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Missouri Drought Monitoring

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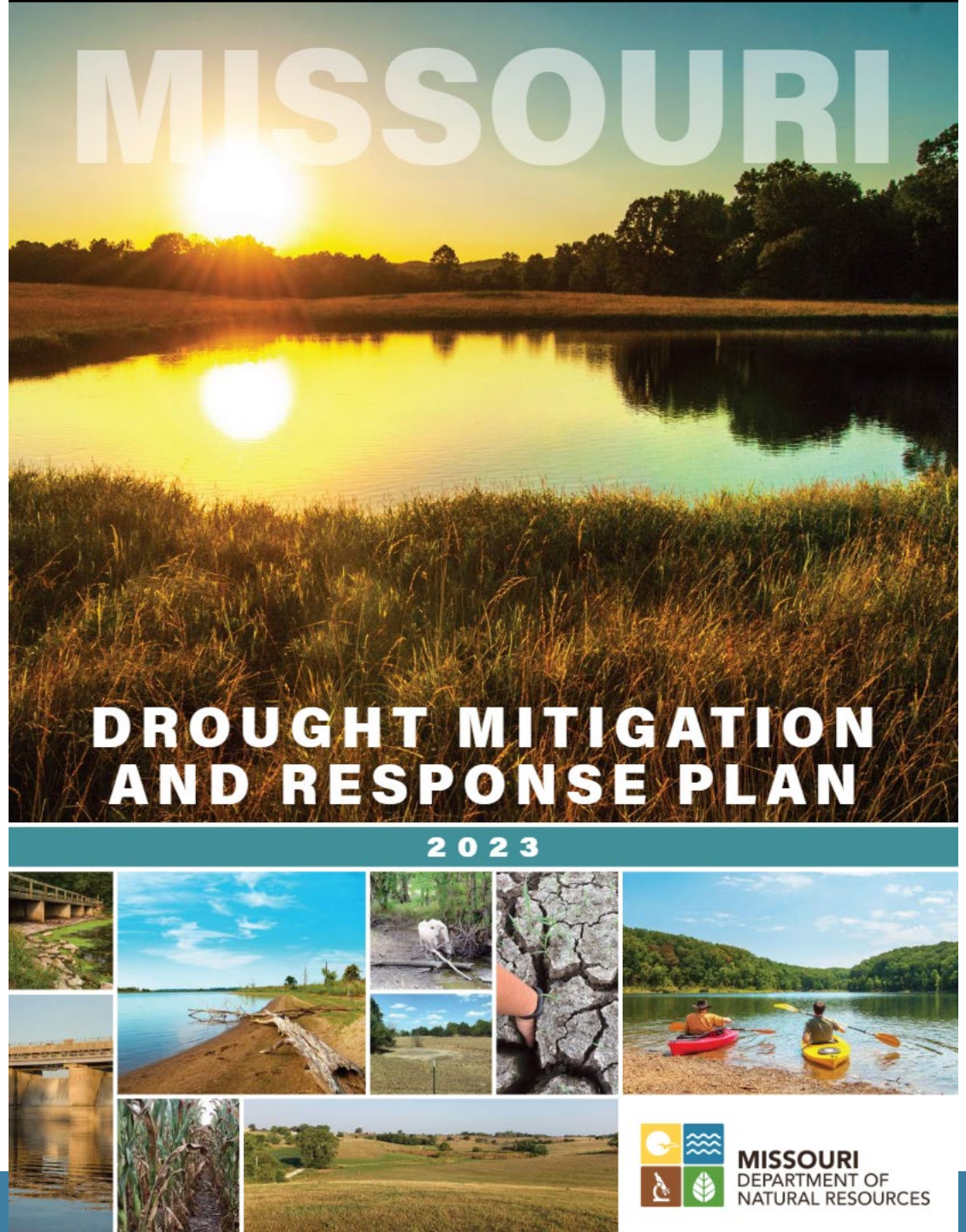
Water Resources Center



Phase 0 - Advisory

Phase 1 – Incipient

Phase 2 – Alert

Phase 3 – Conservation

Phase 4 – Emergency

Increasing Drought Severity

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Table 7-1. Proposed Response Plan Indices and Indicators

