

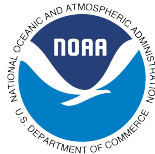
# **National Integrated Drought Information System An Overview for Connecticut**

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**Sylvia Reeves, Drought Information Coordinator  
Northeast Drought Early Warning System**

**27 July 2023**

# National Integrated Drought Information System (NIDIS)



Act of 2006 (P.L. 109-430) prescribed a comprehensive, interagency approach for drought monitoring, forecasting, and early warning planning and preparedness to help states and local communities cope with the impacts of drought.



## Primary Activities...

- Advancing Regional Drought Early Warning Systems
- Improving drought prediction and forecasting
- Supporting drought planning and preparedness
- Supporting drought impact assessments
- Strengthening collaboration
- Leading the U.S. Drought Portal: [www.drought.gov](http://www.drought.gov)

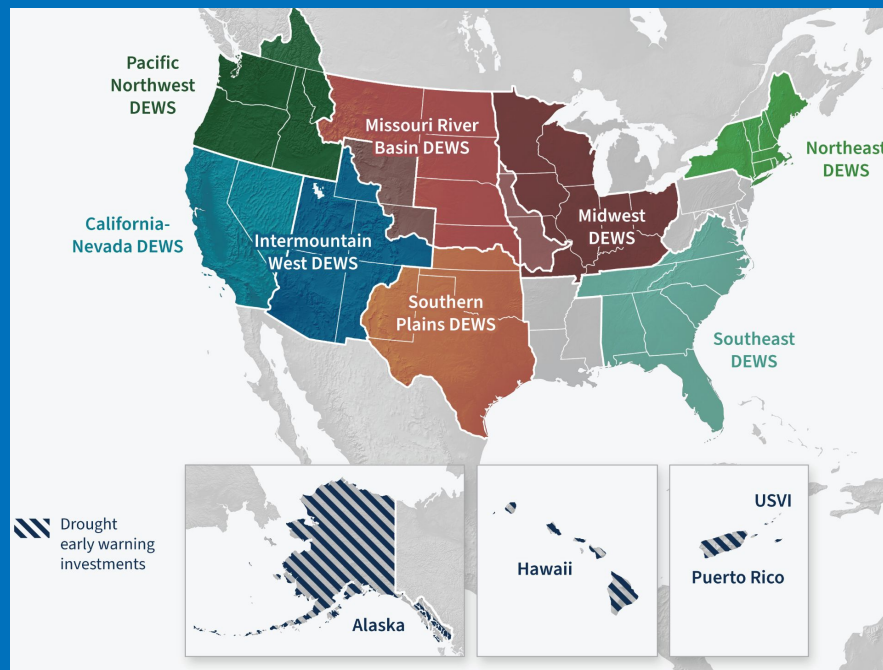
Enable the Nation to move **from a reactive to a more proactive** approach to managing drought risks and impacts



