

Small Water Systems and Rural Communities Drought and Water Shortage Contingency Planning and Risk Assessment

Part 1 – Recommendations for Drought and
Water Shortage Contingency Plans

**REPORT PURSUANT TO
SECTION 10609.42 OF THE CALIFORNIA WATER CODE
March 2021**



California Department of Water Resources
Water Use Efficiency Branch

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Abbreviations and Acronyms

AB	Assembly Bill
Agency Coordination Team	five-agency coordination team
AWWA	American Water Works Association
CAL OES	California Office of Emergency Services
CDAG	County Drought Advisory Group
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CPUC	California Public Utilities Commission
CWC	California Water Code
DDW	California State Water Resources Control Board, Division of Drinking Water
DWR	California Department of Water Resources
ENP	Emergency Notification Plan
ERP	Emergency Response Plan
GSA	Groundwater Sustainability Agency
HSC	California Health and Safety Code
IHS	Indian Health Services, U.S. Department of Health and Human Services
LHMP	Local Hazard Mitigation Plan
OEHHA	Office of Environmental Health Hazard Assessment, California Environmental Protection Agency
OPR	Governor’s Office of Planning and Research
SADWF	Safe and Affordable Drinking Water Fund
SAFER	Safe and Affordable Funding for Equity and Resilience
SB	Senate Bill
State Water Board	California State Water Resources Control Board
WSCP	Water Shortage Contingency Plan

Executive Summary

This report is submitted pursuant to California Water Code (CWC) Section 10609.42, which directs the California Department of Water Resources (DWR) to identify small water suppliers and rural communities that may be at risk of drought and water shortage vulnerability, and to propose recommendations and information in support of improving their drought preparedness. The report is published in two parts: Part I deals with drought and water shortage contingency planning recommendations, and Part II presents a methodology of drought and water shortage vulnerability assessment and risk scoring.

Specifically, CWC Section 10609.42 requires:

1. DWR, in consultation with the California State Water Resources Control Board (State Water Board) and other relevant state and local agencies and stakeholders, to identify small water suppliers and areas of households on private supplies (termed “rural communities” in the legislation, and also called “self-supplied communities” in this report) that may be at risk from drought and water shortage. DWR must then notify counties and groundwater sustainability agencies (GSA) of suppliers or communities that may be at risk within its jurisdiction, and it may make the information publicly accessible on the DWR website (CWC Section 10609.42[a]).
2. DWR, in consultation with the State Water Board and stakeholders, develop recommendations and guidance relating to the development and implementation of countywide drought and water shortage contingency plans to address the planning needs of small water suppliers and rural communities. The legislation directs DWR to explain how the planning needs of small water suppliers and rural communities can be integrated into complementary existing planning processes (CWC Section 10609.42[b]).

To develop recommendations and guidance on drought planning, and to identify drought and water shortage risk indicators for small water systems and self-supplied communities, DWR utilized a public process involving state agencies, cities, counties, small communities, small water suppliers and other stakeholders in forming a stakeholder advisory group, the County

Drought Advisory Group (CDAG). The CDAG had many discussions on the best ways to improve small communities' preparation for the next drought. The group offered a venue and process for close collaboration between state agencies and local agencies, as well as a place to accept input from other key stakeholders.

Throughout the stakeholder process a four-phase model of disaster risk management helped to frame the drought and water shortage planning approach. This model includes the following phases: (1) Mitigation, Preparation, and Capacity Building; (2) Forecasting and Monitoring; (3) Drought and Water Shortage Response; and (4) Recovery and Relief (Wilhite 2000 and 2014).

State agencies and stakeholders alike agreed that additional planning requirements for the suppliers and communities for drought preparedness and long-term resiliency should leverage and extend existing processes, when possible. The recurring theme of this report's recommendations is to incorporate water shortage contingency plans into existing planning documents for small water suppliers serving 1,000 to 3,000 service connections, and Emergency Response Plans for all small water suppliers. Leveraging existing DWR processes and resources to develop and implement water shortage contingency planning, and State Water Board processes to develop and implement emergency response planning, will help minimize costs to both local and state agencies.

Rural communities with water systems serving fewer than 15 service connections and self-supplied households are likely to be unable to perform meaningful water shortage planning themselves, so integrating planning within existing county plans is more feasible. Counties use a variety of tools to plan for and mitigate against future disasters and hazards, including Local Hazard Mitigation Plans (LHMP), General Plan elements, Emergency Operations Plans, Climate Adaptation Plans, Groundwater Sustainability Plans, and others. Providing counties with the flexibility to use one or more of these plans is intended to leverage existing processes and organizational capacities, in an effort to improve preparation for future droughts.

Regional planning solutions that transcend county boundaries were discussed towards the end of the CDAG stakeholder process. Further discussion is necessary to advance a holistic and regional approach for

drought and water shortage planning solutions that include urban water suppliers, small water suppliers, and self-supplied communities.

Because tribes are sovereign governments with data and regulatory systems that are not structured within the state or counties, their planning systems will be different. This report proposes that Indian Health Services continues to promote the water shortage contingency plan they developed during the last drought (a template is included in Appendix 4 of this report).

Technical assistance for small community water systems serving less than 3,000 service connections, and noncommunity water systems that are schools would facilitate their ability to develop their water shortage contingency plans and Emergency Response Plans and comply with minimum resiliency requirements.

The recommendations in this report, as shown in Tables 1–4 below, should be considered in the context of other statewide policies and efforts concerning water, including water resiliency, water conservation, safe and affordable drinking water, the Human Right to Water, the Sustainable Groundwater Management Act, and biodiversity.

It will require time, effort, and funding to carry out these recommendations. The pace of implementation will depend upon the feasibility and availability of resources and competing priorities. But these recommendations set a direction and create a collective recognition of the ways to support small water suppliers and rural communities plan and be prepared for drought and water shortage.

