DROUGHT PLANNING & M

Beth Hall

Indiana State Climate Office

PURDUE UNIVERSITY | THE INDIANA STATE CLIMATE OFFICE

What is drought?

About DROUGHT

Drought –Challenges

- Challenging to define: measurements, impacts, etc.
- Difficult to monitor the onset, evolution, and demise
- Drought is “relative”, added complexity

Defining Drought

5 general drought categories:

1. Meteorological Drought: period with below-normal **precipitation** accumulation
2. Agricultural Drought: period with **soil moisture** deficiency
3. Hydrological Drought: period of **groundwater** and/or **streamflow** deficiency
4. Socioeconomic Drought: drought impacts result in effects on people through **availability of economic goods** (food, water, fuel, etc.)
5. Ecological Drought: prolonged and widespread deficit in **naturally available water supplies** that create multiple stresses across ecosystems

About DROUGHT

Drought Indicators in Indiana

- Precipitation
- Evapotranspiration & Evaporative Demand
- Soil moisture
- Streamflow/Ground Water
- Reservoir/Surface Water Level
- Snowpack
- Vegetation Health/Productivity
- Impact Reports

About DROUGHT

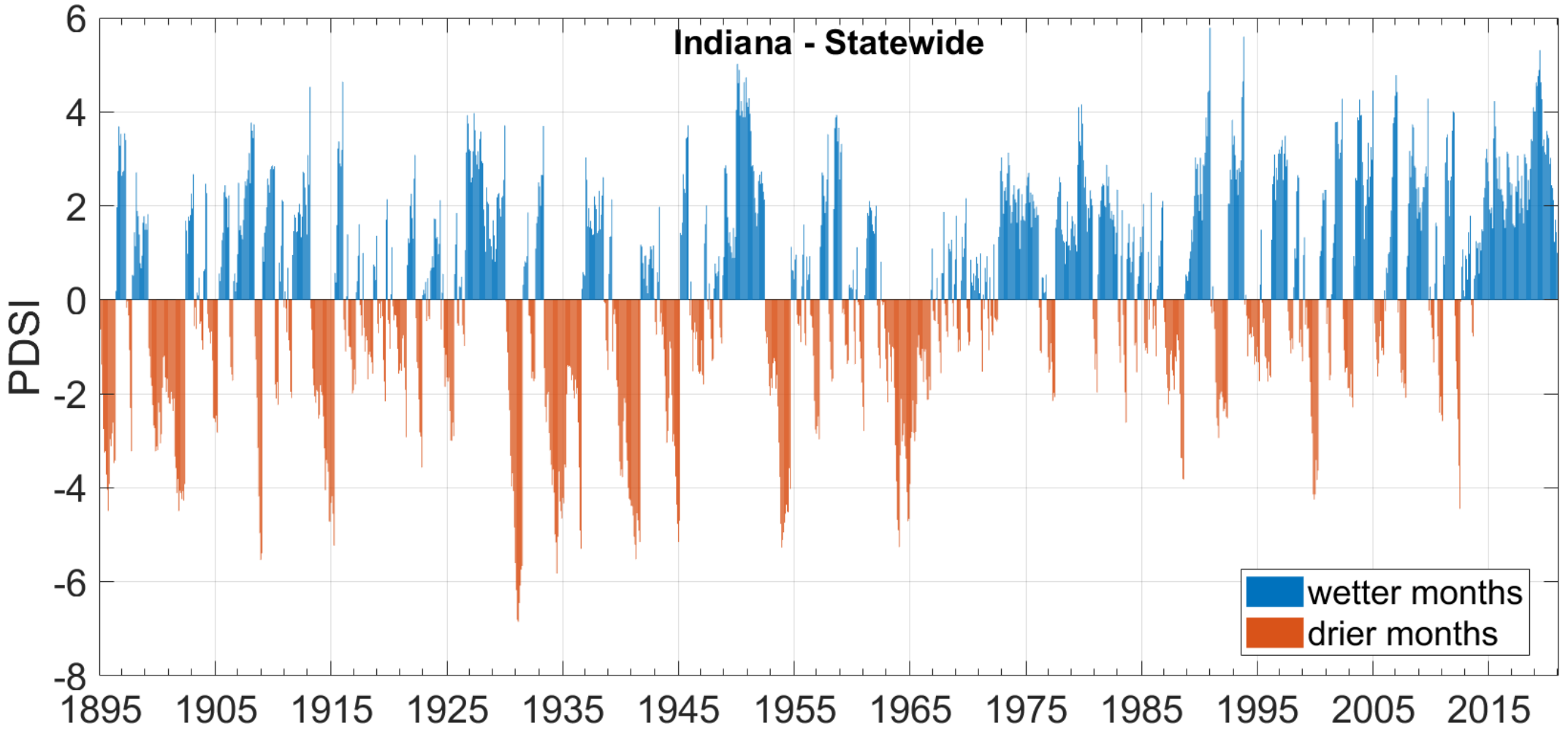
Drought Characteristics

- **Frequency:** how often drought occurs
- **Onset:** the point in time a location enters drought
- **Intensity:** magnitude of dryness and/or impacts; can be a snapshot or accumulated
- **Duration:** the time a location spends in drought
- **Extent:** the size of the geographic area(s) in drought
- **Demise:** the point in time a location is no longer in drought

There is no single indicator that can properly summarize any of these characteristics