@DroughtGov



## NIDIS Drought Early Warning Systems (DEWS)

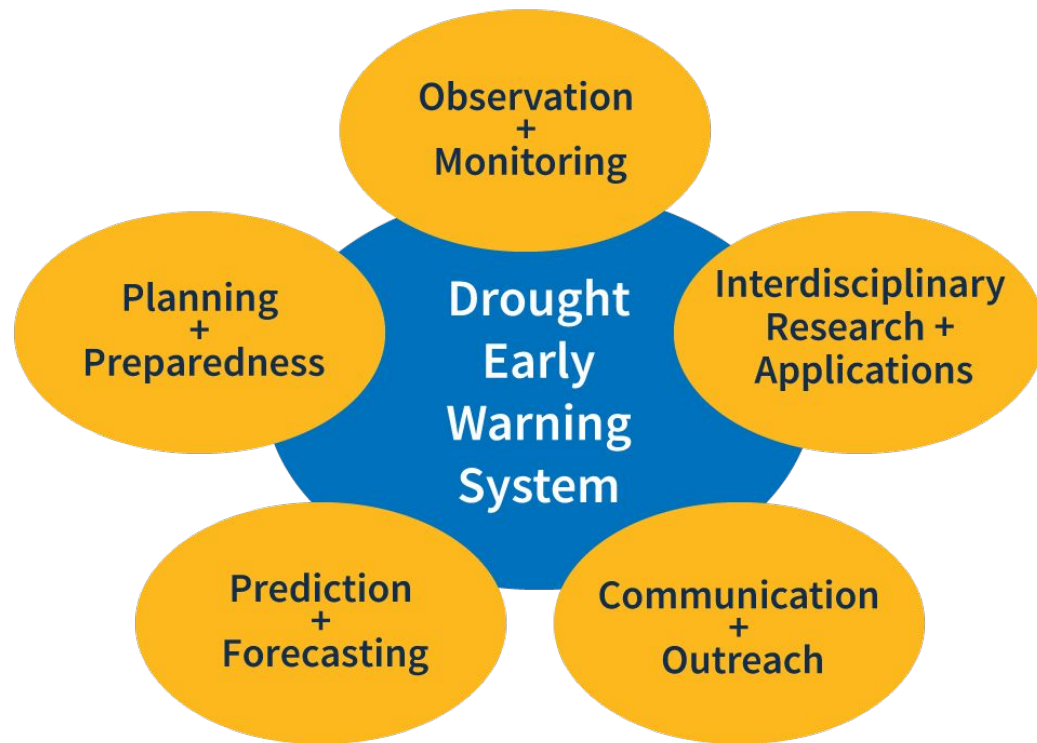


## APPROACH

# Drought Early Warning

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“Provision of **timely and effective information** that allows individuals exposed to a hazard to **take action** to avoid or **reduce their risk** and **prepare** for an effective response.”



# Unique Role of NIDIS

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1

## **Convening and Coordination**

Partnerships, consultations, networks, workshops, etc.

2

## **Delivering Information**

Drought.gov, drought status updates, communications, etc.

3

## **Advancing and Integrating Research Into Action**

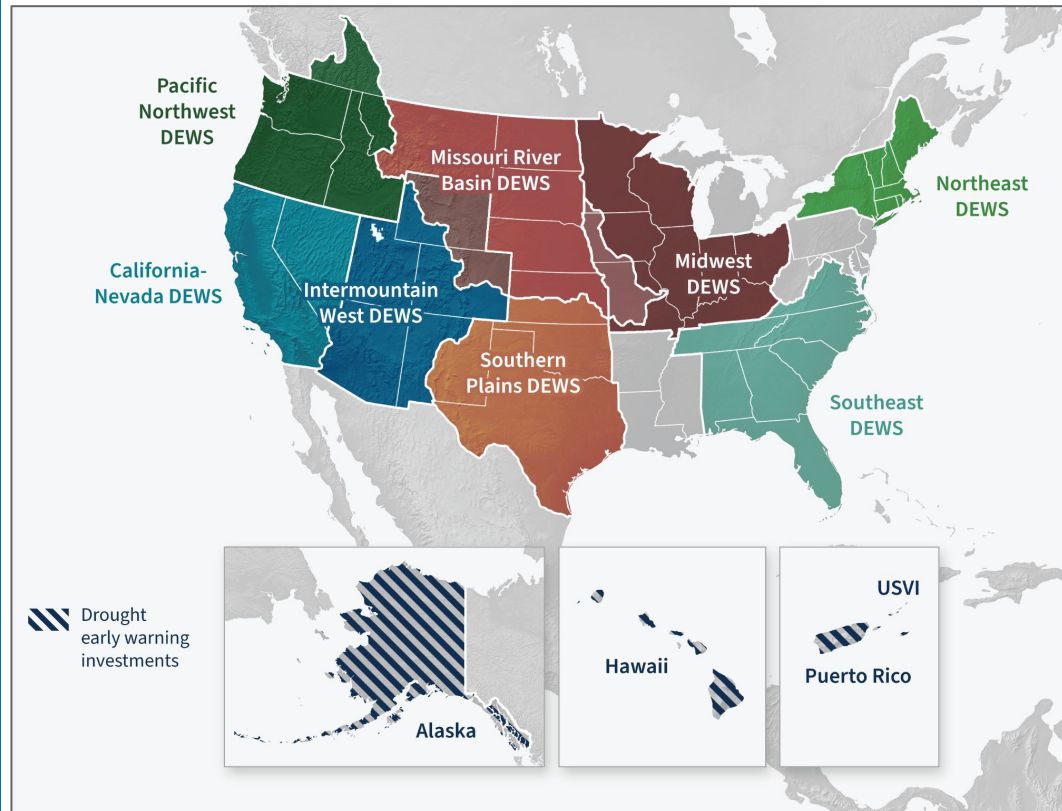
Applied research, products development, assessments

Interagency **collaboration** and **partnerships** are key to all we do!

## REGIONS

# Drought Early Warning Systems

A Drought Early Warning System (DEWS) utilizes new and existing **networks** of federal, tribal, state, local and academic partners to **make climate and drought science accessible and useful** for decision makers.



# Regional DEWS Strategic Action Plans

2021–2023

## Missouri River Basin

Drought Early Warning System  
(DEWS) Strategic Action Plan



Document prepared by the National Integrated Drought Information System (NIDIS)  
in partnership with key stakeholders in the region (Appendix C).

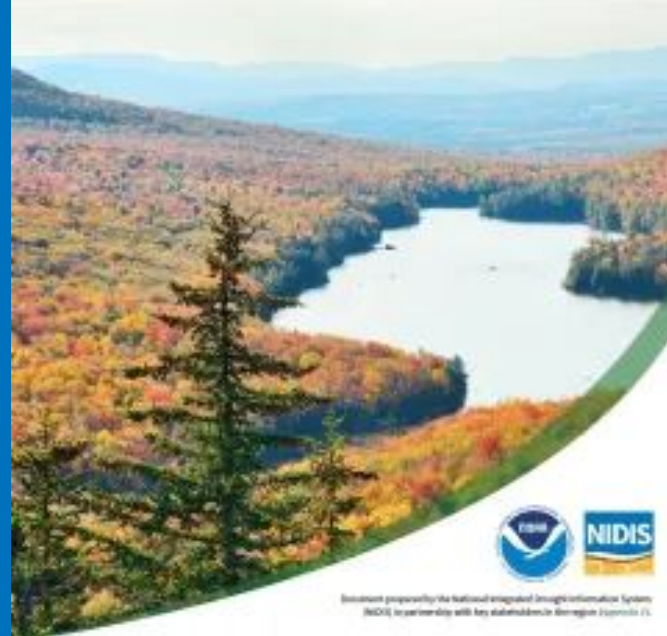
## Key Themes

- Drought indicators & impacts to inform planning
- Proactive drought management actions
- Integrated/applied research
- Collaboration and network building

2022–2026

## Northeast

Drought Early Warning System  
(DEWS) Strategic Action Plan



Document prepared by the National Integrated Drought Information System (NIDIS)  
in partnership with key stakeholders in the region (Appendix C).

## REGIONS

# DEWS In Action

**Communications & Outreach:** Communicate the current conditions, impacts, and outlook for drought to our regions.

**Predictions & Forecasting:** Support CPC and University researchers to improve seasonal-to-subseasonal forecasting.

**Observations & Monitoring:** Increase availability of soil moisture data and products for drought and flooding.

**Planning & Preparedness:** Support states to identify best indicators for drought, and to incorporate this into their state plans.

**Research & Applications:** Support research on rapid transitions from too much to too little water (and vice versa).

## Midwest Drought Status Update



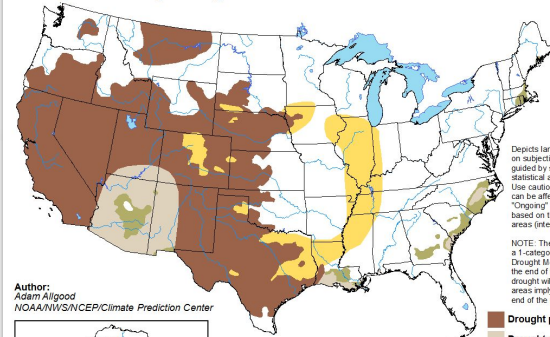
July 21, 2022

### Drought Continues to Intensify Across Portions of the Midwest

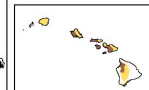
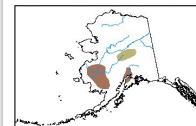


