



# **Addressing Contemporary Drought Challenges: Ongoing NIDIS Efforts to Gather and Act on New Service Requirements and Innovation**

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**Amanda M. Sheffield, PhD**

**21st CPASW/48th CDPW, March 29, 2024**

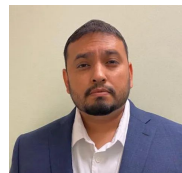
# NIDIS Program Office Staff



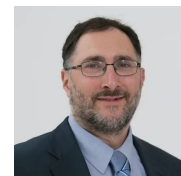
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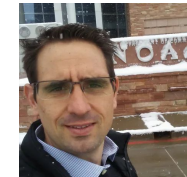
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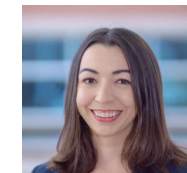
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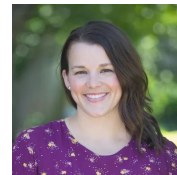
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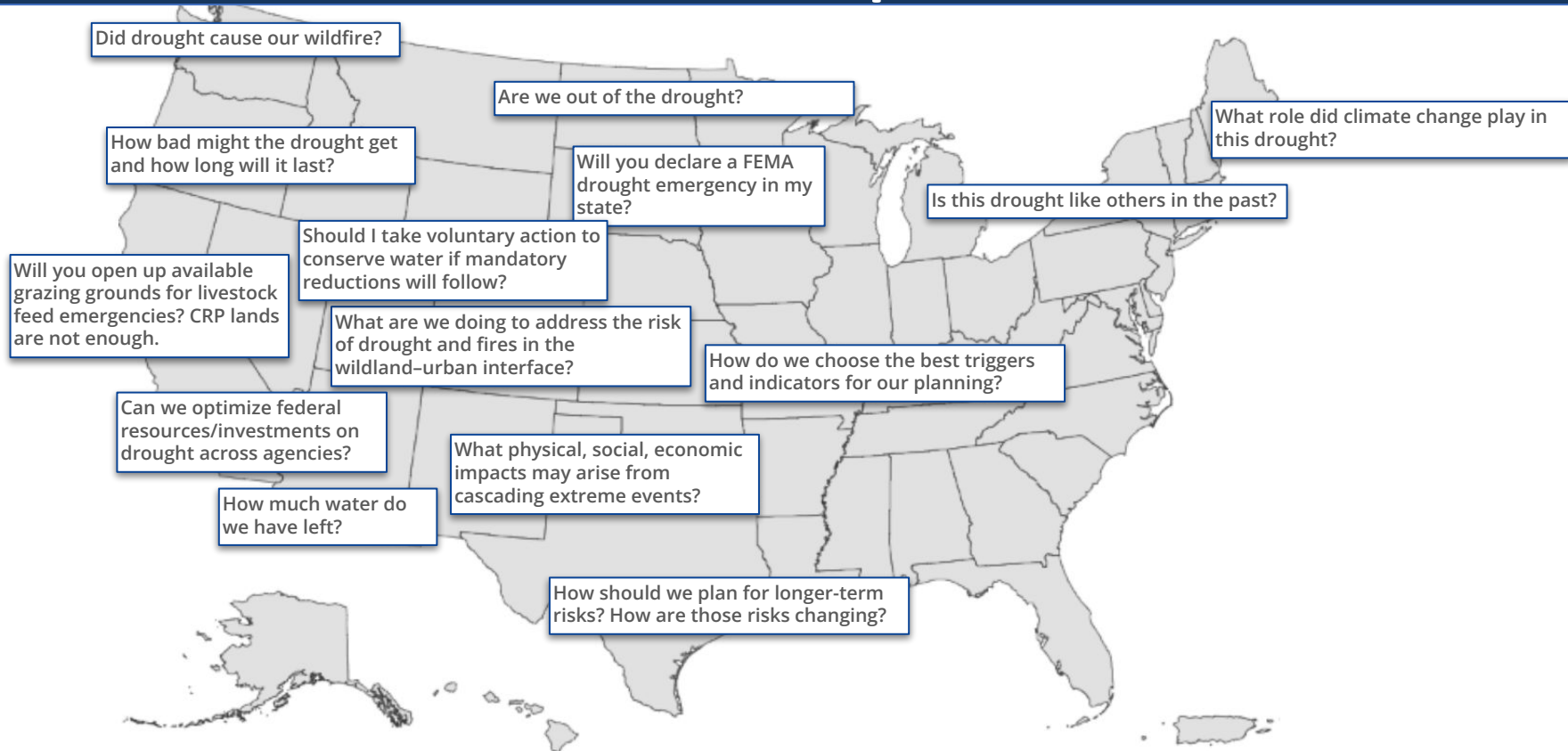


**Molly Woloszyn**  
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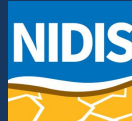
**Eleanor Hasenbeck**  
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Specialist

