The United States Drought Monitor Process and Reporting Drought Impacts

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The USDM has continuously evolved from past efforts to monitor drought including early versions of the USDM



Instead of using a single indicator/index, a <u>Hybrid</u> <u>Approach</u> is used: U.S. Drought Monitor (USDM)





The United States Drought Monitor

- Hosted by the NDMC as part of a 3way partnership with NOAA and USDA
- Over 12.5 million hits a year (more during significant drought events)
- Used in several USDA programs
- > Used by the IRS for tax deferrals
- Many others !

United States Drought Monitor droughtmonitor.unl.edu Current Map Maps Data Summary About Conditions & Outlooks En Español NADM

Map released: March 25, 2021

Data valid: March 23, 2021



5 levels of intensity on the map, 4 are considered drought, 1 is not

- D0 happens once every 3-5 years
- D1 happens once every 10 years
- D2 happens once very 20 years
- D3 happens once every 25-30 years
- D4 happens 1-2 times a century

Intensity:
 D0 Abnormally Dry Not Drought
 D1 Moderate Drought
 D2 Severe Drought
 4 Drought intensities
 D3 Extreme Drought
 D4 Exceptional Drought

Percentiles and the U.S. Drought Monitor

Advantages of percentiles:

- Can be applied to any parameter used in the drought analysis
- Can be used for indicators of any length of data record
- Puts drought in historical perspective:

How many occurrences in a given period of time



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



(21st-30th percentile)

Period of record is important !

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The map is...

An attempt to represent <u>all</u> the different types of drought on one map



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U.S. Drought Monitor Approach



- Many types of drought "information" can be collectively analyzed
 - Determining if the majority of information is 'converging' (telling the same story) about the accuracy, or inaccuracy, of the drought as depicted by the U.S. Drought Monitor
 - Several *dozen* inputs are considered in any given week
- Authors need to look at 100% of the data, <u>BUT</u> don't believe in any one piece of data input 100% in making a decision...

• Multiple indicators and many types of information are part of the analysis

- These data will identify different climatic and hydrologic parameters which are needed to understand the complete picture of a drought indicator's performance and how they interact in each part of the country
- Impacts are the "ground truth", yet aren't monitored to the extent which other data are....you can't measure what you don't monitor!

U.S. Drought Monitor Objectives



Assessment of <u>current</u> conditions and <u>current</u> impacts

The U.S. Drought Monitor is **<u>NOT</u>** a model

• The map is made manually each week based off the previous week's map

The U.S. Drought Monitor is **<u>NOT</u>** interpreting only precipitation

The U.S. Drought Monitor is **<u>NOT</u>** a forecast or drought declaration

• Can be used by decision makers in this way though

 The U.S. Drought Monitor does <u>NOT</u> take into account any relief programs when the map is produced.

Identifying impacts

- "S" short-term impacts, "L" long-term impacts or "SL" for a combination of both
- "S"-6 month time scales or less, "L"-greater than 6 month time scales

Incorporate **local expert** input

- Accomplished via email and impact reports
- Validation of Objective Indicators

Authors try to be as **objective** as possible (using the percentiles methodology) and the <u>"Convergence of evidence"</u> approach

- The physical data, drought indices/ indicators <u>must</u> support the depiction on the map
- Impact data validates physical data but <u>impacts</u> <u>alone will not drive changes</u> on the map.

Once the map is completed and published for the week, the map is final, and <u>no changes will be made retroactively!</u>



Regional and Local Feedback/Input Process How are other states contributing?

- Annual User Feedback Forums (USDM/NADM) since 2000
- Various webinars/telecons/reports/data/products
- Regional Climate Centers and NOAA Regional Climate Service Directors and Coordinators along w/ Weather Forecast Offices (WFOs)
- State Climatologists
- USDA FSA/NRCS
- Native American Tribal input
- CoCoRaHS (impacts)
- National Integrated Drought Information System (NIDIS) RDEWS basin webinars:
- **State Drought Task Forces**: North Carolina, Hawaii, Oklahoma, Texas, New Mexico, Alabama, Florida, South Dakota, Kentucky, Arizona, Montana, and California and many others !

How is all of this done?







Emerging Satellite-based Observations and Products

Over the past 10+ years, a number of satellite remote sensing-based tools and *products characterizing different parts of the hydrologic cycle that influence drought conditions* allowing new composite drought indicators to be developed.

Examples

- Evaporative Stress Index (ESI)
- Quick Drought Response Index (QuickDRI)
- Evaporative Demand Drought Index (EDDI)
- GRACE soil moisture and groundwater anomalies
- Vegetation Drought Response Index (VegDRI)















Drought Machine

The USDM map is the end product, but the **PROCESS** is what makes the USDM what it is.

Trust The Process !



Providing Drought Condition Reports or Impacts



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There are many ways to share reports on current conditions or drought related impacts: Coordinate with the State Drought task force/coordination team

□CoCoRaHS observers can utilize the condition monitoring platform built into the observing system where daily precipitation is shared too.

Utilize the CMOR (Condition Monitoring Observation Reporting) platform to submit information and photos. This is open to the public.

Utilize the Visual Drought Atlas to submit regular photos of areas both in and out of drought. This is open to the public.

Regardless of the system users want to use, the USDM Authors will utilize impact and condition reports to help validate the various data used in making the map. These data will be archived and are available to anyone who wants to use them.

How to contribute drought impact reports or condition reports

droughtimpacts.unl.edu

Drought Impacts Toolkit							Login
	Home	Condition Monitoring Observations	Drought Impact Reporter	Visual Drought Atlas	Emerging Impacts	Impact Assessments	



Different systems collect condition monitoring observations using a common seven-point dry-to-wet scale to capture what they see at a specific place and time.

3

DROUGHT IMPACT REPORTER

We systematically scan news stories, looking for "a loss or change at a specific place and time due to drought," providing a preliminary historic record and sometimes insight on emerging conditions.



VISUAL DROUGHT ATLAS

The Visual Drought Atlas is a way to compare the appearance of different landscapes over time, in dry, wet and normal years.

Condition Monitoring Observations CMOR Reports



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Condition Monitoring Observations



Reporter



Visual Drought Atlas

https://droughtimpacts.unl.edu/VisualDroughtAtlas.aspx

Visual Drought Atlas

Visual Drought Atlas



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Any Questions ?



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