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Climate Change Risk Index and Municipal Bond Disclosures of United States Drinking Water Utilities.

Abstract

Climate change increases risks to the operations and financial reliability of drinking water utilities across the United States (US). Here we develop a comparative climate risk index that includes hazard, vulnerability, and exposure components for 1455 medium and large municipal US drinking water utilities. We find that 67 million customers are serviced by utilities with higher climate risk. Drinking water utilities in the Western US have higher risk due to expected large changes in climate hazards, while utilities in the Northeast and Midwest have higher risk due to existing vulnerabilities and exposure. We use this climate risk index, along with an analysis of municipal bond official statements, to identify utilities in need of climate adaptation and resilience planning. Of the analyzed bonds, 36% were issued by high risk utilities and didn't mention climate change. This work offers recommendations for multiple decision-makers, including utility customers, bond purchasers, and government agencies.

Introduction

Drinking water utilities across the United States (US) are exposed to current and future climate change impacts that could affect their ability to provide adequate quantity and quality of water to consumers. The types of climate hazards and magnitude of anticipated changes vary among utilities, due to regional physical climatic conditions. Utilities also vary in their ability to prepare for and recover from negative effects of climate hazards, given differences in existing infrastructure systems and financial resources. Understanding how drinking water utilities are exposed and vulnerable to multiple aspects of climate change can identify gaps in climate resilience planning¹. Integrated multi-component quantitative measures of drinking water utility climate exposure and vulnerability are needed to compare different climate risks facing different utilities and to inform public funding and investment strategies.

The extent to which climate change poses risks depends on the interaction of climate hazards (the climate change-induced physical events and changes that may cause loss of life, injury, or other health impacts) with the exposure (the people and assets in harm's way of those hazards) and vulnerability (the propensity of those people and assets to be adversely affected) of human and natural systems^{2,3}. Most current publicly-available climate service tools do not consider exposure and vulnerability in measures of climate risk, resulting in ineffective assessments of how prepared a system is to manage climate hazards⁴.

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26 January 2026

