

EPA Drought-Related Tools & Resources for Water Utilities



Overview

EPA has tools to help water utilities address drought in the short and long term

- Prepare
- Respond
- Adapt

Primary program delivery vehicles are the

- Water Security Division programs
 - Emergency Preparedness
 - Climate Ready Water Utilities
- WaterSense program



Incident Action Checklists

Drought, Earthquake, Extreme Cold and Winter Storms, Extreme Heat, Flooding, Hurricane, Tornado, Tsunami, Volcanic Activity, Wildfire

EPA

Incident Action Checklist – Drought

The actions in this checklist are divided up into three "tip & 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 a serious hydraulic imbalance. Droughts normally develop and end slowly with impacts potentially several years afterwards. Areas that have experienced a drought are also at an increased risk of flooding because the dry ground cannot effectively absorb rainwater. Droughts in the United States 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 affected area
- Potential power interruptions due to high energy demand if drought is accompanied with unusual temperatures
- Loss of fire suppression capabilities
- Possible increased pressure to develop water reuse practices



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.)



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Incident Action Checklist – Wildfire

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

Wildfire Impacts on Water and Wastewater Utilities
A wildfire is any instance of uncontrolled burning in grasslands, brush or woodlands. Wildfires can be caused by human carelessness or arson. Wildfires often begin unnoticed, spread quickly and present a direct risk to proper infrastructure. In addition to potential degradation of the water supply, in some cases, source water quality issues for 5-10 years following a wildfire. Areas that have experienced a wildfire are also at an increased risk of flash floods because the ground where vegetation has burned away cannot effectively absorb rainwater. Other impacts (including those impacts resulting from flash floods) are more detrimental to drinking water and wastewater utilities. Specific impacts to drinking water and wastewater utilities may include, but are not limited to:

- Infrastructure damage to the facility or distribution system due to proximity to the fire or firefighting activities
 - Loss of water quantity due to increased withdrawals for firefighting activities
 - Source water quality changes due to increased nutrients and other pollutants, which can result in higher algal blooms, potential odor and taste issues, and subsequent higher treatment costs
 - Increased sediment in reservoirs as a result of runoff and flash floods from burned areas, which can affect quality, and reduced reservoir capacity and effective service lifespan
 - Increased sediment and debris in stormwater runoff following flash floods, impacting water quality and the processes water supply downstream, as loss of forest canopy can lead to increased evaporation and reduced amount of water stored in snowpack
- The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from wildfires.

Examples of Water Sector Impacts and Response to a Wildfire
Denver Water responds to impacts from wildfire and flooding
On May 15, 1996, the 11,300-acre Buffalo Creek fire occurred on an tributary to the upper South Platte River, source of Denver, Colorado's water supply. While Buffalo Creek itself contributes a very small share of Denver supply, it is located directly upstream of the Strontia Springs Reservoir, the intake point for the Fort Collins Twp. – a facility that handles approximately 80% of Denver's water.
Two months after the Buffalo Creek fire, heavy thunderstorms occurred directly over the burned area, causing rainwater that washed more sediment into the reservoir than had accumulated over the previous 13 years, resulting in an estimated loss of 30 years of the reservoir's planned 50-year life.
The emergency cleanup costs totaled nearly \$1 million. Chronic cleanup costs due to increased turbidity totaled \$200,000 in water treatment costs per year, and dredging was estimated to cost \$15 to \$20 million over 10 years.
To mitigate future damage, the utility installed sensors upstream of the reservoir to monitor the amount of debris and sediment coming down the river, allowing the utility to shut down its treatment plant before flash floods could cause damage. Denver Water and the US Forest Service Rocky Mountain Region are also investing \$13 million over a 5-year period for mechanical thinning, fuel reduction, creating fire breaks, erosion control, decommissioning roads and reforestation.
Source: EPA "Adaptation Strategies Guide for Water Utilities 2012"

EPA

Incident Action Checklist – Extreme Heat

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

Extreme Heat Impacts on Water and Wastewater Utilities
An extreme heat event or heat wave is a period of abnormally hot and/or humid weather, typically lasting two or more days. Though temperature thresholds that mark extreme heat events can vary by geographic locale, these events can be extremely dangerous; in fact, heat is the top weather-related killer in the United States. Extreme heat can impact employee operations and power delivery, and can cause the public to seek relief. Extreme heat or heat wave impacts to water and wastewater utilities may include, but are not limited to:

