



RESILIENCY

PREPARING FOR
WATER SUPPLY DISRUPTION

“We’ve defined resiliency as the ability to **reduce the impacts** of and **recover rapidly** from disruptive events”

— Jim Miller
Engineering Superintendent,
Everett Public Works



photo source: Boeing

A REGION COMES TOGETHER

The Central Puget Sound region is susceptible to a variety of natural threats, such as earthquakes, volcanos, wildfires, severe storms, and drought. These threats have the potential to disrupt the delivery of safe and reliable water. Catastrophic events such as these are a reality every community could face.

To plan for these threats, the Central Puget Sound Water Supply Forum (comprised of Seattle Public Utilities, Tacoma Water, Everett Public Works, Cascade Water Alliance, and other water utilities in the region) came together — without crisis or mandate — to determine how utilities could continue providing essential water service during a crisis.



ENSURING THERE IS
DRINKING WATER
DURING DROUGHTS

INCREASING SEISMIC
DESIGN STANDARDS
TO BETTER WITHSTAND
EARTHQUAKES

PLANNING FOR THE DELIVERY
OF HIGH QUALITY WATER, EVEN AFTER
A VOLCANO, WILDFIRE, EARTHQUAKE,
OR OTHER DISRUPTIVE EVENT

Although the region's water utilities currently manage their own systems for a variety of risks, the Water Supply Forum recognized the importance of leveraging regional resources to better prepare for potentially major water supply disruptions. Through this unprecedented collaborative effort, our region's water utilities aim to minimize the impacts and costs of a disruptive event to the region's 2.3 million residents, ports, local and international businesses, schools, and medical facilities.



photo source: UW Medicine

“**Reliable water supply infrastructure** is key to supporting **business, growth, the economy** and everything your family needs to **thrive.**”

— Linda McCrea
Superintendent, Tacoma Water



photo source: Port of Tacoma

“The mark of a **strong community** is its **resiliency** in **responding** to threats.”

— Ray Hoffman
Director, Seattle Public Utilities



UW Medicine
UNIVERSITY OF WASHINGTON
MEDICAL CENTER

photo source: UW Medicine

THE FORUM'S RESILIENCY PROJECT

To strengthen our community, the Water Supply Forum undertook the Resiliency Project. The objective of this project is to help the water utilities of King, Pierce, and Snohomish counties take proactive steps in evaluating and enhancing this region's water supply system resiliency across and between individual utility service area boundaries. The project focused on evaluating risks to water supply and system infrastructure, and identifying what our region's utilities can do to mitigate these risks.

Teams of technical staffs from each utility analyzed extreme risk scenarios and identified critical water supply vulnerabilities. Specific risks evaluated include earthquakes, water quality threats, droughts, and climate change. The teams determined the consequences of these water supply risks to the region's residents and businesses. After 18 months



AFTER A MAJOR EARTHQUAKE, THE INABILITY TO RESTORE ESSENTIAL SERVICES, SUCH AS WATER, CAN RESULT IN BUSINESSES FAILING AND POPULATIONS PERMANENTLY LEAVING THE IMPACTED REGION.

— FEMA; NEW ZEALAND PARLIAMENT

of evaluations and collaboration, the risk teams have issued initial conclusions and recommendations. The following pages summarize the key findings from these risk assessments.

The Resiliency Project reveals opportunities for collaboration. Joint planning effectively presents a roadmap for water suppliers, stakeholders, and leaders throughout the region. By proactively preparing for these risks, our families, businesses, and community will be more readily able to recover.

RESILIENCY FOLLOWING AN EARTHQUAKE

The Puget Sound region is susceptible to earthquake damage, induced predominately by three main shallow faults and a deep subduction zone.

A large earthquake event could result in damage to critical water system infrastructure and thousands of distribution system breaks, producing water outages and economic impacts.

Evaluation of major earthquake events revealed that in some areas it could take as long as 60 days to restore water to at least 90% of customers.