About DROUGHT

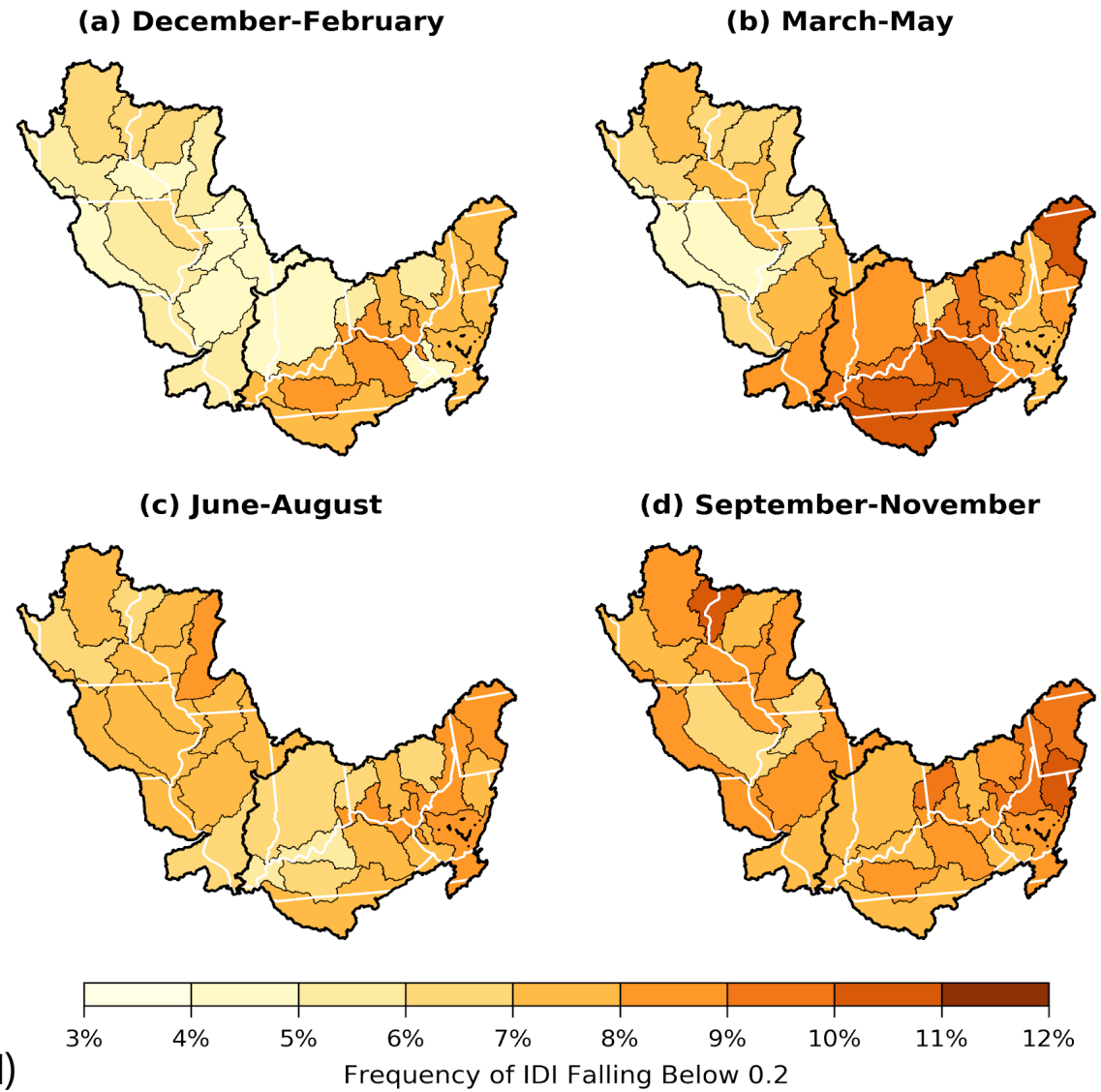
Drought Characteristics: Frequency



About DROUGHT

Drought Characteristics

- Maps show frequency of drought onset by season across the OH and MS basins
- Drought onset is most likely in spring in all but northeast Indiana
- Winter onset is unlikely in all but far southern Indiana

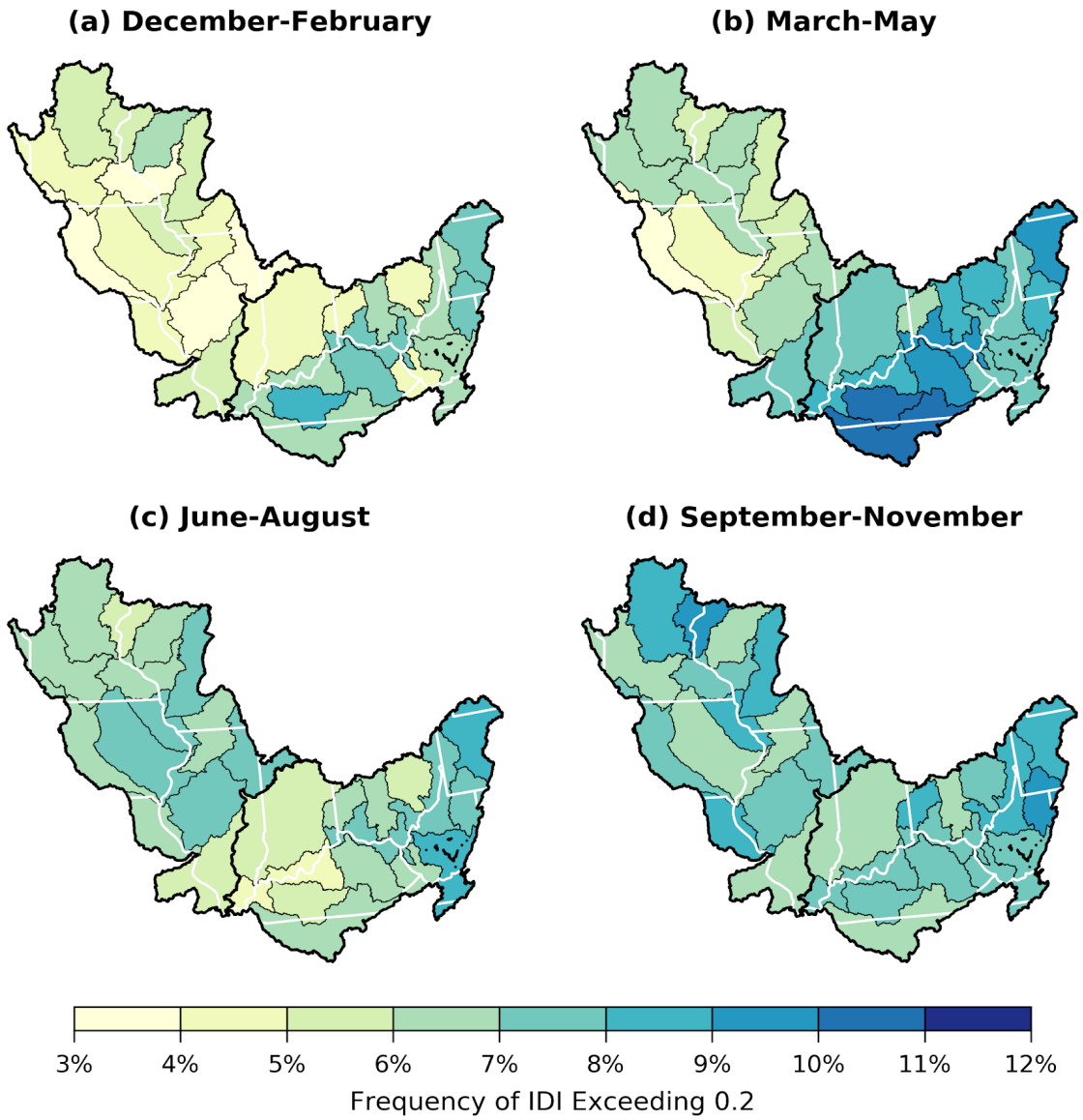


Hoell *et al.* (2021)

