

Enhancing Resiliency in the Aftermath of Extreme Events

Water/Wastewater Utilities and Extreme Climate and Weather Events (CC7C11)

The Central Issue

Extreme climate and weather events are occurring more frequently and with more intensity across the nation. They often leave communities, and the water utilities that serve them, reeling from costly aftermath. These extreme events have the potential to disrupt water services including drinking water supply, wastewater conveyance and treatment, and stormwater management.

Context and Background

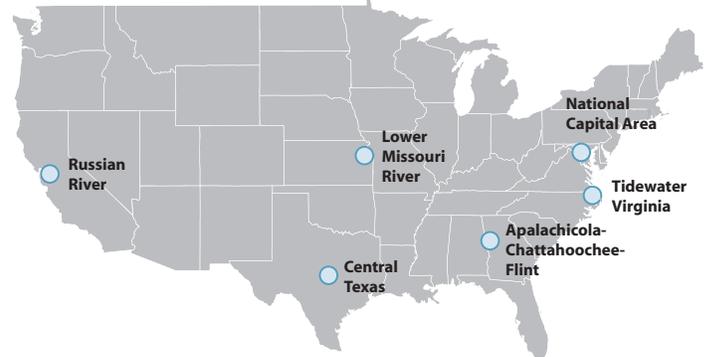
In 2009 President Obama established a national task force charged with better preparing the nation to manage the impacts of climate change. There is global recognition that the water sector remains at the forefront of these impacts, yet water resources and services have reverberating impacts on energy, development, and economic sectors. Utilities' abilities to successfully respond and adapt to increasing trends of extreme events is of the utmost importance for resiliency in all sectors.

Collaboratively with NOAA, U.S. EPA, and partner organizations, research was conducted at six local workshops, organized to include participants that experienced different types of extreme events throughout a river basin or watershed. The localities included:

- Apalachicola-Chattahoochee-Flint River Basin, Georgia
- Central Texas
- Lower Missouri River Basin, Kansas and Missouri
- National Capital Area
- Russian River Basin, California
- Tidewater Area, Virginia

Findings and Conclusions

The research found that there is a cascading nature to extreme events. That is, instead of one dominant event, localities are managing multiple types and occurrences of extreme events, many



The report is based on the results of six workshops which focused on different types of extreme events throughout a river basin or watershed in various locations across the U.S.

of which have become more severe and more frequent in recent decades. Communities need leadership to help navigate the path to resilience. Effort is required to tailor decision tools for resilience to local conditions and to navigate jurisdictional networks. Leadership that encourages multi-disciplinary collaboration and communication increases access to actionable information for science-based decision making. This report closes information gaps and increases access to existing information to provide a useful first step while looking forward to enhance resiliency to include actions for “rebuilding differently” in the aftermath of extreme events.

Management and Policy Implications

Water services are critical and water infrastructure must be prioritized. Consequently, community leaders must understand their risk and define their risk tolerance for disruption during extreme events. To build resilience, communities must embrace both emergency response and long-term preparedness. The complex array of decisions needed to support resilience within a basin requires coordination across water service areas and jurisdictional boundaries.



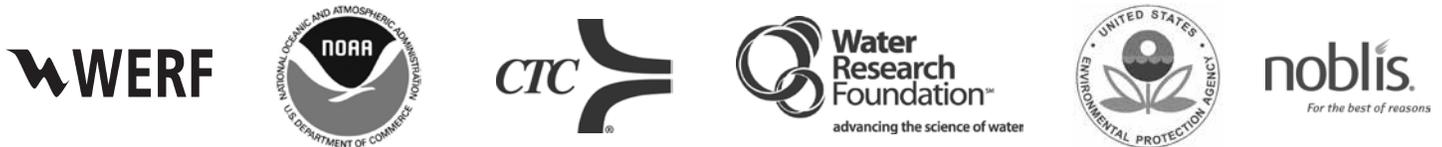
Flood water approaches homes in Norfolk, Virginia.

Executive Summary



Water/Wastewater Utilities and Extreme Climate and Weather Events

Related WERF Research	
Project Title	Research Focus
Global Lessons for Watershed Management in the United States (00WSM5)	Identifies the most promising watershed management approaches from around the world.
Moving Toward Sustainable Water Resources Management: A Framework and Guidelines for Implementation (00WSM6a/b)	Presents a conceptual framework and guidelines for developing an implementation plan for sustainable water resource management (SWRM).
Guide to Climate Risk Information – A Series of Technical Fact Sheets (CC1C08)	Fact sheets explain the terminology, concepts, models, and observations relevant to climate change, particularly as it relates to wastewater and stormwater and provide wastewater and stormwater service providers a summary of information and resources available on the effect of climate change in the areas of water quality, hydrology, sea level, and vulnerability to risk
Implications of Climate Change for Adaptation by Wastewater and Stormwater Agencies (CC2R08)	Provides an overview of the current understanding of natural climate variability and the projected global climate changes over the next 20-50 years. Explains that the real task will be to develop strategies with sufficient flexibility and resilience to deal effectively with increased uncertainty and describes the general risk management approach to adaptation planning.
Institutional Issues for Green-Gray Infrastructure Based on Integrated “One Water” Management and Resource Recovery (SIWM2T12)	Defines the barriers to achieving integrated water management and innovation in water technologies and examines case studies of how communities have tackled those barriers. The case studies provide practical examples of how to practice a more integrated and sustainable approach to water resource management and service.
Blueprint for Onsite Water Systems: A Step-by-Step Guide for Developing a Local Program to Manage Onsite Water Systems (SIWM7W14)	Provides information on developing local programs to manage onsite water systems as a proactive way to increase water resiliency and promote green building practices while protecting public health. Includes a sequence of steps and associated actions which will inform critical decisions regarding the scope, structure, and implementation of a local program.



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