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Matthew M. Fontaine

*Herrera Environmental Consultants*, [matthew.fontaine@gmail.com](mailto:matthew.fontaine@gmail.com)

Anne C. Steinemann

*University of Colorado Boulder*, [asteinemann@ucsd.edu](mailto:asteinemann@ucsd.edu)

Michael Hayes

*University of Nebraska - Lincoln*, [mhayes2@unl.edu](mailto:mhayes2@unl.edu)

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# State Drought Programs and Plans: Survey of the Western United States

Matthew M. Fontaine, P.E.,<sup>1</sup> Anne C. Steinemann, M.ASCE,<sup>2</sup> and Michael J. Hayes<sup>3</sup>

<sup>1</sup> Water Resources Engineer, Herrera Environmental Consultants, Seattle, WA 98121  
(Corresponding author — email matthew.fontaine@gmail.com)

<sup>2</sup> Program Manager, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA 92092-0224;  
and Research Scientist, CIRES, University of Colorado, Boulder, CO 80309-0216 (email asteinemann@ucsd.edu)

<sup>3</sup> Director, National Drought Mitigation Center, University of Nebraska–Lincoln, Lincoln, NE 68583-0988 (email mhayes2@unl.edu)

## Abstract

Drought preparedness programs are considered a primary defense against drought hazards. This article investigates state drought programs in the western United States, including a review of drought plans and interviews with state drought officials. While nearly all states have developed drought plans and larger drought programs, the scope and depth of these programs vary widely. State programs and plans typically address monitoring, declaration and response, and communication and coordination. Yet few states conduct postdrought assessments or impact and risk assessments. Resources tend to be allocated more for drought response than mitigation. Officials emphasized not only the importance of available monitoring data, but also the need for improved information for monitoring and predicting drought. State drought officials recommended the following: (1) clear and relevant drought indicators and triggers; (2) frequent communication and coordination among state agencies, local governments, and stakeholders; (3) regularly updated drought plans; and (4) strong leadership that includes a full-time state drought coordinator.

**Keywords:** Climate assessment, Droughts, Geography, Water resources decision making, Water resources management and outreach

## Introduction

Drought costs an estimated \$6–\$8 billion annually in the United States [National Oceanic and Atmospheric Administration (NOAA) and the Western Governor’s Association (WGA) 2004]. Theory and experience suggest that drought planning can help to reduce drought impacts (Knutson et al. 2007; Wilhite 1987; Wilhite et al. 2000, 2005; Shepherd 1998). While no state had a formal drought plan during the drought of 1976–1977, nearly all states now have drought plans and larger drought programs [National Drought Mitigation Center (NDMC) 2007]. Drought programs typically include activities and resources for drought preparedness and response, such as drought plans, monitoring networks, and communication and response strategies. Drought plans, in turn, describe how these actions will be implemented before, during, and after a drought. Despite the significant costs of drought and the widespread reliance on drought plans, relatively little prior work has assessed systematically these plans or larger programs. This study addresses that need, with a focus on the western United States.

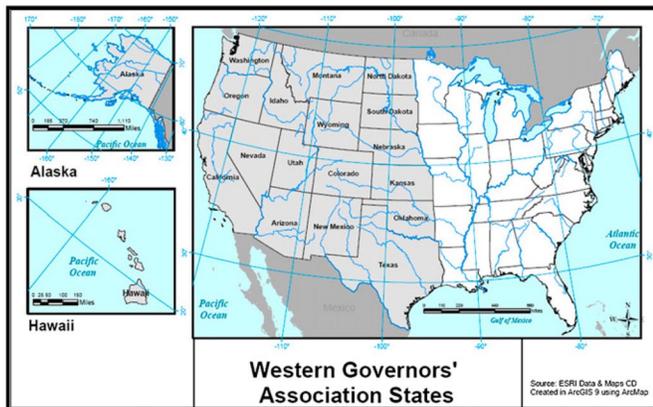
The importance of drought programs is emphasized by the National Integrated Drought Information System (NIDIS), an initiative led by the WGA and the NOAA. The vision of NIDIS is to provide water users and decision makers, at all levels, with “decision support tools needed to better prepare for and mitigate the effects of drought” (NOAA and WGA 2004). In this study, the authors investigated drought programs in each of the WGA states (Figure 1), cataloged the components and structure of the drought programs and plans, and identified factors that officials believe make them

effective. Results offer insights and information to help improve drought planning and reduce drought impacts.