About DROUGHT

Drought Characteristics: Demise

- Maps show frequency of drought demise by season across the OH and MS basins
- Drought demise is also most likely in spring; summer/fall in northern Indiana

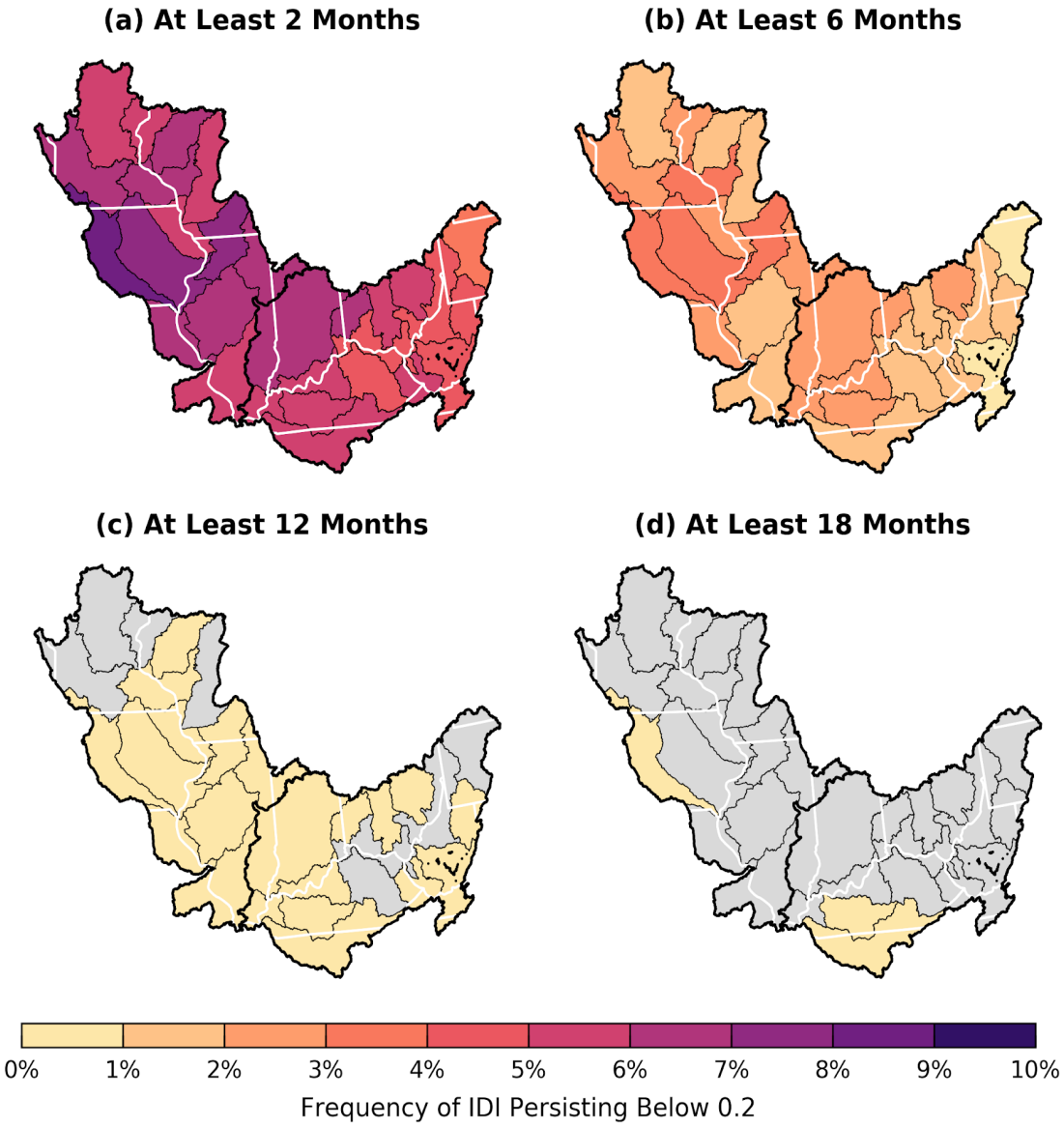


Hoell *et al.* (2021)

About DROUGHT

Drought Characteristics: Duration

- Maps show frequency of drought by duration
- < 5% of droughts in Indiana persist for at least 6 months, < 1% at least 12 months

