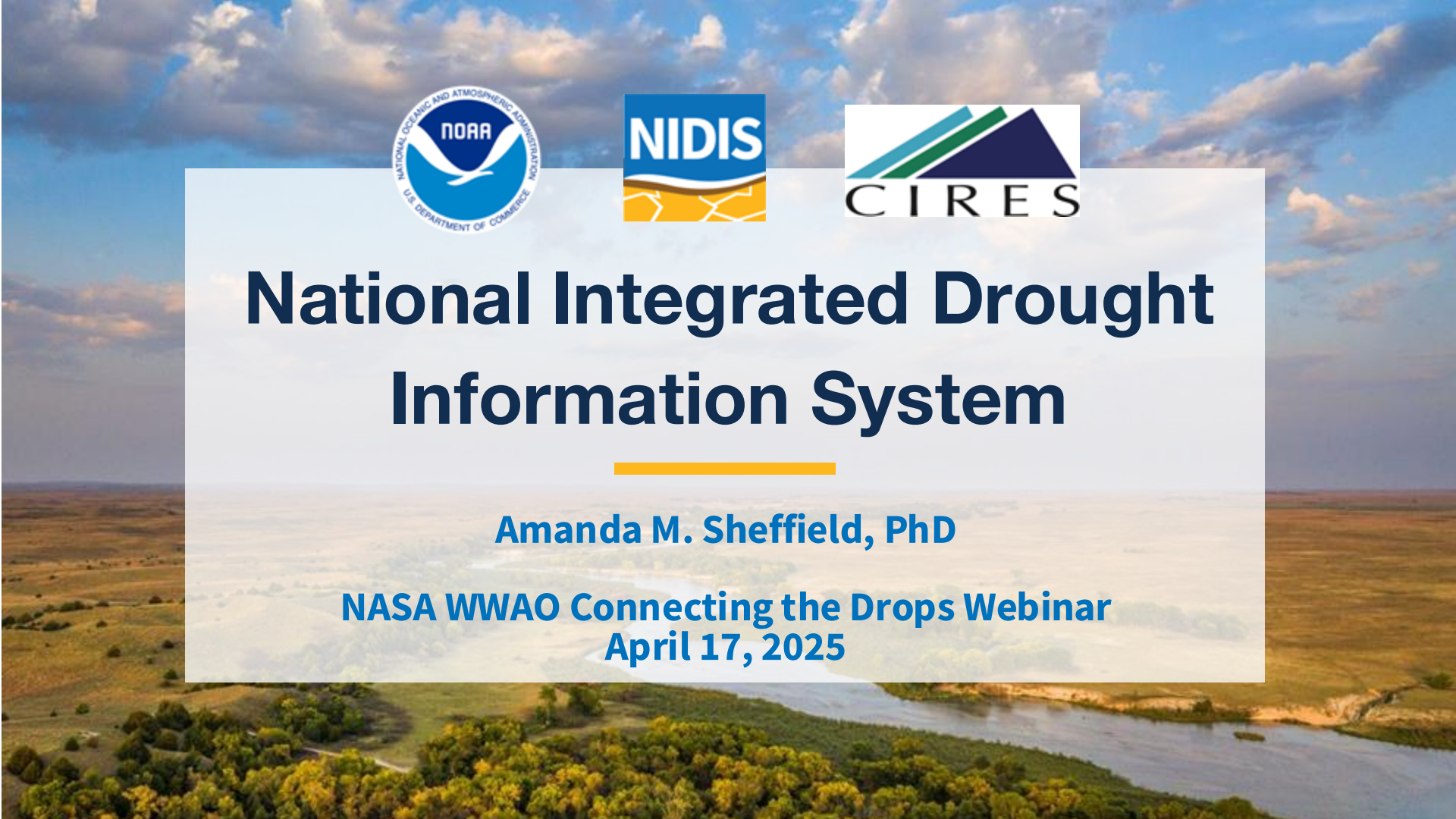
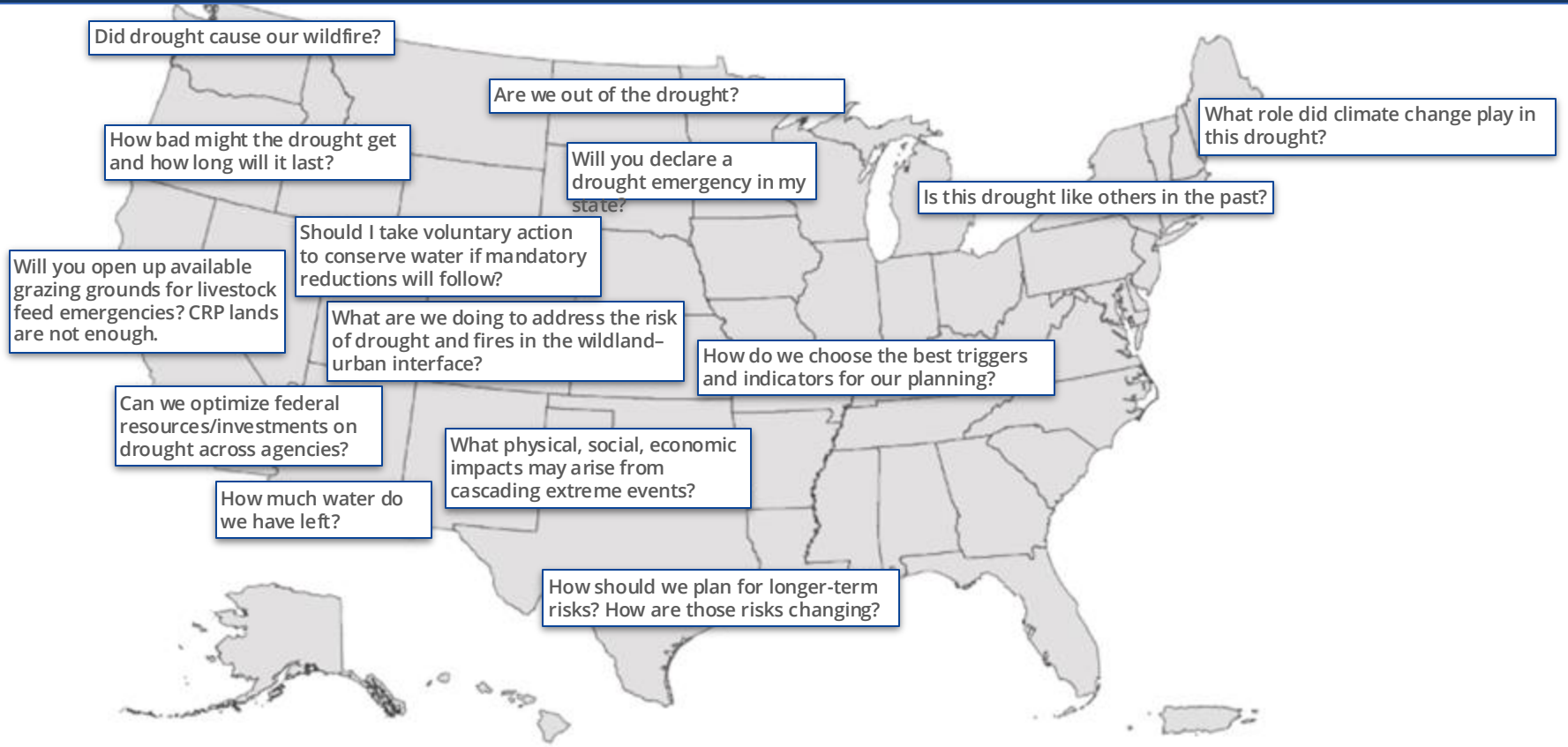