## Drought Program Components Reviewed in the Western States

To assess drought programs, the authors reviewed all available drought plans from the 19 WGA states, and conducted in-depth semistructured interviews with state drought officials. Drought officials were asked to describe the activities and resources of their drought programs as well as the implementation of their drought plans. The authors also inquired about specific components of the programs and plans, and the activities before, during, and after a drought. Finally, each official was asked to identify the factors that make a drought program effective, and to provide general recommendations for other states. The interview protocol is available in the supplemental data in the ASCE library ([www.ascelibrary.org](http://www.ascelibrary.org)).

A set of primary drought program components was identified, based on a review and synthesis of the literature, in addition to the authors’ experience with state drought planning (Hayes et al. 2004; Knutson et al. 1998; NDMC 2007; Shepherd 1998; Steinemann and Cavalcanti 2006; Wilhite 1987; Wilhite et al. 2000, 2005). These seven components, subsequently described, are (1) drought plans, (2) monitoring, (3) declaration and response, (4) communication and coordination, (5) postdrought assessment, (6) impact and risk assessment, and (7) mitigation. The authors examined the extent to which states addressed these components in their drought programs and plans, the resources that were allocated to drought, the activities that were performed, and the self-reported factors that influence drought program effectiveness.



**Figure 1.** Map of states in the Western Governors' Association (Copyright © Esri. All rights reserved.)

### Assessment of Drought Programs in the Western States

The efforts and progress in drought programs in each of the 19WGA states are summarized, with full details available in Tables S1–S7 in the ASCE library ([www.ascelibrary.org](http://www.ascelibrary.org)).

### Drought Plans

Drought plans are documents that guide decision making before, during, and after a drought. They typically specify drought stages, indicators, triggers, and responses. The authors identified the states that have drought plans, examined the contents of the plans, and determined the actual use of the plans within state drought programs.

The authors examined all WGA state drought plans that were available. Of the 19 WGA states, 17 had drought plans at the time of this research, and 16 were available for review. (Most plans are provided on the NDMC website.) The level of detail found in drought plans varies from state to state. Some plans are checklists to verify that prescribed steps have been taken; some are operational plans that delegate duties among local, state, and federal government agencies; and others are comprehensive plans that include indicators, triggers, drought phases, delegation of duties, responses, and mitigation activity schedules.

When asked to describe the use of drought plans in practice, most officials referred to their plans as guidelines, checklists, or road maps. Many officials use drought plans to document the resources and responsibilities of local, state, and federal agencies. These protocols are often part of the state's emergency management plan. Some plans also provide instructions for communication and coordination with individual stakeholders (e.g., instructions for requesting assistance and phone numbers of drought contacts). Several state plans also include sections that describe the impacts of previous droughts, which officials have used to prioritize monitoring and response activities for developing drought. Despite the variety of detail among the plans, officials expressed little desire to make major changes. They typically make only minor changes, such as updating the terminology and methods to better reflect current practices, or updating the list of agencies with drought-related responsibilities.

### Monitoring

Drought monitoring can help to identify the onset and recession of drought and improve drought preparation and response.

Monitoring activities often include tracking and assessing drought indicators, reviewing and compiling drought impact reports, and communicating information to the public. Drought triggers, or specific values of indicators, can be used to define stages of drought and activate or deactivate responses. The authors examined the use of impact reports, indicators, and triggers, and investigated how state drought plans incorporate indicators and triggers, their levels of specificity, and the advantages or limitations of that specificity.

Officials in all states monitor drought impacts and most observe other indicators of water-supply conditions. A few officials use specialized monitoring tools developed with government agencies or universities. Eight states have defined triggers in their drought plan and all but one of these use the triggering systems in practice. All states that use triggering systems also use professional judgment (e.g., assessment of impacts and field conditions) to evaluate drought status. One state follows triggers strictly when entering drought or elevating drought status, and incorporates subjective data only when receding from drought. Ten states use defined spatial scales for assessment of drought, typically watersheds or climate divisions. One official assesses drought at the smallest regional scale of concern, from a single jurisdiction to the entire state.