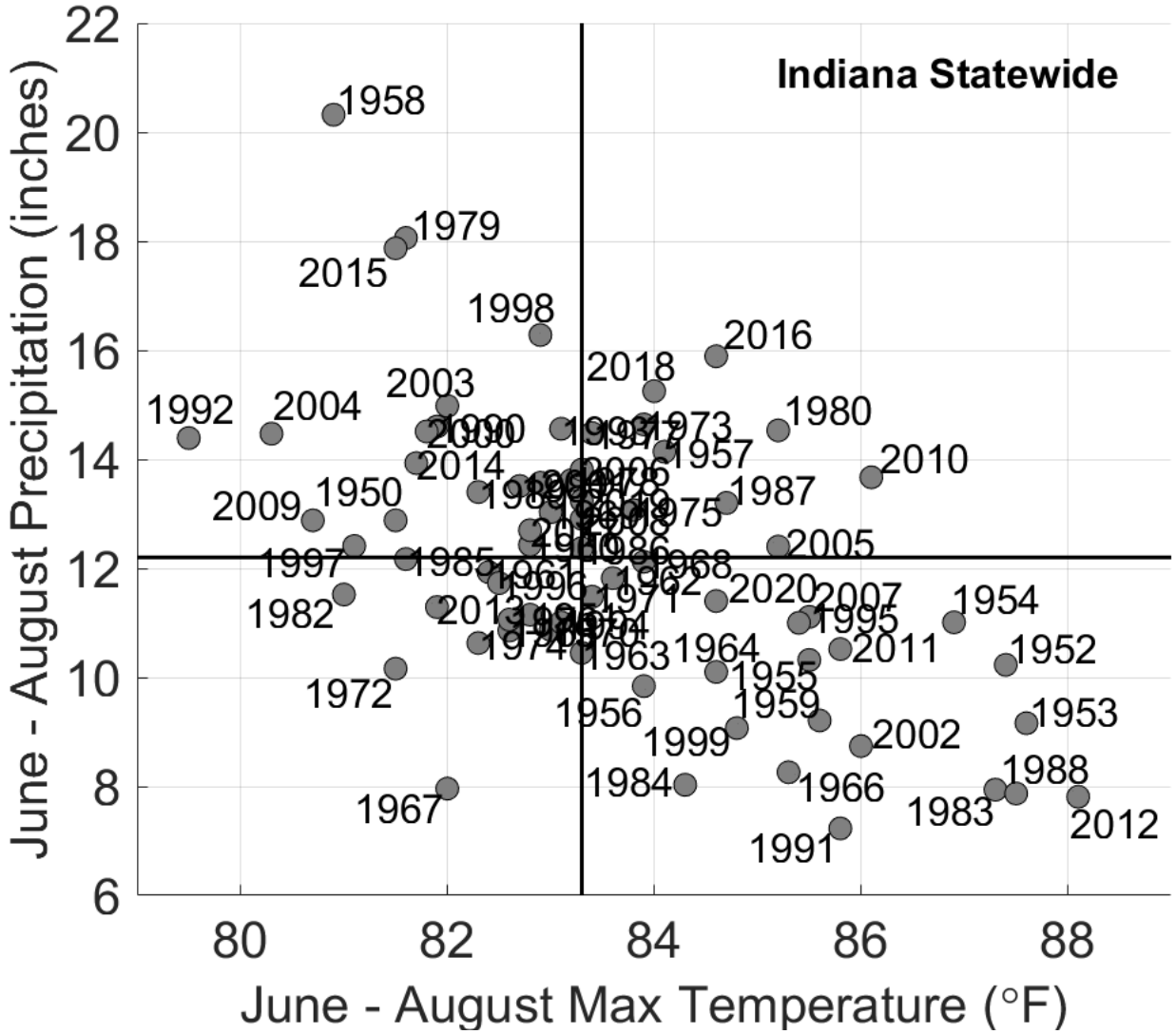


Hoell *et al.* (2021)

About DROUGHT

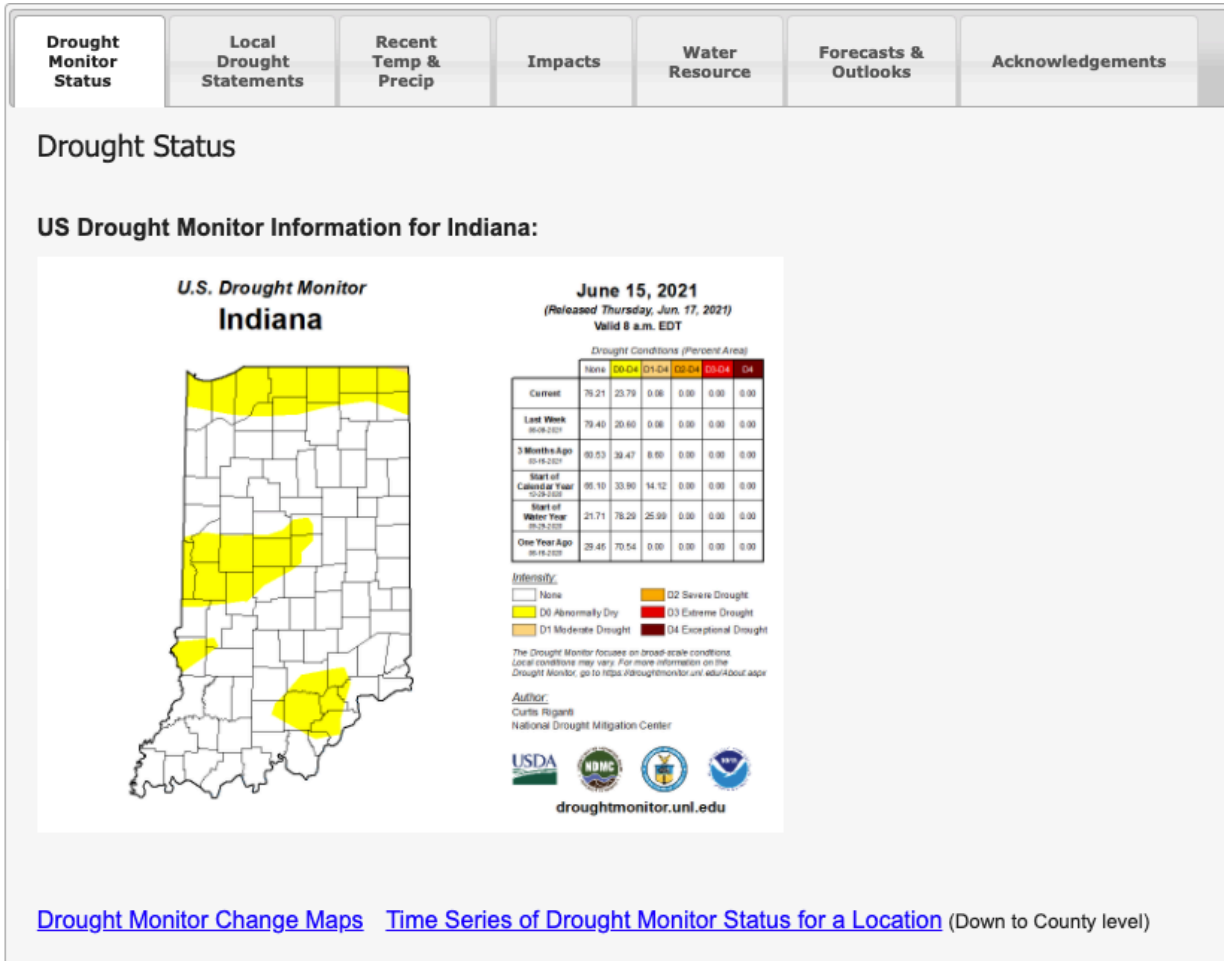
Dry Surface Feedback to Drou

- Subsidence, drier air reduce instability
- High evaporative demand, lack of cloud cover dries out the soil
- ET is decreased and the dry air becomes drier… higher temperatures
- 25–40% of drought persistence in the Midwest is attributed to soil moisture feedbacks



