United States Environmental Protection Agency

Water Health and Economic Analysis Tool Version 3.0

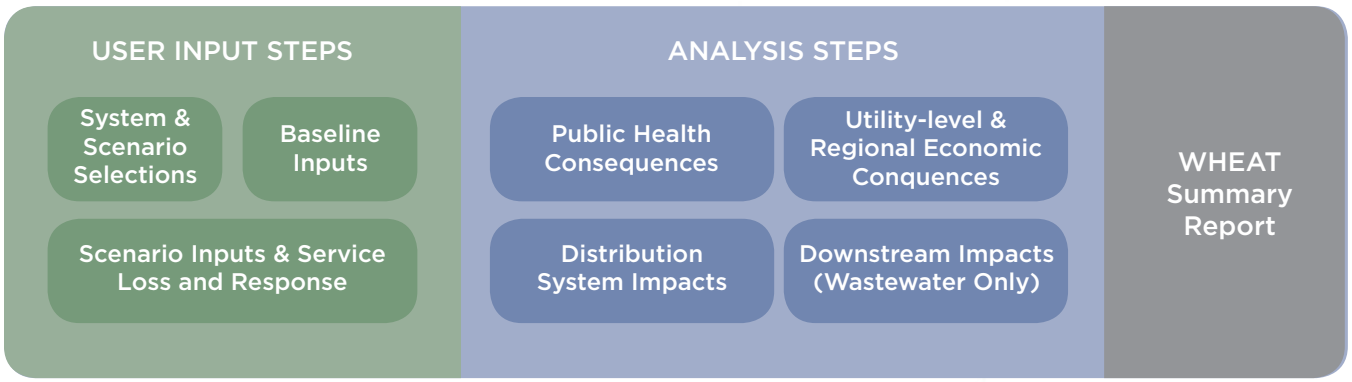
CONSEQUENCE ANALYSIS TOOL FOR WATER UTILITIES

PURPOSE

The Water Health and Economic Analysis Tool (WHEAT) is designed to assist utility owners and operators in quantifying an adverse event's public health consequences (i.e., injuries and fatalities), utility-level financial consequences, direct and indirect regional economic consequences and downstream impacts. The United States Environmental Protection Agency (EPA), in collaboration with drinking water and wastewater (water sector) partners, developed WHEAT to support consequence analyses for three scenarios: 1) loss of one or more assets, 2) release of a stored hazardous gas and 3) intentional contamination of a drinking water distribution system.

The WHEAT methodology uses a step-by-step process that assists users in conducting a consequence analysis through development of "what-if" scenarios. Users can easily enter information about their utility; build and run a consequence analysis scenario; and generate a report that summarizes the results.

WHEAT CONSEQUENCE ANALYSIS PROCESS



FEATURES

- Step-wise guidance to build scenarios and estimate utility-level consequences
- Help materials at each step of the analysis to guide users through the process
- Three scenarios of potential consequences:

Release of a hazardous gas

Loss of operating assets

Water contamination

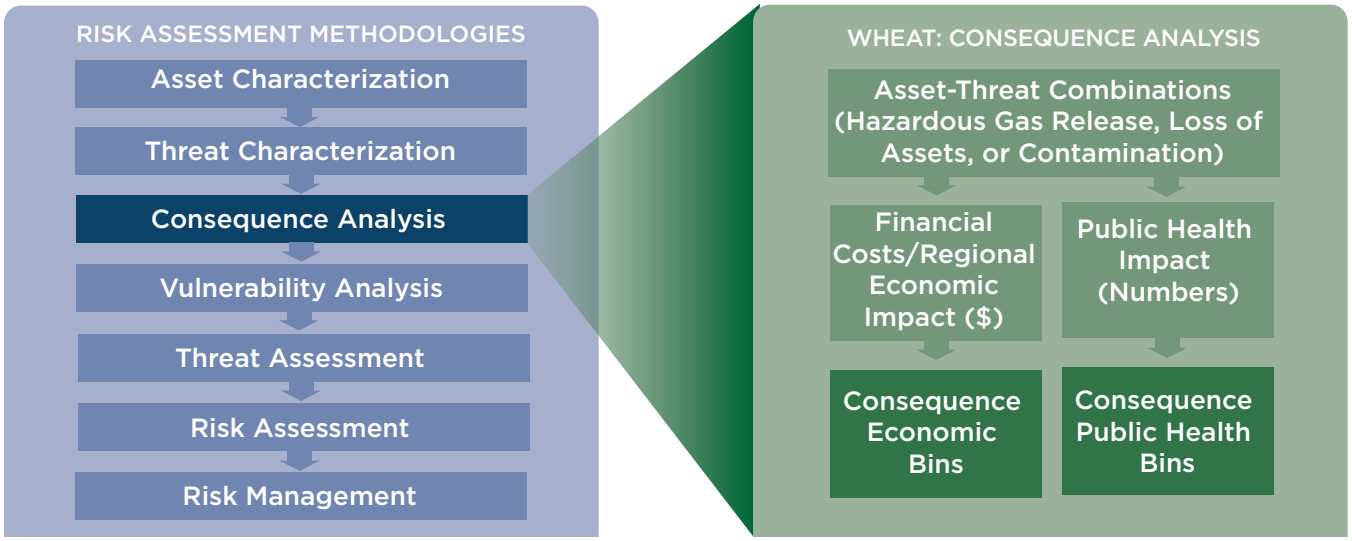
- Detailed report that summarizes the baseline, scenario and consequence analysis results

The utility-level financial consequences reported by WHEAT correlate the extent and duration of loss in drinking water or wastewater service with the extent of damage to operating asset(s). The tool estimates the following as they result from the incident: lost sales revenues, increased utility operating costs (e.g., labor, equipment, materials, replacement water, environmental damage and remediation) and asset repair and replacement costs. Regional economic impacts are also estimated to account for losses incurred by businesses directly affected by, for example, a loss of service (i.e., direct impacts) and losses among other businesses that are linked economically to the directly affected businesses (i.e., total impacts).

APPLICATION OF WHEAT ANALYSIS RESULTS

Determining an adverse event's potential consequences is an important step in conducting a comprehensive risk assessment. The results of a WHEAT analysis can inform risk assessment tools such as EPA's Vulnerability Self Assessment Tool (VSAT). WHEAT users can readily import their results directly into a VSAT risk assessment to help determine the potential consequences (i.e., public health and financial impacts) of a specific threat's impact on a utility's assets. WHEAT output data can be used to make informed decisions regarding asset management as part of a risk assessment, including actions to take or countermeasures to put in place to improve emergency preparedness, enhance resilience and justify expenditures for future infrastructure improvement. Using WHEAT greatly simplifies risk assessment, giving users quantitative information for better managing their utility's risk in case of adverse events.

WHEAT CONSEQUENCE ANALYSIS AS A PART OF WATER SECTOR RISK ASSESSMENT METHODS



FOR MORE INFORMATION

Download WHEAT Version 3.0 at **http://www.epa.gov/wheat**.
For more information or questions, email **WHEAThelp@epa.gov.**

Office of Water (4608-T) | EPA 817-F-14-003 | May 2014