# Drought is a very complicated hazard to understand and plan for





# National Integrated Drought Information System (NIDIS)

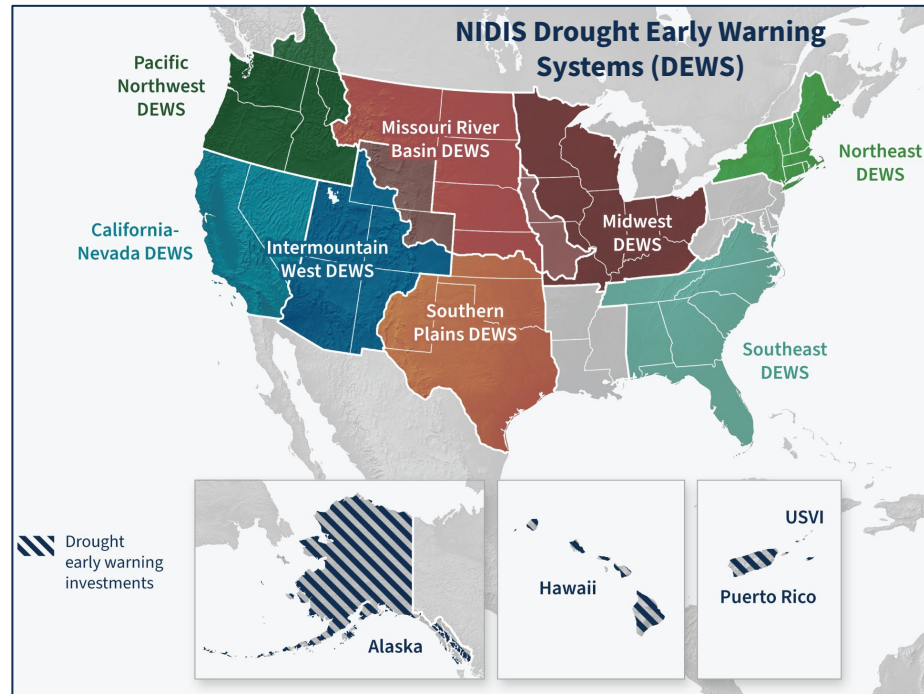


NIDIS is a **multi-agency partnership** that coordinates drought monitoring, forecasting, planning, and information at federal, tribal, state, and local levels across the country.

## How do we do this work?

- 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





# 2022–2026 NIDIS Strategic Plan

*Advancing Drought Science and Preparedness Across the Nation*

## Goal 1

**Provide the best early warning information for a wide range of decision-makers and audiences**

## Goal 2

**Improve the monitoring of drought conditions across a variety of spatial and temporal scales**

## Goal 3

**Improve drought planning and preparedness**

## Goal 4

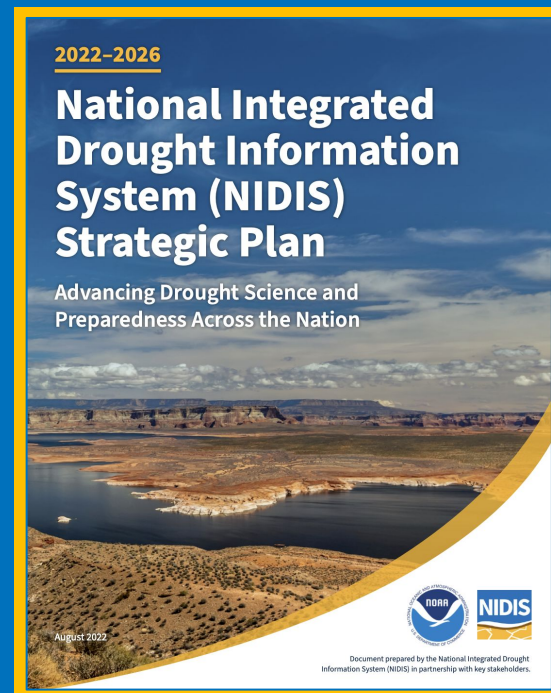
**Improve risk assessments, decision-based applications and actions**