Many officials meet monthly during times of drought and less frequently during other times. Some officials recommended frequent meetings with monitoring groups to evaluate conditions during drought. The Montana drought official holds monthly meetings with the drought committee on a year-round basis to assess the drought status of each county. The state has identified an extensive network of field specialists who report impact data during these meetings and also has coordinated with the National Weather Service to develop a specialized, high-resolution, web-based, visual system for monitoring hydrologic indicators. Oklahoma has developed a specialized tool for monitoring drought using data from the Oklahoma Mesonet. Hawaii includes representatives from each of the four counties throughout the drought-monitoring process.

States mentioned a range of indicators used to monitor drought, which include the following: (1) percentage of normal precipitation, (2) temperature, (3) soil moisture, (4) reservoir levels, (5) streamflow, (6) groundwater levels, (7) Palmer Drought Severity Index (PDSI), (8) Standardized Precipitation Index (SPI), (9) Surface Water Supply Index (SWSI), (10) Crop Moisture Index (CMI), (11) Keetch-Byram Drought Index (KBDI), and (12) a variety of tools that display indicator values or combine multiple data sets and indexes (e.g., the U.S. Drought Monitor). Some states reported that certain indicators were the most relevant or primary indicators. Oklahoma reports that the KBDI is an important indicator because fire is one of the primary drought hazards in that state; Oklahoma also uses the PDSI and the SPI. Arizona relies primarily on streamflow indicators and the SPI for monitoring short-term and long-term drought. Kansas relies primarily on the U.S. Drought Monitor when evaluating drought conditions. Nevada's indicators vary by season and include the PDSI, SPI, and reservoir levels. Oregon and Utah both rely heavily on the SWSI.

Eight states (Arizona, Colorado, Montana, Nevada, Texas, Utah, Washington, and Wyoming) use defined triggers that activate drought responses. Arizona has identified region-specific indicators for each drought-assessment area, and has evaluated indicators by comparing retrospective drought stages to historical drought impacts, using expertise from stakeholders and resource managers. One state reported that triggering mechanisms can be restrictive and opts to review indicators subjectively, often incorporating impact reports into their assessment of drought. Several drought officials noted the importance of identifying specific indicators for different sectors, regions, and time periods.

### **Declaration and Response**

States declare drought in different ways and for different purposes. The authors characterized state drought-declaration and -response activities, such as whether states rely primarily on the U.S. Department of Agriculture for federal drought declaration and relief, issue state drought declaration to activate state response, specify a geographic scale to assess drought, or use formal methods to identify drought stages and responses.

According to officials interviewed, the primary purpose of drought declaration in six states is to support the state gubernatorial request to the Secretary of Agriculture for federal disaster designation and assistance after drought impacts have occurred. This process typically includes the following steps: (1) county commissioners evaluate impacts within the county, (2) county commissioners declare a drought disaster internally, (3) the Governor requests that the Secretary of Agriculture declare a drought disaster within the county, (4) the USDA Farm Services Agency evaluates impacts in each county, and (5) the Secretary of Agriculture accepts or rejects the gubernatorial request.

In addition to the federal disaster designation, states also may declare drought internally, such as through a gubernatorial declaration. This state level (internal) declaration often is used to alert the public of impending drought conditions, activate state-level responses or special state powers, trigger requirements for jurisdictions or the public, or a combination of these. States without procedures to declare drought internally may still activate drought responses.

Of six state programs that focus on activating federal assistance programs, New Mexico and Wyoming formally assess drought in stages. Of 11 states that focus on internal response, all declare or assess drought in stages, with the exception of Washington. The number of stages varies among states from two to five, with three being the most common.

Response strategies vary among the states, and commonly include the following: (1) increasing communication, (2) issuing water restrictions, (3) facilitating water transfers, (4) expediting the processes for water transfers and permitting of temporary water rights, (5) purchasing water rights or permits to keep water in streams, (6) issuing grants and loans to public water-supply systems, (7) recommending federal drought concessions (e.g., opening up roadsides to haying), and (8) activating state assistance and technical support to applicable sectors (e.g., state agricultural departments providing information and support directly to agricultural stakeholders). Colorado, Oklahoma, and Washington have specific drought-response funds, while officials from other states noted that their programs would benefit from allocation of drought-specific funds.