### U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for June 16 - September 30, 2022  
Released June 16



Author:  
Adam Allgood  
NOAA/NWS/NCEP/Climate Prediction Center



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



<http://go.usa.gov/3eZ73>

# NIDIS in Action Across the U.S.

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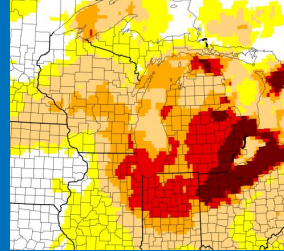
**Drought  
& Human  
Health**



**Drought &  
Wildfire**



**Flash  
Drought**



**Drought  
Impacts &  
Indicators**



**Soil  
Moisture**



**Economic  
Assessments**

# Drought Assessment in a Changing Climate Technical Workshop

Shared information on **state of current research.**

Identified **immediate actions and long-term recommendations** to improve drought assessment.

Identified **outstanding research questions** to advance the science.

Identified specific needs for changes to drought monitoring/assessment protocols to **incorporate climate change information.**

**February 28-March 1, 2023  
Boulder, CO**



Climate Hubs  
U.S. DEPARTMENT OF AGRICULTURE



# 2nd National Flash Drought Workshop

Bring together **flash drought research community + practitioners** to learn from one another, build stronger connections, and increase coordination.

## Highlights from workshop...

- State of the science presentations
- Case studies
- Emerging science
- Regional breakout groups and flash drought scenarios
- Tools Cafe

## Moving forward...

- Work at the regional/sectoral level

May 2-4, 2023  
Boulder, CO



# Drought and Public Health: A Roadmap for Advancing Engagement and Preparedness

Informed by **extensive dialogue and feedback** from academic and practitioner groups through workshops and interviews.

Provides a list of **key opportunities and recommended actions** to advance drought and public health engagement and preparedness.

Inform and **direct future efforts and investments** in drought and public health by Federal, state, and local agencies.

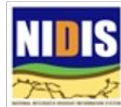


# National Coordinated Soil Moisture Monitoring Network “NCSMMN”

*Coordinated, high-quality,  
nationwide soil moisture  
information for the public good*

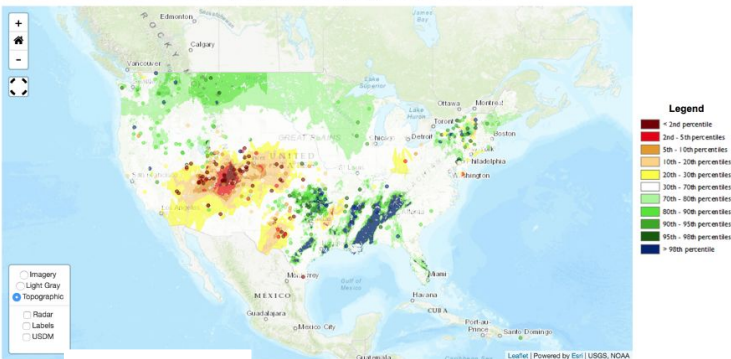


- Network of Networks
  - State and Federal Mesonets
  - Private, citizen science
  - ... and satellite / model-based data
- Network of People
  - Partnering agencies - federal and state
  - Data providers
  - Researchers, model & tool developers
  - End user community



# What Soil Moisture Information?

5 cm Soil Moisture Percentile (Regression Kriging Interpolation) on Tue Oct 22 2019



