Oklahoma Drought Update:

August 15, 2023

Gary McManus
Oklahoma Mesonet
Oklahoma Climatological Survey
A Brief History of Oklahoma Droughts
The Biggies

1910s drought
Dust Bowl
1950s drought

20-year wet signal

2010-15 Drought

Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2022
A Bit Further Back

C. Great Plains PDSI

YIKES!
La Niña develops when stronger than normal trade winds push warm water farther west.

Enhanced upwelling makes surface waters in the eastern Pacific cooler than normal.
El Niño

Typical Wintertime Pattern

Warm

Low Pressure

Wet

Wet & Cool

Persistent, Extended Pacific Jet Stream & Amplified Storm Track

NWS/NCEP
Climate Prediction Center
OK Drought 2000-2023

Oklahoma Percent Area in U.S. Drought Monitor Categories

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Single-dip Double-dips Double-dip Triple-dip

La Ninas: can be “drought starters” in Oklahoma
• Negative PDO values = more La Nina episodes
• Positive values (red) = more El Nino episodes

What’s next?
Synopsis of our 2021-23 Drought

- **August 2021:** Drought begins, accelerates in December 2021 through early spring 2022
- **Spring 2022:** Relief for eastern two-thirds, west drought remains
- **June 28, 2022:** Only 31% of the state in drought
- **June 11, 2022:** “Flash drought” begins, rapid intensification due to extreme lack of rainfall, above normal temperatures, sun, and wind
- **Mid-October 2022:** Drought peaks (worst since February 2013)
- **Winter-Spring 2023:** I-44 divide…relief to the southeast, intensification to the northwest
- **Summer 2023:** More widespread relief, drought hanging on in far southwest and north central/east
A Dubious Record
Goodwell, driest year in OK History
(1880s-present)

Lowest annual rainfall totals
Oklahoma (1888-2022)

- Goodwell: 6.48”, 2022
- Regnier: 6.53”, 1956
- Boise City: 6.95”, 1956
- Turpin: 7.26”, 2011
- Kenton: 7.44”, 1956
- Gage: 7.62”, 2011
- Range: 7.77”, 2011
- Hardesty: 8.10”, 1952
- Felt: 8.53”, 2022

Mesonet
Oklahoma’s Weather Network

365-Day Rainfall Accumulation (inches)

January 1-December 31, 2022
Current Conditions

U.S. Drought Monitor

Oklahoma

August 8, 2023
(Released Thursday, Aug. 10, 2023)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

<table>
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<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
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<tr>
<td>Current</td>
<td>62.25</td>
<td>37.75</td>
<td>12.81</td>
<td>5.04</td>
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<td>Last Week</td>
<td>52.33</td>
<td>47.07</td>
<td>17.90</td>
<td>7.68</td>
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<td>3 Months Ago</td>
<td>39.19</td>
<td>60.81</td>
<td>52.47</td>
<td>48.07</td>
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<td>Start of Calendar Year 01/01/2023</td>
<td>1.82</td>
<td>08.18</td>
<td>89.73</td>
<td>80.92</td>
<td>56.13</td>
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<td>Start of Water Year 09/01/2023</td>
<td>0.00</td>
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<td>One Year Ago</td>
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<td>99.33</td>
<td>92.45</td>
<td>48.83</td>
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Intensity:
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Brad Pugh
GPO/NOAA
Southwest Jackson County
Southern OK Dry Spell Grows

Consecutive Days With Less Than 0.25" Rainfall

August 13, 2023

Mesonet

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Growing Season Rainfall

Growing Season Rainfall
March 1-Aug. 14, 2023

Departure from 1991-2020 Normal Rainfall
Growing Season to Date
Mar 1, 2023 through Aug 13, 2023
Last 365 Days

365-Day Rainfall Accumulation (inches)

Departure from 1991-2020 Normal Rainfall
Last 365 Days

Aug 14, 2022 through Aug 13, 2023

Created 3:00:00 PM August 14, 2023 CDT. © Copyright 2023

Mesonet
Change in the Last Year

August 8, 2023 compared to August 9, 2022

droughtmonitor.unl.edu
Are Problems Lurking?

A month ago

Drying out!

40 cm (16") Percent Plant Available Water

1-day Average 16-inch Percent Plant Available Water
Burn bans
Oklahoma Reservoir Levels and Storage as of 8/7/2023

Reservoir Storage
(Percent of Normal Pool Storage as of 8/7/2023)
- > 100%
- 100% - 90%
- 90% - 80%
- 89% - 80%
- 79% - 70%
- 69% - 60%
- 59% - 50%
- 49% - 40%
- 39% - 30%
- < 30%

Reservoir Levels
 Positive number indicates the lake level in feet, above the normal pool elevation
 Negative number indicates the lake level in feet, below the normal pool elevation

This map shows reservoir storage as a percentage of normal pool storage capacity.
The source information was collected from real-time lake gages monitored by the U.S. Army Corps of
Engineers (https://www.swt-wc.usace.army.mil/Daily_Morning_Reservoir_Report.pdf), and the
For more information please visit the OKWRS’s website: (https://www.owrbo.k.gov).

[Map of Oklahoma showing reservoir levels and storage]
Forecasts and Outlooks
Next 7 Days

HEAT DOME
RETURNS!

168-Hour Day 1-7 QPF
Valid 12Z Tue Aug 15 2023
Thru 12Z Tue Aug 22 2023
Issued: 0954Z Tue Aug 15 2023
Forecaster: WPC
DOC/NOAA/NWS/NCEP/WPC
Next Week HOT AND DRY!

HEAT DOME RETURNS!
The CPC/IRI ENSO outlook sees El Nino continuing through the 2023-24 winter into spring.
## Strength Is Important

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66% Chance: Strong El Nino

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September Temperature

CFSv2 monthly T2m forecast for Sep 2023

Monthly anomalies (K)

Normalized monthly anomalies

Grey areas skills < 0.3

Grey areas skills < 0.3
September Rainfall

CFSv2 monthly Prec forecast for Sep2023

Monthly anomalies (mm/month)

Normalized monthly anomalies

Grey areas skills < 0.3
Thank You!