### **Communication and Coordination**

State drought-response actions typically include increased communication with stakeholders and the public, such as through drought advisories, drought websites, and meetings among stakeholders and local drought officials. The authors examined these communication strategies and the interactions between state and local governments during drought. Because drought response is often left up to local governments, the types of support given to local governments by states also was reviewed.

As part of their drought response, most states increase the amount of communication they issue to the public regarding drought conditions and the status of drought declarations. The types of communication include press releases, public service announcements, issuance of drought advisories, and outreach to officials in jurisdictions. Drought officials in Montana and Hawaii communicate directly

with county commissioners and mayors of major cities by providing direct assistance and information on response. Some officials reported that strong leadership is vital for communication to be effective. In Montana, the Lieutenant Governor chairs the drought committee, which helps to ensure media coverage and the credibility of drought committee resolutions. To encourage cooperation from local governments, Oregon and Utah require counties to formally declare drought emergencies prior to gubernatorial declarations. By empowering local governments in the drought-declaration process, officials believe that drought responsibility can be shared, which is especially important when a drought declaration has the potential to adversely affect certain sectors.

Some states have established local groups that provide information to the state on drought conditions and impacts, enabling the states to focus response efforts. Other state monitoring groups use field agents to report on local impacts. Many state drought committees have individual state agencies that report on drought-impact information from specific sectors, and then provide assistance as needed (e.g., a state department of agriculture monitors impacts in the agricultural community and then provides information and assistance to affected groups or individuals).

### **Postdrought Assessment**

Through postdrought assessments, states can examine the effectiveness of their drought-monitoring and -response efforts, and make improvements to their drought programs and plans. Postdrought assessments also can be used to prioritize mitigation strategies based on the most recent drought impacts. The authors identified the states that perform postdrought assessments, and the ways they use assessments for drought preparedness.

Drought program effectiveness depends on continual evaluation and improvement. Five states perform formal postdrought assessments to evaluate the effectiveness of response actions and to improve future responses. Three of these five states have used the assessments to improve their drought programs and plans. For instance, Hawaii now uses a subjective assessment of drought indicators rather than drought triggers based on comments collected during postdrought assessments. Arizona now assesses drought at a watershed scale rather than by climate division. North Dakota updated their drought-planning documents following each drought, and Washington formally documents postdrought assessments.

### **Impact and Risk Assessment**

Assessing drought impacts enables states to identify vulnerable sectors and regions, allocate resources to reduce impacts, and prioritize mitigation activities to reduce risk during future droughts. The authors examined the actions taken by states to assess impacts and risks and to reduce overall vulnerability.

By identifying drought impacts and vulnerable groups, states develop a basis for prioritizing drought-response and -mitigation activities. Several state drought plans include descriptions of previous drought impacts. Others identify potential future impacts and list responses for each impact. To apply for a federal drought disaster designation, states need to assess drought impacts within each county, so most states have evaluated drought impacts at some level. Impact reports also can provide important data for assessing the vulnerability of sectors and regions in the state. Several states have commissioned studies with local universities to identify drought impacts. The University of Washington has produced a report on drought impacts and vulnerability in Washington State, and Texas A&M has developed a similar report for Texas. Hawaii has conducted a vulnerability assessment that focused on drought indicators.

Comparing previous drought impacts to drought designations and responses can help to validate and improve indicators and triggers. Arizona compared historic drought impacts to simulated drought designations. Kansas and Colorado both have performed studies to identify the most vulnerable municipal and industrial water supply systems to prioritize state assistance. California requires public water providers to assess drought vulnerabilities whenever changes are made to water-management plans. In these assessments, local officials evaluate factors that contribute to short-term and long-term drought vulnerability and identify future planned actions.

### **Mitigation**

Mitigation refers to the range of activities, performed in advance, to reduce the effects of drought. The authors identified states that have incorporated mitigation activities into their drought programs and plans, and that have taken actions to reduce long-term vulnerability. Drought plans can incorporate mitigation by including prioritized lists of mitigation activities, and may include a schedule and designations of responsibility for implementing such activities.