## Goal 5

**Increase drought awareness and catalyze action**

## Goal 6

**Foster the exchange of information, practices, and lessons**



# Unique Role of NIDIS in the Federal Drought Landscape



**Developing  
and  
Delivering  
Information**



**Convening,  
Coordinating,  
Capacity  
Building**



**Advancing and  
Integrating  
Science into  
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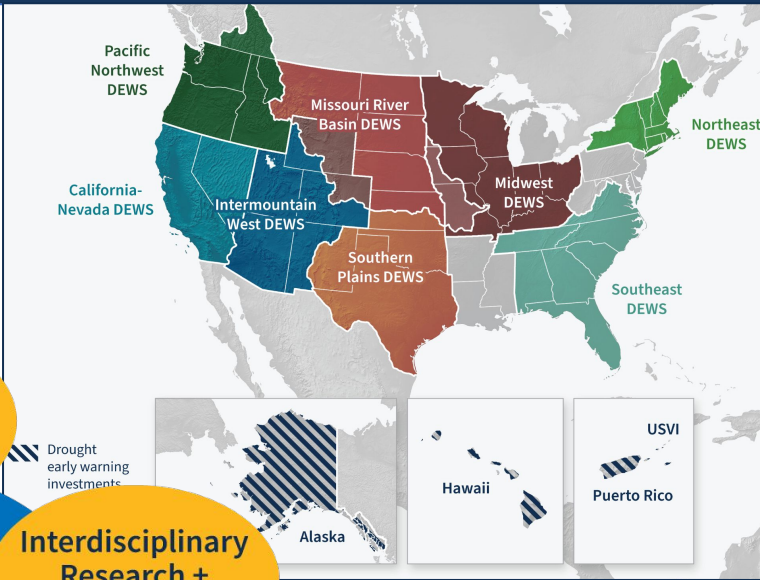
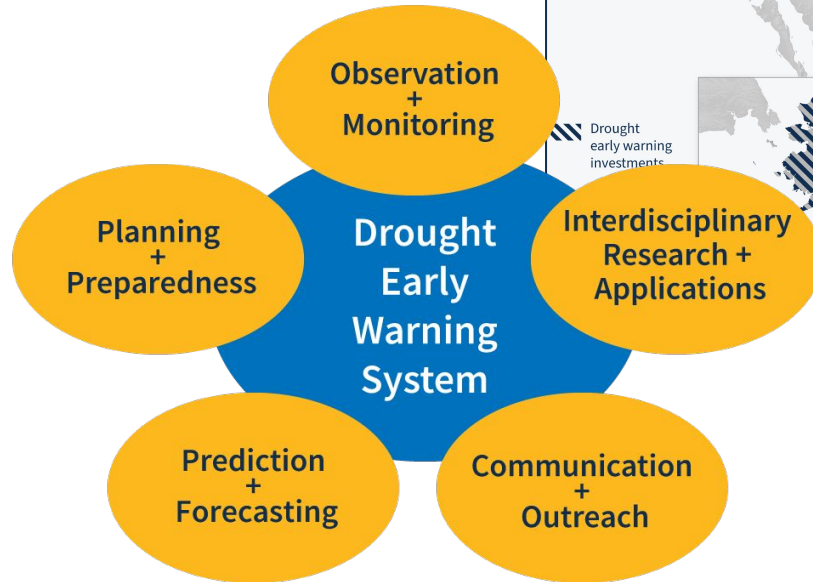
**Advancing and  
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# NIDIS Drought Early Warning Systems



A **Drought Early Warning System** (DEWS) is a network of regional and national partners that share information and coordinate actions to help communities in the region cope with drought.



An official website of the United States government [Here's how you know](#) ▼

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

Search    

[Data and Maps](#) ▼ [By Sector](#) ▼ [By Location](#) ▼ [Research and Learn](#) ▼ [About](#) ▼ [News and Events](#) ▼

## Climate Engine Launches New Website to Facilitate Drought and Vegetation Monitoring

Climate Engine, with support from NOAA's National Integrated Drought Information System, is partnering with the Bureau of Land Management (BLM) to guide drought planning on BLM-managed lands.

### FEATURED NEWS AND ARTICLES

[2nd National Flash Drought Workshop Report](#)

[Severe Drought Increases Mortality Risk in the Northern Rockies & Plains](#)

[Sign for Up Local Drought Alert Emails](#)

**How is drought affecting your neighborhood?**

**Advancing Drought Science and Preparedness Across the Nation**

# The U.S. Drought Portal

- Up-to-date drought conditions from the **city** and **county** level to across the globe
- Interactive & customizable maps and data that show drought in new ways
- Interactive historical drought tool, showing historical drought data up to 2,000 years
- Timely updates on local drought information, including regional drought status updates and local drought alert emails
- Research and Learn section where you can “go back to the basics” on drought or view innovative drought research

# Unique Role of NIDIS in the Federal Drought Landscape



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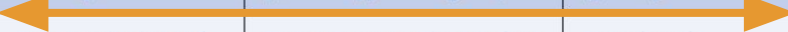


# Information and services needed depends on sector, location, decision timescale



**Table 1: Examples of How Drought Information is Utilized for Different Decisions**

Sector	Weekly	Subseasonal to seasonal (monthly, water year)	Climate (years, decades)
<b>State Planning and Response</b>	State monitoring and drought declarations	State response actions such as restrictions	State drought planning
<b>Agriculture</b>	Irrigation timing and amount	Planting; seed purchases; livestock selling; land fallowing	Business planning
<b>Wildfire</b>	Fire response and suppression activities	Staff and resource allocation	Preventive actions/ long-term planning
<b>Water Resources</b>	Reservoir management; water permitting	Utility allocation during drought; allocating backup drinking water supplies	Infrastructure planning; updating water plans
<b>Ecosystems and Tourism</b>	Snow making; river and lake access	Staff and resource allocation	Restoration site selection
<b>Public Health</b>	Heat, smoke, and dust event monitoring	Preparedness for increased illness and disease	Preventative actions for mental health
<b>Transportation/ Manufacturing</b>	Waterway access; cargo capacity	Port access and supply chains; water for goods production	Navigation planning
<b>Energy</b>	Electricity generation; heat wave monitoring; water quality	Power and energy shortage planning; alternative water supply decisions; pricing	Infrastructure planning