National Integrated Drought Information System

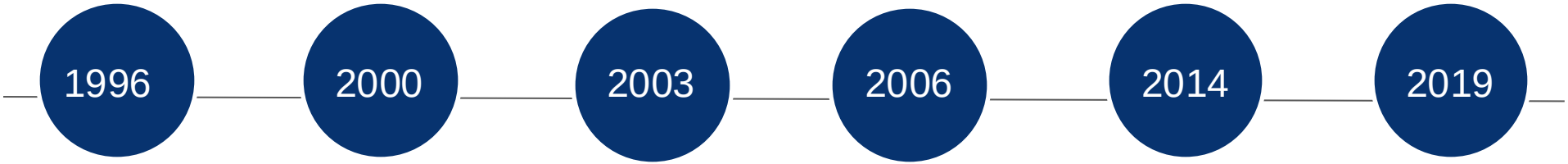
Amanda M. Sheffield, PhD

NASA WWAO Connecting the Drops Webinar
April 17, 2025

Drought is a very complicated hazard to understand and plan for



History



Western Governors advocate for change in how U.S. prepares for and responds to drought

National Drought Policy Commission Report: Develop "an effective drought information delivery system"

WGA and NOAA produce "Creating a Drought Early Warning System for the 21st Century"

NIDIS authorized by Congress with strong bipartisan support, signed into Public Law (P.L. 109-430)

NIDIS reauthorized by Congress with strong bipartisan support, signed into Public Law (P.L. 113-86)

NIDIS reauthorized by Congress with strong bipartisan support, President Trump signed into Public Law (P.L. 115-423)

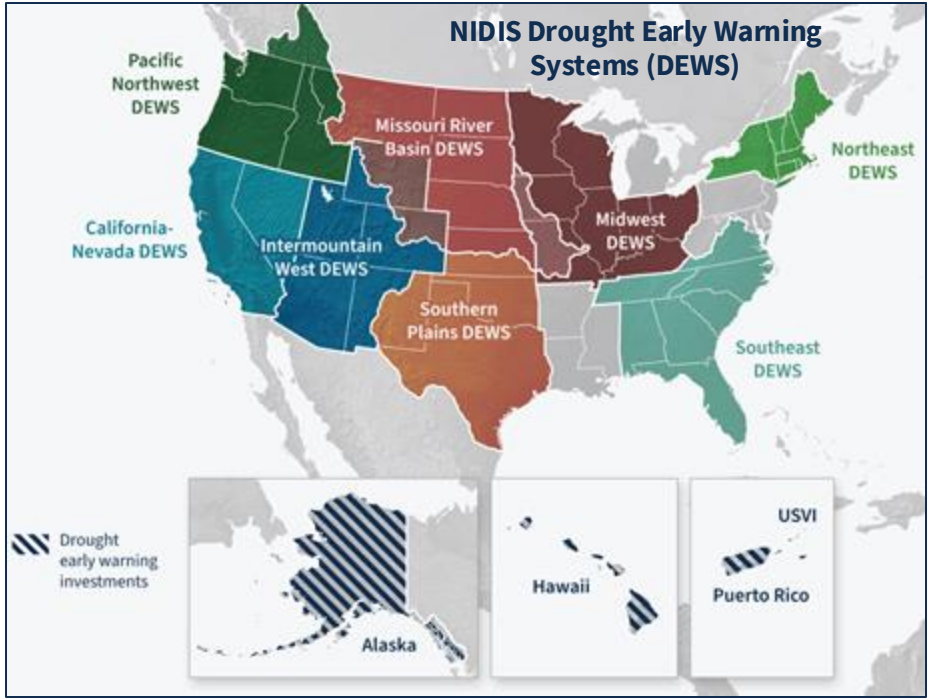
National Integrated Drought Information System (NIDIS)

