

# Drought Preparedness and Response

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AWWA MANUAL M60

*First Edition*



**American Water Works  
Association**

MANUAL OF WATER SUPPLY PRACTICES — M60, First Edition

## Drought Preparedness and Response

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# Introduction

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The world's supply of drinkable fresh water is under increasing pressure. Over a billion people do not have access to safe drinking water, and it is anticipated that 2.8 billion people will be in that situation within the next two decades. Most people in the United States have easy access to water—it simply comes out of their tap, and it is clean and plentiful. However, increasingly, a growing number of communities are experiencing periodic water shortages. Some of the challenges contributing to water shortages today include:

- Population growth even though citizens may be using less water per person.
- Over the past five years, many areas of the country have experienced the hottest and driest years on record. According to NASA, the year 2008 was the ninth warmest year since instrumental temperature measurements began in 1880, and all of the nine warmest years have occurred in the past 11 years.
- Water is delivered through an increasingly complex and aging network of distribution systems.
- Water treatment processes have become more sophisticated and costly.
- Energy-related expenses, from transportation to treatment, have increased significantly.
- The environment is taxed to a critical point in numerous key waterways.
- The reliability of water deliveries has diminished as uncertainty and variability increases, as related to climate change, regulatory actions, delivery system security, and other factors.

There are also new opportunities for reducing the impact of water shortages. Widespread use of the Internet allows for information sharing and communication at a level unimagined in previous decades. New technology allows for more efficient use of water, from commercial cooling towers to smart irrigation controllers. Regional alliances have been established to coordinate water supply and demand management efforts.

AWWA Manual M60 *Drought Preparedness and Response* is designed to help water managers who are facing water shortages. The manual illustrates the use of demonstrated methods of the past as well as the use of new tools and methods. Managing water shortages involves temporarily reducing demand and finding alternate water to temporarily increase supply. Some of these actions will result in permanent changes in water use, such as the installation of efficient toilets. The focus of the manual is to provide a step-by-step process to anticipate and respond to water shortages through a structured planning process.

## DEFINITION OF A DROUGHT AND WATER SHORTAGES\_\_\_\_\_

In the most general sense, *drought* is a deficiency of precipitation over an extended period of time, resulting in a *water shortage* for some activity, group, or environmental purpose. A water shortage occurs when supply is reduced to a level that cannot support existing demands. Natural forces, system component failure or interruption, or regulatory actions may cause these water shortages. Such conditions could last two to three months or extend over many years.

## WATER SHORTAGE CONTINGENCY PLANNING \_\_\_\_\_

Providing a reliable supply of water, which is the primary goal of all water suppliers, requires being prepared for water shortages of varying degree and duration.

Contingency planning before a shortage occurs allows for the selection of appropriate responses consistent with the varying severity of shortages. Effective programs occur when water suppliers start demand reduction programs before a severe shortage develops.

If demand reduction programs are delayed, reserve supplies may be depleted early in an extended shortage, causing unnecessary social and economic harm to the communities. A Water Shortage Contingency Plan (WSCP) enables a water supplier to assess the risks and reduce the vulnerability of a community to drought impacts and to establish priorities that will provide water for public health and safety and minimize impacts on economic activity, environmental resources, and the region's lifestyle.

## DROUGHT-RELATED REGULATIONS AND PLANNING REQUIREMENTS

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In many states, there are regulations that water suppliers must follow when declaring a water shortage emergency and providing them with authority to enforce emergency measures. Frequently, water suppliers are required to develop and periodically update water shortage contingency plans as part of their overall water management planning process.

WSCPs typically include the following components:

- An estimate of supply and demand for five or more consecutive dry years
- A description of the stages of action to take in response to water shortages
- A plan for dealing with a catastrophic supply interruption
- A list of the prohibitions, penalties, and consumption reduction methods used
- An analysis of expected revenue effects of reduced sales during shortages and proposed measures to overcome those effects
- A system to monitor and document water reductions

## SEVEN-STEP PLANNING AND IMPLEMENTATION PROCESS

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Water shortage contingency planning is a dynamic process. It evolves as conditions change and new information becomes available. WSCPs include specific mandatory requirements and penalties that become effective when certain shortage conditions or triggers occur. The chapters of this manual describe a seven-step planning process designed to assist water suppliers facing water shortages.

The seven steps discussed in this manual are:

*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.*

Appendix A: Water Shortage Contingency Planning Checklist provides an overview of the entire planning cycle as a way to track the tasks in each step. Some of the tasks can be done simultaneously and are not necessarily in the order that a particular water supplier will follow. The checklist, combined with the information provided in this manual's seven steps, can help form the foundation of a water supplier's water shortage contingency plans and actions or update an existing plan.