Drought Resources and Tools

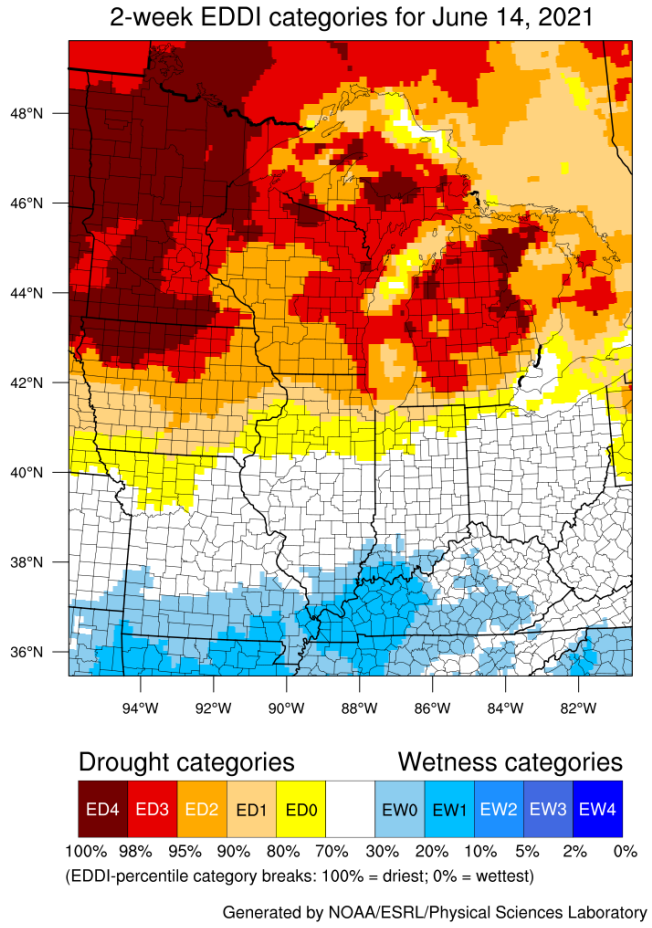
NWS-Indy Drought Page



https://www.weather.gov/ind/drought

Drought Resources and Tools

NWS-Indy Drought Page



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Drought Resources and Tools

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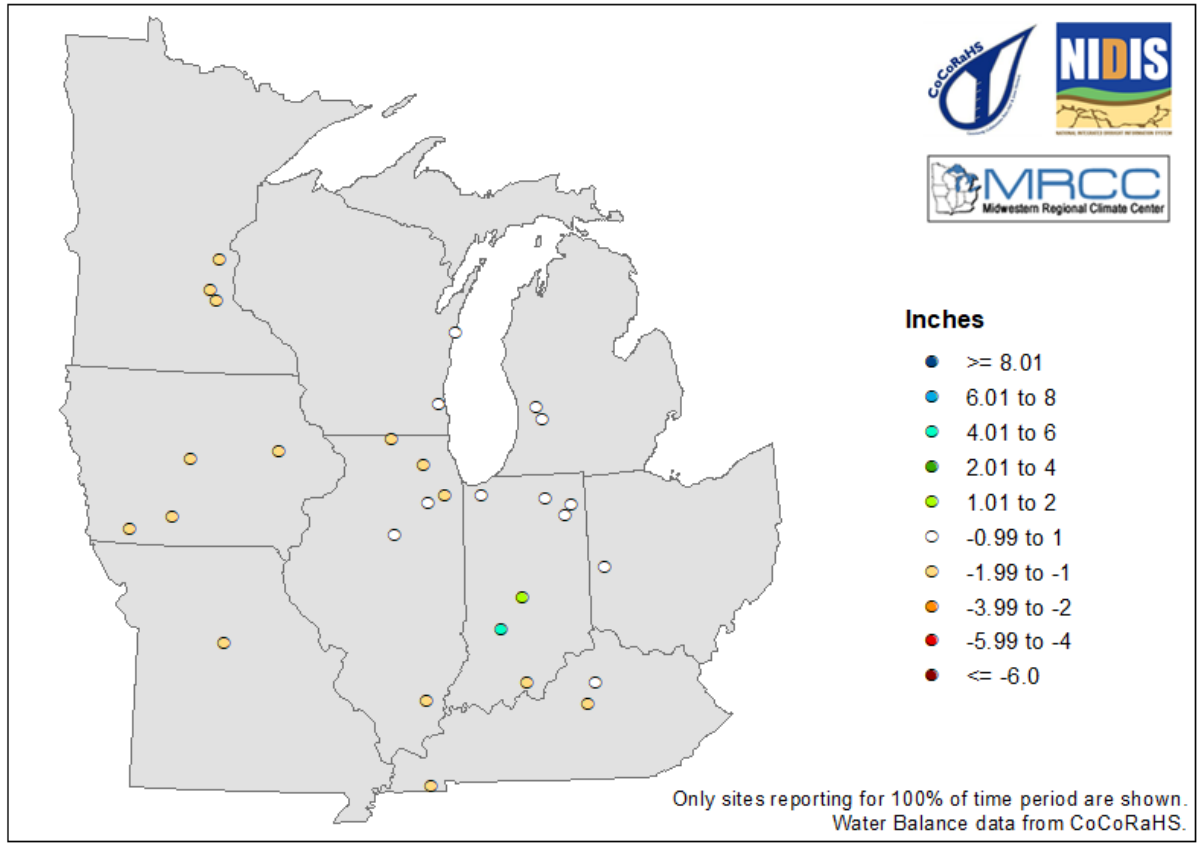
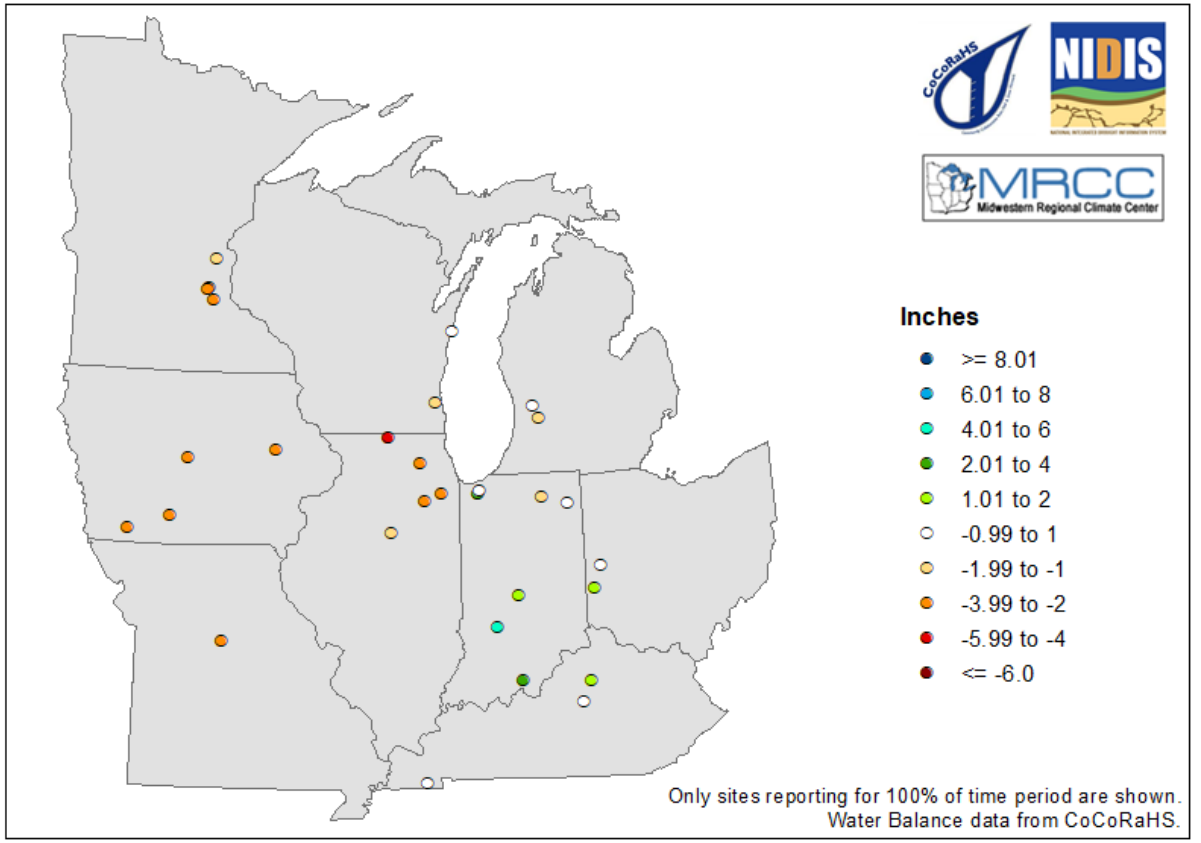
Water Balance for 7-day Period: 6/12/2021 - 6/19/2021