Primary Indices and Indicators	Drought Type	Description
U.S. Drought Monitor (USDM)	Comprehensive	Uses a variety of drought, climatological, hydrological, soil moisture, and other indicators.
Standard Precipitation Index (SPI)	Meteorological	Compares observed precipitation over 1- to 24-month periods with long-term averages for the same period.
Palmer Drought Severity Index (PDSI)	Agricultural	Incorporates monthly temperature and precipitation along with water-holding capacity of soils. Includes memory from past months.
Crop Moisture Index (CMI)	Agricultural	Uses the difference between potential evapotranspiration and moisture to indicate short-term moisture supply for crop producing regions.
Streamflow (28-day)	Hydrologic	Compares observed streamflow over a 28-day period with long-term averages for the same period.
Secondary Indices and Indicators	**Drought Type**	**Description**
Evaporative Drought Demand Index (EDDI)	Flash	Examines how anomalous the atmospheric evaporative demand (the thirst of the atmosphere) is for a given location over 1 week and 4 weeks.
QuickDRI	Flash	Represents a drought alarm indicator of emerging or rapidly changing drought conditions.

Phase 0 - Advisory

U.S. Drought Monitor
Missouri

July 22, 2025
(Released Thursday, Jul. 24, 2025)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week 07-15-2025	90.65	9.35	0.00	0.00	0.00	0.00
3 Months Ago 04-22-2025	88.20	11.73	0.07	0.00	0.00	0.00
Start of Calendar Year 01-07-2025	69.71	18.54	11.75	0.00	0.00	0.00
Start of Water Year 10-01-2024	39.30	36.97	15.78	7.95	0.00	0.00
One Year Ago 07-23-2024	98.86	1.14	0.00	0.00	0.00	0.00

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:
David Simeral
Western Regional Climate Center

droughtmonitor.unl.edu

Data used:

- US Drought Monitor (USDM)
- Observed Precipitation
  - Last 7 Days observed
  - Departure from normal (last 60 days)
  - Percent of Normal (last 30 days)
- CPC Outlooks
  - 6–10-Day, 8–14-Day, 3-4 Week, Monthly Outlook, Seasonal Outlook, Drought Outlook
- Quantitative Precipitation Forecast

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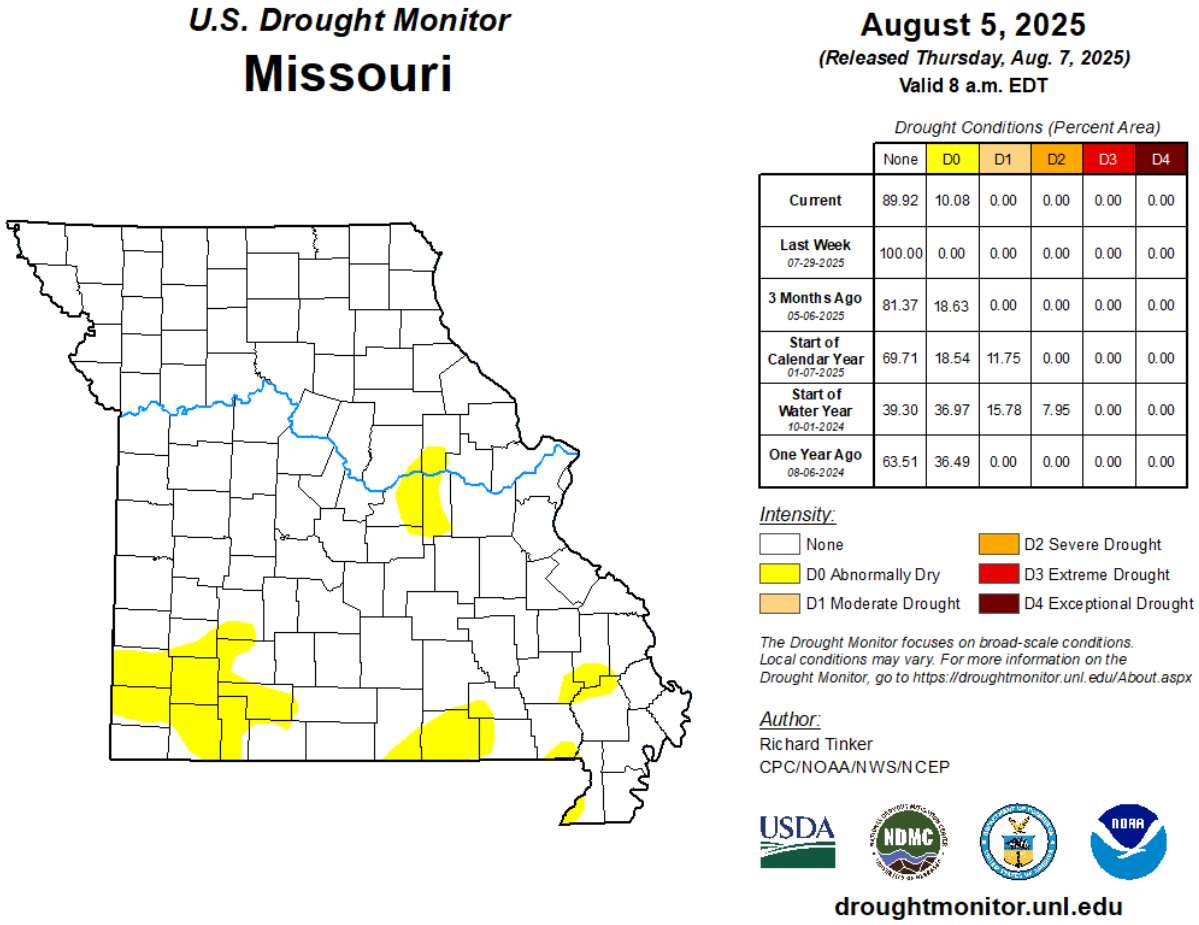
Phase 1 - Incipient