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

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



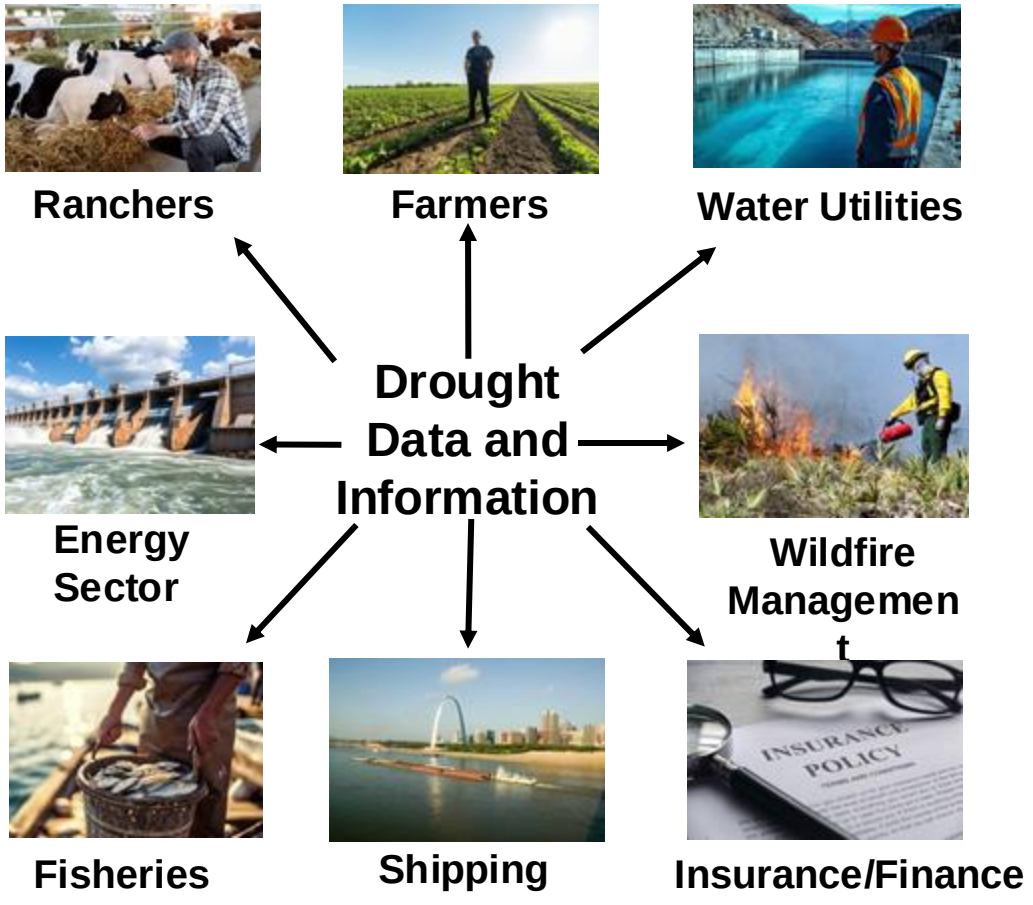
Unique Role of NIDIS in the Federal Drought Landscape

Developing and Delivering Information

Convening, Coordinating, Capacity Building

Advancing and Integrating Science into Services

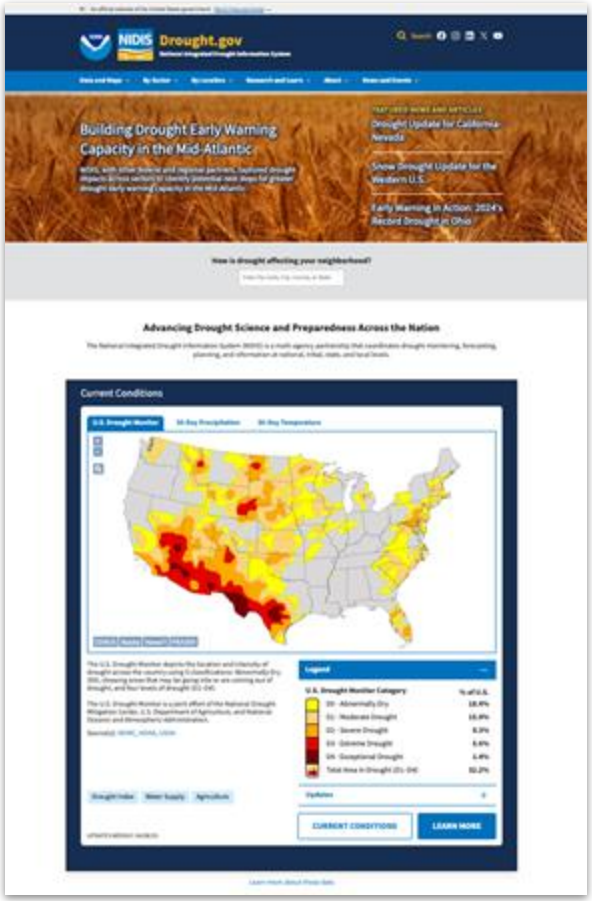
Communicate Drought Forecasts, Conditions, and Impacts



- Serving over **20,000** drought decision-makers across economic sectors and all levels of government through webinars, workshops, and email communications
- Serving **millions** annually through Drought.gov and social media
- Delivering timely data and products that reflect local, regional, and state differences in drought conditions

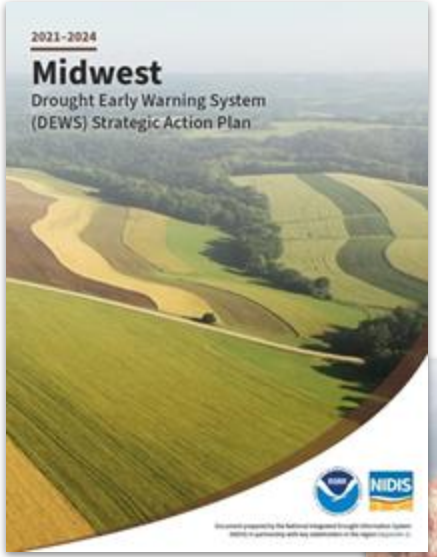
@NOAADrought

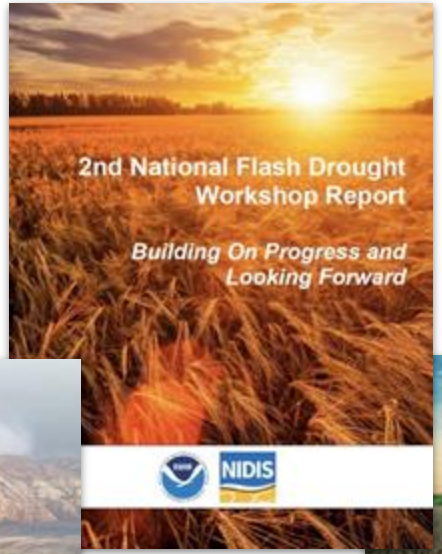
The U.S. Drought Portal: Drought.gov

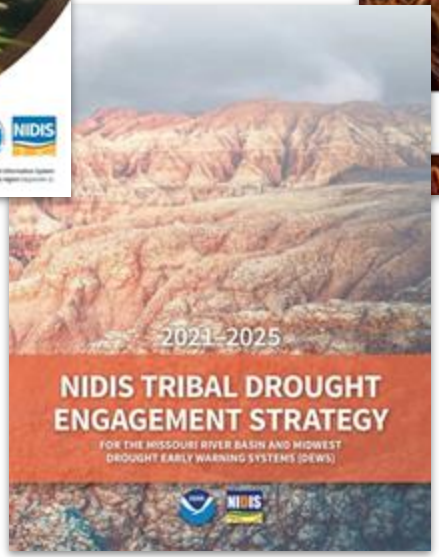


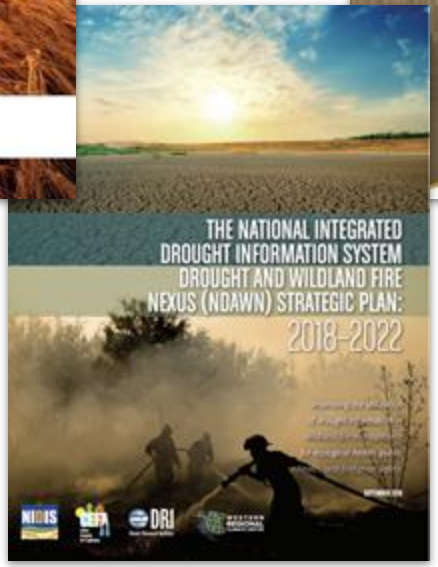
- The federal government's **authoritative, interagency drought information website**
- In 2024, **1.3 million** users visited Drought.gov **1.9 million** times
- **Integrates drought data & information** from across the government, creating an efficient **one-stop shop** for decision-making, planning, and communications
- **Interactive, customizable maps** show current conditions, forecasts, and historical drought data, as well as **drought impacts to economic sectors** like agriculture and navigation

Stakeholder and Partner Driven Needs





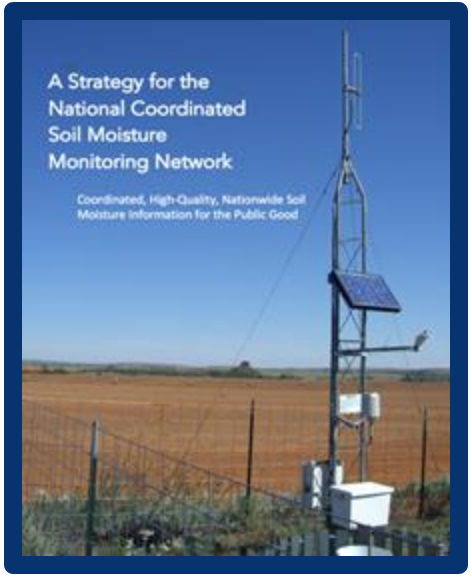




National Coordinated Soil Moisture Monitoring Network

Objectives:

- **Lead coordination of in situ soil moisture networks nationally** to ensure data and operational coordination, as well as address gaps in coverage
- **Cultivate expertise** in soil moisture measurements and interpretation
- **Support R&D** to create real-time, gridded, user-friendly soil moisture products, using in situ, satellite, and modeled data



Milestones in national soil moisture efforts

2006	2009	2013	2019	2021	2022-2027
NIDIS established by public law	1st National Soil Moisture Workshop	Vision for National Soil Moisture Network emerges	Congressional NIDIS Reauthorization Act of 2018	NCSMMN Strategic Plan	UMRB Build Out & Data Value Study

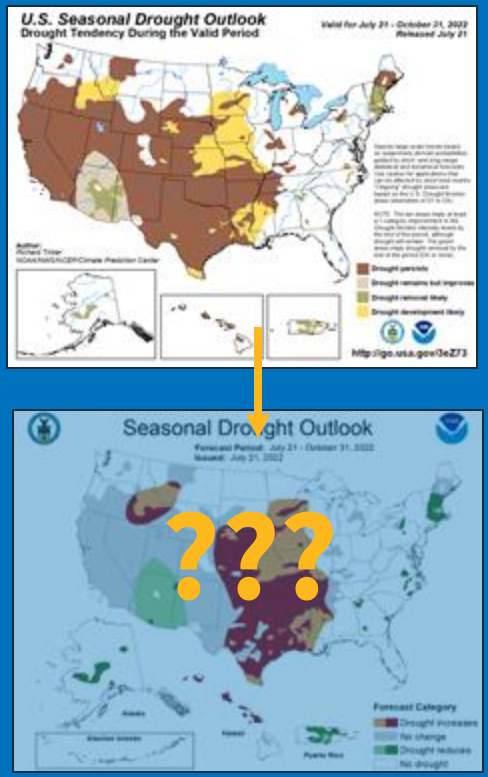
Improving NOAA Climate Prediction Center (CPC) Drought Outlook Products and Services

Task 1: New probabilistic drought outlooks: Seasonal, Monthly, and Flash Drought

Task 2: Evaluation of sub seasonal dynamical forecasts to capture known sources of sub seasonal 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.



NIDIS Drought and Wildland Fire Nexus

Key Challenges Identified by Wildland Fire Practitioners/Managers:

Lack of flexibility in planning processes to manage impacts	Droughts amplify safety concerns for firefighters & communities	Droughts increase likelihood for post-fire vegetation shifts	Extensive droughts increase potential for large wildfires	Drought increases firefighting resource demands/costs	Drought increases wildfire management uncertainty

NDAWN Goals & Research Themes

- Knowledge Exchange
- Tool Development
- Communication
- Science & Research: Climate & Antecedent Conditions
- Science & Research: Fuels
- Science & Research: Post-Fire Recovery

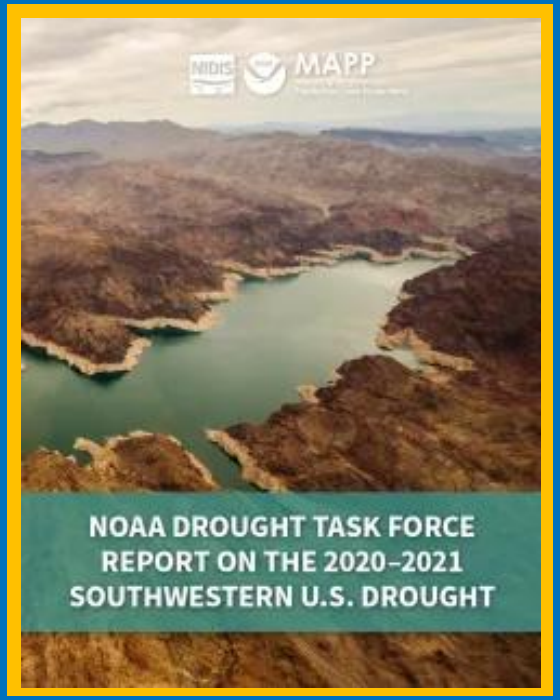
NIDIS/MAPP Drought Task Force V

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…"

