

## Using WNTR to Model Water Distribution System Resilience

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The Water Network Tool for Resilience (WNTR) is a new open source Python package developed by the U.S. Environmental Protection Agency and Sandia National Laboratories to model and evaluate resilience of water distribution systems. WNTR can be used to simulate a wide range of disruptive events, including earthquakes, contamination incidents, floods, climate change, and fires. The software includes the EPANET solver as well as a WNTR solver with the ability to model pressure-driven demand hydraulics, pipe breaks, component degradation and failure, changes to supply and demand, and cascading failure. Damage to individual components in the network (i.e. pipes, tanks) can be selected probabilistically using fragility curves. WNTR can also simulate different types of resilience-enhancing actions, including scheduled pipe repair or replacement, water conservation efforts, addition of back-up power, and use of contamination warning systems. The software can be used to estimate potential damage in a network, evaluate preparedness, prioritize repair strategies, and identify worse case scenarios. As a Python package, WNTR takes advantage of many existing python capabilities, including parallel processing of scenarios and graphics capabilities. This presentation will outline the modeling components in WNTR, demonstrate their use, give the audience information on how to get started using the code, and invite others to participate in this open source project.

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