Data used:

- Products listed on previous slide as well as:
- Streamflow
  - Current real time, 7-day average, 14-day average, 28-day average
- Standard Precipitation Index
  - 1,2, 3 month and sometimes 6, 9, 12 if long-term signal is there
- Evaporative Demand Drought Index
- Max Forecast Temperatures
- Observed Precipitation – Iowa Environmental Mesonet
- Soil Moisture

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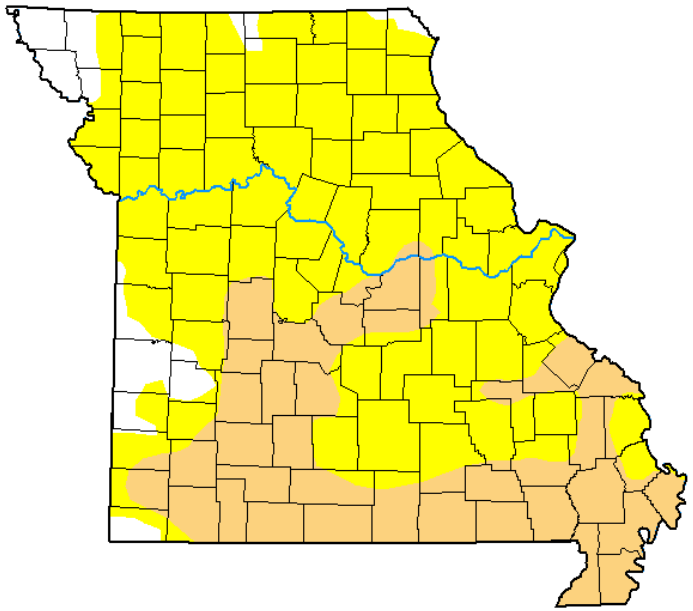
Phase 2 - Alert



U.S. Drought Monitor
Missouri

September 2, 2025
(Released Thursday, Sep. 4, 2025)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	6.32	63.02	30.66	0.00	0.00	0.00
Last Week *08-26-2025*	39.02	46.92	14.06	0.00	0.00	0.00
3 Months Ago *06-03-2025*	71.68	20.89	7.42	0.00	0.00	0.00
Start of Calendar Year *01-07-2025*	69.71	18.54	11.75	0.00	0.00	0.00
Start of Water Year *10-01-2024*	39.30	36.97	15.78	7.95	0.00	0.00
One Year Ago *09-03-2024*	44.31	40.89	14.80	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

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Author:
David Simeral
Western Regional Climate Center

droughtmonitor.unl.edu

Data used:

- All previously mentioned data as well as
- QuickDri
- VegDri
- ForDri
- Missouri River Water Management
- Missouri River gages/forecast at Hermann
- Mississippi River gages/forecast at St Louis
- Conditions Monitoring Observer Reports

