

Incident Action Checklist – Drought

The actions in this checklist are divided up into three “rip & run” sections and are examples of activities that water and wastewater utilities can take to: prepare for, respond to and recover from drought. For on-the-go convenience, you can also populate the “My Contacts” section with critical information that your utility may need during an incident.

Drought Impacts on Water and Wastewater Utilities

Drought is a period of abnormally dry and/or unusually hot weather that is sufficiently prolonged to cause a serious hydraulic imbalance. Droughts normally develop and end slowly with impacts potentially lasting several years afterwards. Areas that have experienced a drought are also at an increased risk of flash flooding because the dry ground cannot effectively absorb rainwater. Droughts in the United States have caused cascading effects on the water sector that may include, but are not limited to:

- Loss of supply (both surface water and groundwater)
- Increased demand from customers (e.g., previously self-supplied communities that cannot meet the demand, agricultural customers requiring more water for irrigation)
- Deterioration of water quality and difficulties complying with drinking water regulations
- Increases in treatment and pumping-related costs
- Limited options for accessing other local water sources through interconnections due to increased regional demand and water scarcity
- Decreased capacity in alternative and supplementary sources due to high demand for emergency water by other industries and communities in the drought affected area
- Potential power interruptions due to high energy demand if drought is accompanied with unusually high temperatures
- Loss of fire suppression capabilities
- Possible increased pressure to develop water reuse practices



NOAA

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from drought. (Because drought and extreme heat events can coincide, please see the Extreme Heat Incident Action Checklist for intense heat-specific activities.)



NOAA

Example of Water Sector Impacts and Response to Drought

El Paso, Texas Drought Response

El Paso and surrounding areas in West Texas experienced severe drought conditions in 2011 and 2012. The arid region gets much of its water from snowmelt in the New Mexico and Colorado mountains, which experienced below-normal snow levels. The other source, southern New Mexico reservoirs, was also at record-low levels. The water shortage did not significantly impact El Paso's water supply for homes and businesses because in addition to conservation efforts, more well water and water from a water-desalination plant was used to augment the shortage.

Since 1963, to adapt to historic shortages, El Paso Water Utilities has supplemented its water supply (100 MGD capacity plant) with reclaimed water. The utility supplies city parks and other public spaces, construction sites, and industrial sites with almost 6 million gallons of reclaimed water per day.

Furthermore, El Paso Water Utilities has instituted a number of conservation efforts and incentive programs for customers, including watering restrictions, general use conservation activities and indoor and outdoor water efficiency rebates.

Despite the conservation efforts, farmers who rely on water for irrigation and grazing lands were hurt by the 2011-2012 water shortage. The El Paso County Water Improvement District #1 planned to allocate six inches of water per acre to its customers when the river water was first released from the dam, which is substantially lower than the previous year's allocation of 42 inches of water per acre, and below the full allocation of 48 inches per acre. The 2014 irrigation allocations are 18 inches per acre, which is still below the full allocation.

In an effort to secure sufficient supply for all customers, the city has purchased about 100,000 acres of land in outlying areas, acquiring the rights to the water that flows underneath. The utility also is considering future investment in water pipelines to pump water from supplies that are further away.

*Source: El Paso Times, "El Paso – Area farmers to suffer as drought drags on."
Source: El Paso Water Improvement District #1, "Allocation for 2014 Irrigation Season."*



My Contacts and Resources



CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
	Local EMA	
	State EMA	
	State Primacy Agency	
	WARN Chair	
	Power Utility	