5 cm Soil Moisture Percentile (3Day SMAP L3) on Tue Oct 22 2019



- **Products:** Real time, gridded soil moisture products using (and blend

- In situ data
- Remote sensing data
- Model outputs



- **Technical Assistance Materials**

- **Standards**

- Data-quality criteria for *in situ* networks
- Sensor performance standards

- **Datasets for research, tool development**

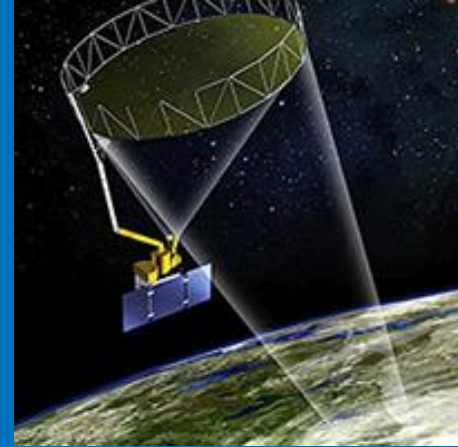
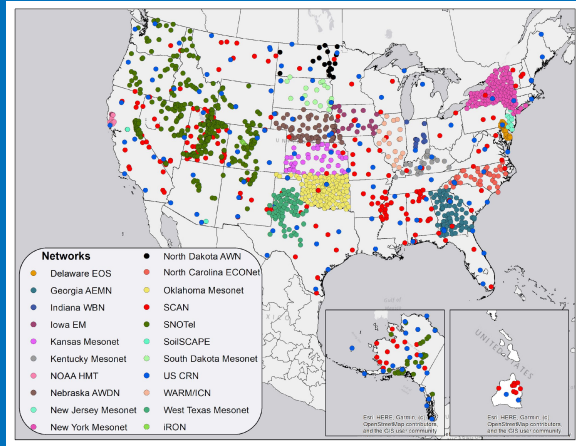
# Recent Accomplishments – NCSMMN Network

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- NCSMMN Strategy released
- Key *in situ* network expansions:
  - USACE Upper Missouri River Basin project: 500+ stations
  - SE Region: AL, GA, FL Buildout: ~150 stations
- Development of proof-of-concept gridded, blended maps:
  - NationalSoilMoisture.com
  - NOAA USCRN SWAMP model
- Soil Moisture Product Advancement by Partners:
  - NASA SPoRT-Lis
  - Crop-CASMA
  - ... others!
- Ramped-up Outreach and Engagement



# *In Situ* - Remote Sensing Nexus



- Complementary Views of Soil Moisture Status
  - Broad scale versus point
  - Periodic passes versus continuous
- *In Situ* Provides Calibration / Validation of Satellite

# Drought.gov Soil Moisture Dashboard

**Six soil moisture products** in one place to facilitate analysis:

- NASA SPOrT-LIS
- Crop-CASMA
- GRACE
- Nationalsoilmoisture.com
- CPC Leaky Bucket
- NLDAS NOAH