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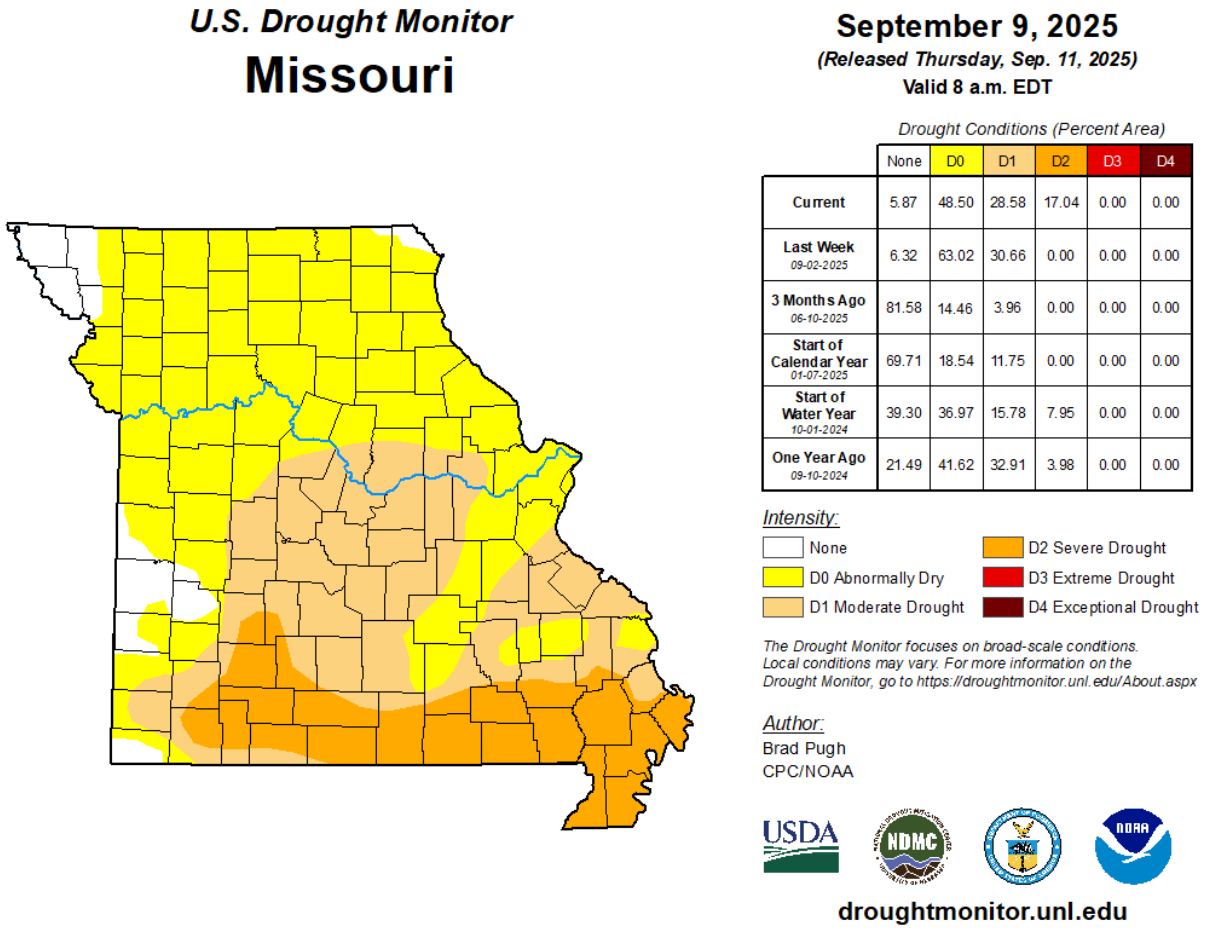
Phase 3 - Conservation



Data used:

- All previously mentioned data as well as:
- Groundwater Observation Wells
- Impact Team updates and reported drought impacts
  - Impact Teams stood up in the past:
    - Agriculture
    - Commercial Navigation
    - Power Generation
    - Drinking Water

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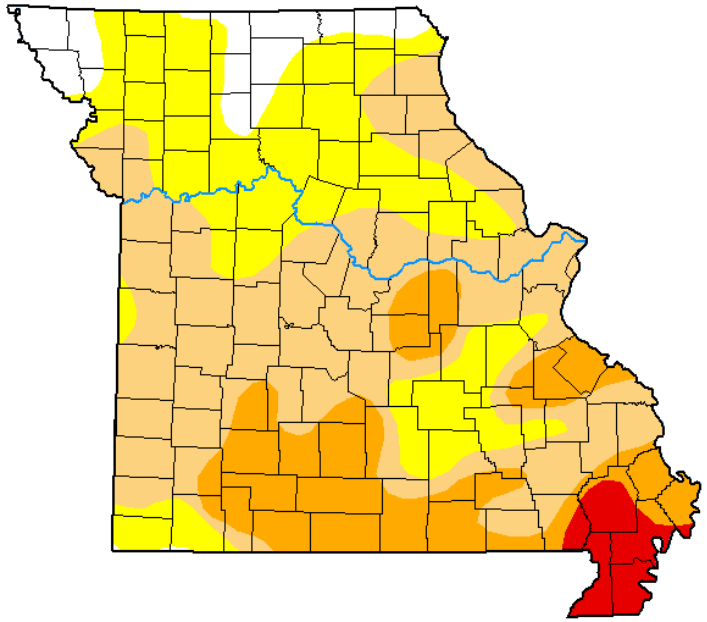
Phase 4 - Emergency



