

# A Looming Threat

Water utilities must be prepared to address climate change's impact on infrastructure

## Defining Climate Change

Before discussing the impact climate change can have on water infrastructure, Renner noted the importance of understanding what the phrase actually means.

"While climate change is typically described in terms of average changes in temperature or precipitation, it is important to realize that most of the social and economic costs associated with climate change, including impacts to water utility infrastructure, will result from shifts in the frequency and severity of extreme events," Renner said.

Water and wastewater infrastructure systems are located in both engineered and natural environments, making them vulnerable to damage from these more frequent and severe weather events.

"Water infrastructure is typically expected to last for decades, but failing to properly account for climate change could render facilities obsolete or inoperable long before the end of their expected lifespan," Renner said.

challenging treatment systems and increasing corrosion of buried infrastructure.

Indirect impacts result from longer-term secondary effects of climate change on drinking water and wastewater infrastructure systems. For example, indirect impacts may result from the shifting of population centers that can lead to changes in waste loads, water use patterns, and the needs for storage and distribution system capacity.

Interview compiled by Amy McIntosh



Rob Renner is the executive director of the Water Research Foundation, a 501(c)3 nonprofit organization that sponsors research that supports the water community in cooperatively managing water from all sources to meet social, environmental and economic needs. Renner previously was the executive director of the International Society of Automation and served as deputy executive director of the American Water Works Assn. He has more than 20 years of experience as a consultant optimizing water treatment plant performance, and has a bachelor's degree in civil engineering and a master's degree in engineering from South Dakota State University. Renner can be reached at [rrenner@waterrf.org](mailto:rrenner@waterrf.org)

**C**limate change can be a touchy subject, but nevertheless water utilities must be prepared for the threats that can result from changes in temperature or an increase in severity and frequency of extreme weather events. Rob Renner, executive director of the Water Research Foundation (WRF), spoke with W&WD Associate Editor Amy McIntosh and discussed the potential threats to infrastructure from climate change, and how utilities are responding to public perception of the issue.

**Amy McIntosh: Which weather-related threats associated with climate change are most likely to cause damage to water systems? How will these events impact water infrastructure?**

**Rob Renner:** There are two fundamental factors that water and wastewater utilities must consider when planning to address the implications of climate change: direct and indirect impacts.

Direct impacts result from the effects of climate change on drinking water and wastewater infrastructure system functions and operations. Direct impacts may be caused by changes in average daily temperatures, more frequent and intense rainfall events, rising sea levels, and sustained and extreme droughts. Average daily temperature changes or drought can alter soil temperatures and the buried infrastructure environment, causing pipe breaks; challenge treatment systems by affecting the quantity and quality of runoff into surface waters; and change water demand for irrigation and urban uses. More frequent and intense rainfall events can challenge treatment systems by increasing turbidity and sedimentation, or cause direct flood damage to aboveground utility facilities and buried infrastructure. Rising sea levels can lead to saline intrusion into groundwater aquifers,

**McIntosh: How can a utility adapt its existing infrastructure in preparation for climate change?**

**Renner:** Water and wastewater utilities will first need to perform vulnerability assessments to determine how climate change may impact their operations in order to identify appropriate adaptation strategies, which can be incorporated into capital improvement plants.

**McIntosh: Do you think public perception of climate change has any effect on utilities' overall preparedness for its impact?**

**Renner:** WRF has recently completed a project titled Effective Climate Change Communication for Water Utilities (Project 4381). The results of the project indicated that, with some exceptions, most utilities are not currently engaged in a climate conversation, primarily because they are concerned it will decrease support for the utilities' responses to climate change (i.e., trigger negative reactions).

The results of the national survey done during the project on community water and climate change provide a key to addressing this perception. For example, the survey found that 71% of the American public views their water utility as a trusted source of information on the local impacts of climate change (compared with a 43% level of trust in local elected officials), and 92% of Americans want their water utility to be a leader in preparing for the local impacts of climate change. The research also found that because climate change is complicated, very few people (including water professionals) understand why climate change will result in a change in the water cycle and extreme weather. Despite the lack of understanding, it is crucial for utilities to respond to climate change in a timely manner. **w&wd**

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