**<https://www.drought.gov/testing/soil-moisture-indicators>**

NOAA NIDIS **Drought.gov**  
National Integrated Drought Information System

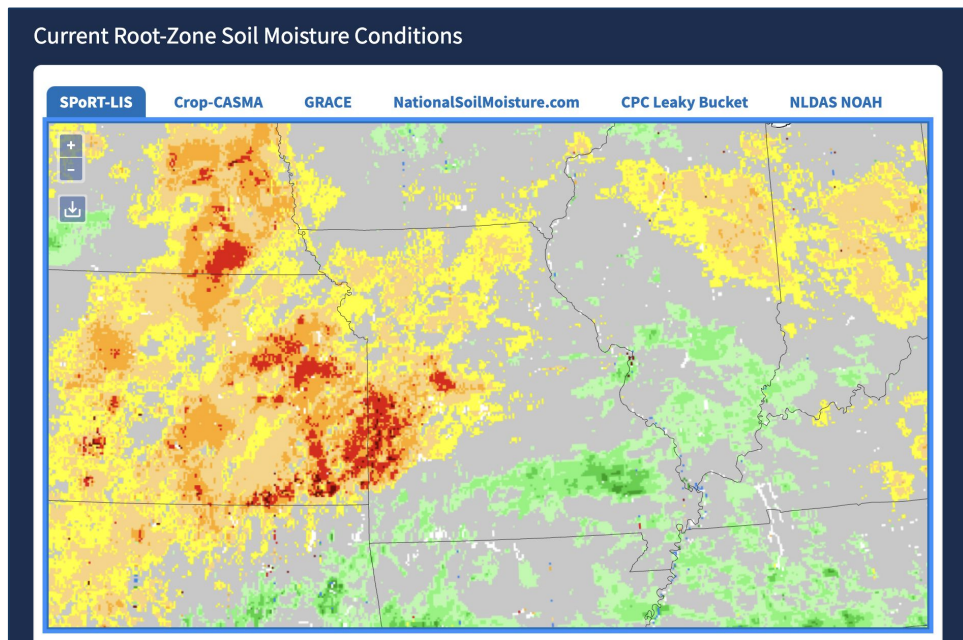
Search f t y

Data and Maps ▾ By Sector ▾ By Location ▾ Research and Learn ▾ About ▾ News and Events ▾

## Drought Indicators: Soil Moisture Product Dashboard

The following soil moisture maps are presented together to facilitate analysis. This page is **experimental** – use with caution.

**Please note** areas of variation across products and interpret accordingly. For example, the units may be percentiles or anomalies, and products may have different depths, validation dates, data sources, and methodologies.



# Interdisciplinary Research Support

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## Competitive Applied Research Opportunities

### *Coping with Drought Program*

- Supports research on drought related to ag, ecosystems, water resources, etc.
- Development of decision support tools for regional, state and local use
- Current FY22 focus on **ecosystem impacts** and **tribal resilience**

## Regional and State Research Projects

- Supports **co-production of applied research to address state and regional needs**
- Northeast DEWS Examples:
  - Improve Dry Well reporting and assessment through permit review
  - UMASS Lowell 3yr analysis of synoptic patterns => heat/drought



# NASA DEVELOP Project Characteristics



- **10-week** research projects
- Highlight the applications and capabilities of **NASA Earth observations**
- Address **community concerns** relating to **decision-making** for real-world environmental issues
- Research is conducted by **interdisciplinary teams** under the scientific guidance of DEVELOP Science Advisors and Mentors from NASA and partner organizations
- NIDIS partners with the **NOAA NCEI** location on drought-focused projects

<b>Summer 2021</b>	<i>Compared in situ soil moisture to satellite and model product</i>	<i>Illinois State Climate Office</i>
<b>Fall 2021/ Spring 2022</b>	<i>Evapotranspiration climatology; compare in situ to satellite ET data</i>	<i>Midwest Climate Hub, MN Dept Ag, MI/IL SC</i>
<b>Summer 2023</b>	<i>Drought/air quality study in OR/WA</i>	<i>OR and WA health depts</i>





**Drought.gov**

National Integrated Drought Information System



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News and Events ▾

## High-Resolution Western Drought Forecasts Could Be on the Horizon

A new computer modeling technique developed by NCAR scientists offers the potential to generate months-ahead summertime drought forecasts across the Western United States.

### FEATURED NEWS AND ARTICLES

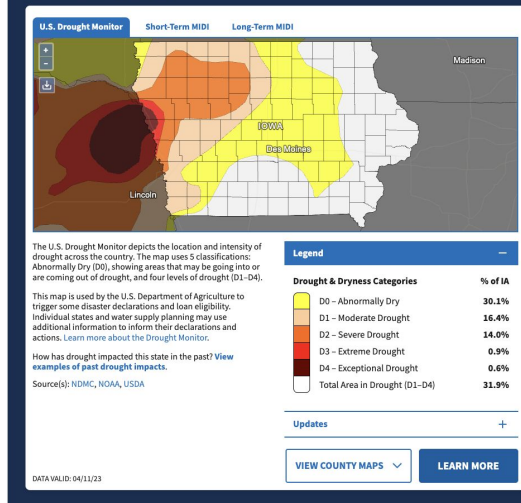
Special Edition Drought Status Update for the West

Drought Update for the North Central U.S.: May 19

NEW: Improved & Expanded State Pages on Drought.gov

How is drought affecting your neighborhood?