Water Balance for 30-day Period: 5/20/2021 - 6/19/2021



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Drought Resources and Tools

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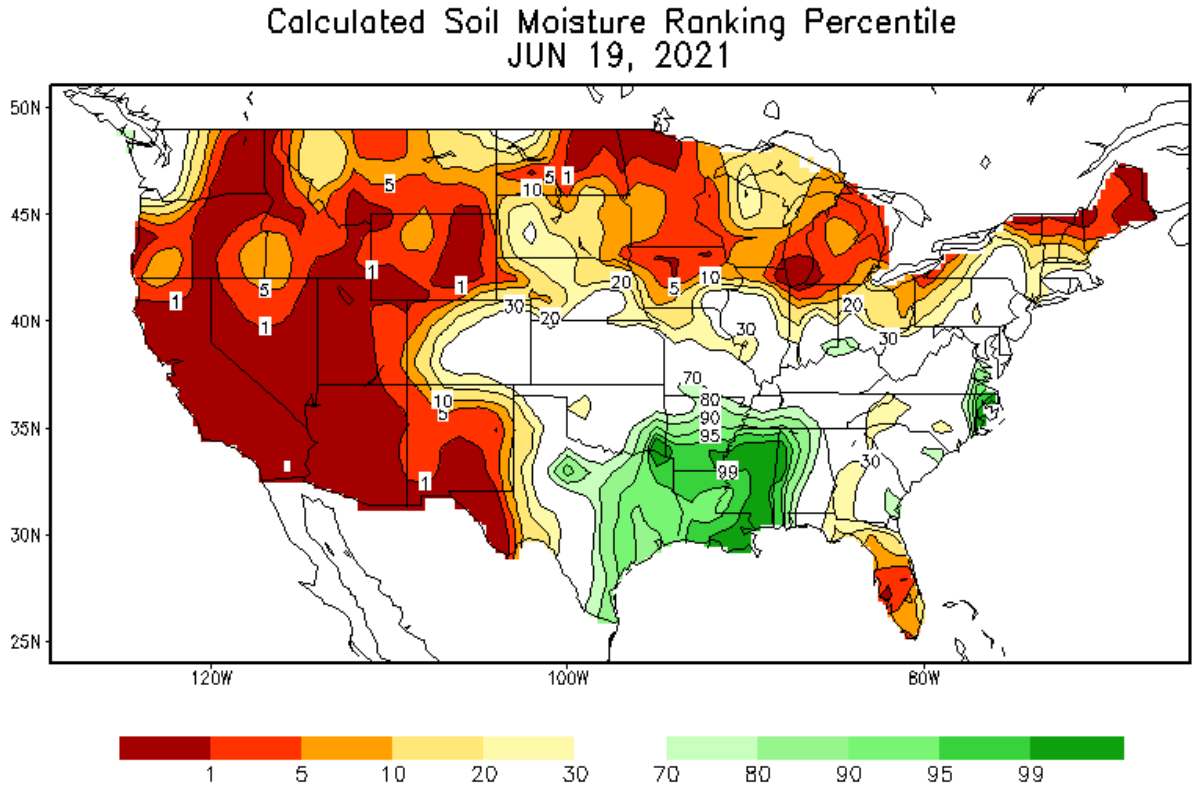

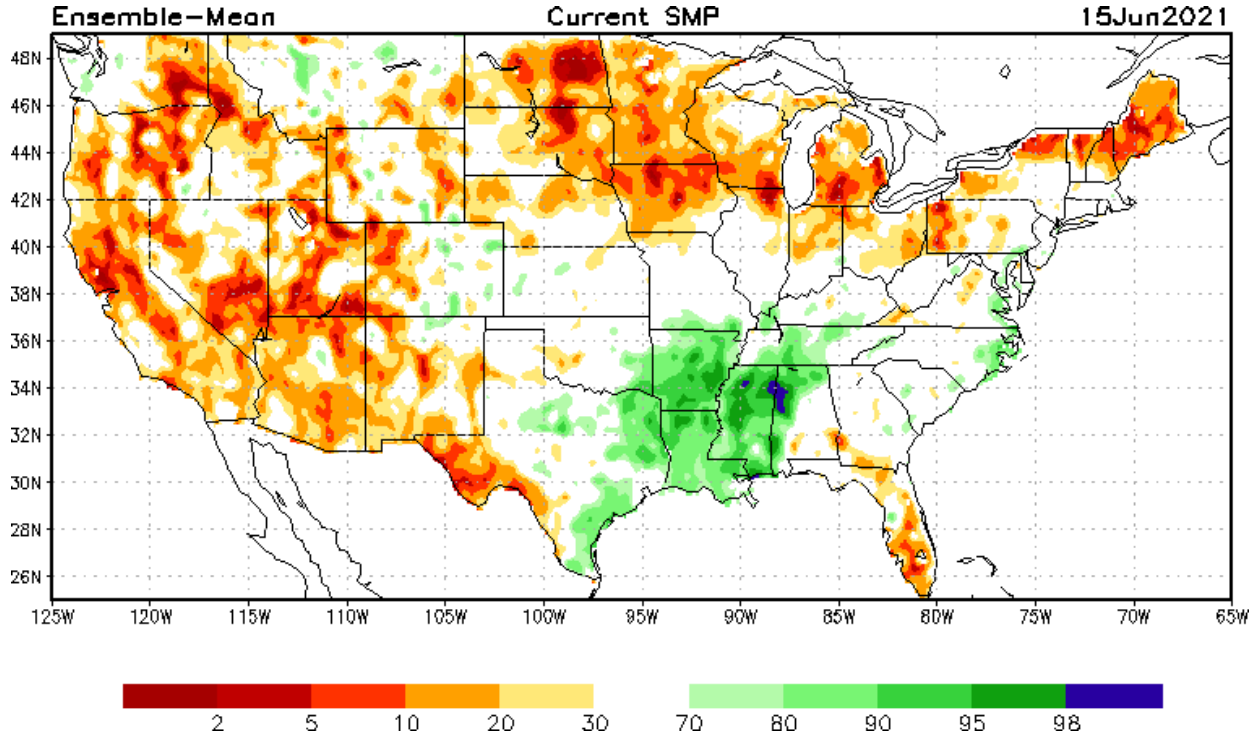

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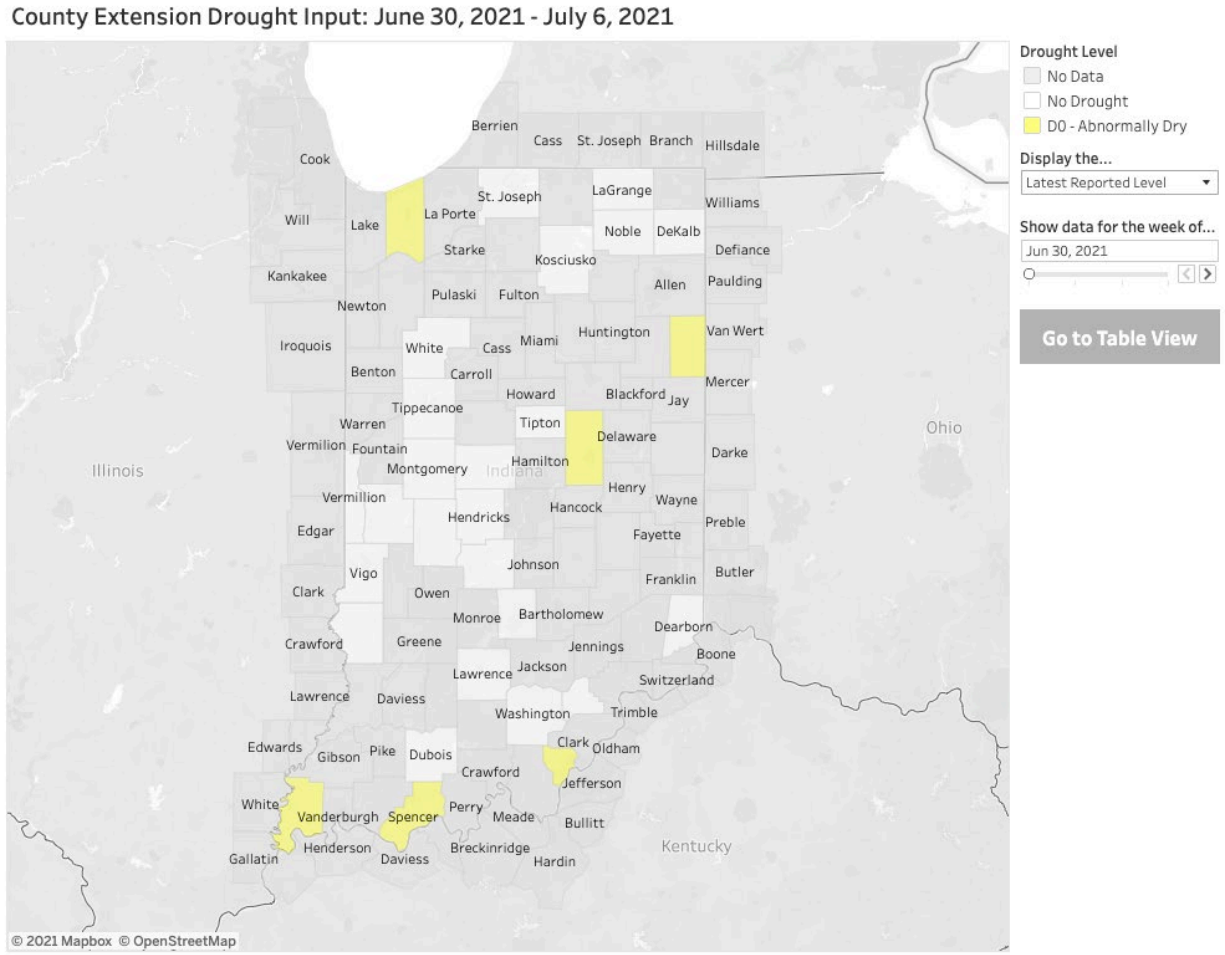
How you can help!

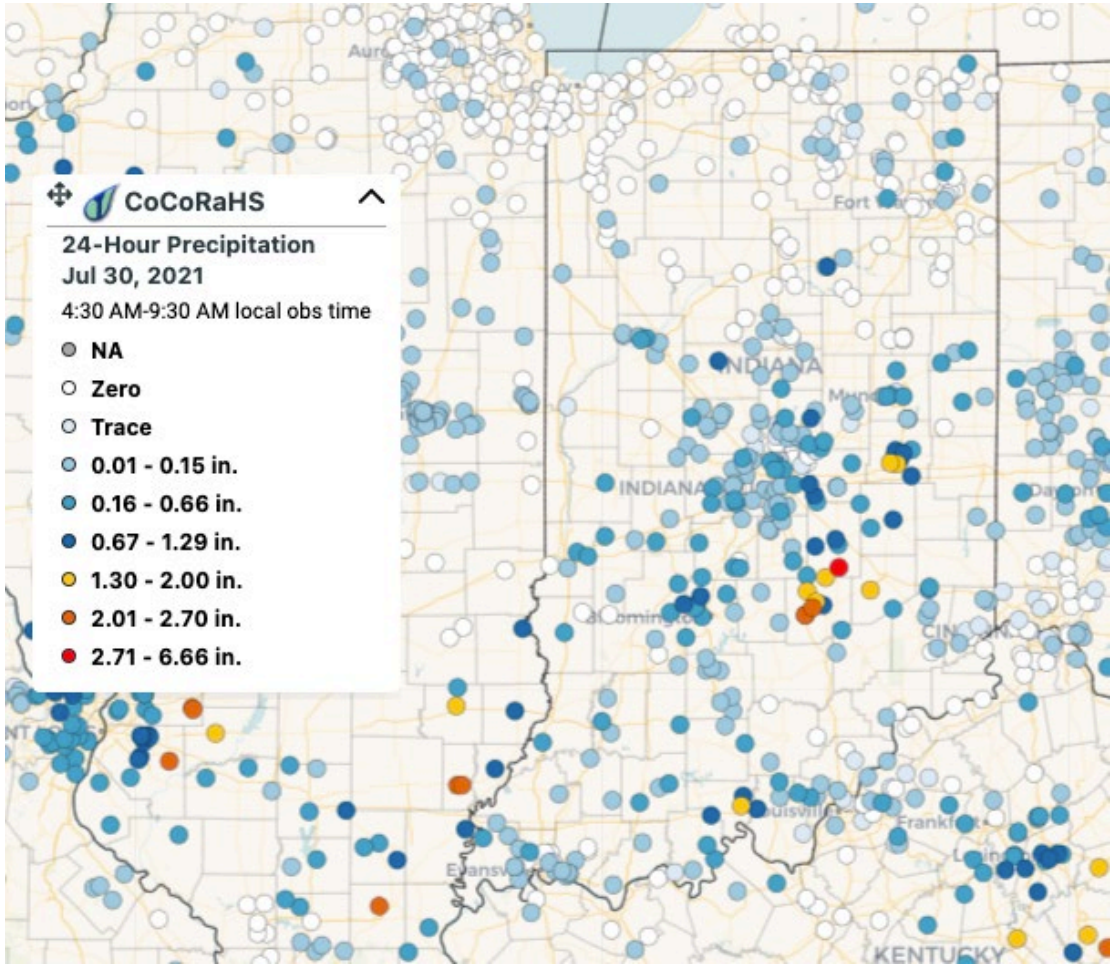
NWS-Indy Drought Page



https://ag.purdue.edu/indiana-state-climate/indiana-drought-conditions/

How you can help!

CoCoRaHS



https://www.cocorahs.org/

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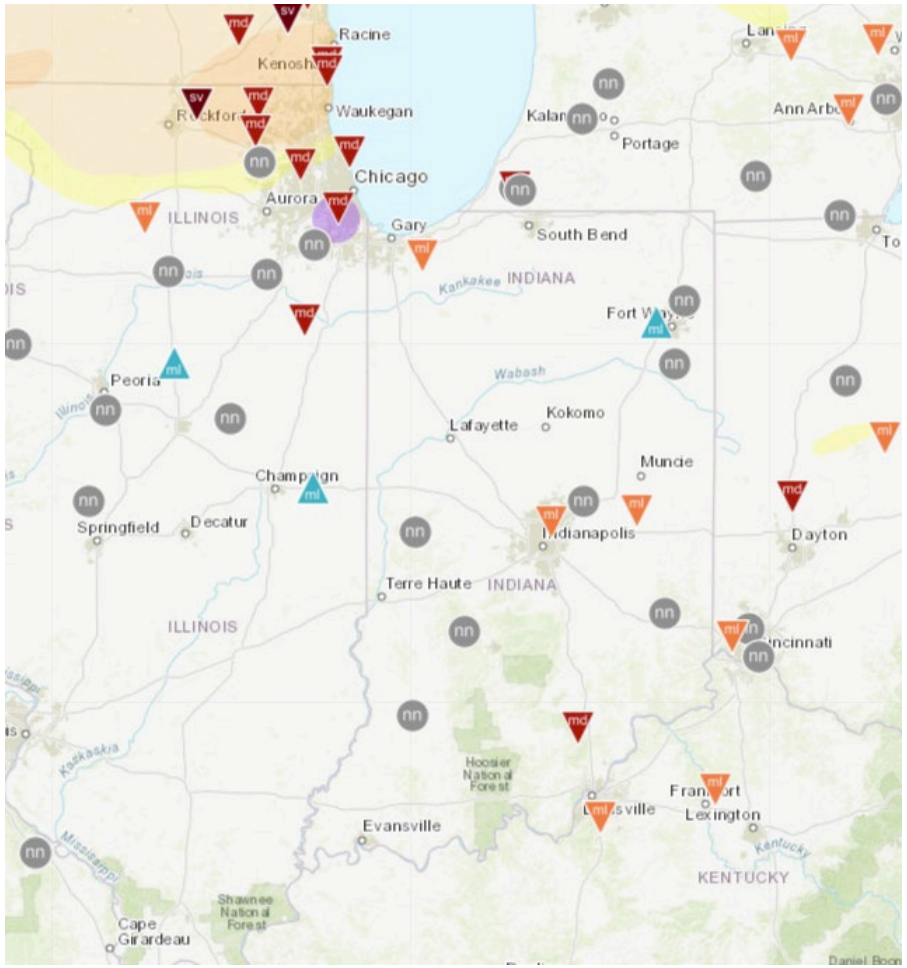

https://www.cocorahs.org/

Summary

- Drought is a **complex hazard** that requires a multi-faceted approach for prediction, early-warning, monitoring, and response
- Understanding drought impacts requires **engagement with multiple, diverse groups** across the state… precipitation alone will not cut it
- Indiana has experienced prolonged, severe droughts in the 20th Century, relatively **few since the 1960s**
- Long-term **increases in precipitation** have reduced drought duration and frequency
- Model projections show **increased variability** on top of the background of an overall wetter climate
- **Observations are critical** to understanding and planning for drought

THANK YOU

Beth Hall
Indiana State Climate Office
bethhall@purdue.edu

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