- Loss of power and communication lines due to increased electricity demand
- Increased water demand due to higher temperatures, which could result in shortages
- Changes in source water quality related to increased water temperatures due to both higher air temperatures and higher temperatures of industrial discharges (e.g., cooling water used at power plants)
- Safety risks for staff working in the field for prolonged periods of time



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

Example of Water Sector Impacts and Response to an Extreme Heat Event

Wisconsin Utility Anticipates Potential Water Shortages
Madison, Wisconsin, experienced a heat wave in June and July 2012, which resulted in an increase in water use. Due to the high temperatures and drier-than-normal conditions, the Madison Water Utility anticipated a potential water shortage and issued advisories for their customers to stay hydrated, but otherwise conserve water during the heat wave to reduce the risk of a shortage.
The utility advised customers to water their gardens and lawns only when needed, repair leaks in their homes, install water-saving devices such as aerators and flow regulators and use the most efficient setting for dishwashers and washing machines.

Source: City of Madison News Release, "Use Water Wisely as Heat Wave and Dry Spells Hit Wisconsin" (2012); Wisconsin, "Yearly Weather Summary" (2012)

EPA

Incident Action Checklist – Flooding

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

Flooding Impacts on Water and Wastewater Utilities
Flooding is common throughout much of the United States and can be caused by heavy precipitation events, storm surges, levee or dam failures or inadequate drainage. These events often occur with little or no notice, and can cause extensive damage to drinking water and wastewater infrastructure. Flooding impacts to utilities often include, but are not limited to:

- Infrastructure damage, possibly resulting in service interruptions
 - Pipe breaks due to washouts, which could result in sewage spills or low water pressure throughout the service area
 - Debris blockage at an intake or unearthened water and wastewater lines due to falling trees
 - Loss of power and communication lines
 - Combined sewer overflows (CSOs)
 - Water quality changes to source waters and treated effluents, including increased turbidity, increased nutrients and other potential contaminants
 - Restricted access to the facility due to debris, flood waters and damage to roadways from washouts and sinkholes
 - Loss of water quality testing capability due to restricted facility and laboratory access and damage to utility equipment
- The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from floods.

Example of Water Sector Impacts and Response to a Flood

Warwick, Rhode Island Wastewater Treatment Plant Flooding

In March of 2010, a monthly record of nearly 16 inches of rain caused extreme flooding along the Pawtuxet River in the City of Warwick, Rhode Island, and left the Warwick Wastewater Treatment Plant completely flooded. Staff members were forced to move critical mobile equipment to higher ground as flood waters rose and threatened electrical equipment. The flood took the facility and six pumping stations along the Pawtuxet River offline. The Warwick Sewer Authority was forced to purchase five large portable pumps to keep up capacity.
Although the levees in Warwick were built three feet higher than the 100-year flood level, the river reached three feet above the levees during the 2010 flood. Rhode Island Department of Emergency Management (RIDEM) personnel recommended that the wastewater treatment plant be designed to higher flood levels (e.g., 500-year flood) to mitigate future damage from flooding events. Since the flood, the utility moved its Supervisory Control and Data Acquisition (SCADA) system to the second floor from the ground floor of the operations building. The utility has also purchased several new generators and other energy efficient equipment.

Source: Brown University Center for Environmental Studies, "Contingency Management in Rhode Island: A Look at the State's Level of Preparedness and Management of Resources, Communications, and Administration During the January 2012 Drought" (2012)

Source: "Treated Plant Operator Magazine," January 2011 Issue, "Wastages and operators at two Rhode Island treatment plants report experiences and lessons learned from the recent floods of March 2010"



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:

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- Limited options for accessing other local water sources through interconnections due to increased regional demand and water scarcity
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- 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

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).



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FEMA

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/primary 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.

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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/>

Notes:

- 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

Office of Water (4608-B) EPA 817-F-15-001 January 2015
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water.epa.gov/infrastructure/watersecurity/emmerplan/

→ "Water Sector Incident Action Checklists - Drought"



Other Preparedness Tools

- Preparing for Extreme Events Workshop Planner
 - Five scenarios: **drought**, floods, sea level rise, wildfires, reduced snowpack
 - Includes templates to help a user plan and carry out workshops that bring utilities and community partners together
- Tabletop Exercise Tool for Water Systems
 - **Drought** is one of 15 scenarios included in the tool

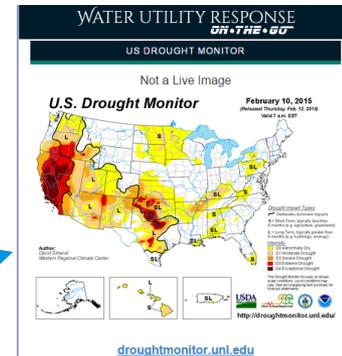
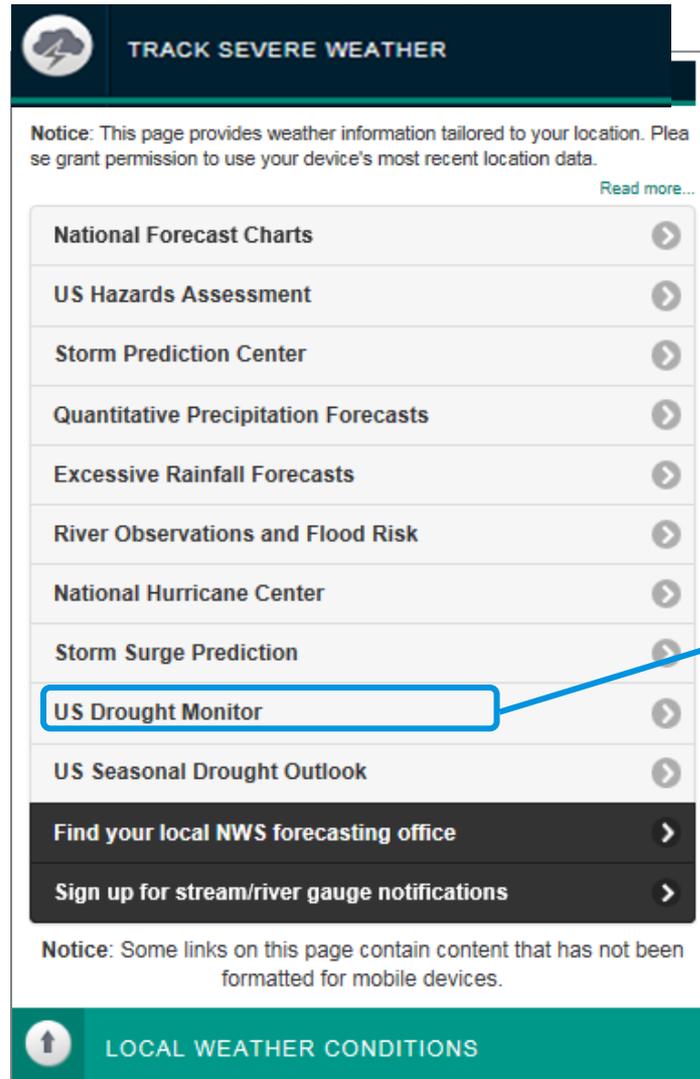
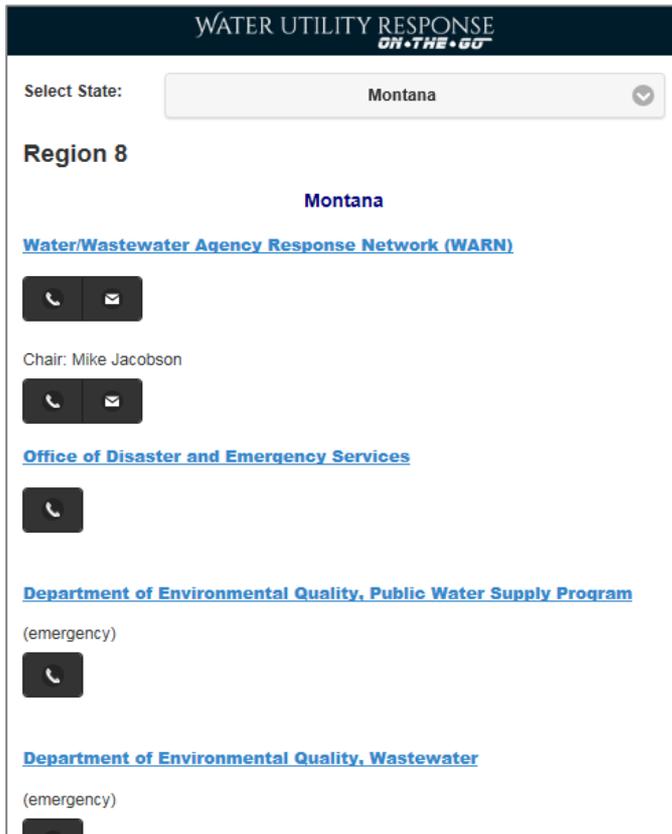


Water Utility Response *On-The-Go!*

epa.gov/responseotg



Water Utility Response *On-The-Go!*



Water Utility Response *On-The-Go!*



INCIDENT ACTION CHECKLISTS

- Drought**
- Earthquake
- Extreme Cold and Winter Storms
- Extreme Heat
- Flooding
- Hurricanes
- Tornado
- Tsunami
- Volcano
- Wildfire

WATER UTILITY RESPONSE *ON-THE-GO*

INCIDENT ACTION CHECKLIST - DROUGHT

Review and track these drought response activities for your utility.

▼ ▲

- + Planning
- + Coordination
- + Communication with Customers
- **Facility and Service Area**

Utilize pre-established emergency connections, set up temporary connections to nearby communities or draw emergency water from pre-selected tanks/hydrants.

Monitor source water quantity (e.g., reservoir levels, stream flows, well levels, groundwater levels).

Monitor water quality and adjust treatment, as reduced water quantity and increased temperatures could change water chemistry.

Clear All

WATER UTILITY RESPONSE *ON-THE-GO*

- RESPOND TO INCIDENTS
- TAKE NOTES & RECORD DAMAGE

DRINKING WATER/WASTEWATER FACILITY DAMAGE ASSESSMENT

Site Name:

Geo Location: Lat: Long:

Asset Description:

Operational Status:

- Operational
- Partially Operational
- Non-Operational
- Threatened

Damage/Threat

1. Physical/Structural:

2. Electrical:

3. Mechanical:

Resource Needs:

Other Notes:

Check the box below if you plan to include photo attachments in the resulting email:

Photo attached in Email

Save Delete **Email**



Other Response and Recovery Tools

Coming Fall of 2015...

Drought Response and Recovery

A Basic Resilience Guide for Water Utilities

- intended to assist small to medium-sized utilities in their response to drought
- Based on 2014 Flood Resilience Guide

The screenshot shows the EPA's Flood Resilience website. At the top left is the EPA logo and the text "United States Environmental Protection Agency". The main heading is "FLOOD RESILIENCE" in large blue letters, followed by the subtitle "A Basic Guide for Water and Wastewater Utilities". Below this, there is a prompt: "Select a menu option below. First time users should start with the Overview." There are four menu options, each with a colored header and a representative image: "Overview" (orange header, image of a flooded residential area), "Approach" (yellow-green header, image of a water treatment structure), "Mitigation Options" (green header, image of a woman speaking at a podium with a "FLOOD HAZARD MITIGATION PROGRAM" banner), and "Pilot Project" (dark blue header, image of a brick building labeled "BERWICK WATER DEPT").

Case studies for 6 unique drought-impacted water systems



– **Two Pilot Assessments:**

- Tuolumne Utilities District (TUD), Sonoma, California
- Corix Spicewood Beach Water System, Spicewood Beach, Texas

– **Four additional case studies:**

- City of Las Vegas, New Mexico
- Cities of Hays and Russell, Kansas
- Clinton, Oklahoma
- Hogansville, Georgia



Guide will have Worksheets related to:

- Staffing, Response Plans and Funding
- Water Supply and Demand Management
- Communication and Partnerships

And a Case Study Map with Videos

Drought Response and Recovery Project: Case Studies Map

Overview | Tuolumne Utilities District, CA | Spicewood, TX | Las Vegas, NM | Hogansville, GA | Hays and Russell, KS | Clinton, OK

Welcome to the Drought Response and Recovery Water Utility Case Studies map provided by US EPA. Navigate these tabs to browse small and medium drinking water utilities that have responded to the impacts of drought.

The background image in each of the following tabs is extracted from the [United States Drought Monitor](#) and corresponds to peak drought for the utility. Click on any location with a dot to reveal more information about the utility and the strategies they employed to become more resilient to drought.

EPA suggests using the Google Chrome browser when on the GeoPlatform.

How Can Your Partners Help You?
This video covers how utilities can work with customers as well as local and state partners to respond and recover to drought.

Flood Resilience Guide - Step 1

Response Actions: Supply and Demand
This video covers successful water supply and demand actions a utility can use to respond to drought.

GLEN NUNNELLEY | Associate Engineer
Tuolumne Utilities District

01:08

HD



Fed FUNDS - Federal Funding for Utilities-Water/ Wastewater-in National Disasters

Click on this button, answer a few questions, and be steered to the most appropriate Federal Disaster Funding Programs.

Click on this button to learn about FEMA, EPA, USDA and other disaster funding programs.



Click on this button for a checklist of activities to prepare for funding such as developing emergency procurement procedures.

Recommendations including printable forms on how to document damage, emergency response and temporary repair actions.

Click on this button for information on just-in-time training, technical assistance from mentor utilities, and example completed forms.

www.epa.gov/fedfunds



Adaptation

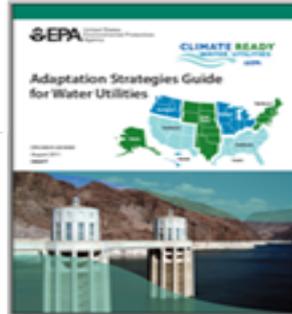
Climate Ready Process

Adaptive Response Framework



Explore Elements of Climate Readiness

Adaptation Strategies Guide



Learn Climate and Adaptation Basics

Toolbox

- Featured Resource
- Region Map
- Activities
- Funding
- Publications and Reports
- Tools and Models
- Training, Workshops and Seminars

Research and Gather Information

Extreme Events Workshop Planner



Collaborate with Partners

Climate Resilience Evaluation and Awareness Tool



Assess Risks and Evaluate Opportunities



Adaptation Strategies Guide

- Presents easy-to-understand climate science, translating data into impacts for utilities
- Lists adaptation strategies related to impacts
- Assists in the adaptation planning process

- Includes Climate Briefs by Region
- Strategy Briefs looking at **drought**, water quality degradation, floods, ecosystem changes, service demand and use
- Sustainability briefs on green infrastructure, energy management, **water demand management**



Adaptation Strategies Guide for Water Utilities



Examples

- Planning, Operational, and Capital/Infrastructure Strategies by Group (e.g., drought), impact (e.g. reduced groundwater recharge) and sustainability area (e.g., water demand management).

LINKS TO STRATEGY BRIEFS

| BRIEFS BY GROUP | | | Sustainability Briefs | | | | |
|-----------------|-----------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----|
| | | | DW | WW | EM | GI | WDM |
| Drought |  | Reduced groundwater recharge |  | | | | |
| | | Lower lake & reservoir levels |  | | | | |
| | | Changes in seasonal runoff & loss of snowpack |  | | | | |
| | | | | |  |  | |

| ✓ | CAPITAL/INFRASTRUCTURE STRATEGIES | COST |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <input type="checkbox"/> |  Acquire and manage ecosystems, such as forested watersheds, vegetation strips and wetlands, to regulate runoff. | \$\$\$ |
| <input type="checkbox"/> | Build infrastructure needed for aquifer storage and recovery, either for seasonal storage or longer-term water banking, (e.g., recharge canals, recovery wells). | \$\$\$ |
| <input type="checkbox"/> |  Diversify options to complement current water supply, including recycled water, desalination, conjunctive use and stormwater capture. | \$\$\$ |



CREAT – Climate Resilience Evaluation & Awareness Tool

CREAT 3.0 CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL

CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL: CREAT

Build Climate Resilience at Your Utility

Prepare for Extreme Weather Events

CREAT is a risk assessment and planning application for water, wastewater and stormwater utilities of all sizes.

CREAT helps the water sector utility understand and best adapt to climate change.

- 1 YOU NEED TO KNOW:**
Extreme weather events pose significant challenges to your utility.
Find out what they are.
- 2 HERE'S HOW:**
CREAT helps you build climate change scenarios and identify the potential impacts on your utility.
- 3 YOU GET:**
Comprehensive evaluation, including:
 - Strategies to identify cost-effective risk reduction measures
 - Reports to communicate risk to stakeholdersCustomer confidence recognizing proactive risk management.

CLIMATE AWARENESS
Understand how climate change affects your utility.
• Review current climate concerns
• Build awareness of climate projections

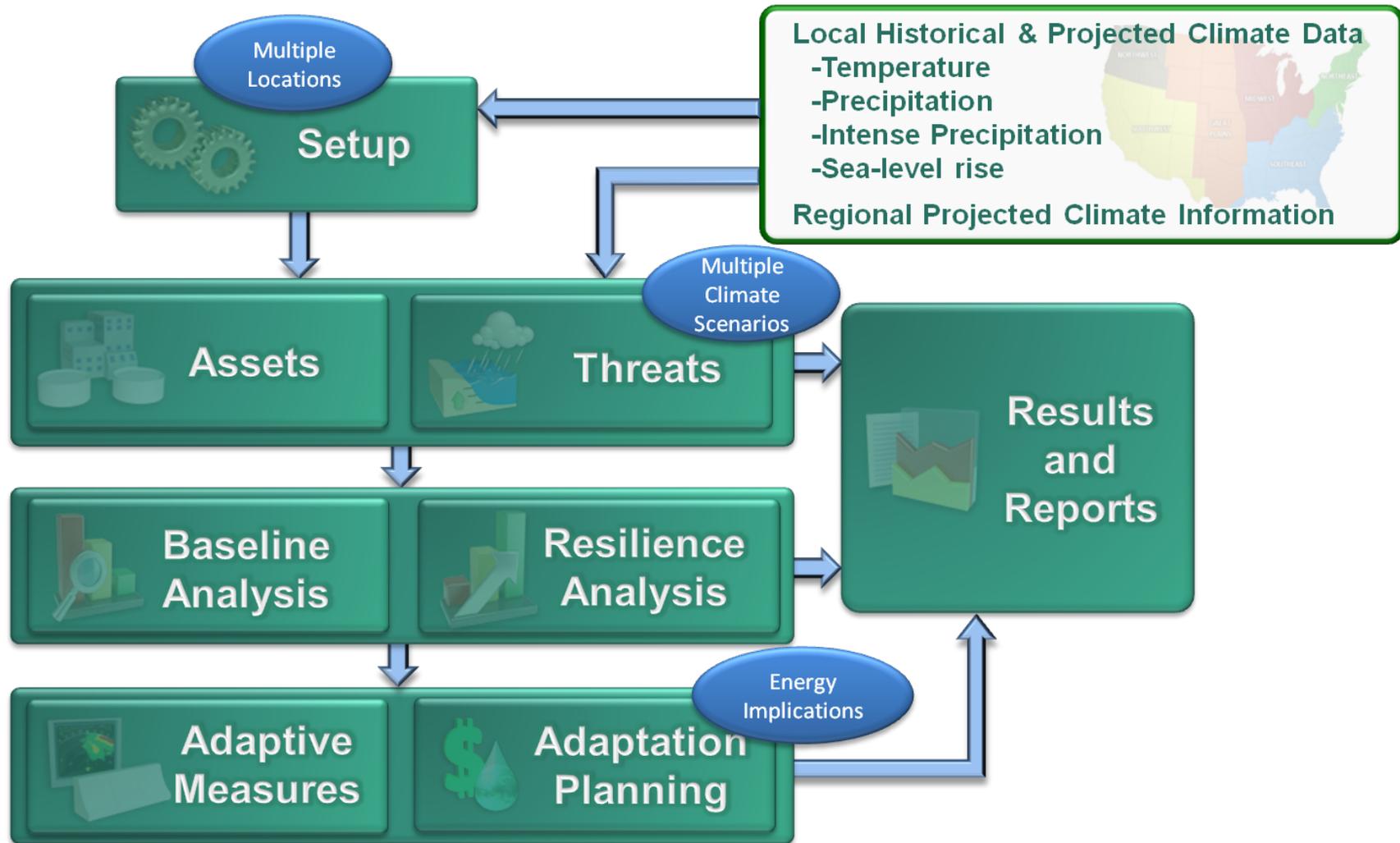
SCENARIO DEVELOPMENT
Understand your utility's risk
• Identify specific threats for analysis
• Gauge different scenarios with respect to your vulnerabilities

ASSET SCREENING
Determine value and vulnerability of utility assets
• Grabing values that represent critical issues
• Evaluate consequences to assets at risk

ADAPTATION PLANNING
Design plans and determine budgets
• Identify resiliency measures with CREAT library
• Develop short- and long-term plans
• Protect assets and address threat impacts

RISK ASSESSMENT
Evaluate options and create plans
• Assess and compare risks to gauge resilience across scenarios
• Evaluate risk reduction to total capital cost

CREAT Process





WaterSense Program

WaterSense seeks to protect the future of our nation's water supply by offering ways to use less water with water-efficient products & services.

Program partners with manufacturers, retailers, local/state government, utilities, builders, non-profits, and trade associations to extend the reach of the program

Since 2006, WaterSense and its partners have helped consumers save billions of gallons of water and billions in water and energy bills

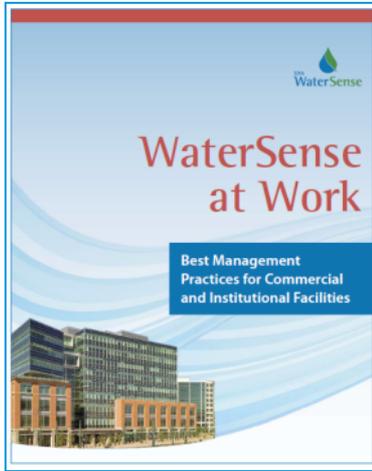


Sample WaterSense Resources

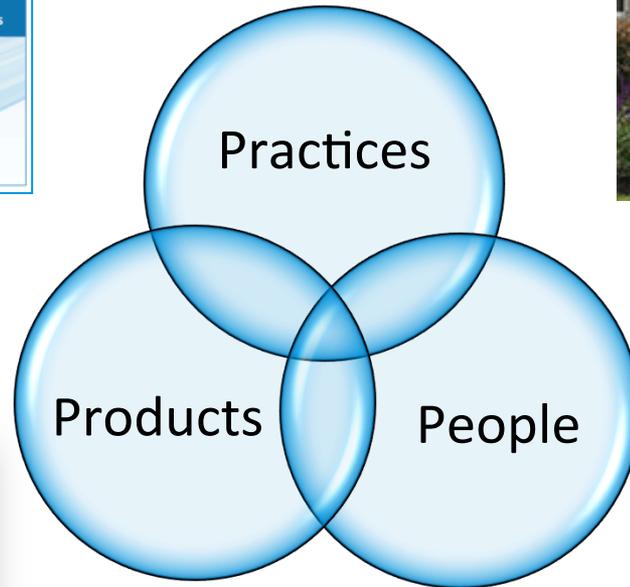
- Specifications for WaterSense labeled products for residential indoor, outdoor, and commercial uses
- Specifications for WaterSense labeled homes
- Best management practices for commercial and institutional water efficiency and outdoor water use
- Consumer campaigns to engage the public (e.g., Fix a Leak Week)



WaterSense Focus – 3 P's



Tips and BMPs to save water indoors and outdoors – at home & business



Specific fixtures and technologies save water

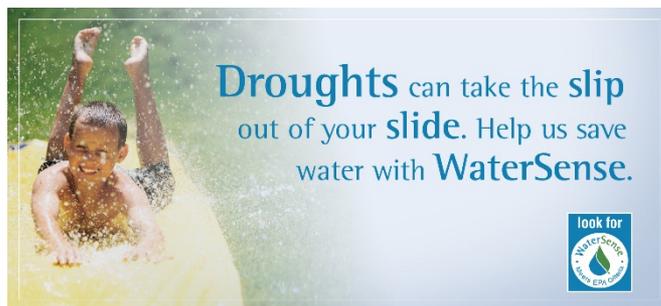


Partners reach users to change behavior



What WaterSense Brings – Tools and Resources

- Infographics
- Bill stuffers
- Messaging and Tips
- Sample social media posts
- Article for placement
- Case study



**YOU skip a shower...
SAVE 17 GALLONS of water**

**YOUR YARD skips a shower...
SAVE 2,500 GALLONS of water**

**When in DROUGHT,
Every DROP Counts.**

**When in Drought...
Use Your WaterSense**

Every year, drought strikes some part of the country. If your area is experiencing a drought, there are actions you can take to help your community by reducing your water use. Even if your water shortages are not severe, consider these simple tips to save water at home.

- FOLLOW THE RULES.** If your community has taken the step of recording water use, it's to ensure that water is allocated to critical community needs such as firefighting, health care facilities, and food businesses.
- CHECK FOR LEAKS.** Make sure your faucets, toilets, and showerheads are not leaking and check your sump pumps. If you find leaks, fix them—leaks can waste nearly 1,000 gallons of water each month. Learn more about fixing and fixing leaks at www.epa.gov/whatsnew/leaks.
- CONSIDER AN UPGRADE.** If you're thinking about a bathroom update, now is the time to replace a water-saving fixture with a high-performance WaterSense labeled model, which are independently certified to use at least 20 percent less water than standard models. Information about WaterSense labeled products is available at www.epa.gov/watersense.
- TAKE A SPRINKLER BREAK.** Grass doesn't have to be bright green year-round. It's natural for your lawn to go dormant and look a little brown in summer's hotter months. You can cut back on watering and reduce stress on your local water supplies. If you have an irrigation system with a clock timer, consider upgrading to a WaterSense labeled controller, which sets the appropriate watering schedule and lets it know when to turn off.

5. GO THE EXTRA MILE. If you've done all you can to be water efficient, you can get credited for collecting water from your washing or other uses and reusing it to water your flowers. More water-saving tips are available at www.epa.gov/watersense/our_water-saving_tips.

Remember, when the rains return, your water-saving steps don't have to go away. Reusing water-saving habits will help you save water, energy, and money and help your community when drought returns. For more information, visit www.epa.gov/watersense.

WaterSense Sample "When in Drought" Social Media Posts

It's always important to use water efficiently, but there are times when saving water becomes even more important, such as when drought occurs. Inspired your Twitter followers and Facebook network to do their part to save water using the sample social media posts below. Even if water shortages are not severe in your community, these simple steps can help save water for future generations. For more tips on how to save water during a drought, visit www.epa.gov/watersense/our_water-drought-tips.

Sample Social Media Posts

- #WhenInDrought let grass grow for deeper roots, reduced evaporation, and fewer weeds. More tips: usa.gov/05f0
- #WhenInDrought give sprinklers a break and save 10,000 gallons a week! It's okay to let grass get a little brown. usa.gov/05f0
- #WhenInDrought give your hose a break. Sweep driveways, sidewalks, and steps rather than hosing them off. usa.gov/05f0
- #WhenInDrought use regionally appropriate plants that require minimal watering. See which are best for your region: usa.gov/06f0
- #WhenInDrought be a leak detective to find and fix leaks inside and out while saving water, energy, and money. usa.gov/06f0
- #WhenInDrought follow the rules! Check your utility to find out restrictions specific to your area. Do your part to help your community! usa.gov/06f0
- #WhenInDrought timing is important to avoid water waste. Don't water outdoors during the heat of the day. More tips: usa.gov/06f0
- #WhenInDrought add mulch around shrubs to retain water, moderate soil temperature, and prevent erosion. More tips: usa.gov/06f0
- #WhenInDrought switch to a WaterSense labeled showerhead and save 6 gallons of water each shower. usa.gov/06f0
- #WhenInDrought replace faucet aerators with WaterSense labeled ones. They're just a few \$ but save H2O and energy. usa.gov/06f0
- #WhenInDrought the average family could save 13,000 gallons of H2O per year with WaterSense labeled toilets. usa.gov/06f0

June 2010





When in Drought Campaign

WaterSense Drought public-facing webpage -
www.epa.gov/watersense/our_water/drought.html

- Drought tips
- Link to video on YouTube

SHARE YOUR #WATERSAVINGYARD PICS



WHEN IN DROUGHT (OR NOT!), YOU CAN STILL HAVE A BEAUTIFUL LANDSCAPE WITH LOW WATER-USING PLANTS.

ENTER THE #WATERSAVINGYARD PHOTO CHALLENGE BY **AUGUST 27th**

VOTE FOR YOUR FAVORITE BY **SEPTEMBER 10th**



Water Saving Yard Challenge

www.epa.gov/watersense/watersavingyard

- Photo challenge seeking landscape transformations to more water-efficient designs
- Can submit via Facebook, Twitter or Instagram



The value of partnering

- EPA sets the stage & partners run with it
 - Our efforts are more powerful when partners join forces
- Support national specification for water-efficient products and services
- Access free materials, templates and logo or label
- Membership in a network of water efficiency experts
 - Learn new strategies
 - Collaborate with other types of partners
- Recognition from EPA as a water efficiency leader
- WaterSense is FREE to join!

http://www.epa.gov/watersense/partners/become_a_watersense_partner.html



Water Security and WaterSense Information

Water Security

www.epa.gov/watersecurity

- Look for links on Climate Change and Preparedness Planning

WaterSense

www.epa.gov/watersense

www.facebook.com/epawatersense

www.twitter.com/epawatersense

E-mail: watersense@epa.gov

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