Mitigation reflects a shift from reactive, response-oriented programs toward more proactive programs to reduce impacts and long-term vulnerability. Most states have drought programs that address mitigation. Eight states (Arizona, Colorado, Hawaii, Montana, Nebraska, New Mexico, Texas, and Washington) address mitigation directly in their drought plans. Officials reported the following mitigation strategies: (1) increasing water conservation, particularly for development and growth; (2) developing new and more robust water supplies; (3) increasing delivery infrastructure and intersystem connections to allow water sharing; (4) increasing the availability of monitoring data; (5) developing a rangeland fire insurance program; and (6) requiring public water systems to consider drought in their water-management-planning documents. The Arizona and Colorado plans define goals, actions, responsible agencies, and schedules for each mitigation action.

### **Drought Programs and Effectiveness**

State officials were asked to identify the factors that are essential for an effective drought program. These findings are summarized by program component and by frequency of mention.

#### **Drought Plans**

- Update drought plans to reflect current procedures;
- Ensure drought plans include all drought-related responsibilities for each state agency;
- Record previous drought impacts in the drought plan to create a useful record for future droughts; and
- Revise drought plans using findings from postdrought assessments.

#### **Monitoring**

- Conduct regular (monthly) monitoring committee meetings to foster a team atmosphere and gain experience;
- Include decision makers in monitoring committee meetings so technical experts understand what information is needed by decision makers;
- Develop a good monitoring system (appropriate data and tools);
- Use regionally specific and well-defined indicators and triggers;
- Leave some flexibility in designation of drought stages;

- Be consistent in assessment and communication of drought; and
- Document drought impacts early.

#### **Declaration and Response**

- Take specific needs of different sectors into account when making decisions;
- Use professional judgment when interpreting drought triggers;
- Have multiple response stages;
- Have clearly defined actions for sectors and local communities that correspond with drought declaration stages; and
- Create a schedule for all response actions.

#### **Communication and Coordination**

- Engage stakeholders as much as possible to empower local governments with ownership of drought mitigation and response;
- Include local entities in drought-assessment and -response processes;
- Include local entities in mitigation programs;
- Have good communication of drought status and appropriate response actions; and
- Encourage local governments to develop their own drought plans.

#### **Postdrought Assessment**

- Review the plan after each drought episode and revise as necessary.

#### **Impact and Risk Assessment**

- Conduct site visits to familiarize the drought committee with vulnerable areas.

#### **Mitigation**

- Encourage jurisdictions to develop and maintain drought response plans;
- Support water system interconnections to reduce vulnerability by enabling water to be moved from areas with surplus to areas with deficits; and
- Encourage jurisdictions to consider water availability when evaluating growth and development.

#### **Other**

- Have a full-time drought coordinator in a strong leadership position;
- Have a diverse executive drought-planning group;
- Have a dedicated source of drought funding; and
- Have a thorough understanding of local water supply systems and demands.

#### **Conclusions**

Drought programs across the 19 western states have notably different levels of activities and resources. Some programs are minimal, without documented responses or long-term mitigation, while other programs are more extensive, with full-time personnel for managing drought issues and well-developed components across every aspect of this assessment. When asked about potential weaknesses in or improvements to their programs, officials were reticent. None of the officials reported that their programs or plans were inadequate or would benefit from major revisions.

Drought officials pointed to several factors that make their programs successful; these include motivated personnel, clear and relevant drought indicators, monitoring systems, strong leadership, a full-time state drought coordinator, and established lines

of communication among officials and stakeholders. For successful plans, states officials recommended well-defined indicators, triggers, stages of drought, and responses for multiple sectors and regions.

Drought monitoring frequently was cited as a vital component of drought programs, but also the component that was most in need of improvement. Specifically, many states lacked indicator data at spatial and temporal scales needed for effective monitoring. NIDIS could help fill this gap by improving data networks and drought monitoring ability nationwide, providing states with additional tools and improvements.