Source: [2022-2026 NIDIS Strategic Plan](#)

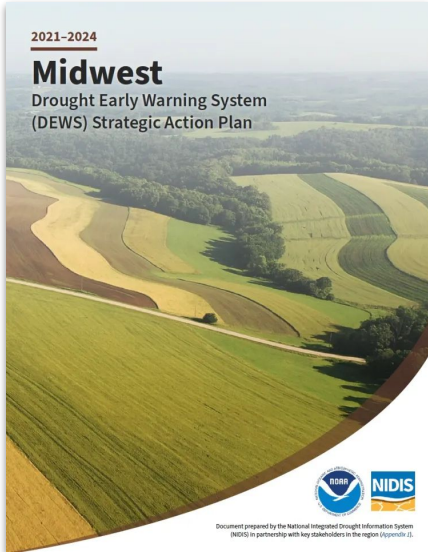
# Stakeholder and Partner Driven Needs





2021-2024

## Midwest

### Drought Early Warning System (DEWS) Strategic Action Plan



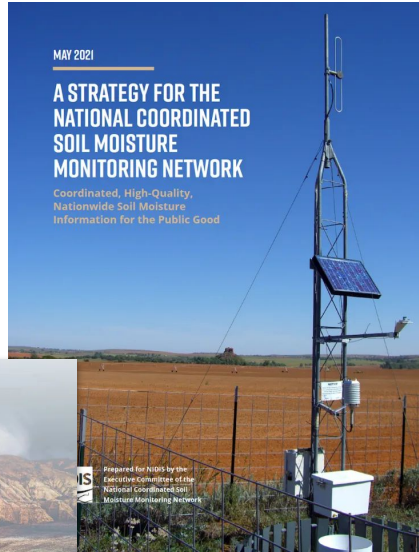
 

Document prepared by the National Integrated Drought Information System (NIDIS) in partnership with key stakeholders in the region (September 2021).

MAY 2021

## A STRATEGY FOR THE NATIONAL COORDINATED SOIL MOISTURE MONITORING NETWORK

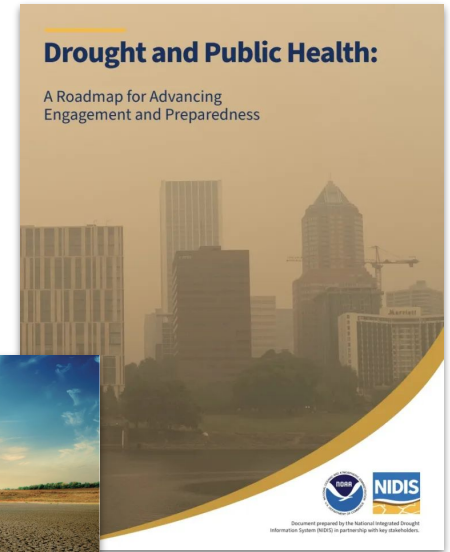
Coordinated, High-Quality, Nationwide Soil Moisture Information for the Public Good





Prepared for NIDIS by the Executive Committee of the National Coordinated Soil Moisture Monitoring Network

## Drought and Public Health:

### A Roadmap for Advancing Engagement and Preparedness



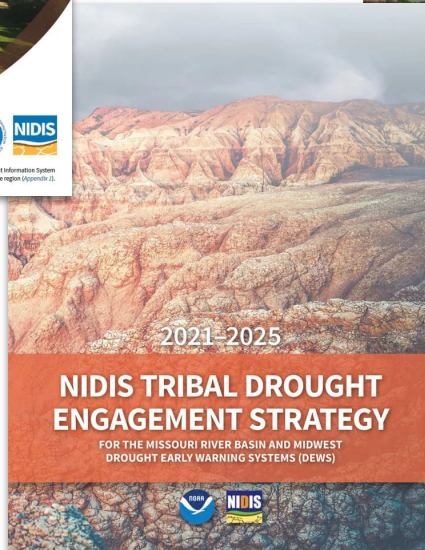
 



Document prepared by the National Integrated Drought Information System (NIDIS) in partnership with key stakeholders.

2021-2025

## NIDIS TRIBAL DROUGHT ENGAGEMENT STRATEGY

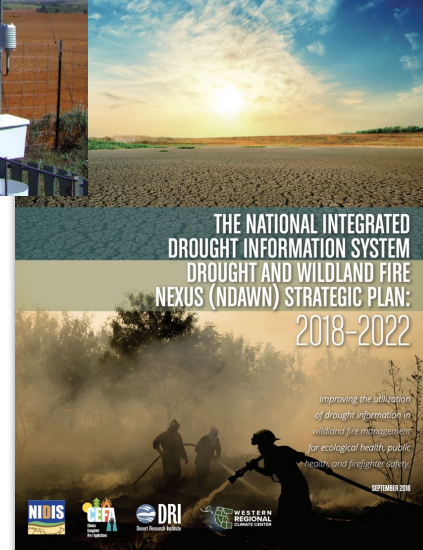
FOR THE MISSOURI RIVER BASIN AND MIDWEST DROUGHT EARLY WARNING SYSTEMS (DEWS)







 

## THE NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM DROUGHT AND WILDLAND FIRE NEXUS (NDAWN) STRATEGIC PLAN: 2018-2022

Improving the utilization of drought information in wildland fire management for ecological health, public health, and firefighter safety.