The potential direct and indirect economic losses from water system damage alone could exceed \$2 billion.

THIS COULD HAPPEN HERE...

- ▷ Like Puget Sound ports, Kobe, Japan is a port city
- ▷ Similar geology to Puget Sound
- ▷ Over 6,000 people died
- ▷ Over 60 days of water outages
- ▷ Economic loss of over \$150 billion



1995 KOBE JAPAN EARTHQUAKE

photo source: Don Ballantyne

RESILIENCY FOLLOWING IMPACT TO WATER QUALITY

Water quality risks could have a severe negative impact on a utility's ability to provide safe drinking water, resulting in potential health and safety impacts. These events could pose risks of an immediate emergency nature with high consequences to water quality if they were to occur.

SPECIFIC RISKS TO WATER QUALITY IN THE REGION INCLUDE THE FOLLOWING:

WILDFIRE

EARTHQUAKES

SEVERE ADVERSE WEATHER

ACCIDENTAL CONTAMINATION

VOLCANIC HAZARDS



RESILIENCY IN RESPONSE TO CLIMATE CHANGE

Climate change is projected to alter the water cycle, which could mean reduced snowpack and stream flows, warmer water temperatures, and increased fire danger.

Water availability may be greatly reduced. This and other climate change impacts would likely be similar throughout the three-county area since there is a strong correlation in streamflows of the five major rivers that are the main sources of existing and future surface water supplies for the region.

Groundwater resources are likely to be relatively robust in the face of climate change, compared with surface water. Mainland aquifers that currently contribute to water supply are not at risk of saltwater intrusion, even as sea levels continue to rise.

Water supply evaluations suggest that Seattle, Everett, and Tacoma would have sufficient supply to meet today's water demands, as well as demands forecasted for 20 years into the future, under hot, dry summers if the worst drought on record (1987) repeated itself.

Preliminary comparisons of the 1987 and 2015 droughts show that 1987 remains the worst drought on record for surface water supplies in the region.



RESILIENCY FOLLOWING A DROUGHT

Reduced precipitation and snowpack or extended warm dry periods may limit water availability. These conditions would also increase outdoor water use, and increase overall demand for water, at a time of limited supply. The result could be insufficient supply to fully support essential and desired uses, even with conservation efforts in place.

Groundwater sources are less vulnerable to a single-year drought than surface water. However, multi-year periods of reduced precipitation could lead to aquifer decline or depletion.



“The Forum plans to **advance discussions with other lifeline sectors** (including power, transportation, and emergency management) to **better prepare** for an emergency event.”

— Chuck Clarke
CEO, Cascade Water Alliance

NEXT STEPS...

To reduce the potential impacts of a disruptive event, it is important to not only understand water supply risks, but also to prepare for these risks. Therefore, the Water Supply Forum is moving forward with its next phase of the Resiliency Project. Plans include further evaluation of these risks and potential mitigation measures, to minimize water system damages and ensure continued supply of high-quality water during a disruptive event.

To learn more about the Resiliency Project and access the Resiliency Project Risk Reports, visit: www.watersupplyforum.org



ABOUT THE WATER SUPPLY FORUM

VISION

Provide leadership, from the utility perspective, on current and future regional water supply and related water resources issues in King, Pierce and Snohomish counties.

MISSION

Provide a venue for policy discussions on critical water supply and stewardship issues while sharing utility perspectives and insights with regional stakeholders. The Forum provides members and the public with a portal for water supply and related water resource issues.

The Forum addresses current and future water supply issues, including supply system resiliency, planning, policy and regulation, and environmental stewardship. It is comprised of representatives of public water systems and local governments in Washington state's central Puget Sound region. Working cooperatively, the Forum's members promote the reliable delivery of safe, clean water throughout the region.





To find out more about what residents and businesses can do to be more prepared, visit: www.makeitthrough.org

www.watersupplyforum.org