Enter city or zip code



## Stay Informed: Local Drought Updates

## Drought Alert Emails

Get email updates when U.S. Drought Monitor conditions change for your location or a new drought outlook is released.

## Regional Drought Status Updates

NIDIS & its partners issue regional updates covering drought conditions, outlooks/forecasts, and local impacts.

## Midwest Drought Email List

Get regional drought status updates right to your inbox, as well as drought news, webinars, and other events for the Midwest.

## North Central U.S. Climate and Drought Summary and Outlook Webinars

This webinar series, which covers the region from the Rockies to the Great Lakes, includes a summary of past and current conditions, potential and ongoing impacts across sectors (e.g., agriculture, water resources, navigation), and outlook information.

## U.S. DROUGHT PORTAL

## Updated Drought.gov State Pages

**New interactive maps** featuring key drought indicators at the state level

**Customization** and **sharing options**

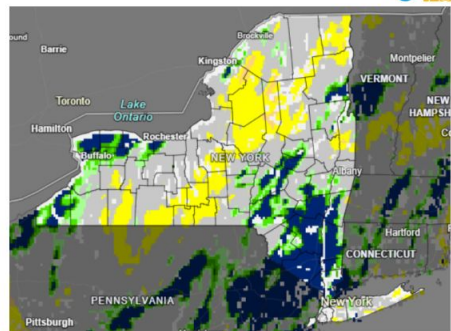
Highlighted state government **drought resources**

**Educational overview** of drought in the region

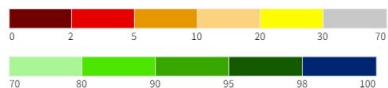
**Improved usability** and page performance

Resources to stay up to date on **local drought information**

20 cm Soil Moisture Percentile

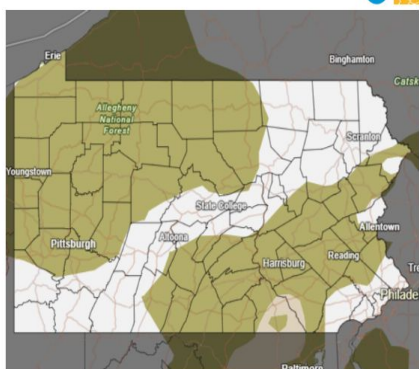


20 cm Soil Moisture Percentile



Drought.gov

1-Month Drought Outlook



Drought is Predicted To...

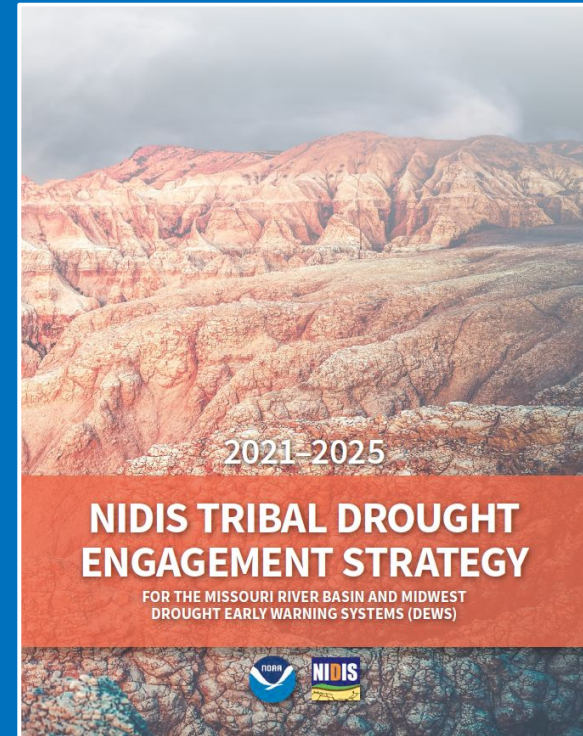


Drought.gov

# NATIONAL NIDIS Tribal Drought Engagement Strategy

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- **Key tribal engagement activities** to implement in 2021 and beyond.
- Integrating tribal perspectives into NIDIS' work is important to ensure tribal nations are **equal partners** in responding to drought.
- Presents ***Guiding Principles of Engagement:***
  - Respecting tribal sovereignty
  - Ensuring trust and reciprocity
  - Ensuring DEWS are culturally appropriate and useful for tribal nations



# NIDIS Tribal Strategy: Key Outcomes

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## Observations and Monitoring

Support the expansion of reservation-specific drought observation data.

Strengthen existing monitoring networks: provide access to more weather stations, stream gauges and soil moisture on reservations.

Tribal nations receive regional observation and monitoring data in a timely manner.

Map monitoring stations on reservations and provide support on how to address data gaps, including identifying funding and long-term maintenance support.



# NIDIS Tribal Strategy: Key Outcomes

## Interdisciplinary Research and Applications

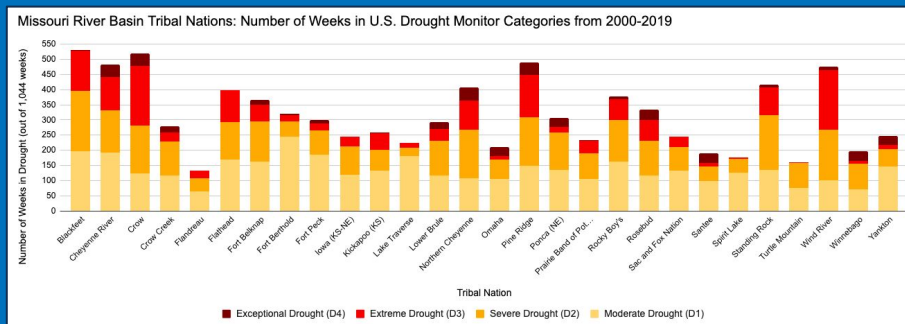
Integrate the results of drought research into tribal decision-making and planning.

Improved understanding and application of drought indicators on reservations.

Drought research and knowledge is documented by tribal nations and used to strengthen drought early warning.

Reservation-specific drought mitigation actions are better understood.

Improved understanding of tribal drought risk.



# NIDIS Tribal Strategy: Key Outcomes

## Planning and Preparedness

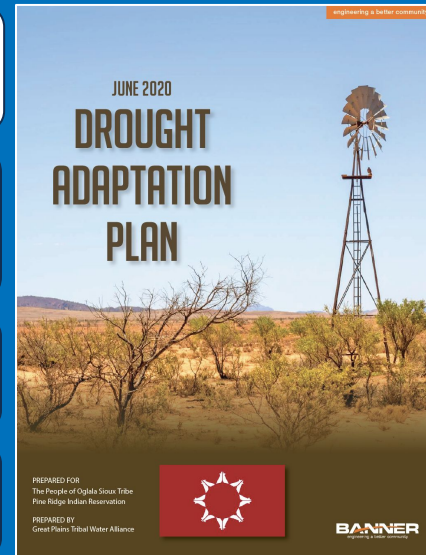
Help with planning, but also help to advance action and implementation of actions.

Key tribal drought exposures and resilience across the region are better understood.

Drought mitigation and adaptation actions and approaches are better understood and implemented by tribal resource managers.

Provide technical support for tribal nations with significant drought exposure and financial need.

Ecosystem health across the two regions is improved through restoration efforts.



## **NIDIS Coordinators working with NWS on improvements to Drought Information Statements**

# **Drought Information Statement**

(Work with the Boston MA and Burlington VT NWS offices paused due to Vermont flooding.)

Let's take a look at a sample from Texas:  
<https://www.weather.gov/media/ewx/ewx-drought.pdf>

NOW FOR YOUR QUESTIONS About NIDIS



# My Questions for You

Drought and Agriculture - Do you get many queries?

Can I help with regional “situational awareness” of drought impacts?

Any ideas for improved public messaging around hydro drought (especially when it's been raining)?

What would be most helpful to you in terms of improving drought monitoring and observation? More CMOR reports and sharing?

Can you share suggestions for regional research opportunities or new data sets?

Are there public sector partners that you would like me to reach out to?

# Thank You!

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National Integrated Drought  
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