SEPTEMBER 2018

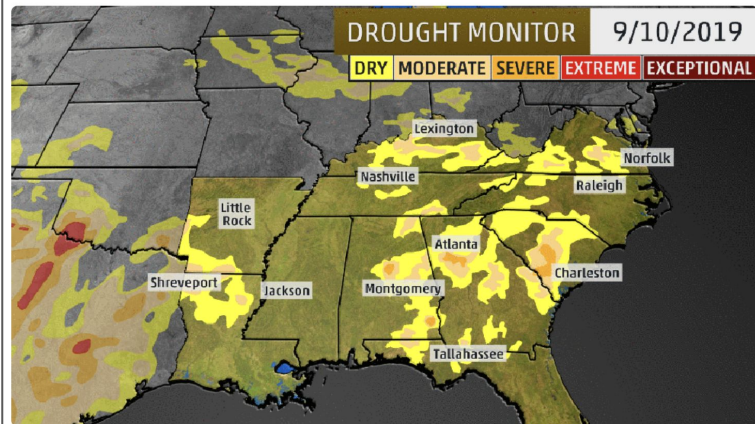
   

## Flash Drought

Rapid onset or intensification of drought conditions that culminates in **impacts** to one or more sectors.

### A Flash Drought Is Developing in the Southeast, And There's Little Relief Ahead

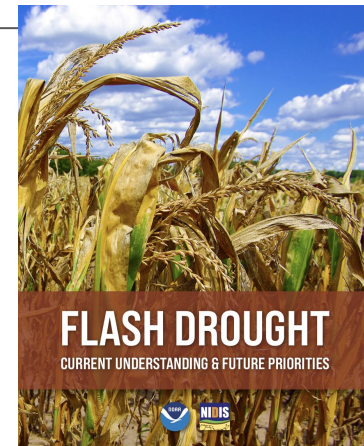
By Jonathan Belles · September 26, 2019



DIANA KRUZMAN SCIENCE MAY 28, 2022 8:00 AM

### 'Flash Droughts' Are the Midwest's Next Big Climate Threat

New research shows that dry weather is coming on more quickly than before, with little advance warning. It could devastate farmers.





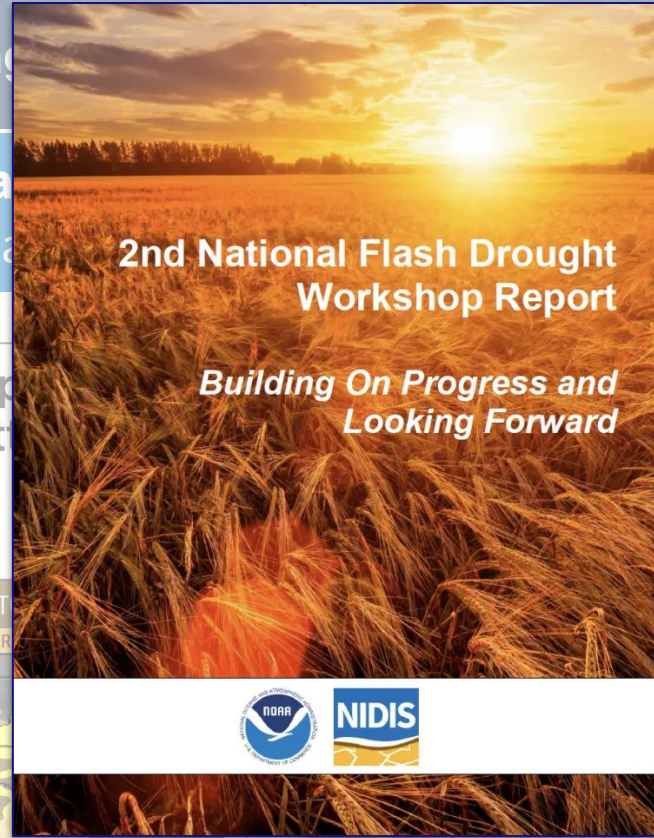
# Flash Drought

Ra  
the

**Newly Released!**  
of drought conditions  
one or more sectors.

## 2nd National Flash Drought Workshop Report

*Building On Progress and Looking Forward*



### A Flash Drought Is Developing in the Southeast, And There's Little Warning Ahead

By Jonathan Belles · September 26, 2019



### ...the Midwest's Next Big Climate

...coming on more quickly than before, with little advance warning. It could



<https://www.drought.gov/documents/2nd-national-flash-drought-workshop-report-building-progress-and-looking-forward>

# Looking Forward

# Key Workshop Recommendations

## **Contextualize Flash Drought by Region and Sector**

*Example: Conduct regional climatology studies to identify typical drought intensification rates.*

## **Increase Access: Flash Drought Monitoring Data/Tools**

*Example: Develop products in collaboration with social scientists and user design specialists.*

## **Raise the Level of Condition Monitoring and Impact Collection**

*Example: Share examples of successful efforts to collect more on-the-ground reports.*

## **Improve Flash Drought Prediction on Multiple Timescales**

*Example: Develop real-time monitoring tools that include trends and short-term forecasts.*

## **Improve Flash Drought Communication, Response and Planning through Coordination and Sharing**

*Example: Share success stories showcasing various scales of coordination to effectively respond to a flash drought event.*

## **Continue to Advance Research and Understanding of Flash Drought**

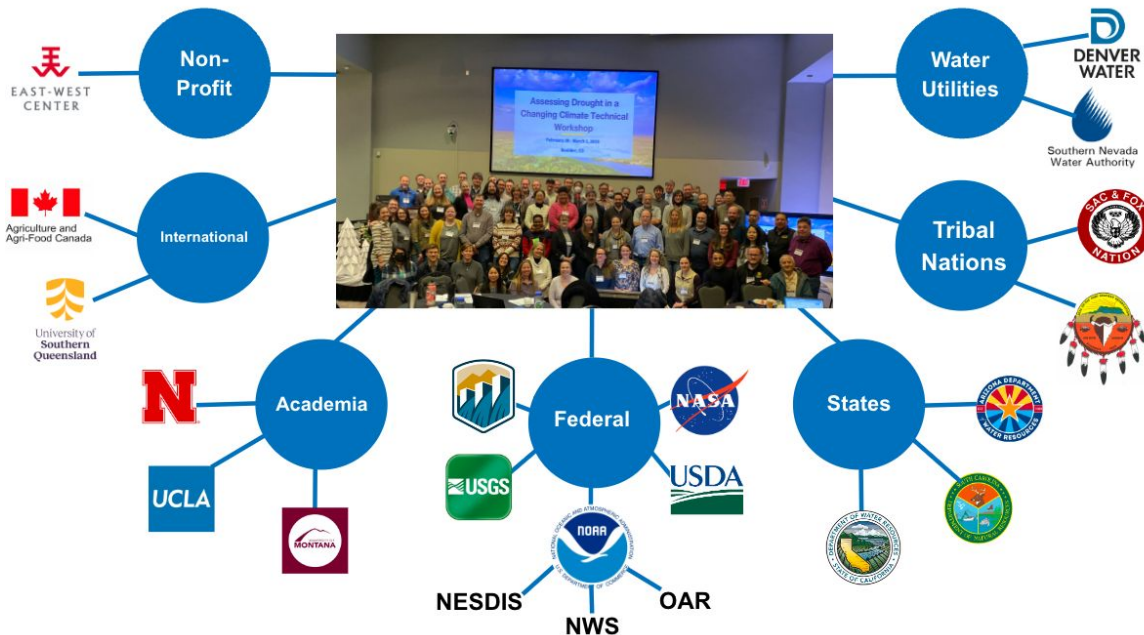
*Example: Conduct post-flash drought assessments at various scales (e.g., regional, state, local) and/or sectors.*

## **Develop Pathways for Effective Research to Action**

*Example: Create virtual spaces for interaction amongst researchers and practitioners (e.g., Basecamp, Slack).*



# Assessing Drought in a Changing Climate



## DROUGHT ASSESSMENT IN A CHANGING CLIMATE

Priority Actions and Research Needs

NOAA Technical Memorandum OAR CPO 002

“Climate change brings to the surface long-standing challenges in drought monitoring, observation, research, prediction, knowledge-sharing, and communication.

**Drought assessment in a changing climate will require significant adjustments in approaches to address non-stationarity.”**



Climate Hubs  
U.S. DEPARTMENT OF AGRICULTURE





# Outcomes and Planned Implementation



1

**Literature Review** - Reference climatologies for drought assessment and recommended changes to account for climate change (accepted)

2

**Synthesis Manuscript** - Codify workshop outcomes in the peer-reviewed literature and provide some prioritization (underway)

3

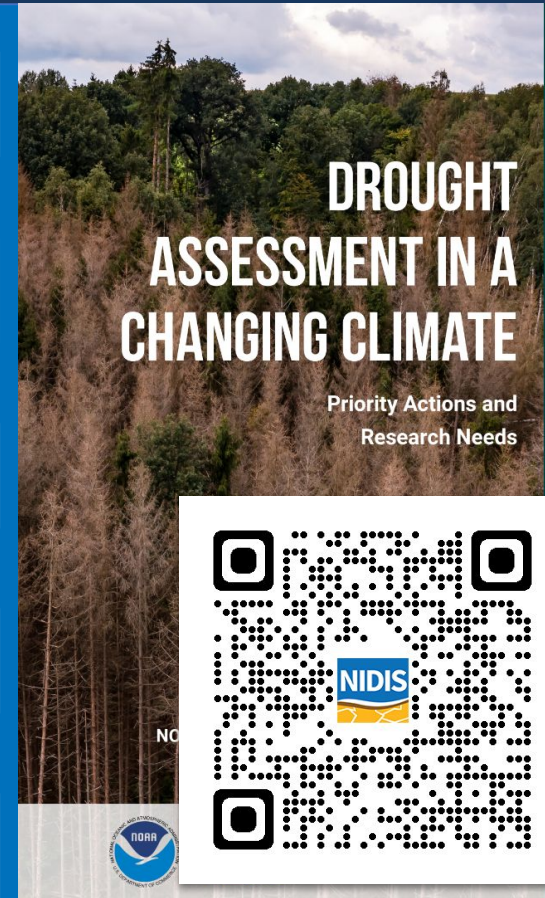
**NOAA** - Building out a roadmap linking various NOAA capabilities and programs

4

**NIDIS Coping with Drought Competition** - For FY25, specific topic TBD

5

**Federal Research** - Can inform federal research program funding opportunities across agencies



# Unique Role of NIDIS in the Federal Drought Landscape



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# 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 FY22/FY24 on **tribal resilience**

## Regional and State Research Projects

- Supports **co-production of applied research to address state and regional needs**
- Example: Created a new ACF River Basin Drought and Water Dashboard

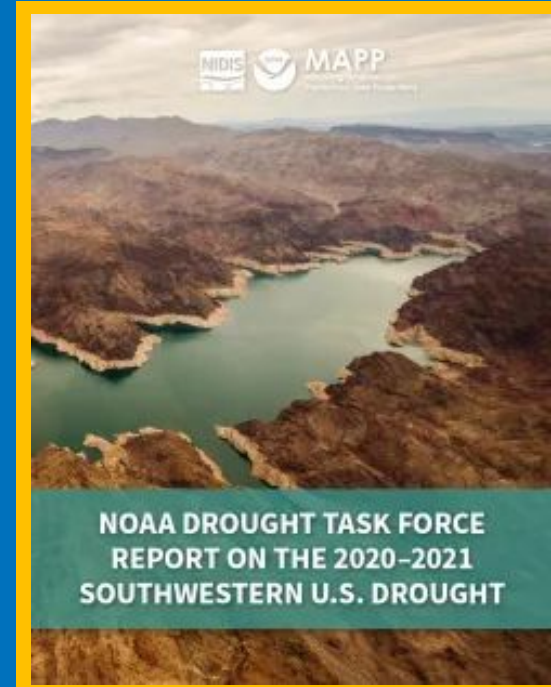
# NIDIS/MAPP Drought Task Force V

*Collaboration with NOAA CPO Modeling, Analysis, Predictions and Projections (MAPP) Program*

## Science for the 21st Century Western U.S. Hydroclimate

Prepare “...the west to anticipate, react, and manage the increasing challenges posted by the dynamic hydrological systems critical to their lives and economies...help discriminate between long-term aridity vs. serial drought events vs. isolated drought events and improve understanding of how the propensity for and drivers in the west are changing...”

“Predictability and Prediction: ...regional phenomena that drive precipitation variability and sources of water in the west....seasonal to multi-year time scales...”





# Improving NOAA Climate Prediction Center Drought Outlook Products and Services



## Task 1:

New probabilistic drought outlooks - Seasonal, Monthly, and Flash.

## Task 2:

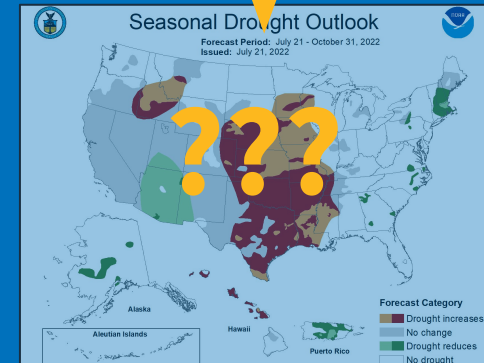
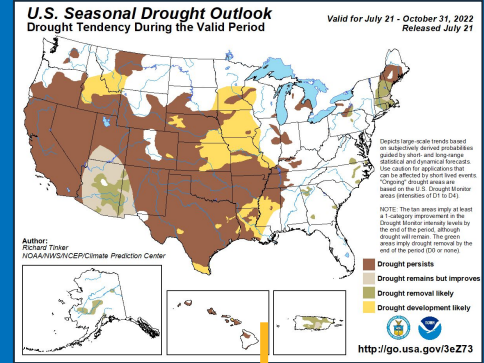
Process-oriented evaluation of subseasonal dynamical forecasts for capturing known sources of subseasonal drought predictability.

## Task 3:

Automate and objectify the CPC deterministic production process; produce outlooks for short-term and long-term drought to better address the needs

## Task 4:

Improve the understandability and usability for users by testing improved visualizations of the outlooks.



# Low Flow Prediction Collaboration (NIDIS/NWS)

*Collect and integrate user requirements to enhance NWS hydrological low-flow prediction products and services, with **a focus on identification of low-flow thresholds via NIDIS***

## Goals:

- Enhance NOAA's national-level efforts on low-flow predictive information and services through targeted stakeholder engagement, co-development of products, and integration into decision making actions.
- Improve the incorporation of NOAA's water prediction efforts into NIDIS drought efforts at state, national and interagency levels.



THE UNIVERSITY OF  
**ALABAMA** | Alabama Water  
Institute

**NWC** | National  
Water  
Center

**OWP** | OFFICE OF  
WATER  
PREDICTION



# Vision for Drought Risk & Resilience Planning (DRRP):

Equitably accessible **drought risk assessment tool** that provides climate services data in a platform to create risk profiles for drought preparedness & planning to build equitable drought resilience for future climate & water extremes across sectors & geographic scales.

# DRRP Fills Two Primary Gaps



**Technical Assistance with Drought Risk Assessments in Changing Conditions**



**Novel platform to integrate multiple scientific and climate data sets specific to drought, with climate projections and impacts into Drought R&V assessments**



# DRRP will Improve Informed Decision Making for Drought Resilience Priorities

## INFORMED DECISIONS

- Planning
- Communications
- Stakeholder engagement
- Decision making

## ANALYSIS

- Analysis/assessments to understand data and assess risks
- Tools, models, forecasts & predictions

## DATA ACCESS

- Data tools and delivery pathways
- Access to information catalogs & interactive portals

## DATA PRODUCTION

- Monitoring / on-the-ground data collection
- Increase temporal & spatial resolution

# Utilizing Advancing Technology & Methodologies



## Our goal was to develop a more tailored characterization of drought conditions in California



PPIC

PUBLIC POLICY INSTITUTE OF CALIFORNIA



### 1 Incorporating water infrastructure and management

Above-ground storage and conveyance



Groundwater basins



### 2 Developing sector-specific drought hazard indicators

Urban communities



Rural communities



Irrigated agriculture



Freshwater ecosystems



### 3 Linking drought indicators and impacts for different sectors



Urban communities



Rural communities



Irrigated agriculture



Freshwater ecosystems

### 4 Co-developing decision support tools



Science



Cities



Rural communities



Agriculture

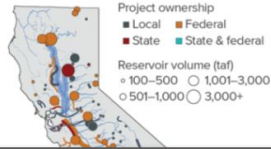


Ecosystems

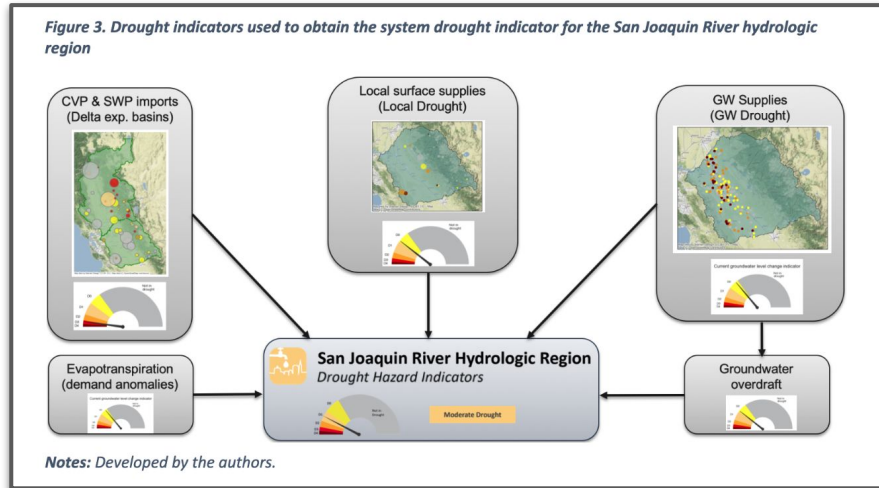
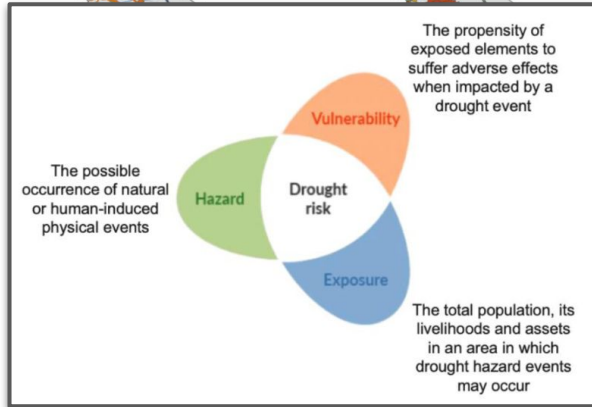
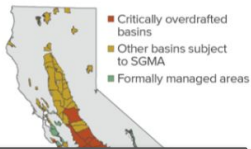
## Our goal was to develop a more tailored characterization of drought conditions in California

### 1 Incorporating water infrastructure and management

#### Above-ground storage and conveyance



#### Groundwater basins



### 4 support tools



# Thank You

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For more information, email  
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[www.drought.gov](http://www.drought.gov)



National Integrated Drought  
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