Table 1. Summary of Recommendations for Small Water Suppliers

S1. All small community water systems serving 15 to 2,999 service connections, and noncommunity water systems that are schools, should be required to develop an Emergency Response Plan and a drought supply evaluation to submit to the State Water Board.
S2. State Water Board should work with small community water systems serving less than 1,000 service connections, and noncommunity water systems that are schools, to improve drought and water shortage resiliency.
S3. All small community water systems serving 1,000 to 2,999 service connections should be required to develop an abridged drought and water shortage contingency plan and to coordinate with groundwater sustainability agencies, where applicable.
S4. The state should support small water systems with technical assistance on drought and water shortage planning, preparation, and response.
S5. In developing a water shortage contingency plan, small water systems should use the proposed periodic statewide drought and water shortage risk assessment prepared by the state, unless justifiably better data is available to improve drought and water shortage resiliency.
S6. All water suppliers should be required to provide and maintain accurate water service area boundaries on a designated site, to be maintained by the State Water Board.
S7. The state should support small community water systems, and noncommunity water system that are schools, to install additional infrastructure for improving drought and water shortage preparedness and response (e.g., a backup well or water meters).

Table 2. Summary of Recommendations for Self-Supplied Communities

R1. Counties can strengthen drought resilience by completing a countywide drought and water shortage contingency plan for self-supplied communities, including self-supplied households and water system with fewer than 15 service connections, specifying drought as a risk in their Local Hazard Mitigation Plan (LHMP), and having Emergency Operations Plans covering the entire county that include planned response to drought and water shortage conditions.
R2. The county or state should provide technical assistance to self-supplied households, to improve the reliability of their water supply.
R3. Incorporate drought resilience and water shortage contingency policies or implementation programs into the safety element, conservation element, or other appropriate elements of General Plans.
R4. Counties and regional planning agencies should use the proposed periodic statewide drought and water shortage risk assessment prepared by the state, unless better local data and assessment are available, to prioritize needs for drought and water shortage contingency planning.
R5. The state should continue improving its understanding of domestic well locations and associated well depths.

Table 3. Summary of Recommendations for Tribes

T1. Tribes are encouraged to develop drought and water shortage contingency plans and to formally adopt them through a resolution of the Tribal Council or other tribal authority with jurisdiction.
T2. The state should coordinate with Indian Health Services when preparing the proposed periodic statewide drought and water shortage risk assessment, to include tribal water systems in the assessment.

Table 4. Summary of General Recommendations

G1. The state should conduct periodic statewide drought and water shortage risk assessments, generating risk scores for each small water system, noncommunity water system that is a school, and self-supplied community using best-available statewide information.
G2. Drought and water shortage contingency planning and responses should be incorporated into implementation of the Safe and Affordable Drinking Water Fund.
G3. Establish a standing interagency drought and water shortage task force to facilitate proactive state planning and coordination, both for pre-drought planning and post-drought emergency response. The task force would be composed of Department of Water Resources, State Water Board, California Public Utilities Commission, California Office of Emergency Services, and Governor's Office of Planning and Research.

1.0 Introduction

1.1 Purpose

The California Department of Water Resources (DWR) seeks to identify small water suppliers and rural communities that may be at risk of drought and water shortage vulnerability, and to propose recommendations and information in support of improving their drought preparedness. In that effort, this report has been prepared pursuant to the requirements of California Water Code (CWC) Section 10609.42, which states:

- a) *No later than January 1, 2020, the department, in consultation with the board and other relevant state and local agencies and stakeholders, shall use available data to identify small water suppliers and rural communities that may be at risk of drought and water shortage vulnerability. The department shall notify counties and groundwater sustainability agencies of those suppliers or communities that may be at risk within its jurisdiction, and may make the information publicly accessible on its Internet Web site.*

- b) *The department shall, in consultation with the board, by January 1, 2020, propose to the Governor and the Legislature recommendations and guidance relating to the development and implementation of countywide drought and water shortage contingency plans to address the planning needs of small water suppliers and rural communities. The department shall recommend how these plans can be included in county local hazard mitigation plans or otherwise integrated with complementary existing planning processes. The guidance from the department shall outline goals of the countywide drought and water shortage contingency plans and recommend components including, but not limited to, all of the following:*
 - 1) *Assessment of drought vulnerability.*
 - 2) *Actions to reduce drought vulnerability.*
 - 3) *Response, financing, and local communication and outreach planning efforts that may be implemented in times of drought.*
 - 4) *Data needs and reporting.*

5) Roles and responsibilities of interested parties and coordination with other relevant water management planning efforts.

This Part I of the *Recommendations for Drought and Water Shortage Contingency Plans* report addresses the directives contained in CWC Section 10609.42(b), and a companion Part II addresses the directives in 10609.42(a).

1.2 Background

In June 2018, AB 1668 and Senate Bill (SB) 606 were passed as part of efforts to make water conservation a California way of life. The legislation tasked DWR and the State Water Resources Control Board (State Water Board) with implementing several directives related to urban and agricultural water use efficiency and countywide drought resiliency.

To initiate and coordinate the implementation of the legislation, a five-agency coordination team (Agency Coordination Team) was formed comprising DWR, the State Water Board, the California Department of Food and Agriculture (CDFA), California Public Utilities Commission (CPUC), and California Energy Commission (CEC). In September 2018, listening sessions were held in Sacramento, Fresno, and Los Angeles to solicit public input and stakeholder engagement in implementing the legislation.

In November 2018, a County Drought Advisory Group (CDAG) was formed to advise DWR on the implementation of the legislative mandates specific to (1) identifying small water suppliers and rural communities at risk of drought and water shortage and (2) developing recommendations and guidance for countywide drought and water shortage contingency plans to address the planning needs of those communities.

DWR kept its partner state agencies informed about CDAG activities through the Agency Coordination Team. This team was formed to coordinate SB 606- and AB 1668-related projects aimed at long-term improvements in water conservation and drought planning. These projects will serve to help California adapt to climate change and the increasingly frequent and more intense droughts throughout the state.

