



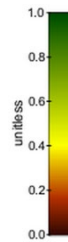
FWI is a soil moisture product that is independent of soil type. All FWI display products are updated daily between 7 and 8 am.

FWI was specifically developed for the Campbell 229-L soil moisture sensor used by Oklahoma Mesonet scientists at the Agricultural Research Service’s Grazinglands Research Station in El Reno, Oklahoma. The sensor used is a heat dissipation sensor and operates by measuring a temperature difference after a heat pulse. The magnitude of the heat dissipation varies as a function of the amount of water surrounding the sensor. Because of the measurement principal employed by the sensor, useful values cannot be acquired during frozen soil conditions and are not reported during those time periods.

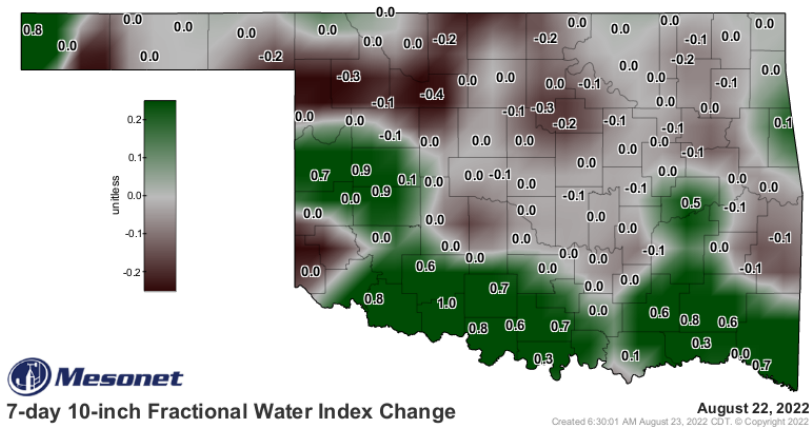


The following table lists Fractional Water Index ranges as they relate to generalized plant growth and stress responses. Plant responses vary with species, variety, cultural care, and pests.

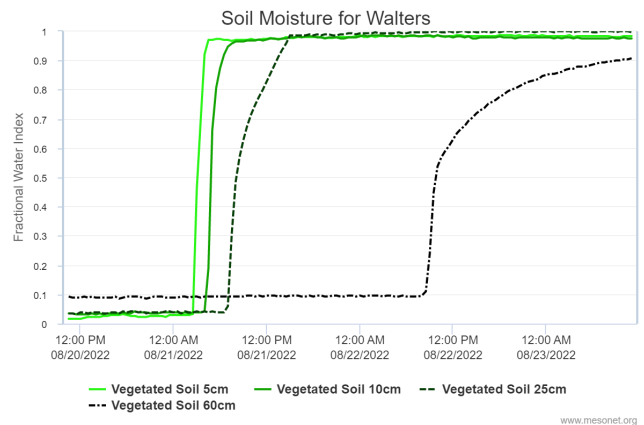
Fractional Water Index (FWI)	Generalize Plant Response
1.0	As wet as sensor can read
>0.7	Optimum for plant growth
0.4 to 0.7	Water stress possible
<0.4	Wilting likely occurring
0.0	As dry as sensor can read



The 7-Day Change in 10-inch FWI map provides a one-week statewide change over time. Green colored areas indicate increases in soil moisture. Grey-purple colored areas indicate either no change or a loss of soil moisture over a one-week time frame.



The Soil Moisture Graph shows FWI changes for a single Mesonet site. Graphs are available from the past 1 hour to 90 days. With the sensors at up to four depths, the depth of water infiltration from rain events can be easily monitored. For longer FWI time frames, refer to the “Past Data” tab on the website.



Author: J. Wes Lee and Dr. Brad Illston. Version date September 30, 2022.

Reference: Illston, et.al. 2008. [Mesoscale Monitoring of Soil Moisture across a Statewide Network](https://doi.org/10.1175/2007JTECHA993.1). Journal of Atmospheric and Oceanic Technology, 25, 167-181. [ <https://doi.org/10.1175/2007JTECHA993.1> ]

