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## **NATIONAL CAPITAL REGION WATER SUPPLY AND DISTRIBUTION SYSTEM RESILIENCE STUDY 2016**

### **BACKGROUND**

A water emergency such as a treatment plant outage, Potomac River contamination event, or natural disaster has the potential for significant regional disruption. There is limited capability in metropolitan Washington to transfer potable water across the Potomac River or to areas where shortfalls might occur due to the segmented nature of the region's water systems. The consequences of such a water outage could be the loss of water service from days to a month or more depending upon the scenario. In addition to the operational impacts of a regional water outage, the estimated direct and economic impacts could be several billion dollars, depending upon the scenario.

In response, the Metropolitan Washington Council of Governments (COG), working with water utilities across the region, carried out a Water Supply and Distribution System Redundancy Study. The main purpose was to evaluate the ability of the region's water supply system to withstand regional emergencies and to identify and evaluate potential engineering improvements to increase the overall reliability of the system.

The study used a risk-based methodology, employing industry best practices, to evaluate potential failure scenarios, their impacts on water service, societal/economic consequences, and potential mitigating initiatives. This study evaluated potential improvements with respect to their ability to enhance regional water system resilience.

COG and metropolitan Washington water utilities identified scenarios that would result in customers experiencing a loss of service. The study evaluated the impact of loss of water service using People Outage Days as a metric, without assigning greater weights to businesses, critical customers and facilities. The study evaluated potential engineering alternatives that would mitigate risk with respect to being able to supply winter average demand. Types of improvements evaluated included off River raw water storage options new raw water transmission capabilities, and new treated water network interconnections.

### **RECOMMENDATIONS**

The risk analysis showed a total monetized Net Present Value risk of \$37 billion over the 100-year modeling period and highlighted that Potomac River contamination events are responsible for a substantial amount of the total risk carried by the region's water systems. The study showed that targeted raw water storage combined with raw water transfer and treated water transfer improvements are the most effective risk-mitigating initiatives and generally are considered "no regrets" type improvements. Longer-term improvements include providing a greater volume of raw water storage and other improvements. The optimal mix of projects and risk has tentatively been identified below.

Improvement		Relative Capital Cost	Potential In-Service Year
Fairfax Water	Quarry Storage Reservoir	\$46 M	2026
WSSC & DC Water	Interconnection & Main Upgrades	\$32 M	2021 - 2025
Washington Aqueduct	Travilah Quarry Storage Reservoir & Dalecarlia Bypass	\$160M - 300M	2024 -2035/ 2065

## CONCLUSIONS AND NEXT STEPS

Project funding and cost sharing arrangements are critical to implementation of regional water infrastructure projects. This is especially true for the higher cost raw water infrastructure projects identified in the study. The study recommends that COG and the region's water utilities work together to consider funding options and strategies to support the proposed improvements identified in this study.

Recommended next steps include:

1. Conducting a condition assessment of the federally owned water main system to more directly understand, quantify and prioritize potential areas of risk and identify improvement needs.
2. Evaluating additional benefits and cost of building the Travilah Quarry sooner, before being fully mined in 2060, resulting in benefits being accrued sooner but with a smaller storage volume.
3. Investigating raw water storage options in addition to Chantilly Quarry to provide off-line raw water storage near Corbalis water treatment plant.