Some of these agencies actively participated on the CDAG Project Team and were actively involved in planning and attending Advisory Group meetings. In addition to legislatively mandated criteria, the state agencies and CDAG

advised DWR to also consider the following related directives and policies in developing the drought and water shortage vulnerability assessment indicators, and the proposed recommendations and guidance for contingency planning:

- Governor Newsom’s Executive Order N-10-19 (April 2019), which directs agencies to recommend a suite of priorities and actions to build a climate-resilient water system and ensure healthy waterways. In implementing the directive, the California Natural Resources Agency, California Environmental Protection Agency, and CDFA solicited extensive public input to prepare the Water Resilience Portfolio released by the Governor on July 28, 2020. The portfolio consists of a water policy roadmap to guide state efforts to meet the water needs of California’s communities, economy, and environment as the climate changes.
- Senate Bill 200 (Monning 2019, Health and Safety Code Section 116686), which establishes the Safe and Affordable Drinking Water Fund in the State Treasury to help water systems provide an adequate and affordable supply of safe drinking water in both the near and long terms and authorized water system administrators to provide an adequate supply of affordable, safe drinking water to disadvantaged communities.
- SB 862 Budget Act of 2018, which appropriates funding for State Water Board to implement a needs analysis on the state of drinking water in California.
- AB 685 (2012, CWC Section 106.3), which declares that everyone in California has a right to clean, safe, affordable, and accessible water adequate for human consumption and sanitary purposes. The legislation instructed all relevant state agencies—including State Water Board—to consider the human right to water when revising, adopting, or establishing policies, regulations, and grant criteria pertinent to water uses. Recently, the State Water Board enlisted the expertise of the Office of Environmental Health Hazard Assessment (OEHHA) to develop a framework for evaluating the quality, accessibility, and affordability of the state’s domestic water supply.

It is important to recognize that the CDAG effort is complementary with other state efforts, including:

- The State Water Board is working to prioritize assistance and funding for vulnerable water systems through a needs assessment aimed at implementing resiliency measures and infrastructure improvements.
- Through its Human Right to Water Assessment effort, OEHHA is conducting a baseline assessment and creating a data tool for evaluating the quality, accessibility, and affordability of the drinking water supply and associated challenges that water systems face.

1.3 Agency and Stakeholders Roles

To gather input, DWR consulted with state agencies—State Water Board, OEHHA, CPUC, Governor's Office of Emergency Services (Cal OES), Governor's Office of Planning and Research (OPR), and CEC—and the federal agencies Indian Health Services (IHS) and the U.S. Environmental Protection Agency, along with the 32-member CDAG stakeholder advisory group acknowledged in this report.

For the duration of this project, DWR worked closely with the State Water Board and OEHHA. Close agency coordination was beneficial, as there is significant overlap between this effort and the State Water Board, Division of Drinking Water's Drinking Water Needs Assessment project and the effort led by OEHHA to develop *A Framework and Tool for Evaluating California's Progress in Achieving the Human Right to Water*.

The CDAG stakeholder advisory group included representatives from counties, cities, water districts, academia, environmental justice and environmental organizations, tribes, and third-party assistance organizations and associations. Advisory group meetings were open to the public and announcements of public meetings were posted on DWR's website and listservs. The advisory group met bimonthly, as necessary, for the duration of the project, starting in December 2018.

Many CDAG members were involved in the response to the historic drought of 2012–2016; they are familiar with the need for better coordination and planning to support families and systems affected by the emergency, and also the high cost of drought-related impacts (Lund 2018). DWR leveraged that wealth of experience through an inclusive process to integrate lessons learned into recommendations and guidance. This direction affirms a top priority is to proactively plan to avoid the most challenging issues, as learned from the last drought.

In February 2019, a literature review was completed to document findings from previous studies and reports relevant to this project. The literature review is attached as Appendix 1. Stakeholders referred to those findings in CDAG meetings to suggest, develop, and prioritize recommendations. The findings and stakeholder viewpoints serve as background information on issues used for framing the recommendations in this report.

Two workgroups were created to focus on the two legislative mandates to identify those at risk, and to give recommendations for water shortage contingency planning, they became the:

- Risk Assessment Technical Workgroup
- Water Shortage Contingency Plan (WSCP) Workgroup

Both workgroup meetings were planned as needed, and participation was solicited from the advisory group. Participation was in-person and online and focused on technical details and discussion of options. Information collected from the workgroup meetings was shared with the advisory group through draft documents and presentations at bimonthly meetings.

1.4 Drought Planning Approach: Phase Model of Disaster Risk Management

Throughout the stakeholder process, a four-phase model of disaster risk management helped to frame the drought and water shortage planning approach (Wilhite 2000 and 2014):

Phase 1: Mitigation, Preparation, and Capacity Building. This pre-disaster learning phase includes risk assessment, risk reduction, improving coping capacity, and improving emergency and water shortage plans.

Phase 2: Forecasting and Monitoring. This pre-disaster phase includes ongoing forecasting and monitoring, improving scientific data, and accounting for precipitation, water supply, and climate changes.

Phase 3: Drought and Water Shortage Response. This phase includes communication, seeking assistance, and implementing any emergency response procedures that are defined for use during a disaster.

Phase 4: Recovery and Relief. This post-disaster response phase includes impacts' assessment, assistance to households and suppliers, and funds to in-boundary organizations to distribute assistance.

Figure 1 presents the four-phase model of disaster risk management. The recommendations throughout this report reference the phases, acknowledging all drought and water shortage planning, monitoring, response, and mitigation actions fall within one or more of these phases.

Many of the items listed in the four-phase cycle are addressed by existing federal, state, and local efforts and reporting processes.



Note: This framework is based on Ekstrom et al. (2020) and informed by Baird (1975); Carter (2008); Coetzee and Niekerk (2012); and Van Dongeren et al. (2018)

Figure 1. Disaster Risk Management Framework

2.0 Recommendations and Guidance: Drought and Water Shortage Contingency Planning

In accordance with CWC Section 10609.42(b), this section describes recommendations and guidance relating to the development and implementation of countywide drought and water shortage contingency plans to address the planning needs of small water suppliers and rural communities. DWR is required to explain how the planning needs of small water suppliers and rural communities can be integrated into complementary existing planning processes. The CDAG placed a high priority on this integrated approach, working to find an approach that is both effective and efficient.

To inform the recommendations, the CDAG WSCP workgroup examined several existing tools and reporting mechanisms used during the recent drought that could support aspects of drought and water shortage contingency planning for small water suppliers.

During the last major statewide drought, the State Water Board issued requirements and recommendations for steps that water suppliers should take for drought planning. Many of these requirements (listed in Figure 2) were directed to urban water suppliers. However, some were applicable to all water suppliers.

Education

- Educate customers and employees on emergency regulations, opportunities, and incentives to upgrade indoor fixtures and appliances.
- Use education and the tools available through the Save Our Water and State Water Resources Control Board Division of Drinking Water website.
- Educate and prepare governing boards on the drought response actions contained in the emergency regulations.

Increase Local Supplies

- Accelerate the completion of projects that conserve potable water by making use of alternative water supplies.
- Improve leak reporting and response programs.
- Take proactive steps to secure communities' water supplies and educate customers about water conservation and the status of their supply reserves.
- Conduct water loss audits and make leak detection and repair a top priority for the duration of the drought.

Use the checklist and template available through the State Water Resources Control Board Division of Drinking Water website to assess water supply and develop a water shortage contingency plan. That template can be found at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/drought/sample_drought_contin_plan.docx

Figure 2. State Water Resources Control Board Division of Drinking Water Key Recommendations to Water Suppliers During the 2012–2016 Drought

IHS also developed a voluntary water shortage contingency planning template for tribes (included as Appendix 4 of this report). A collaborative effort between the tribes, IHS, and other state and federal agencies focusing on drought plans has resulted in an increase from 20% to 65% of tribes having a drought plan.

Small water system and rural community drought preparedness varied widely across the state. The CDAG experiences suggest few drought-preparedness improvements have been made since the 2012-2016 drought ended.

The CDAG WSCP Workgroup suggested that the water shortage contingency planning steps outlined in the 2019 American Water Works Association (AWWA) M60 Manual could be helpful for framing recommendations to build resiliency to future droughts and water shortages. Those steps consist of:

- Step 1. Form a water shortage response team

- Step 2. Forecast supply in relation to demand
- Step 3. Balance supply and demand and assess mitigation options
- Step 4. Establish triggering levels
- Step 5. Develop a staged demand-reduction program
- Step 6. Adopt the plan
- Step 7. Implement the plan

The CDAG recommendations for meeting the drought and water shortage planning needs of small water suppliers and self-supplied communities are presented separately below.

2.1 Recommendations for Small Water Supplier

The CDAG participants shared the knowledge gained from their experiences during the last drought statewide. During the drought, those represented during this discussion described a lack of pre-planning, few agreements, and a lack of emergency/contingency plans such that many small system stakeholders were not aware of the possibilities for assistance during times of acute or chronic water shortage. Many small system stakeholders have a significant need for drought and water shortage contingency training.

The CDAG members strongly believe that while planning is necessary, there is no need to start a new planning process specifically for smaller water systems serving less than 1,000 service connections. Small water systems need to plan and prepare, but generally do not have the managerial, technical, and financial capacity to develop a full-scale WSCP, such as required of urban water suppliers. The preferred approach is to leverage complementary existing processes and authority to require drought and water shortage emergency response planning for all small water systems. However, the State Water Board does not have the regulatory authority to require development and submission of Emergency Response Plans (ERP) for any public water system. ERP development could be done with standardized templates and forms that small water suppliers and school water systems would fill out with technical assistance and training provided by the state. These templates and forms would be an add-on to existing state data-reporting requirements. In addition, small water systems serving 1,000 to 2,999 service connections should adopt and submit a WSCP to DWR. DWR,

through its existing water shortage contingency planning program, would provide guidance and technical assistance on how to develop a WSCP and review submitted plans.

Specific recommendations are described below, followed by general recommendations. It will require time, effort, and funding to carry out these recommendations. The pace of implementation will depend upon the feasibility and availability of resources and competing priorities.

Drought Planning and Technical Assistance

Recommendation S1. All small community water systems serving 15 to 2,999 service connections and noncommunity water systems that are schools, should be required to develop an Emergency Response Plan and a drought supply evaluation to submit to the State Water Board.

The ERP should be updated every five years, or when significant changes occur, and then submitted to State Water Board's Division of Drinking Water (DDW) similar to the Emergency Notification Plans (ENP). Small water systems should also be required to submit drought supply evaluations to the State Water Board (e.g., groundwater levels).

The State Water Board should work with small community water systems serving 15 to 2,999 service connections, and noncommunity water systems that are schools, to develop an ERP template that would integrate emergency response and water shortage planning components—including methods to evaluate their supply into existing State Water Board reporting processes and plans.

The State Water Board should determine the appropriate components to be included in an ERP, and the most appropriate way to collect this data, which may include, but is not limited to, sanitary surveys or electronic submission.

Two components that the CDAG stakeholders wanted to emphasize include:

- Small community water systems, and noncommunity water systems that are schools, should proactively compile a list of relevant resources that can be used for assistance in the event of a drought or water shortage emergency, including local community-based organizations that work with vulnerable populations in and around areas served by the public water system, contractors for drilling wells, certified water haulers, and emergency shower vendors.

- Small community water systems, and water systems that are schools, should have a plan for community outreach and informing communities of the resources available in the event of a drought or water shortage emergency, including a list of contacts for assistance requests.

Recommendation S2. The State Water Board should work with small community water systems serving less than 1,000 service connections and noncommunity water systems that are schools to improve drought and water shortage resiliency.

The State Water Board determined that small water systems with less than 1,000 service connections may not have the capacity to develop water shortage contingency plans. State Water Board's Safe and Affordable Funding for Equity and Resilience (SAFER) program is currently developing a Needs Assessment to determine goals to improve resiliency of small water systems.

The State Water Board is conducting analyses to identify funding needs for implementation of resiliency projects and to incorporate those needs into its expenditure plan and intended use plan analysis and prioritization processes for existing, new, and expanded funding sources.

Recommendation S3. All small community water systems serving 1,000 to 2,999 service connections should be required to develop an abridged drought and water shortage contingency plan and coordinate with groundwater sustainability agencies, where applicable.

CDAG referred to this plan as an "abridged WSCP" to differentiate it from the more stringent WSCP requirements that urban water suppliers need to comply with as part of their urban water management plans (CWC Section 10632.2). The proposed WSCP for small water suppliers is consistent with the AWWA M60 Manual (Drought Preparedness and Response). The proposed WSCP is not as extensive as what applies to urban water suppliers serving more than 3,000 service connections. This recommendation does not modify the definition of an urban water supplier nor does it extend the urban water management planning requirements to suppliers below the established 3,000 service connections threshold.

A small water system that is covered under a WSCP of an urban water supplier's Urban Water Management Plan is exempt from developing an

individual abridged water shortage contingency plan proposed in this recommendation.

Appendix 2 contains the basic planning components recommended for water shortage contingency planning for small water suppliers.

It is important to emphasize public participation during the development and amendment of the abridged water shortage contingency plan, and outreach to all residents, with specific consideration of disadvantaged communities and those who may be underrepresented.

Small community water systems serving 1,000 to 2,999 service connections would update their WSCPs every five years, or when significant changes occur, and then submit them to DWR. A copy of the ERP must be included as part of the submitted WSCP.

Recommendation S4: The State should support technical assistance to small water systems on drought and water shortage planning, preparation, and response.

The state can provide venues for local coordination and knowledge transfers involving diverse expertise and representation (e.g., community advocates, local system operators, disadvantaged self-supplied or small water system users, and large system operators). Training can include how to complete effective water needs assessments to identify the investments small water suppliers need to make. Technical assistance should support increased water resiliency efforts (including support of water resiliency planning) for small water suppliers, especially in disadvantaged communities, to ensure equitable implementation of these recommendations. Technical assistance to assist in consolidation efforts, and to develop good examples of regionalization and partnerships, would ensure these concepts are adopted in California. This technical assistance could be provided via existing technical assistance providers or through development of new programs.

DWR should develop a guidebook adapted from the AWWA M60 Manual (Drought Preparedness and Response) that is tailored to California small water suppliers' needs.

Technical assistance for small community water systems serving less than 3,000 service connections, and noncommunity water systems that are schools, would facilitate their ability to develop their water shortage

contingency plans and Emergency Response Plans and comply with minimum resiliency requirements.

Monitoring and Assessment

Recommendation S5. In developing a water shortage contingency plan, small water systems should use the proposed periodic statewide drought and water shortage risk assessment prepared by the State, unless justifiably better data is available to improve drought and water shortage resiliency.

Small water suppliers should use the information in the proposed periodic statewide drought and water shortage risk assessment, unless better data is available, to inform planning and in prioritizing projects that enhance a water supplier's drought and water shortage resiliency.

Recommendation S6: All water suppliers should be required to provide and maintain accurate water service area boundaries on a designated site to be maintained by the State Water Board.

Collecting, standardizing, updating, and publishing service area boundaries for all water suppliers is a critical step toward having the necessary tools to assess risk to drought and water shortage and to engage water system consolidations and regional partnerships. Water service area boundaries are also important geospatial datasets for estimating and projecting utility populations and water demand for water supply planning, providing information to the public about their water supplies and drinking water quality, and for emergency response. Although there have been previous efforts to map all of the approximately 7,400 public water systems in California, the existing maps are not complete and are not consistently updated or verified. Likewise, there is a need to develop both the public water system service area boundaries and legal boundaries for the purposes of evaluating growth and consolidation potential.

Well depth, well-log information, and water service area boundaries should also be reconciled with existing DWR and State Water Board well databases, and they should be linked.

Even though the above recommendations pertain to individual small water systems, multiple small water systems can meet the proposed requirements through a combined Emergency Response Plan or a combined abridged water shortage contingency plan. A combined plan—developed by multiple small

water systems or in coordination with a large urban water supplier in lieu of multiple individual plans—must cover all the required planning components for each of the participating water systems.

Infrastructure Needs to Improve Drought and Water Shortage Resiliency

Recommendation S7: State should support small community water systems and noncommunity water system that are schools to install additional infrastructure to improve drought and water shortage preparedness and response (e.g., backup well or water meters).

Currently, drinking water regulations under California Code of Regulations, Section 64554(c) specify that new community water systems using only groundwater must have a minimum of two sources of supply, and that the system must be capable of meeting maximum day demand with the highest-capacity source offline. The State Water Board is not able to apply this requirement to the many existing small water suppliers that rely on a single groundwater well for domestic water. This makes these small water suppliers even more vulnerable to drought impacts, as noted in the risk evaluation outlined in section 3.0 Topics for Future Discussion. Additional infrastructure is needed, such as backup wells, water tanks, and water meters, to improve resiliency. Additional funding would provide incentives that would improve resiliency.

Through their experience regulating drinking water systems, the State Water Board has indicated that most water systems under 1,000 connections have difficulty ensuring water supplies during natural disaster events, regardless of the development of planning materials, due to their inherent lack of economies of scale to finance needed infrastructure improvements and the high cost of emergency response activities. The minimum infrastructure resiliency measures recommended by the State Water Board—for those small water systems where consolidation is infeasible—to help ensure sustainable water supplies include the following:

- Participate in California Water/Wastewater Agency Response Network (CalWARN) or other equivalent mutual-aid organization.
- Adopt a drought conservation, communications, and enforcement policy—including coordination with the county—that will go into effect when water supply vulnerability/risk thresholds are met.

- Secure a back-up power source and test it quarterly to ensure continuous operations.
- Implement monitoring systems that are sufficient to detect production-well groundwater levels.
- Have at least one back-up source of water that meets current water quality regulations and meets average day demand.
- Implement service-connection metering and monitor for pipe leakage. During periods of water supply vulnerability, monitor customer water use.
- Have source and distribution system capacity to meet wildfire flow requirements.

The State Water Board is currently preparing a Needs Analysis methodology to determine at-risk water systems across the state and a cost estimate to determine the associated costs to mitigate both water systems that are in violation and at-risk systems—including self-supplied communities. To the extent that monies are available, these efforts will inform the State Water Board’s funding program to help address water systems at risk of failure. With respect to drought, the State Water Board’s risk assessment methodology builds off some of DWR’s CDAG efforts by investigating, and in many cases sharing, risk factors developed through DWR’s public stakeholder process.

2.2 Self-Supplied Communities Recommendations

During the CDAG process, the varied group of participants shared impacts they encountered during the last drought and how state and local responses (or the lack thereof) helped (or exacerbated) challenging water shortage conditions in rural regions. Participants urged DWR and other state agencies to apply common-sense guidelines to water management in self-supplied communities during a drought. They stated that state agencies need to better understand the unique nature of water use and dependencies (e.g., groundwater versus surface water) in rural areas before the state codifies and then requires implementation of contingency plans that may have little recognition of these unique challenges. Related to the discussion above is the general lack of knowledge that self-supplied water systems have on how to communicate with state and regional agencies when a problem emerges

or occurs at the local level. There is a need for local-to-state communication to continue during non-drought years.

This input from the CDAG members was invaluable, and it has helped DWR to develop the drought and water shortage planning components proposed in this report.

The consideration for the roles and responsibilities of different entities is crucial, especially when developing regional solutions to support smaller, more vulnerable water systems. The CDAG helped to define and plan coordination, considering the roles of the different entities that have related authority and expertise, to ensure that there is drought planning and oversight for all communities in the state. DWR recommends that existing efforts should be leveraged instead of mandating a new plan.

Specific recommendations for self-supplied community water shortage contingency planning are discussed below. For the successful implementation of all recommendations, funding will be necessary to assist in implementing the proposed new activities.

Drought Planning and Technical Assistance

Recommendation R1: Counties can strengthen drought resilience by completing a countywide drought and water shortage contingency plan for self-supplied communities including self-supplied households and water systems with fewer than 15 service connections, specifying drought as a risk in their local hazard mitigation plans (LHMP), and having Emergency Operations Plans covering the entire county that include planned response to drought and water shortage conditions.

The county drought and water shortage contingency plans should follow the steps and include the elements listed in Appendix 3, which starts with the county forming a water shortage response team that includes county officials, State Water Board district offices, and large and small water systems personnel, among others. Specifically:

- 1) Counties should use one or more of the following existing processes to incorporate required and recommended components related to drought and water shortage contingency planning for self-supplied communities (listed in Appendix 3): Local Hazard Mitigation Plan (LHMP), General Plan (Safety Element, Conservation Element, or other

element), Emergency Operations Plan, Climate Adaptation Plan, Integrated Regional Water Management Plan, Groundwater Sustainability Plan, or other plan.

- 2) The state should develop a cross-referenced table in an online template for counties to report where their various water-shortage contingency plan components are integrated. The completed form should be submitted to the state on an annual basis.
- 3) Although LHMPs are not currently required, all counties have an LHMP, and these should be updated to include drought. Drought should be identified in the county's LHMP as a risk in all areas of the county (including unincorporated areas) not covered by an Urban Water Management Plan WSCP or abridged WSCP for small water suppliers. Near-term and long-term mitigation projects to address drought and water shortage vulnerabilities should also be identified because few counties currently include projects to mitigate drought impacts in their LHMPs.
- 4) In the county General Plan, available drought support / response services should be added as a section of a safety element. Additionally, future water quality and contaminants map information from the State Water Board Needs Assessment project—required by Health and Safety Code Section 116772(a)(1)—should also be considered in General Plans, as these may impact availability of safe water.
- 5) Emergency Operations' Plans should include planned response to drought conditions that cover the entire county, including unincorporated areas.
- 6) Each county should consider, as part of its existing planning processes, the development of a robust plan for community outreach and informing communities of the resources available in the event of a drought or water shortage emergency. The plan should include a list of contacts to notify for assistance or information requests.
- 7) Counties should consider establishing a standing county drought and water shortage task force, to ensure consistency within counties and to include representatives from local governments, community-based organizations, local water suppliers, and members of the public. The

formation of each county task force should be included in each county's General Plans, or in some other existing county plan.

- 8) County planning departments should ensure that planning considers future water availability, including climate change impacts. Existing mechanisms, such as the California Environmental Quality Act process, should be used for land use permitting.

DWR, in coordination with other relevant state agencies such as CAL OES and State Water Board, should on a regular basis review county planning documents containing recommended WSCP components, to ensure that integration of drought and water-shortage contingency planning is meaningful and targeted to the needs of vulnerable populations most at risk of drought and water shortage. In instances where this integration is lacking or insufficient, DWR, in coordination with other relevant state agencies such as CAL OES and the State Water Board, could provide suggested changes to incorporate in the planning documents.

Recommendation R2: The Counties or State should support technical assistance to self-supplied households to improve reliability of their water supply.

Homeowners and renters need help with resiliency planning. Training, such as workshops, can be coordinated by the counties and state to disseminate educational materials.

Recommendation R3: Incorporate drought resilience and water shortage contingency policies or implementation programs into the safety element, conservation element, or other appropriate elements of the General Plans.

Under current law governing General Plans in Government Code 65302, General Plans must address water resources and various natural hazards that relate to water in the conservation and safety elements. Currently within the safety element of the General Plans, "Mitigating Hazards through Drought Resiliency Plans" is discussed as a best practice. However, drought is not specifically identified as a topic that must be addressed in either element. Legislation adding specific drought and water-shortage contingency planning requirements to one or more of these General Plan elements, to address the need to mitigate risk and vulnerability, would help improve drought and water shortage preparedness. OPR would be required to update

the General Plan guidelines to incorporate legislative changes to GC 65302, if proposed legislation were signed into law.

Monitoring and Assessment

Recommendation R4. Counties and regional planning agencies should use the proposed periodic statewide drought and water shortage risk assessment prepared by the State, unless better local data and assessment are available, to prioritize needs for drought and water shortage contingency planning.

Counties should use the proposed periodic statewide drought and water shortage risk assessment as explained in Recommendation G1 for their county, and, to the extent feasible, supplement it with additional data including information collected by the counties to prioritize drought and water shortage management actions. The counties' risk analyses should be documented into one of their plans (e.g., General Plan) so that the risk of all areas within a county are understood and accounted for in planning.

Recommendation R5: The State should continue improving its understanding of domestic well locations and well depths.

At present, DWR has compiled an online well completion-report database listing the location (within a one-square-mile public lands' section) of all domestic wells and when they were permitted. However, the usefulness of the information is hampered by (1) a lack of information on which wells have since been plugged and abandoned, and (2) a lack of precise information on well locations. Many counties have information on which wells have been plugged and abandoned. The counties should share this information with DWR to add to the existing online well completion-report database. Going forward, well completion permits issued by counties should record the latitude and longitude of wells within 100 meters. This information would be redacted from the public version of the database to protect privacy concerns.

The state should also link the DWR well completion-report database with the State Water Board domestic well database.

An understanding of domestic well locations and well depths will help improve future drought and water shortage risk assessments for self-supplied communities.

2.3 Tribal Systems Recommendations

IHS has prepared a drought contingency plan template, which tribes may choose to use to develop their own plan. Tribes are encouraged (but not required) to share their drought contingency plans with IHS, so that IHS can assist the tribe with implementing the plan, should drought conditions arise. That template is included in Appendix 4.

The following recommendations are specific to tribes.

Drought Planning and Technical Assistance

Recommendation T1: Tribes are encouraged to develop drought and water shortage contingency plans and formally adopt them through a resolution of the Tribal Council or other Tribal authority with jurisdiction.

Tribes may use IHS's drought contingency planning template to develop their plans and collaborate with and seek assistance from IHS in implementing their plans.

Monitoring and Assessment

Recommendation T2: The State should coordinate with Indian Health Services when preparing the proposed periodic statewide drought and water shortage risk assessment to include tribal water systems in the assessment.

IHS plans to use the same scoring methodology as the state will use for small-water-system risk scoring. The state should continue to share data that IHS needs to perform this periodic update. IHS will maintain the tribal list so that confidential information about tribal water systems will not be disclosed publicly via the state.

2.4 General Recommendations

The following general recommendations are also suggested:

Conduct Periodic Statewide Drought and Water Shortage Risk Assessment

Recommendation G1: The state should conduct periodic statewide drought and water shortage risk assessments, generating relative risk scores for each small water system, noncommunity water system that is a school, and self-supplied community using best available statewide information.

Drought risk and vulnerability is dynamic and can change with decisions and investments made during a drought. Drought relief and planning needs continual assessments to consider the changing distribution of drought risk given different types of drought and new resilience-building efforts.

The benefit of offering a periodic statewide drought and water shortage risk assessment is that counties, Groundwater Sustainability Agencies (GSA), and other local groups will be aware of those areas and populations that are at higher risk, and they can be prioritized for funding for abridged WSCP development or targeted assistance during periods of water shortage.

DWR should periodically update the statewide drought and water shortage risk assessment for small water suppliers and self-supplied communities, to enable local suppliers to start planning for dry years. The indicators and construction of the scoring should be revised as more data becomes readily available.

This updated risk assessment should be made available to counties, GSAs, integrated regional water management groups, State Water Board water system administrators, and other entities. The data and results of the statewide drought and water shortage risk assessment should be made publicly available in a centralized location, similar to the Human Right to Water Portal currently on the State Water Board website at https://www.waterboards.ca.gov/water_issues/programs/hr2w/. Deficits in data quality and availability identified through this process should be addressed through investment in data collection and enhanced monitoring.

The state should build upon the databases and tools developed for this project to compute/update periodic risk and vulnerability assessments.

Additional funding may be necessary to periodically update and maintain the annual statewide drought and water shortage risk assessment tools developed as part of this CDAG process, along with ongoing funding to support continued refinement of existing data and to gather new data, including data on state small water systems, local small water systems, and concentrations of domestic wells.

All data collected by DWR that is associated with this CDAG process, or implementation of the recommendations, should be made publicly available in a centralized online location.

Integrate Drought and Water Shortage Contingency Planning and Response with Safe and Affordable Drinking Water Fund

Recommendation G2: Drought and water shortage contingency planning and response should be incorporated into implementation of the Safe and Affordable Drinking Water Fund.

Drought and water shortage vulnerability and risk should be:

- Included as part of the State Water Board’s current Needs Assessment project, as well as part of any similar future projects.
- A consideration for project funding from the Safe and Affordable Drinking Water Fund (SADWF), as part of the annual SADWF Expenditure Plan.

Establish Interagency Drought and Water Shortage Task Force

Recommendation G3: Establish a standing interagency drought and water shortage task force to facilitate proactive State planning and coordination, both for pre-drought planning and post-drought emergency response. The task force would be composed of DWR, State Water Board, CPUC, CAL OES and OPR.

This interagency task force should include a diverse stakeholder group—including experts in land use planning, water resiliency, and water infrastructure—to develop strategies to enhance collaboration between the various fields and to consider all types of water users.

In addition, after the submittal of this report to the Legislature, the CDAG and state agencies should continue to meet to follow up on items that can be incorporated in the near term, such as supporting agencies in implementing water shortage contingency planning, and other recommendations, when required.

3.0 Topics for Further Discussion

During the CDAG meetings and discussions with state agencies, many relevant topics were brought to DWR's attention, but they need further discussion before recommendations can be made. Some of those topics are described below.

3.1 Support Regional-Scale Planning

There is a need for regional-scale planning via regional plans that annually assess regional water supply and demand conditions. This regional planning provides an opportunity to focus on communities identified as vulnerable to drought/water shortage and considers urban water suppliers, small water suppliers, other water users, and county WSCPs. Many other strategies can be supported to improve resiliency across multiple systems, such as small systems building partnerships opportunities with other nearby large water systems, including but not limited to, managerial consolidations and mutual-aid assistance opportunities.

Further state data needs could support such regional approaches. The state should develop a map of urban water suppliers in the proximity of small water suppliers, to aid overall planning related to the resiliency of all water suppliers in a region.

3.2 Encourage Policies that Prioritize Sustainable Drinking Water for Rural and Small Water Systems

Throughout the state, regulations and development standards may be insufficient to ensure sustainable drinking water for small water systems and self-supplied communities. The consequence of this has led to the proliferation of small water systems that are vulnerable to system failures caused by drought conditions or water shortage conditions. Further discussion is needed on the following suggestions, to avoid these problems:

- The state could actively encourage collaboration between counties and other key entities, such as GSAs, to support greater coordination between implementation of local Groundwater Sustainability Plans and county implementation of proactive drought and water shortage

planning. The State Water Board and DWR should develop further guidance and decision-support tools to support this kind of collaboration.

- The state could work with the California State Association of Counties to identify opportunities to revise entitlement regulations and development standards to ensure that new small water systems are constructed and permitted with sufficient water supply reliability, redundancy, and drought-resiliency measures to enhance the long-term sustainability of these small water systems and self-supplied communities.
- Self-supplied communities need support to ensure long-term water supply reliability and avoid actions that decrease drought resiliency.
- Counties could require additional drought and water shortage evaluations as part of permit applications for new public water systems and wells.
- California Code of Regulations Section 64215, addressing water supply requirements for state small water systems, could be expanded to (1) ensure adequate supply during drought years, and (2) expand the minimum supply requirement to include water systems with one to four connections. Unresolved issues include how to make sure a well is drought resilient.

3.3 Integrate Drought Risk and Resiliency into Hazard Mapping Tools

Currently, California Health and Safety Code Section 116772(a)(1) requires the State Water Board to make available maps of information on high-risk areas. The State Water Board and DWR should coordinate to integrate hazard mapping tools, and State Water Board efforts should consider extending its examination of communities and suppliers to include mapping of drought risk and resiliency.

3.4 Funding and Financing for Contingency Planning

The CDAG identified that funding and financing is key for small water systems and self-supplied community water shortage contingency planning. Appendix 5 includes several funding ideas for small water systems, suggested by members of the CDAG and that warrant further consideration.

These funding suggestions are not specific to recommendations in this report, but they are included as suggestions, since improving the financial viability of small water systems can improve drought and water shortage planning and resiliency.

4.0 Glossary

Community water system refers to a public water system that serves a minimum of 15 service connections used by yearlong residents, or regularly serves a minimum of 25 yearlong residents of the area served by the system. Health and Safety Code (HSC) Section 116275(i).

Drought is defined in various ways depending on the needs (Moreland 1993). Generally, a drought is when supply does not meet demand for water, which has been met in the past. Drought tends to be associated with lower-than-average precipitation periods, though it can be driven by increases in demand and ambient temperatures (which can influence demand and timing of supplies). Dry or warm periods can lead to reduced surface water flows, reduced surface and groundwater storage, and increased water quality challenges (e.g., from harmful and other algal blooms or increased disinfectant byproduct concentrations). Additionally, dry periods can lead to shifts in pollutant blooms in aquifers. These water quality issues are important drought risks to consider when planning and preparing for droughts, especially as temperatures increase under the changing climate.

Local primacy agency means a local health officer that has applied for and received primacy delegation pursuant to Section 116330. HSC Section 116275(r).

Noncommunity water system means a public water system that is not a community water system. HSC Section 116275(j).

Nontransient noncommunity water system means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year. HSC Section 116275(k).

Public water system means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections, or regularly serves at least 25 individuals daily at least 60 days out of the year. HSC, Section 116275(h).

Self-supplied communities intends to cover what is regarded as the “rural communities” in the legislation. This is intended to cover those households

and others with domestically used water (for dish washing, showering, drinking, and the like) from their own wells and surface water supplies. The unit of analysis for these communities is the U.S. Census Block group, omitting those with zero population (according to ACS 2012-2016) and those that have no domestic wells recorded (based on data from the DWR Well Report Database 2019). For the purpose of this risk and vulnerability assessment, this category also addresses communities served by water suppliers with fewer than 15 service connections.

Noncommunity water system that is a school refers to a school that is a permitted public water system because it has its own water supply.

Service connection means the point of connection between the customer's piping or constructed conveyance, and the water system's meter, service pipe, or constructed conveyance. HSC Section 116275(s).

Small water suppliers for this analysis are those with fewer than 3,000 service connections and serving less than 3,000 acre-feet per year. Urban water suppliers with 3,000 connections and/or those that serve over 3,000 acre-feet are required to develop an urban water management plan, which includes a section on drought and water shortage contingency planning. Those small water suppliers that are listed as participating in an urban water management plan were also excluded because they are expected to be covered by their plan.

State small water system means a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. HSC Section 116275(n).

Transient noncommunity water system means a noncommunity water system that does not regularly serve at least 25 of the same persons over six months per year. HSC Section 116275(o).

Urban water supplier means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually.

Water shortage is an insufficient quantity of water to meet indoor water uses such as drinking and sanitation, and other critical water needs, which can be caused by chronic conditions, extreme events, or both. This includes the physical lack of supply coming out of the tap, a problem that can be caused by dry wells or surface water, a regulatory restriction on accessing surface water, or some physical obstruction impeding water supply.

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Part 1: Report Pursuant to
Section 10609.42 of the California Water Code

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“Managing Drought Risk in a Changing Climate: The Role of National
Drought Policy” (June 2014). Weather and Climate Extremes. Elsevier.

List of Appendices

The appendices to this report follow the main report document and they are available upon request from DWR.

Appendix 1	Literature Review
Appendix 2	Proposed Water Shortage Contingency Plan Components for Small Water System
Appendix 3	Proposed Umbrella Water Shortage Contingency Plan Components
Appendix 4	Indian Health Service Template for a Drought Contingency Plan for a Tribal Public Water System
Appendix 5	County Drought Advisory Group General Funding and Financing Issues