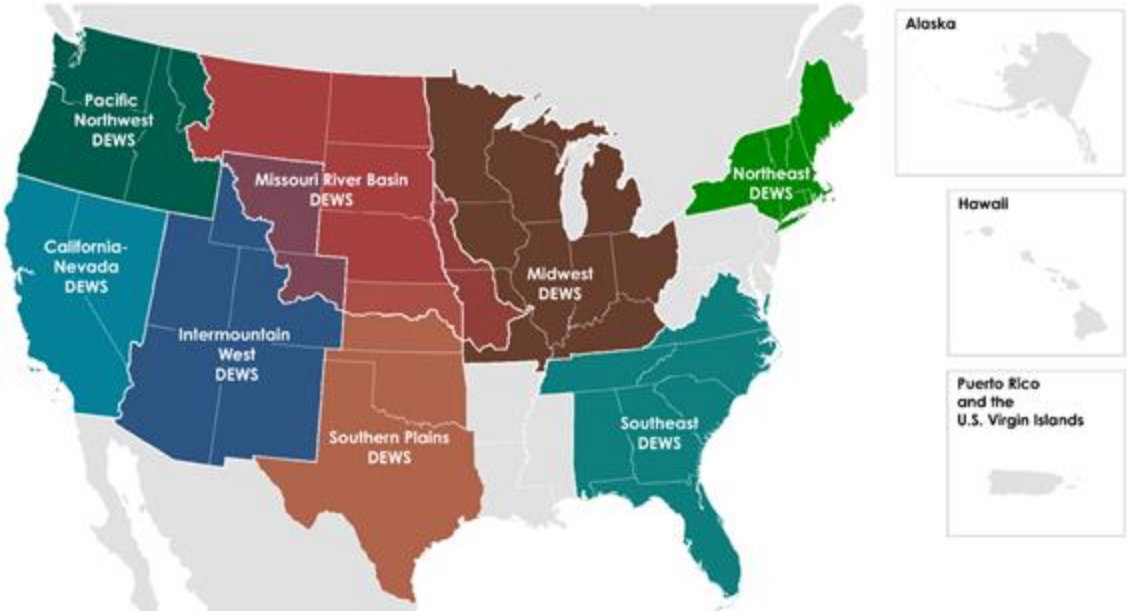
"Predictability and Prediction: …regional phenomena that drive precipitation variability and sources of water in the west….seasonal to multi-year time scales…"



National Integrated Drought Information System (NIDIS)

Components of a Drought Early Warning System

- Observation and Monitoring
- Planning and Preparedness
- Prediction and Forecasting
- Communications and Outreach
- Interdisciplinary Research and Applications



NIDIS Regional Drought Information Coordinators

Jason Gerlich

Molly Woloszyn

Sylvia Reeves

Amanda Sheffield

Elliot Wickham

(Acting) Meredith Muth

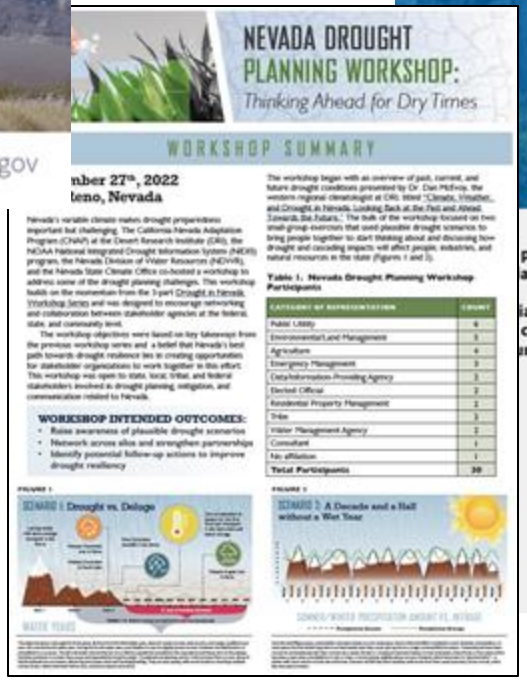
Joel Lisonbee

California-Nevada DEWS in Action

Drought in the Region

- Drought in California and Nevada is a common occurrence that can last for multiple years.
- Topography within the region creates a diverse set of climate conditions, from the snowy peaks of the Sierra Nevada Range to the Mojave Desert, to the mountains and valleys of the Basin and Range.
- Based on the many connections the two states share with respect to geography, climate, water, and drought, a joint CA-NV drought early warning system (DEWS) was developed to support enhanced drought early warning across the region.

CA-NV DEWS in Action



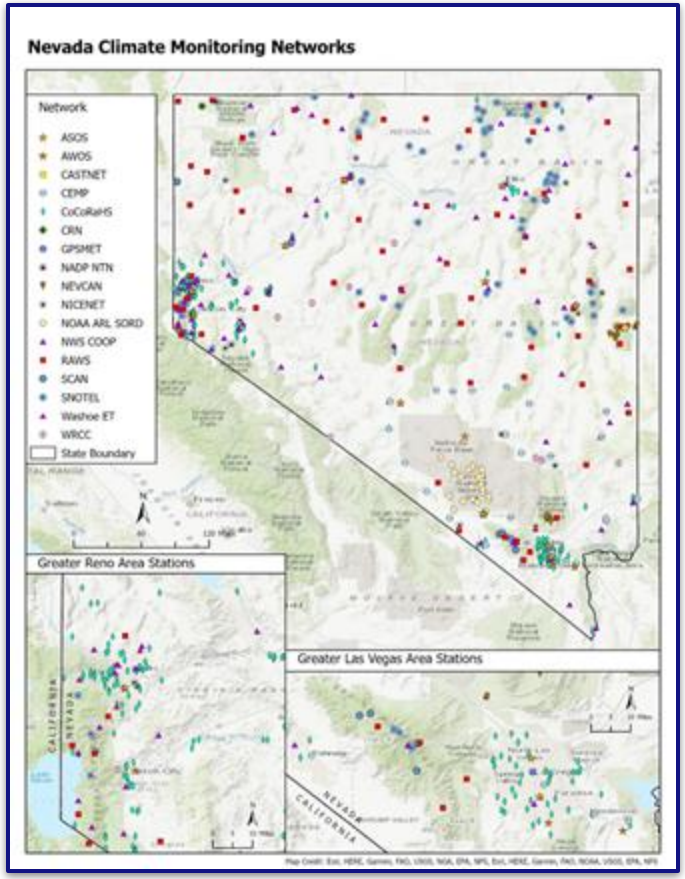
persists in central and southern
a and Nevada.

ially warmer than normal spring and
could bring impacts to spring runoff,
re, and wildfire risk.

