

Appendix 3
Proposed Umbrella Water Shortage
Contingency Plan Components

Prepared for

County Drought Advisory Group Process as Partial Fulfillment of
Assembly Bill 1668

By

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Part 1: Appendix 3 Umbrella WSCP Components

This appendix contains recommended elements of a countywide water shortage contingency plan to cover rural and self-supplied communities. The appendix is part of the report *Small Water Systems and Rural Communities Drought and Water Shortage Contingency Planning and Risk Assessment, Part I – Recommendations for Drought and Water Shortage Contingency Plans*. The 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 provide information in support of improving their drought preparedness.

Figure 1 presents a four-phase model of disaster risk management. All actions related to drought and water shortage planning, monitoring, response, and mitigation can be described by the model and fall within one or more of these phases:

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 science, and accounting for precipitation, water supply, and climate changes.

Phase 3: Drought and Water Shortage Response. This phase includes communication, calling for 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 homes and suppliers, and funds to in-boundary organizations to distribute assistance.



Note: This framework was informed by Baird (1975); Carter (2008); Coetzee and Niekerk (2012); and Van Dongeren et al. (2018).

Figure 1. Disaster Risk Management Framework

Tables 1 and 2 discuss the four-phase model of disaster risk management aimed at improving the drought preparedness of small water suppliers and rural communities. These tables detail a seven-step plan that addresses drought and water shortage vulnerability and risk reduction.

Table 1 presents model Phases 1 and 2 and explains pre-disaster strategies to employ before a drought and during a water shortage. Table 2 presents model Phases 3 and 4 and explains post-disaster strategies to aid in recovering from a drought or a water shortage.

The tables contain the basic recommended planning components that counties should include in their water shortage contingency plans (WSCP) for self-supplied communities—including self-supplied households and water systems with fewer than 15 service connections. This is related to

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Recommendation R1 in the main report *Small Water Systems and Rural Communities Drought and Water Shortage Contingency Planning and Risk Assessment. Part I – Recommendations for Drought and Water Shortage Contingency Plans* which reads:

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 Advisory Group (CDAG) WSCP workgroup offered advice on which plan elements should be required, versus those that are recommended, and DWR has used that information to make a decision, as shown in the second column on each table.

To include the elements listed, a county needs to start by forming a water shortage response team that includes county officials, State Water Resources Control Board (State Water Board) district office staff, and large and small water systems personnel, among others. The proposed WSCP elements are consistent with the American Water Works Association M60 Manual (Drought Preparedness and Response, 2019).

Table 1 presents Phases 1 and 2 of the four phases in the disaster risk management framework shown in Figure 1. Both are pre-disaster phases. Phase 1 is a before-drought/water-shortage learning phase that includes risk assessment, risk reduction, improving coping capacity, and improving emergency plans and water shortage plans. Phase 2 is an ongoing phase that includes monitoring, forecasting, and tracking; improving science; and accounting for precipitation, water supply, or other changes.

Table 1. Pre-Disaster: Phases 1 and 2 of the Four-Phase Model of Disaster Risk Management

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 1: Determine Preparation, Risk Reduction, and Capacity Building Needs	Notes Phase 2: Determine Forecasting and Monitoring Needs
Step 1: Form a Water Shortage Response Team			
Select the Water Shortage Response Team	R	Designate team, team lead, and support entities. AWWA M60 Step 1.	Monitoring and forecasting activities already in place for implementing WSCP.
Set Priorities	r	Based on vulnerability and risk analysis, economic, environmental factors, water efficiency.	Plan already in place and key staff are aware.
Establish Schedules and Maintain Momentum	r	Start planning in advance.	Monitoring protocols already in place.
Coordination, Cooperation, and Communication	R	Coordinate with water suppliers, the community, and among local, regional, state, and federal agencies.	Reporting protocols already in place.
Step 2: Forecast Supply in Relation to Demand			
Data Collection	R	Compile data related to water resources groundwater allocations and surface water rights, water purchase agreements, available water supply and storage capacity, treatment flexibility, recycled water availability, assets, customer characteristics, seasonal demand profiles. Identify early warning systems.	Early warning systems identified in planning stage. Continue to collect data.
Data Analysis	R	Analyze scenarios: supply data analysis, water quality data analysis, water demand data analysis.	Continue to collect and use data to analyze for your region and review for potential adaptations needed due to climate change.
Is There a Predicted Shortage?	R	Plan regional communication. Can wholesale suppliers and/or retail suppliers carryover storage?	Communication already planned.
Catastrophic Supply Interruptions		Short-term and long-term planning. Join regional entities (CalWARN). Emergency Response Plan recommended. Be ready to move directly to highest stage actions.	Early warning systems identified in planning stage. Continue to collect data.
Step 3: Balance Supply and Demand and Assess Mitigation Options			
Supply Augmentation Methods	R	AWWA M60 Table 3-1. (1) Leverage existing assets through existing system flexibility and infrastructure. upgrades; (2) increase supplier water use efficiency; (3) expand water supply portfolio with new sources including recycled water; and (4) seek opportunities to collaborate with other agencies. Expand areas of use boundaries for emergency purposes, as needed.	Some are long-term measures, these should be implemented prior to the drought and reevaluated periodically to determine new information/projects that may be needed.

Table 1. Pre-Disaster: Phases 1 and 2 of the Four-Phase Model of Disaster Risk Management (contd.)

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 1: Determine Preparation, Risk Reduction, and Capacity Building Needs	Notes Phase 2: Determine Forecasting and Monitoring Needs
Demand-Reduction Methods	R	Plan demand reduction measures based on severity of the shortage and by stage.	Collect and analyze data related to demand reduction measures.
Step 4: Establish Triggering Levels			
Trigger Mechanisms	R	Clearly define and document triggers-reservoir, groundwater levels, etc. See list in AWWA M60, p. 56. Use 3-5 stages. Plan exit strategy.	Monitoring and forecasting already planned. Periodically, evaluate if adaptations to triggers are necessary, based on new data.
Step 5: Develop a Staged Demand-Reduction Program			
Criteria for Demand Reduction During a Water Shortage		Criteria includes: timing (will goals be met?), magnitude of savings, season, and costs.	
Establish Stages	R	Based on triggers: between 3-5 stages.	
Measures	r	Short- and long-term measures based on customer categories of demand-reduction measures	
Manage Customer Expectations		Implement system to answer community questions (call in phone line, etc.).	
Step 6: Adopt the Plan			
Involve the Community	r	Develop/Review and update the WSCP, with public input.	If adaptations are necessary, include the community.
Prepare a Revenue Program		Plan for recovering expenses by considering raising water rates, imposing a water shortage surcharge (if legally allowable), include needed drought projects in hazard mitigation plans and seek funding sources from outside agencies, as appropriate.	Reevaluate if modifications are needed, based on new data.
Formalize Cooperation with Local Agencies in the Region		Prepare ordinances and interagency agreements for different levels of water shortage.	Reevaluate if modifications are needed, based on new data.
Review and Finalize the Plan		WSCP should go through formal public review process to minimize future objections when mandatory prohibitions are needed. Quickly adopt the WSCP, formally.	Revise and reapprove if modifications are necessary.

Table 1. Pre-Disaster: Phases 1 and 2 of the Four-Phase Model of Disaster Risk Management (contd.)

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 1: Determine Preparation, Risk Reduction, and Capacity Building Needs	Notes Phase 2: Determine Forecasting and Monitoring Needs
Step 7: Implement the Plan			
Essential Elements of Implementing a Water Shortage Plan		1. Staff levels 2. Staff training and support 3. Office space 4. Equipment 5. Budget 6. Intra-office communication 7. Coordination with other agencies 8. Computer and billing format capabilities 9. Customer assistance 10. Customer appeals 11. Special-needs customers 12. Media contacts 13. Monitoring of actual use	Implement long-term projects.
Public Information and Media Program	r	Getting the public involved will require an expansion of an existing water-conservation public education program. A vigorous public education program during a water shortage emergency is crucial for achieving substantial water-use reductions.	
Drought Recovery and Water Shortage Plan Termination			Monitoring indicates that a water system is capable of supporting unrestricted water demand for a sustained period of time.

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Table 2 presents Phases 3 and 4 of the four phases in the disaster risk management framework shown in Figure 1. Both Phase 3 and Phase 4 are during-drought and post-disaster phases. Phase 3 is an ongoing phase that includes monitoring, forecasting, and tracking; improving science; and accounting for precipitation, water supply, or other changes. Phase 4 is a disaster response phase that includes communication, calling for assistance, and implementing emergency response procedures.

Table 2. During-Drought and Post-Disaster: Phases 3 and 4 of the Four-Phase Model of Disaster Risk Management