Coordination among officials also was cited as important. Some state drought officials have held face-to-face meetings with county officials to evaluate drought at the local level, and have shared the responsibility of drought declaration with local governments. These state officials note that such activities have strengthened their working relationships with local officials, reduced the amount of possible criticism that states receive for drought declaration, and improved drought communication.

Paradoxically, while most states are active in drought monitoring and response, relatively few states have conducted postdrought assessments, impact and risk assessments, or mitigation. This suggests an imbalance between resource allocation for response-oriented actions and mitigation-oriented actions. Several officials confirmed that limited resources typically were dedicated to response rather than to mitigation and assessment. States that performed formal postdrought assessments have used results to prioritize mitigation activities.

This article provided an assessment of state drought programs and plans, together with valuable perspectives from drought officials. Findings may be useful to interstate drought-planning and -mitigation efforts, such as NIDIS, and to state drought officials as they continue to improve their programs and share information with other states.

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**Supplemental Data** — Tables S1–S7 follow the References.

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**ASCE Natural Hazards Review**

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**Supplemental Data**

**Supplemental Material**

Interview Protocol

The interviews included the questions below. Interviewees were asked to respond to the questions, and provide additional clarification, when needed. We provided clarification of terms to ensure consistent understanding among interviewees. The interviews were conducted from October 2006-June 2007. Methods for data elicitation and coding followed procedures as outlined in Babbie (1995) and Dillman (1978). We identified primary drought contacts for each state, using the directory on the NDMC website, and follow-up calls were made when necessary. The state drought coordinator was interviewed in states where drought coordinator is a defined role; in other states, the state climatologist, or other appropriate representative was interviewed.

- How do you declare drought? In stages? By state, by region, by sector? By who? With what information/indicators/triggers? With what responses? How do you release from drought? What works, what doesn't work, and why?
- What are your drought indicators and triggers?
- Do you have flexibility in the interpretation of drought triggers? If so, what are the merits of that flexibility?
- What additional powers does the state have during officially declared drought?. Does this include funding? Are there rules related to how that funding is allocated (e.g., requirements for a certain percentage of funding to be allocated to a particular sector)?
- How do you manage drought responses at the state level while considering the specific needs and (possible existing) drought plans of sectors, local governments, and other stakeholders?
- How do you use your drought plan? What works, what doesn't work, and why?
- How do you relate drought indicators to drought impacts? Have you done any post-drought assessment to evaluate these relationships?
- Do you have instream flow requirements? Are these senior to other rights? How do you manage drought responses with instream flows in mind?

## SUPPLEMENTAL DATA

- Do you have a program or incentives to temporarily relinquish water rights for other beneficial uses (instream – such as water trusts or water banking)? Are these programs effective?
- Does your state have any programs in place to mitigate future impacts (planning and actions during non-drought)?
- What changes would you make to your state drought plan? For instance, have any issues come up that were not addressed by your drought plan? Any plans to make changes to the drought plan?
- What advice could you give to other states as they revise their drought plan? What are the essential components of your program?

**SUPPLEMENTAL DATA**

TABLES

Table S-1. Drought Plans

State	Year of State Drought Plan Reviewed	Drought Plan not Available for Review
Alaska		x**
Arizona	2004	
California		x**
Colorado	2002	
Hawaii	2005	
Idaho	2001	
Kansas	2003	
Montana	1995	
Nebraska	2000	
Nevada	1991	
New Mexico	2003	
North Dakota	2006	
Oklahoma	1997	
Oregon	1991	
South Dakota		x
Texas	2005	
Utah	2003	
Washington	2005*	
Wyoming	2003	

\* Plan is a draft.

\*\* State did not have a drought plan at the time of this research. California now has a drought plan.

**SUPPLEMENTAL DATA**

Table S-2. Drought Monitoring

State	Monitors Impacts	Monitors Hydrologic Indicators	Specialized Hydrologic Monitoring Tools	Defined Triggers	Trigger Flexibility	Defined Scale for Indicator Analysis	Primary Indicators
Alaska	x						
Arizona	x	x		x	x	Watersheds	SPI-6, SPI-12, and Streamflow
California	x	x				State Water Supply Projects	
Colorado	x	x		x	x		
Hawaii	x	x				County	
Idaho	x	x					
Kansas	x	x				River Basins	U.S. Drought Monitor
Montana	x	x	x <sup>1</sup>	x	x	County	
Nebraska	x	x					
Nevada	x	x		x	x	Watersheds	PDSI, SPI, and Reservoirs
New Mexico	x	x				Climate Division and Watersheds	
North Dakota	x	x					
Oklahoma	x	x	x <sup>2</sup>				KBDI
Oregon	x	x				14 River basins	SWSI
South Dakota	x						
Texas	x	x		x	x	Climate Division	
Utah	x	x		x	x <sup>4</sup>	County	SWSI
Washington	x	x		x	x		
Wyoming	x	x		x <sup>3</sup>	x		

<sup>1</sup> = Online monitoring tools developed in coordination with the National Weather Service.

<sup>2</sup> = Online monitoring tools developed in coordination with the Oklahoma Mesonet.

<sup>3</sup> = Defined in plan but not used in practice due to the high level of complexity.

<sup>4</sup> = Flexible for receding stages of drought but not increasing stages of drought.

**SUPPLEMENTAL DATA**

Table S-3. Drought Declaration and Response

State	Declaration or Assessment Primarily to Activate the Federal System	Declaration or Assessment Primarily to Support State and Local Response Actions	Declares Drought in Stages	Assesses Drought in Stages	Executes State Level Response Actions
Alaska					
Arizona		x		x	x
California					
Colorado		x		x	x
Hawaii		x	x		x
Idaho	x				
Kansas		x	x		x
Montana		x		x	x
Nebraska	x				x
Nevada		x	x		x
New Mexico	x			x	x
North Dakota	x				x
Oklahoma		x		x	x
Oregon		x		x	x
South Dakota	x				
Texas		x		x	x
Utah		x	x		x
Washington		x			x
Wyoming	x			x	x

**SUPPLEMENTAL DATA**

Table S-4. Communication and Coordination

State	Increases Communication Efforts During Drought	Provides Drought Coordination Assistance to Jurisdictions or Sectors	Direct Local or	Requires Local Governments to Declare Drought Internally Prior to Gubernatorial Declaration
Alaska				
Arizona	x	x		
California	x			
Colorado	x	x		
Hawaii	x	x		
Idaho	x			
Kansas	x			
Montana	x	x		
Nebraska	x	x		
Nevada	x	x		
New Mexico	x	x		
North Dakota	x	x		
Oklahoma	x			
Oregon	x	x		x
South Dakota	x			
Texas	x	x		
Utah	x	x		x
Washington	x	x		
Wyoming	x	x		

**SUPPLEMENTAL DATA**

Table S-5. Post-Drought Assessment

State	Performs Post-Drought Assessments	Modifies Procedures and Plans to Improve Preparedness
Alaska		
Arizona		x
California		
Colorado		
Hawaii		x
Idaho	x	
Kansas		
Montana		
Nebraska		
Nevada		
New Mexico		
North Dakota	x	x
Oklahoma		
Oregon	x	
South Dakota		
Texas		
Utah	x	
Washington	x	
Wyoming		

**SUPPLEMENTAL DATA**

Table S-6. Impact and Risk Assessment

State	Documents Drought Impacts or Risk	Historical Impacts or Risk	Performs Impact Vulnerability Assessment	Detailed or	Compares Drought Impacts to Response Stages
Alaska					
Arizona		x			x
California		x			
Colorado		x		x	
Hawaii		x			
Idaho					
Kansas		x		x	
Montana					
Nebraska		x			
Nevada					
New Mexico		x			
North Dakota					
Oklahoma		x			
Oregon					
South Dakota					
Texas		x			
Utah					
Washington		x		x	
Wyoming					

**SUPPLEMENTAL DATA**

Table S-7. Mitigation

State	Performs State Level Mitigation Activities	Drought Plan Incorporates Mitigation
Alaska		
Arizona	x	x
California	x	
Colorado	x	x
Hawaii	x	x
Idaho	x	
Kansas	x	
Montana	x	x
Nebraska	x	x
Nevada	x	
New Mexico	x	x
North Dakota	x	
Oklahoma	x	
Oregon		
South Dakota		
Texas	x	x
Utah	x	
Washington	x	x
Wyoming	x	