Key Points

- Since the start of the water year, the area of California and Nevada in drought has increased by ~20% and intensified, including new areas of Extreme (D3) to Exceptional (D4) Drought, according to the U.S. Drought Monitor.
- A north-south gradient in drought conditions shows this water year's drought depended on when, where, and how much precipitation was received.
- February and March storms brought some improvements to a record-setting dry start to the water year in southern California and Nevada.
- Above-normal temperatures are favored over the next two weeks, which will likely impact water resource yields from rapid snowmelt. Similar temperature trends in the Climate Prediction Center's seasonal outlooks for April–June suggest high evaporative demand (the "thirst" of the atmosphere) over the summer, which could dry landscapes and vegetation.
- Drought impacts, such as to vegetation, agriculture, public health, and fire potential, are expected to manifest and/or continue in southern California and Nevada as we head through the likely above-normal warm season. Drought preparedness is key in parts of California and Nevada.

Evaluating Nevada's Drought Monitoring



- Nevada is not adequately monitored for drought, negatively impacting drought detection and monitoring.
- NIDIS supported an inventory of Nevada climate/drought monitoring stations with stakeholders to **identify major monitoring gaps** (e.g. by location and type) across the state and **make recommendations for network development** and research priorities.

Nevada State Climate Office

WESTERN REGIONAL CLIMATE CENTER

DRI Desert Research Institute

[Drought.gov Research Snapshot]

Sector-Specific Drought Early Warning Pilot for Southern CA

- Inform early warning decision making with co-developed, sector-specific, and evidence-based drought intelligence.
- Deliver monthly, sector-specific drought scenarios via a user-centric approach based on integrated, tailored monitoring and forecasting information, enabling proactive decisions ahead of drought.

Utilizing Advancing Technology & Methodologies

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

PPIC PUBLIC POLICY INSTITUTE OF CALIFORNIA

UCLA

1 Incorporating water infrastructure and management

2 Developing sector-specific drought hazard indicators

3 Linking drought indicators and impacts for different sectors

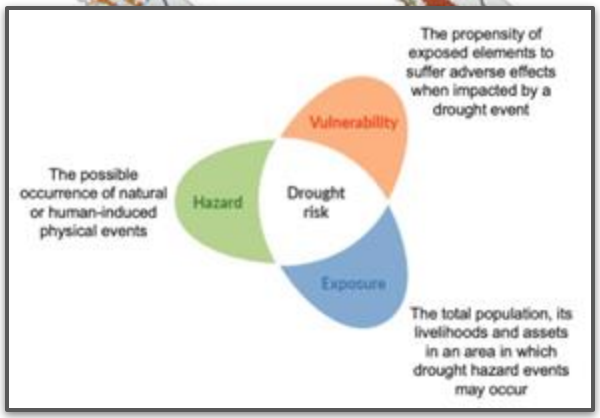
4 Co-developing decision support tools

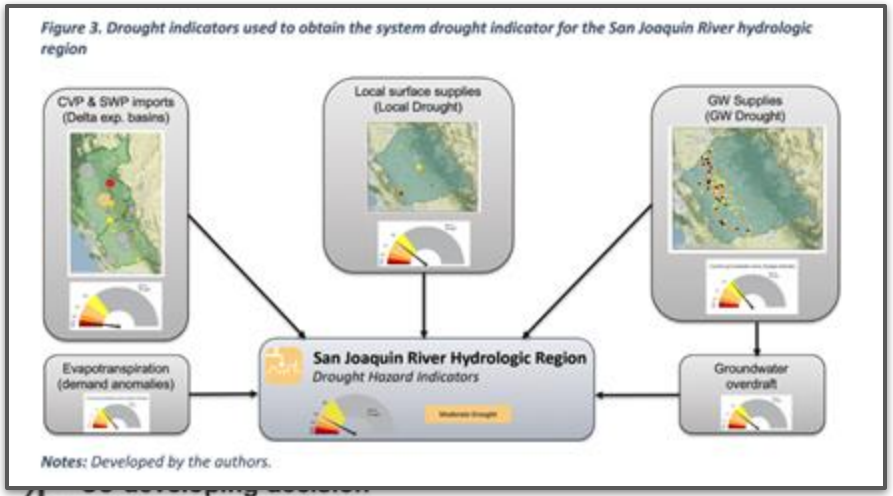
https://www.drought.gov/drought-research/linking-indicators-drought-hazard-multi-sectoral-impacts-application-california

