

Drought Response and Recovery

A Basic Guide for Water Utilities



Dawn Ison
U.S. EPA Office of Ground Water and Drinking Water
Water Security Division

Drought and Water Loss Workshop

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Drought Response and Recovery Guide: Overview

- **Purpose:** provides actionable guidance for drinking water utilities that are currently *responding* to drought. It can also be used by utilities *preparing* for or *recovering* from drought.
- **Audience:** Small and medium-sized drinking water utilities.
- **Features:**
 - Clickable PDF, navigate like a website
 - Best practices and lessons learned from real utilities
 - Worksheets



Drought Response and Recovery

Project Approach – Published in 2016; Updated 2018

- Captured lessons learned from six diverse case studies (varying location, system type, etc.) which helped to drive Guide content
- Worked with Water Sector Focus Group throughout Guide development



Case Study Visits:

- Tuolumne Utilities District, CA
- Spicewood Beach Water System, TX
- City of Las Vegas, NM
- City of Hogansville, GA
- Cities of Hays and Russell, KS
- City of Clinton, OK
- N. Marin Water District, CA
- Castine Water Department, ME

Guide Home Page

DROUGHT RESPONSE AND RECOVERY

A Basic Resilience Guide for Water Utilities

Select a menu option below. New users should start with Overview and Navigation.



[Overview and Navigation](#)



[Staffing, Response Plans
and Funding](#)



[Water Supply and Demand
Management](#)



[Communication and
Partnerships](#)



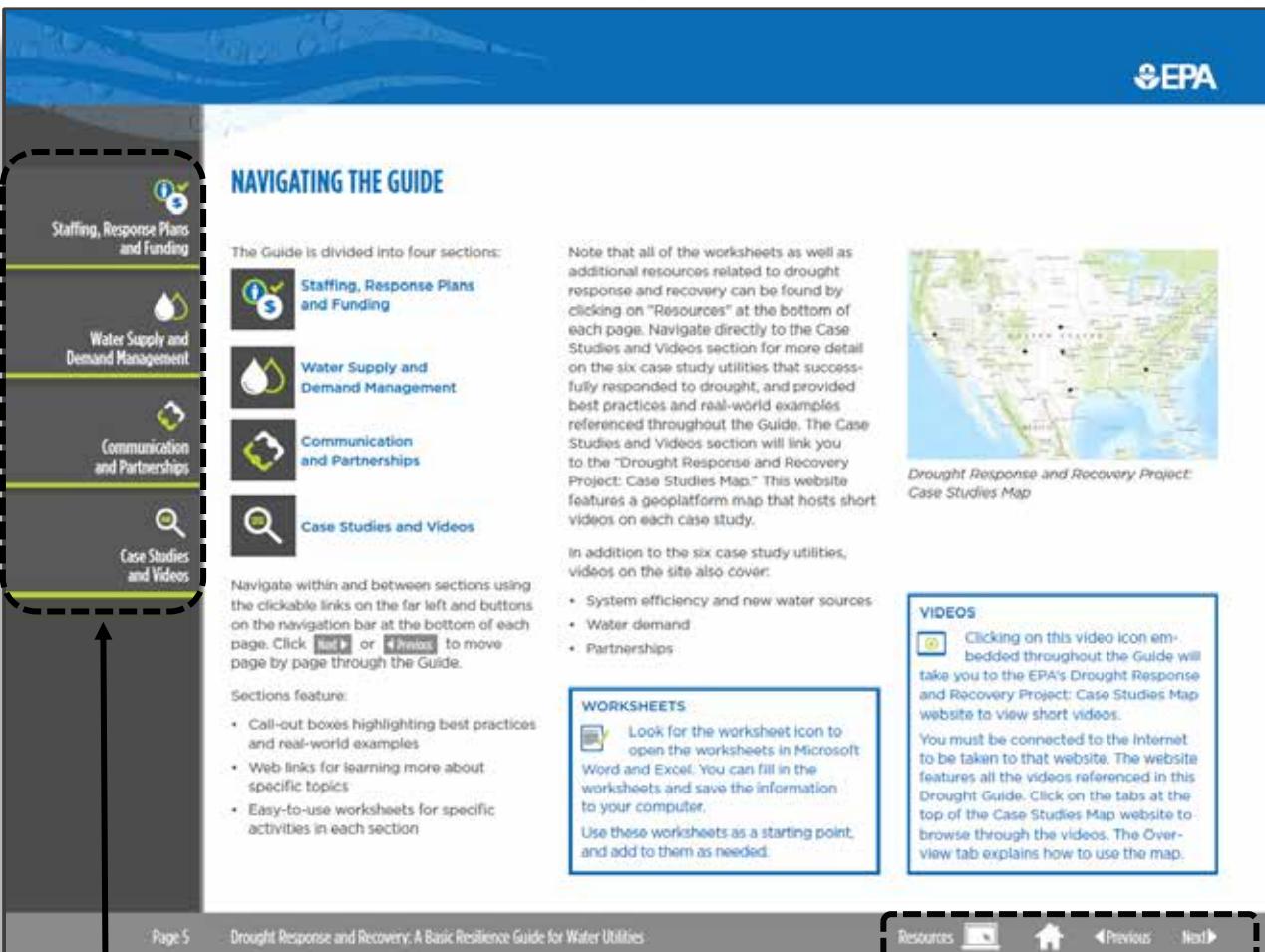
[Case Studies and Videos](#)



Next ►

Guide Navigation

Informational and Easy-To-Use



NAVIGATING THE GUIDE

The Guide is divided into four sections:

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

Note that all of the worksheets as well as additional resources related to drought response and recovery can be found by clicking on "Resources" at the bottom of each page. Navigate directly to the Case Studies and Videos section for more detail on the six case study utilities that successfully responded to drought, and provided best practices and real-world examples referenced throughout the Guide. The Case Studies and Videos section will link you to the "Drought Response and Recovery Project: Case Studies Map." This website features a geoplatform map that hosts short videos on each case study.

In addition to the six case study utilities, videos on the site also cover:

- System efficiency and new water sources
- Water demand
- Partnerships

WORKSHEETS

Look for the worksheet icon to open the worksheets in Microsoft Word and Excel. You can fill in the worksheets and save the information to your computer. Use these worksheets as a starting point, and add to them as needed.

VIDEOS

Clicking on this video icon embedded throughout the Guide will take you to the EPA's Drought Response and Recovery Project: Case Studies Map website to view short videos. You must be connected to the Internet to be taken to that website. The website features all the videos referenced in this Drought Guide. Click on the tabs at the top of the Case Studies Map website to browse through the videos. The Overview tab explains how to use the map.

Page 5 Drought Response and Recovery: A Basic Resilience Guide for Water Utilities

Resources  Home  Previous  Next

Quick navigation between sections and pages

Explore the Drought Guide more easily through:

- Simple icons for tabs, worksheets and videos
- Separate boxes embedded throughout that represent certain types of info
- Sections broken up into key areas with bullets

Guide Features

Best Practices, Worksheets, Links and More

BEST PRACTICE: Applying water conservation measures is one of the least costly “water supplies” that you can add to your portfolio. It can also help defer capital costs.

► **(Corix) Spicewood Beach Water System.** The Texas utility's drought response plan established reduction goals and specific drought response measures to curtail non-essential uses and utilize alternate water sources. For example, during Stage 2 drought, the plan includes measures such as 10 to 20 percent reduction in water use, no more than twice per week irrigation during limited hours, no hydrant flushing, and additional measures for pools and outdoor water features.

The screenshot shows the 'Water Supply and Demand Management' section of the guide. It includes a sidebar with links to 'Staffing, Activation Plans, and Training', 'Water Supply and Demand Management', 'Communication and Partnerships', and 'Local Studies and Notes'. The main content area has sections for 'FOR MORE INFORMATION ON INCREASING SYSTEM EFFICIENCIES' (with links to 'AWWA's WaterSense', 'AWWA's Conservation and Resource Management', and 'AWWA's Water Loss Prevention'), 'IDENTIFY WHERE WATER DEMAND CAN BE REDUCED' (with links to 'AWWA's WaterSense', 'AWWA's Conservation and Resource Management', and 'AWWA's Water Loss Prevention'), and 'FOR MORE INFORMATION ON REDUCING WATER DEMAND' (with links to 'AWWA's WaterSense', 'AWWA's Conservation and Resource Management', and 'AWWA's Water Loss Prevention'). A red arrow points from the 'BEST PRACTICE' box on the left to the 'FOR MORE INFORMATION ON INCREASING SYSTEM EFFICIENCIES' section. A green arrow points from the 'After the Drought' box at the bottom to the 'FOR MORE INFORMATION ON REDUCING WATER DEMAND' section.

The screenshot shows the 'Water Supply and Demand Management' worksheet. It has sections for 'SYSTEM EFFICIENCY' (with a list of tasks like 'Increase leak detection and repair efforts in the distribution system'), 'RESPONSIBLE PARTIES' (with fields for 'Start Date', 'End Date', 'Completion Date', and 'Ext. Duration'), and 'NOTES'. A red box highlights the 'SYSTEM EFFICIENCY' section, and a green box highlights the 'RESPONSIBLE PARTIES' section. A red arrow points from the 'FOR MORE INFORMATION ON INCREASING SYSTEM EFFICIENCIES' section on the left to the 'SYSTEM EFFICIENCY' section. A green arrow points from the 'FOR MORE INFORMATION ON REDUCING WATER DEMAND' section on the left to the 'RESPONSIBLE PARTIES' section.

FOR MORE INFORMATION ON WATER DEMAND MANAGEMENT:

- [Alliance for Water Efficiency \(AWE\)](#)
- [AWWA Drought Portal](#)
- [EPA's WaterSense](#)
- [AWWA Conservation and Resource Management](#)

After the Drought:

- Continue to implement your leak detection and repair program that ensures a prompt response mechanism for utility staff to make repairs. Prioritize and repair or replace components in the water distribution network that could lead to leaks.
- Look for other ways to use water efficiently throughout your utility or other departments, such as installing low-flow fixtures, retrofitting landscapes and replacing inefficient irrigation systems.
- Initiate a program to conduct annual water loss audits.

Drought Response and Recovery Guide

What's covered?

1) Staffing, Response Plans and Funding

- Developing your drought response team and drought plan
- Training on and exercising drought response (tools and tips)
- Recovering revenue, finding sources of funding



2) Water Supply and Demand Management

- Estimating available groundwater/surface water supplies
- Improving system efficiency and reducing customer demand
- Identifying options for additional water supplies



3) Communication and Partnerships

- Communicating drought issues/solutions to customers and decision-makers
- Examples of unique partnerships and outreach efforts
- List of suggested partners to consider reaching out to



Drought Response and Recovery Guide

Case Studies and Videos



CASE STUDIES AND VIDEOS

Staffing, Response Plans and Funding

Water Supply and Demand Management

Communication and Partnerships

Case Studies and Videos

The following case studies highlight small and medium-sized utilities that successfully responded to drought. Reflecting a broad range of situations — diverse geographies, water resources, response actions and funding approaches — these utilities' actual stories demonstrate solutions that work.

They provide examples of proven ways to reduce demand, access additional water supplies, communicate effectively, secure funding and develop partnerships to survive drought. Lessons learned by your peers may help you plan for and respond to drought by finding solutions that work for you and your community.

Note that your state may have specific rules that could prevent use of some the case study utilities' actions, so first check with your state regulators or legal counsel; even if that is the case, these innovative solutions may inspire other ideas to help your utility and community become drought resilient.

Click on the Images to learn about solutions from each case study.



Tuolumne Utilities District, Sonora, California



(Corix) Spicewood Beach Water System, Spicewood, Texas



City of Las Vegas, New Mexico



City of Hogansville, Georgia



Cities of Hays and Russell, Kansas



City of Clinton, Oklahoma



Castine Water Department, Town of Castine, Maine



North Marin Water District, Novato, California

Click on the map to exit the Drought Response and Recovery Guide and navigate to a website featuring a geoplatform map that hosts short videos on each case study.

Draft Drought Response and Recovery Project for Water Utilities

Welcome to the Case Studies Map for the U.S. Environmental Protection Agency's (EPA) Drought Response and Recovery Project for Water Utilities. This site contains Drought Case Studies, Drought Action Videos, and Utility Stories that describe the experiences of small and medium-sized drinking water utilities that successfully responded to drought.

The geographical design of the overview map to the right is taken from the United States Drought Monitor[®] and corresponds to current drought conditions.

How to use this site:

- Click on the case study links to learn about information on each utility.
- Hover over the case study links to further explore how each of the water utility responded to and recovered from the impacts of drought and to see each utility's peak drought conditions.
- Identify specific drought challenges you were overcome by the case study utilities by clicking on the Drought Action Video tab.
- Visit the Utility Stories tab for short descriptions from water utility managers who have overcome drought challenges in their communities. Submit your drought story today by contacting EPA at WDR@epa.gov — EPA will work with you to add your story to the site.

You have information on these case studies and other drought response activities from the Drought Response and Recovery Guide.



Case Studies and Videos

CASE STUDY: Tuolumne Utilities District, Sonora, California 

Click on the video icon to go to the Drought Response and Recovery Project for Water Utilities: Case Studies Map to watch a video about the utility's drought response.

SYSTEM DETAILS

- 14 treatment plants provide water for residential, commercial, industrial, wholesale, agricultural uses and fire suppression.
- Approximately 14,500 connections.
- Surface water stored in the Lyons and Pinecrest Reservoirs on Stanislaus River and released into the "Main Canal."
- Reservoirs and the Main Canal are owned and operated by the Pacific Gas and Electric Company (PG&E).
- Allocated approximately 17,000 acre-feet per year of surface water to treatment plants.
- 400 acre-feet per year groundwater used to supply three well systems.

IMPACT

For the Tuolumne Utilities District (TUD), 2013 was the second consecutive year of intense drought, with precipitation at 25 percent of the annual average of 32 inches. During the third quarter of 2013, TUD estimated that reservoir inflows and instream flows would reach an unprecedented low volume of water available for diversion in 2014. Water supplies would be even less than during the driest year these supplies could last: 45 days at typical water use.

Based on hydrologic/rain gauge weather forecasts, critically low precipitation "wet season," on January 1, 2014, TUD prepared an outlook of what was coming year. They informed and elected to the TUD board prioritizing and asked customers usage by 50 percent. This indicated a reduction (compared to 2013) of 45 percent and a 40 percent reduction. This significantly supply outlook, however, reduced TUD's operating costs.

RESPONSE MEASURES

Staffing, Response Plans and Funding

TUD's General Manager convened his management team — District Engineer, Water Master (Operations Manager) and Public Relations Manager — to lead the drought response. The team engaged other staff from operations and engineering to help with tactical decisions and implementation. TUD

to construct infrastructure needed to supplement existing water supplies: the New Melones Pump Station Project and expansion of the Motelot Reservoir.

Water Supply and Demand Management

TUD took important steps to increase their water supply, for example, they:

- Altered management of flows within the

CASE STUDY: Tuolumne Utilities District, Sonora, California (Continued)

As savings measures, TUD:

- Reduced evaporative losses by modifying hydraulic canal operations to cut off flow to two pitch canals that provided water for agricultural use and a golf course.
- Accelerated leak repairs in the ditcher and distribution pipelines.
- Prohibited all outdoor irrigation.
- Advised customers to eliminate all non-essential water use.
- Enforced the mandatory water use reductions through verbal warnings, written notices (door hangers) and threatened fines.
- Worked with large water users on usage reductions:
 - CAL FIRE (fire department) reduced non-essential training to save water.
 - Sierra Pacific Industries, the largest water user in their system, invested in onsite water recycling and other efficiencies.

Communication and Partnerships

TUD implemented an exhaustive suite of communication tools to raise awareness about the drought, provide conservation tips and inform customers about mandatory conservation requirements. TUD communicated with customers through:

- Press releases, newspaper articles, radio and television interviews.
- Website updates and direct mailings.
- Public hearings, briefings at public meetings and presentations at civic organizations.
- Signage throughout the community.
- Distribution of "conservation kits" contributed by Home Depot and the California Corps.

LOOKING FORWARD

Drought response actions taken over the last few years to reduce demand and secure additional water supplies have prepared TUD for extended drought conditions. The utility continues to look for alternative and innovative water supplies, water storage opportunities and ways to maintain efficient water use, so as to increase their resilience to future droughts.



For more information, visit [TUD's website](#).

[BACK TO CASE STUDY HOME PAGE](#)

Two-page summary on water utility that includes:

- System details
- Drought response measures taken



Links to external Case Studies Map and Videos

Case Studies Map and Videos Home

Geoplatform

Drought Response and Recovery Project for Water Utilities



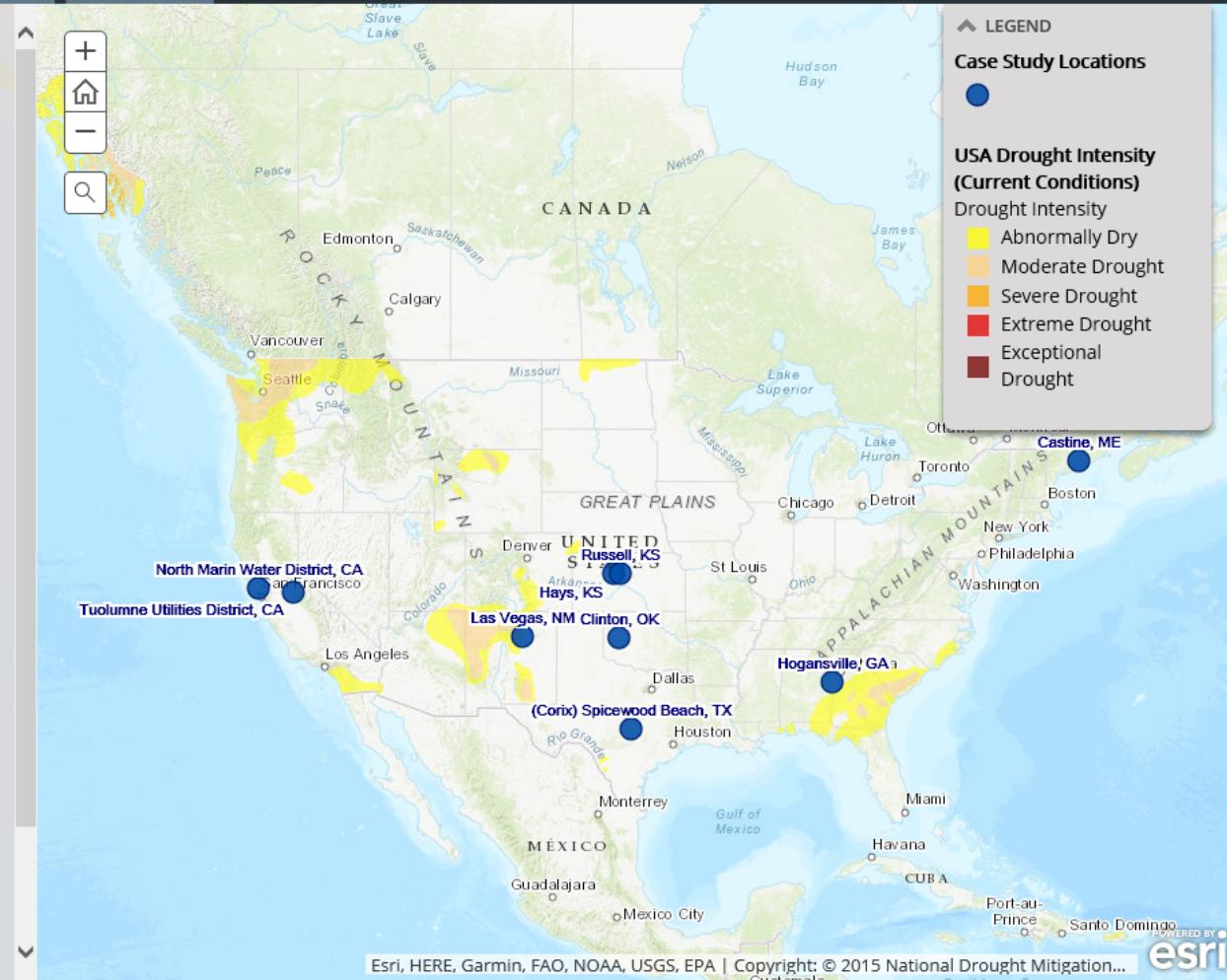
Welcome to the Case Studies Map for the U.S. Environmental Protection Agency's (EPA) Drought Response and Recovery Project for Water Utilities. This site contains Overview, Case Studies, Drought Action Videos, and Utility Stories tabs that describe the experiences of small and medium-sized drinking water utilities that successfully responded to drought.

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- Click on the dots on any map to learn basic information about each utility.
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- View how specific drought challenges were overcome by the case study utilities by clicking on the Drought Action Videos tab.
- Visit the Utilities Stories tab for short descriptions from water systems like you who have shared their own drought response stories. Submit your drought story today by contacting EPA at WSD-Outreach@epa.gov — EPA will work with you to add your story to the site.

For more information on these case studies and other drought response activities [view](#)



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Customs

Case Studies Map and Videos

Geoplatform – Clinton, OK

Drought Response and Recovery Project for Water Utilities

Overview Case Studies Drought Action Videos Utility Stories

City of Clinton, Oklahoma

Clinton's Story:



Clinton's Story: Drought Response & Recovery Project

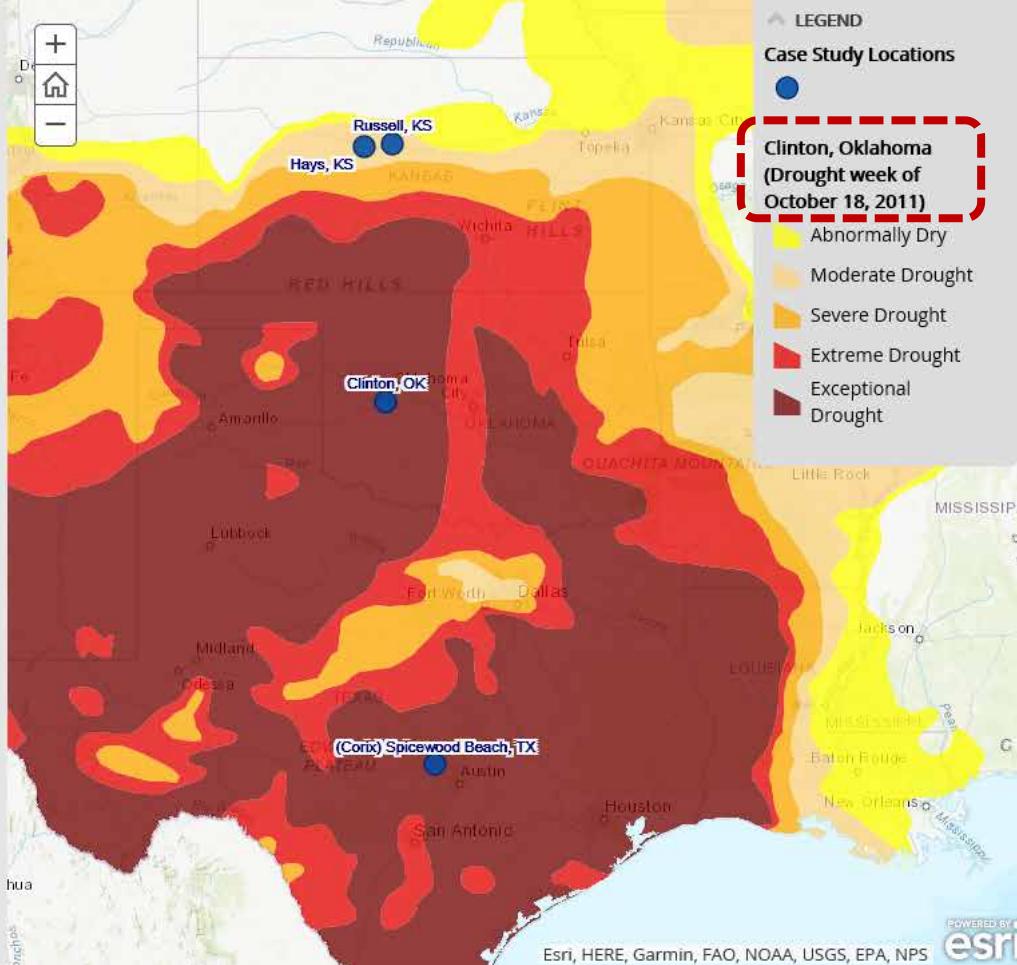
Utility overview: 4,182 connections

- Customers: 45% residential, 55% commercial or industrial

Drought summary: water levels reached a historic low and surface water source went dry; had an existing interconnection, but incurred approximately \$1 million per year in "overage fee" costs to gain additional supply; purchased supply source began to run dry

Drought response actions: implemented water use restrictions, increased the amount of water purchased from existing interconnection; raised water rates by 49% to promote water conservation and provide revenue stability; started constructing new groundwater wells, a 7-mile conveyance system and a reverse osmosis (RO) water treatment plant

their website for contact information. Clicking on a link to their



Clinton, Oklahoma (Drought week of October 18, 2011)

Abnormally Dry

Moderate Drought

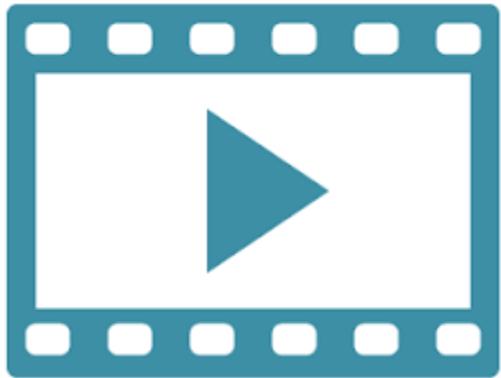
Severe Drought

Extreme Drought

Exceptional Drought

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Drought Guide – 2018 Updates



New resources include:

1. A customizable Drought Response Plan template for utilities
2. Two additional video case studies for the Geoplatform
3. A “share your story” section of the Geoplatform

Share Your Drought Story

Utility Story

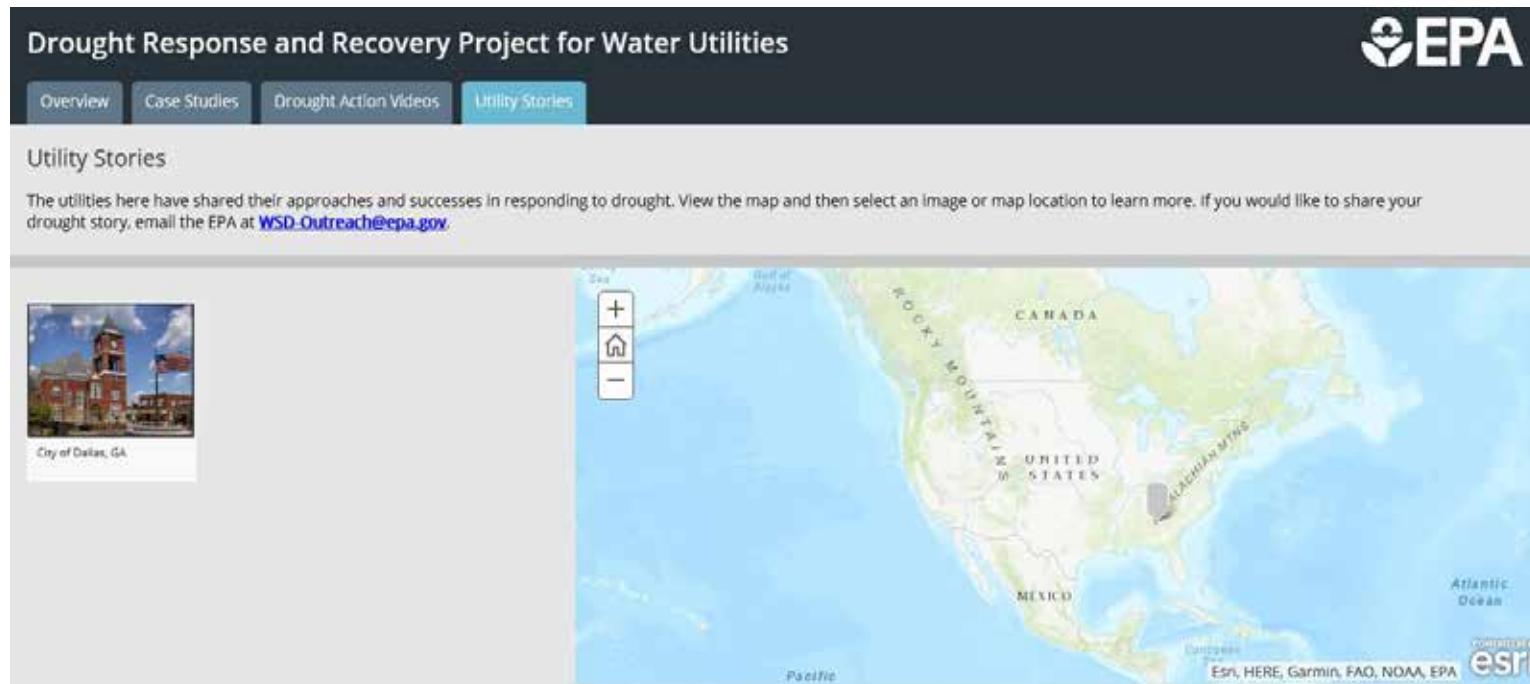
- NEW Section of the Drought GeoPlatform
 - The utilities here have shared their approaches and successes in responding to drought. If you would like to share your drought story, email the EPA at WSD-Outreach@epa.gov.

Drought Response and Recovery Project for Water Utilities

[Overview](#) [Case Studies](#) [Drought Action Videos](#) [Utility Stories](#)

Utility Stories

The utilities here have shared their approaches and successes in responding to drought. View the map and then select an image or map location to learn more. If you would like to share your drought story, email the EPA at WSD-Outreach@epa.gov.



City of Dallas, GA

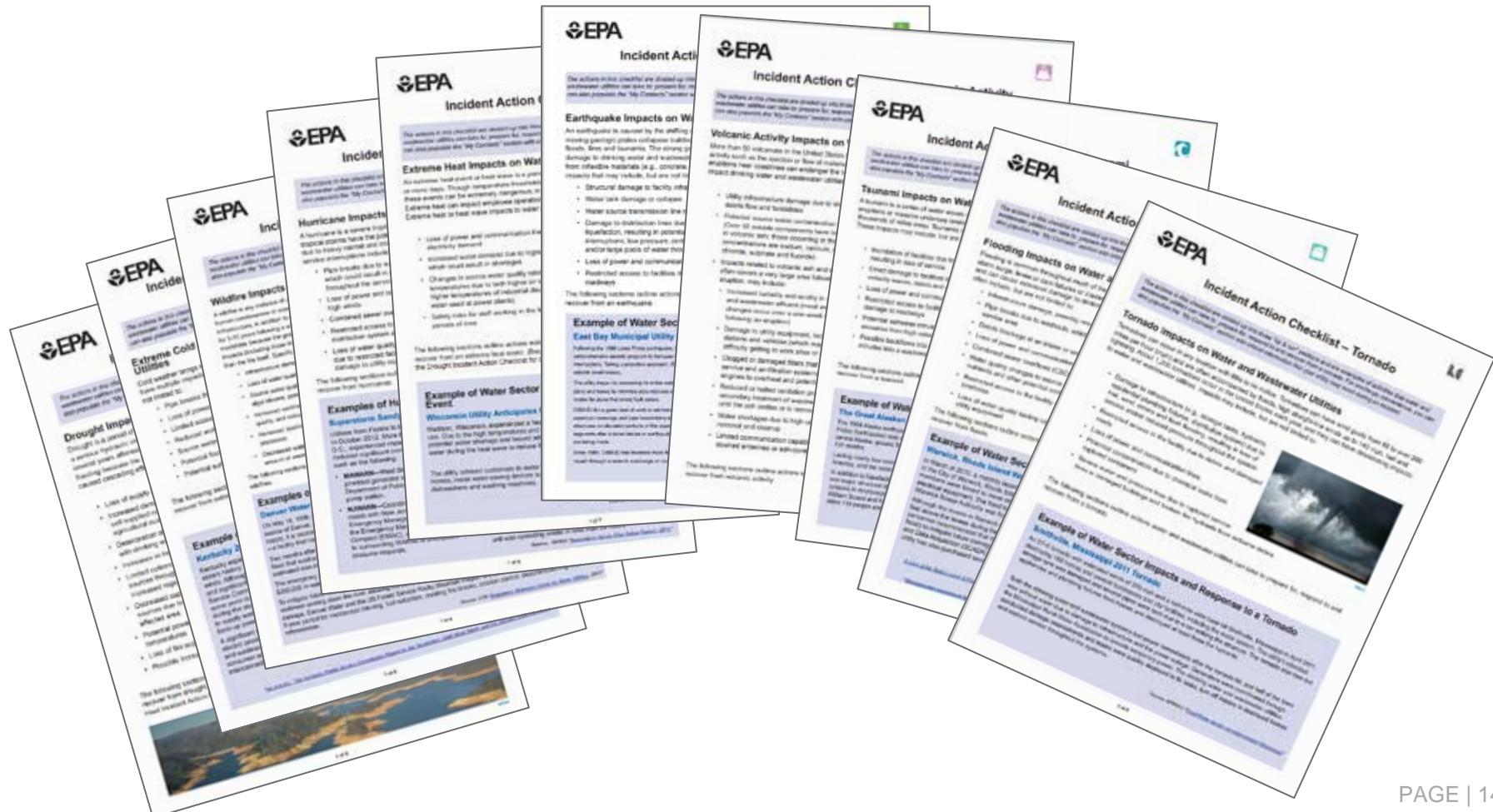
Map of North America showing the location of the City of Dallas, GA. The map includes labels for Canada, United States, Mexico, and the Atlantic and Pacific Oceans. A callout box on the left side of the map highlights the location of Dallas, with a thumbnail image of a building featuring a water tower.

Esri, HERE, Garmin, FAO, NOAA, EPA

Another WSD Drought Related Product

Drought Incident Action Checklist

- One of twelve “Rip and Run” style checklists that utilities can use to help with preparedness, response and recovery



A Few Lessons Learned Along the Way

- Have a water shortage plan
 - Conduct training on the plan. What does it really require to truck in water?
- Water audits are great
 - They are work upfront, but worth it to find out where your real losses and apparent losses are, can save water and money
- Have a short-term and a long-term plan
 - Capital improvements take time and money (including getting approvals). Have a 6-month, 5-year and 10-year plan
- It usually always comes down to money
 - Asset management is key, esp. evaluating rate structures (many systems moving toward higher base rates)
- Don't ever assume you have enough water
 - If you think you have enough now, then start planning for the next source. No easy water sources anymore.

Drought Response and Recovery

Q&A



Questions?

Contact:

Dawn Ison, ison.dawn@epa.gov, 513-569-7686

Explore at:

<https://www.epa.gov/waterutilityresponse/drought-response-and-recovery-guide-water-utilities>

... or google: “EPA Drought Response Guide”