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 3: Response Actions	Notes Phase 4: Drought / Water Shortage Recovery Actions
Step 1: Form a Water Shortage Response Team			
Select the Water Shortage Response Team	R	Same teams as planning stage to implement WSCP.	Team follows WSCP during implementation.
Set Priorities	r	Plan already in place, and the public is familiar with the program.	Team reflects on actions taken and their effectiveness.
Establish Schedules and Maintain Momentum	r	Steps to implement the WSCP are already planned.	
Determine Coordination, Cooperation, and Communication Needs	R	Essential staff roles laid out in WSCP, any recent changes since the last plan should be incorporated.	
Step 2: Forecast Supply in Relation to Demand			
Determine Data Collection Needs	R	Data collected essential to track triggers, if any data found to be missing based on evaluation of the specific drought then this should be immediately collected.	Additional data collection during recovery.
Determine Data Analysis Needs	R	Data analysis to track needed change to triggers based on actual drought.	Notify public when water shortage is over.
Is There a Predicted Shortage?	R	Actions by wholesale suppliers and retail suppliers. Regularly collect up-to-date data and share with other agencies, as needed.	Document lessons learned.
Determine Catastrophic Supply Interruption Needs		Use ERP and contact local OES. Additional steps, as necessary, to secure interim water supplies.	Document lessons learned to revise WSCP and ERP. Coordinate with other agencies (FEMA, CALWARN, etc.) on reimbursement needs/responsibilities.
Step 3: Balance Supply and Demand and Assess Mitigation Options			
Determine Supply Augmentation Methods	R	Water purchases, transfers and interconnections already planned—determine if actual drought requires other non-planned changes.	Offer incentives for increased water use efficiency and irrigation system audits. Reevaluate alternatives for future, based on lessons learned.
Determine Demand-Reduction Methods	R	Public information campaign, restrictions, exemptions, rationing, enforcement, education, feedback—all adapted to actual drought, as necessary.	Continue informing the public, reinforcing positive feedback until no longer necessary.

Table 2. During-Drought and Post-Disaster: Phases 3 and 4 of the Four-Phase Model of Disaster Risk Management (contd.)

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 3: Response Actions	Notes Phase 4: Drought / Water Shortage Recovery Actions
Step 4 Establish Triggering Levels			
Determine Trigger Mechanisms	R	Communicate triggers in Step 7, adapted as necessary, based on actual drought.	Communicate exit strategy in Step 7.
Step 5: Develop a Staged Demand-Reduction Program			
Determine Criteria for Demand Reduction During a Water Shortage			
Establish Stages	R	Communicate monitoring data and stage information.	
Determine Measures	r	Evaluate water saved by conservation measures.	
Manage Customer Expectations		Implement system to respond to community questions.	Communicate exit strategy, anticipate that drought impacts will last longer in some communities than others.
Step 6: Adopt the Plan			
Involve the Community	r	Hold public meetings/events as needed, based on actual drought impacts.	Document what worked and the challenges faced, based on actual drought experience for future plan modifications.
Prepare a Revenue Program		Begin documenting additional staff costs and resources needed. Reevaluate based on actual drought impacts.	Summarize financial impact of drought and challenges faced, based on actual drought experience for future plan modifications. Coordinate with other agencies (FEMA, CALWARN, etc.) on reimbursement needs/responsibilities.
Formalize Cooperation with Local Agencies in the Region		Interagency agreements confirmed in advance of response: determine if any additional agreements are necessary based on actual drought impacts.	Toward the end of the drought is a good time to formalize any informal partnerships that were developed as a result of the drought, or begin searching for additional funding for future droughts, while it is still a high priority.
Review and Finalize the Plan		Contacting industry representatives ahead of time may gain their support.	Make adaptations as necessary, based on actual experiences.

Table 2. During-Drought and Post-Disaster: Phases 3 and 4 of the Four-Phase Model of Disaster Risk Management (contd.)

WSCP Component (AWWA M60, 2019)	DWR suggestion: Required (R)/ Recommended (r) Element	Notes Phase 3: Response Actions	Notes Phase 4: Drought / Water Shortage Recovery Actions
Step 7: Implement the Plan			
Determine Essential Elements of Implementing a Water Shortage Plan		Reevaluate based on current drought scenario.	Reevaluate based on lessons learned in drought scenario.
Determine Public Information and Media Program Needs	r	The lead entity also assumes a central role in publicizing the extent of the water shortage problem, as well as in helping consumers conserve. Even voluntary programs have achieved significant reductions in water use when the public was well-informed and understood the need to conserve.	Reevaluate based on lessons learned in drought scenario.
Determine Drought Recovery and Water Shortage Plan Termination Timing			<p>Water shortage response team reflects on actions taken and their effectiveness.</p> <p>Track progress toward addressing vulnerabilities, build on/update/improve DWR’s list of vulnerable suppliers and communities within the umbrella area.</p> <p>Publicize gratitude for the community’s cooperation.</p> <p>Restore water utility operations, organization, and services to pre-event levels.</p> <p>Document the event and response, and compile records for future reference.</p> <p>Collect cost accounting information, assess revenue losses and financial impact, and review deferred projects or programs.</p> <p>Debrief staff to review effectiveness of actions, to identify the lessons learned, and to enhance response and recovery efforts in the future.</p> <p>Complete a detailed evaluation of affected facilities and services to prepare an “after-action” report—including lessons learned and recommended improvements.</p> <p>Continue to maintain liaisons as needed with external agencies.</p> <p>Plan to update the WSCP as needed.</p>

References

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