Utilizing Advancing Technology & Methodologies

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

1 Incorporating water infrastructure and management





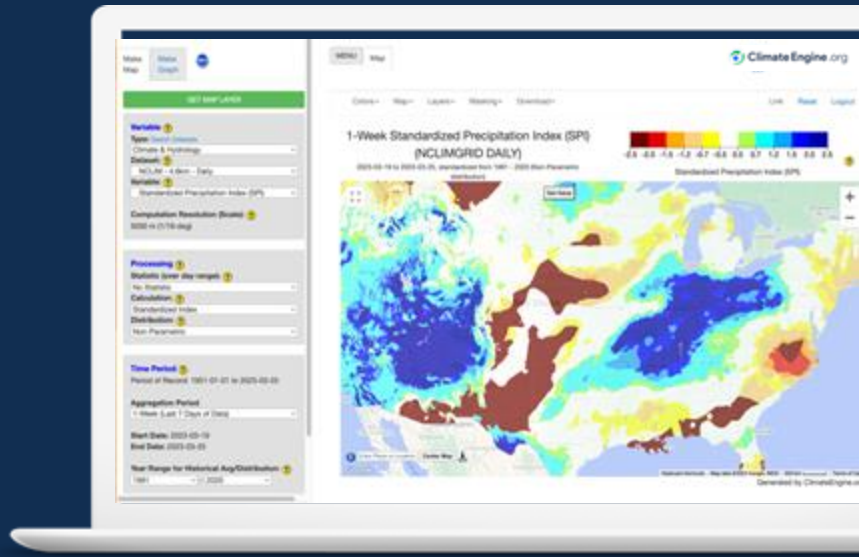
4 support tools

Science
Cities
Rural communities
Agriculture
Ecosystems

https://www.drought.gov/drought-research/linking-indicators-drought-hazard-multi-sectoral-impacts-application-california

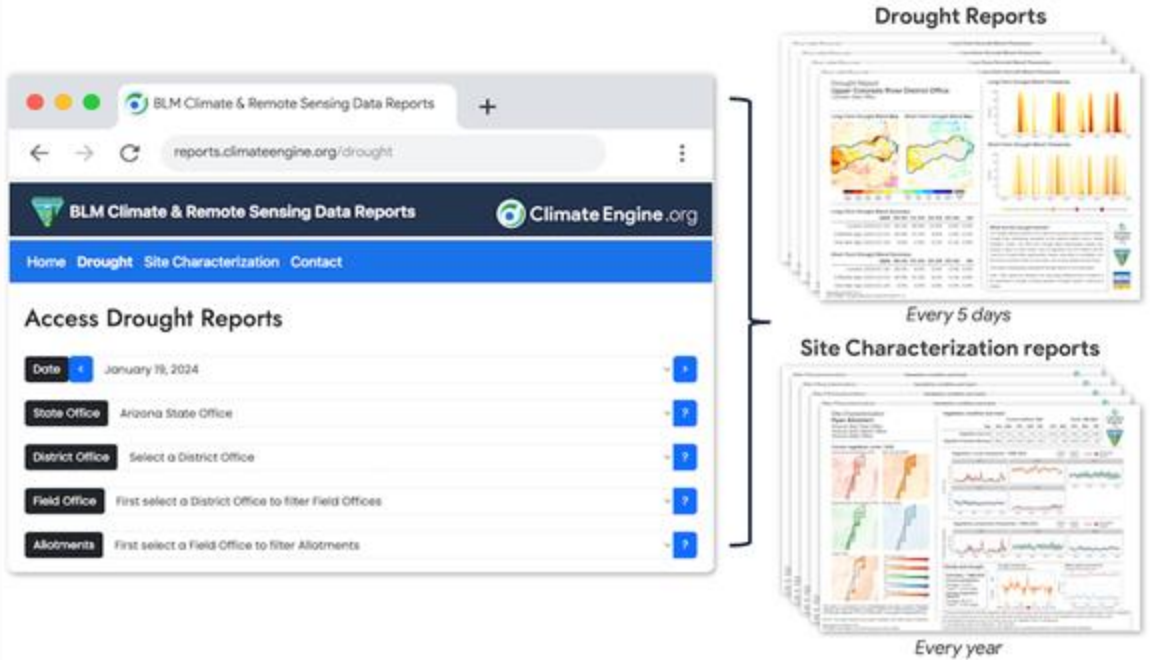
Public-Private Partnership to Deliver Cloud-Based Drought Monitoring on Google Earth Engine

- Cloud-based drought monitoring application built on Google Earth Engine
- Provides a **user interface** (app) and an **API**
- Access petabytes of climate & earth observation data, with on-demand data processing
- Used operationally on Drought.gov:
  - NOAA-managed Google Cloud instance
  - Process high-res gridded data with lower costs & effort



NIDIS · Google Cloud Partner · DRI Desert Research Institute · NASA · USGS · Forest Service U.S. Department of Agriculture · Conservation & Natural Resources · Climate Engine.org

Guiding Drought Planning on BLM Lands



- Climate Engine, with leveraged support from NIDIS, is partnering with the Bureau of Land Management (BLM) to guide drought planning on BLM-managed lands.
- Website provides both **drought and site characterization reports**.
- Allow for more precise and directed drought response and management plans.

Climate Engine.org

[Drought.gov news story]

Thank You

For more information, email
amanda.sheffield@noaa.gov.

www.drought.gov

@NOAADrought