Planning

- Drought mapping and outlooks
 - [U.S. Drought Monitor](#) (National Drought Mitigation Center, National Oceanic and Atmospheric Administration [NOAA], U.S. Department of Agriculture [USDA])
 - [U.S. Seasonal Drought Outlook](#) (NOAA)
- [U.S. Drought Portal](#) (National Integrated Drought Information System [NIDIS])
- [Drought Resource Community](#) (American Water Works Association [AWWA])
- [Drought Planning Resources, By State](#) (National Drought Mitigation Center [NDMC])
- [Drought Planning Toolbox](#) (Colorado Water Conservation Board [CWCB])
- [Drought Ready Communities](#) (NDMC)
- [Fire Weather Outlooks and Forecasting Tools](#) (National Weather Service [NWS])
- [National Significant Wildland Fire Potential Outlook](#) (National Interagency Fire Center [NIFC])
- [Planning for an Emergency Drinking Water Supply](#) (EPA)
- [All-Hazard Consequence Management Planning for the Water Sector](#) (Water Sector Emergency Response Critical Infrastructure Partnership Advisory Council [CIPAC] Workgroup)
- [Vulnerability Self Assessment Tool \(VSAT\)](#) (EPA)
- [Preparing for Extreme Weather Events: Workshop Planner for the Water Sector](#) (EPA)
- [Tabletop Exercise Tool for Water Systems: Emergency Preparedness, Response, and Climate Resiliency](#) (EPA)
- [How to Develop a Multi-Year Training and Exercise \(T&E\) Plan](#) (EPA)

Coordination

- [When Every Drop Counts: Protecting Public Health During Drought Conditions](#) (Centers for Disease Control and Prevention [CDC])
- [Water/Wastewater Agency Response Network \(WARN\)](#) (EPA)
- [Community Based Water Resiliency](#) (EPA)

Communication with Customers

- The following resources are examples of comprehensive outreach materials to encourage utility customers to conserve water during droughts and educate them on procedures.
 - [WaterSense](#) (EPA)
 - [Water Efficiency](#) (Portland Water Bureau [PWB])
 - [Water Efficiency Tips](#) (Dallas Water Utilities [DWU])
 - [Water Conservation Strategies](#) (Association of California Water Agencies [ACWA])
 - [Drought Management Plan Template for Small Water Systems](#) (Florida Rural Water Association [FRWA])

Facility and Service Area

- [Water Audit Tool](#) (AWWA)
- Documentation and Reporting
 - [Federal Funding for Utilities in National Disasters \(Fed FUNDS\)](#) (EPA)

Mitigation

- [Climate Resilience Evaluation and Awareness Tool \(CREAT\)](#) (EPA)
- [Adaptation Strategies Guide](#) (EPA)

Actions to Prepare for a Drought



Planning

- Actively monitor local and regional drought conditions.
- Review and update your utility's emergency response plan (ERP), and ensure all emergency contacts are current.
- Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- Monitor water supply and calculate how long water could be provided if the drought persists.
 - Actively monitor surface water levels and groundwater well levels, and identify the sustainable withdrawal rate for each
- Review and update your utility's drought management plan. Establish "triggers" or "threshold values" for drought conditions that will require action (e.g., if reservoirs fall below a certain level, a certain number of days without precipitation).
- Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- Review or develop your conservation plan and prepare for voluntary or mandatory conservation measures. Know your largest water users and be aware of usage patterns in order to determine the most effective conservation practices for your system (e.g., water fixture rebate programs, watering restrictions, facility audits to mitigate water loss).
- Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of drought and how your utility may have been impacted. Consider taking actions to mitigate drought impacts to the utility, including those provided in the "Actions to Recover from a Drought: Mitigation" section.
- Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).



Actions to Prepare for a Drought *(continued)*



Determine if technical assistance programs are offered by the state, including wellhead protection programs for community water supplies. Assistance may involve:

- Development and utilization of predictive water use models that assist in locating water for communities
- Development and utilization of formal groundwater monitoring networks

Coordination

Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.

Coordinate with WARN members and other neighboring utilities to discuss:

- Potential drought and conservation measures
- Outlining response activities, roles and responsibilities, and mutual aid procedures (e.g., how to request and offer assistance)
- Conducting joint tabletop or full-scale exercises
- Obtaining resources and assistance, such as equipment, personnel, technical support or water
- Establishing interconnections between systems and agreements with necessary approvals to activate this alternate water source. Equipment, pumping rates, demand on the water sources, and any impacts on water rights laws need to be considered and addressed in the design and operations

- Establishing communication protocols and equipment to reduce misunderstandings during the incident

Coordinate with other key response partners, such as your local EMA, to identify potential points of distribution for the delivery of an emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water.

Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.

Coordinate with other neighboring water systems to develop a water use plan, especially if your utility is in an agricultural area, to ensure there will be an adequate water supply by managing drawdown rates with agricultural (e.g., irrigation, livestock watering), industrial and public water supply needs.