U.S. Drought Monitor

Missouri

September 23, 2025

(Released Thursday, Sep. 25, 2025)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	6.48	29.50	41.62	18.81	3.59	0.00
Last Week *09-16-2025*	2.22	35.90	30.42	27.90	3.56	0.00
3 Months Ago *06-24-2025*	83.86	13.16	2.98	0.00	0.00	0.00
Start of Calendar Year *01-07-2025*	69.71	18.54	11.75	0.00	0.00	0.00
Start of Water Year *10-01-2024*	39.30	36.97	15.78	7.95	0.00	0.00
One Year Ago *09-24-2024*	29.39	44.72	18.93	6.96	0.00	0.00

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 Rippey

U.S. Department of Agriculture

droughtmonitor.unl.edu

Data used:

- All previously mentioned data as well as:
- Impact Team updates and reports on drought impacts

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Challenges

- This system sets us up well for a slow-moving, gradual increase into more severe conditions
  - July – advisory
  - Beginning august (D0) – incipient
  - Middle August (2 counties in D1) – alert
  - Beginning September (D2) – conservation
  - Middle September (D3 for 2 weeks) – emergency
  - End of September (D2) - conservation
- This case also highlights the lack of guidance on how to step into lower drought severities – how do we back out of drought phases
- US Drought Monitor map (all drought types map) triggering FSA ag assistance
- % area of drought severity is not currently outlined in movement into the next phase

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Challenges Cont.

Table E1. Drought Response System Phases and Triggers

*PDSI from week ending on 5/11/2024 and QuickDRI from week of 5/12/2024

Primary Indices and Indicators	Drought Phase Triggers				
	Advisory Phase 0	Incipient Phase 1	Alert Phase 2	Conservation Phase 3	Emergency Phase 4
U.S. Drought Monitor (USDM)	No condition	DO (Abnormally Dry)	D1 (Moderate)	D2drought monitor (Severe)	D3 and D4 (Extreme to Exceptional)
Uses a variety of drought, climatological, hydrological, soil moisture, and other indicators.					
Standard Precipitation Index (SPI)	> -0.50	-0.50 to -0.99	-1.00 to -1.49	-1.50 to -1.99	≤-2.00
Compares observed precipitation over 1- to 24-month periods with long-term averages for the same period.					
Palmer Drought Severity Index (PDSI)	> -0.50	-0.50 to -1.49	-1.50 to -2.99	-3.00 to -3.99	≤ -4.00
Incorporates monthly temperature and precipitation along with water holding capacity of soils.					
Crop Moisture Index (CMI)	> 0.00	0.00 to -0.99	-1.00 to -1.99	-2.00 to -2.99	≤ -3.00
Uses the difference between potential evapotranspiration and moisture to indicate short-term moisture supply for crop producing regions.					
Streamflow (28-day)	> 25 percentile	10 to 25 percentile	6 to 9 percentile	2 to 5 percentile	< 2 percentile
Compares observed streamflow over a 28-day period with long-term averages for the same period.					
Secondary Indices and Indicators	**Drought Phase Triggers**				
	Advisory Phase 0	Incipient Phase 1	Alert Phase 2	Conservation Phase 3	Emergency Phase 4
Evaporative Demand Drought Index (EDDI)	Normal or below normal evaporative demand (EW0-EW4)	EDO	ED1	ED2	ED3 or ED4
The EDDI examines how anomalous the atmospheric evaporative demand is for a given location over 1 and 4 weeks.					
QuickDRI	In areas showing an intense signal, this may indicate that a drought phase should be considered, or the existing drought phase changed at that location.				
QuickDRI represents a drought alarm indicator of emerging or rapidly changing drought conditions.					

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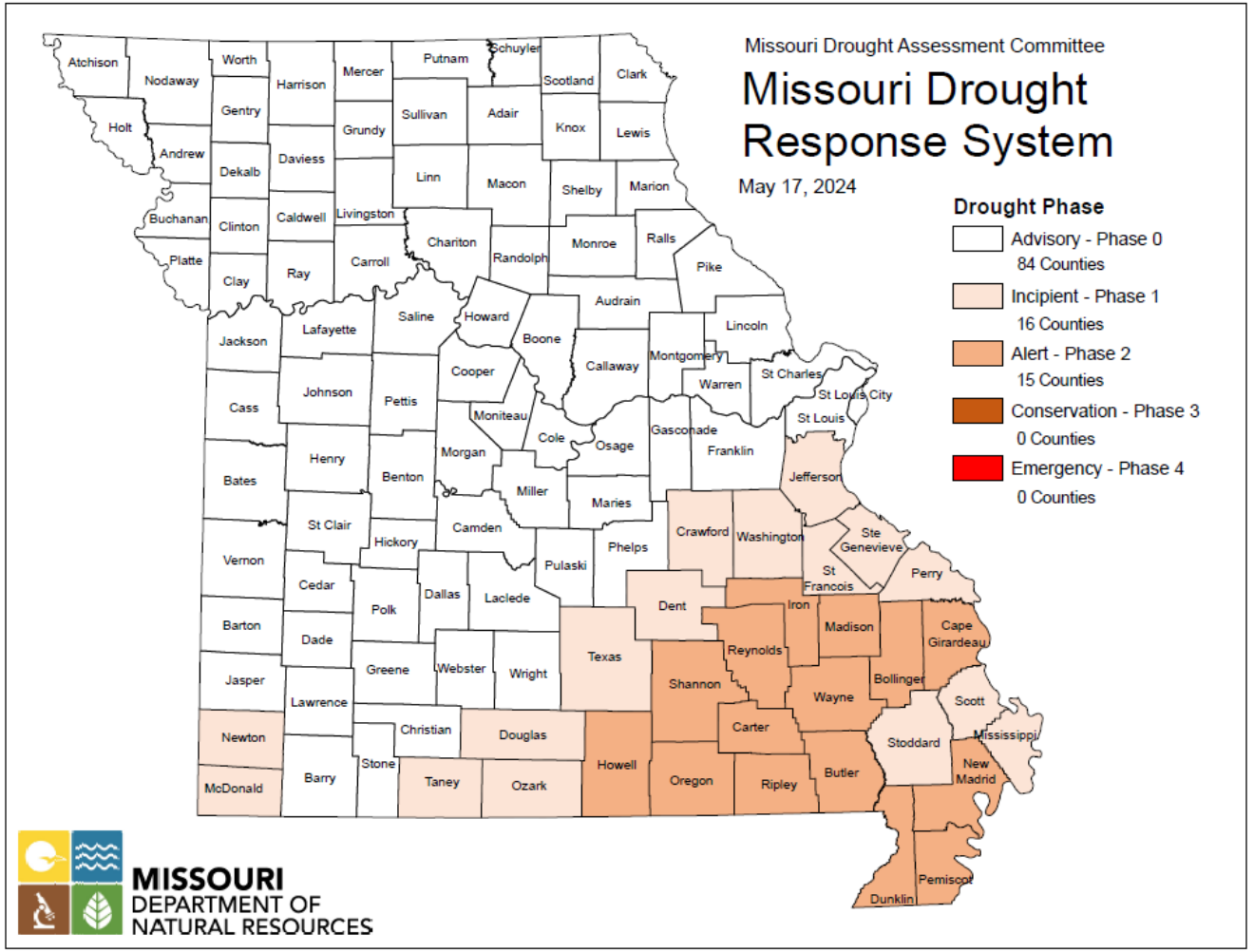

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Most important component of hydrologic system to MoDNR

- Wherever impacts are seen/reported!
  - Agriculture: precipitation (amount and timing), soil moisture, groundwater availability, surface water availability (farm pond storage), evapotranspiration
  - Drinking water reservoirs: precipitation, streamflow
  - Drinking water wells: groundwater/recharge
  - Power generation/public utilities: precipitation, streamflow
  - Commercial Navigation: precipitation, streamflow

- These lead to what Impact Teams are stood up and where resource focus needs to be

Guidance that would be appreciated from this Committee

- How to account for flash drought in drought plan preparations
- How to back out of drought phases
- Thoughts on using US Drought Monitor as an agriculture assistance mechanism