Coordinate water usage with neighboring irrigation districts that are supplied by the same aquifer.

Coordinate with community leaders and high water-using organizations within the community to discuss potential drought and conservation measures.

Sign up for mobile and/or email alerts from your local EMA, if available.

Notes:



Communication with Customers

- Communicate with critical customers, high water users, and agricultural customers to discuss seasonal demand, irrigation practices and conservation measures.
- Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely) and distributing them to customers using appropriate mechanisms, such as reverse 911.
- Develop outreach materials for the public (e.g., radio, social media, and bill stuffers) that clearly describe conservation measures and activities.
 - Become a WaterSense partner and download free water efficiency outreach materials to distribute to your customers: <http://www.epa.gov/watersense/>
- Consider establishing programs to encourage customers to conserve water year round, such as rebate programs, distribution of home retrofit kits and water conservation classes.

Facility and Service Area

- Conduct a water audit to detect and repair leaks throughout distribution system.
- Identify opportunities for groundwater recharge using stormwater and reclaimed water.
- Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- Maintain a full storage tank to assist with demand should there be a source loss, power failure or fire suppression needs.
- In the case of a power loss, ensure personnel are trained to shut down and start up the system manually.

Power, Energy and Fuel

- Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- Document power requirements of the facility; options for doing this may include:
 - Placing a request with the US Army Corps of Engineers 249th Engineer Battalion (Prime Power): <http://www.usace.army.mil/249thEngineerBattalion.aspx>
 - Using the US Army Corps of Engineers on-line Emergency Power Facility Assessment Tool (EPFAT): <http://epfat.swf.usace.army.mil/>
- Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.



Actions to Respond to a Drought



Planning

- Work with your regulatory agency to assist in identifying and approving alternate water supplies and operational or design changes.
- Monitor wildfire conditions and outlooks. See the Wildfire Incident Action Checklist for more information on how to prepare for wildfires.
- Monitor conditions for flash flooding, as dry ground cannot effectively absorb rainwater, and assess conditions of the watershed.

Coordination

- Communicate with public health officials, local EMA, and other partners to:
 - Discuss issues related to heat index emergencies, fires, and public health activities
 - Evaluate conditions and water use requirements related to HVAC systems required by hospitals and identify alternative means to supply water if the utility is unable to meet demand
- If needed, request or offer assistance (e.g., water buffalos, water sampling teams, generators) through mutual aid networks, such as WARN.

Communication with Customers

- Implement mandatory or voluntary water conservation efforts, and conduct regular outreach to customers.
- If water shortages or outages occur, notify customers of water advisories; consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

- Utilize pre-established emergency connections or set up temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.
- Monitor source water quantity (e.g., reservoir levels, stream flows, well levels, groundwater levels).
- Monitor water quality and adjust treatment, if necessary, as reduced water quantity and increased temperatures could change water chemistry.
- Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.

Documentation and Reporting

- Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs that illustrate the drought conditions (with time and date stamp). Proper documentation is critical to requesting reimbursement.

Power, Energy and Fuel

- Use backup generators, as needed, to supply power to system components.
- Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to generators.

Actions to Recover from a Drought



Coordination

- Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- Continue to communicate with customers concerning sustained water conservation measures and practices.

Facility and Service Area

- Complete damage assessments.
- Complete permanent repairs, replace depleted supplies and return to normal service.
- Be prepared for a spike in water demand. Once normal service has been restored after a period of time with no water or highly restricted usage, customers will address those domestic and agricultural water needs that were postponed.

Documentation and Reporting

- Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs: <http://water.epa.gov/infrastructure/watersecurity/funding/fedfunds/>

- Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your vulnerability assessment, ERP and drought/extreme heat contingency plans.

- Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency and duration of drought/extreme heat when planning for system upgrades.
- Consider implementing the following mitigation measures to prepare for possible flash flooding events following a drought:
 - Monitor conditions for flash flooding and assess conditions of the watershed
 - Install a rain gauge upstream of intake for early warning of heavy precipitation that could lead to high turbidity water and sensors to monitor the amount of debris and sediment coming downstream
 - Consider instituting erosion control measures to protect against runoff and sediment concerns that occur during heavy precipitation

Notes: