

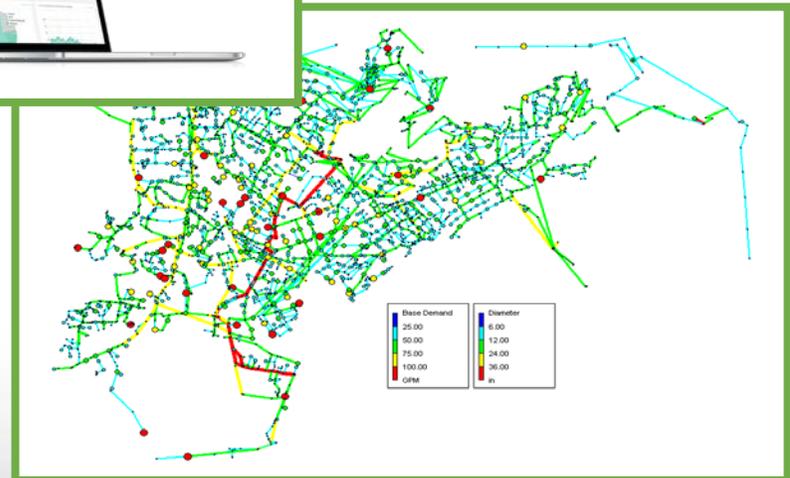
What is EPA Planning for EPANET?

Regan Murray

U.S. Environmental Protection Agency

ASCE Visioning Summit

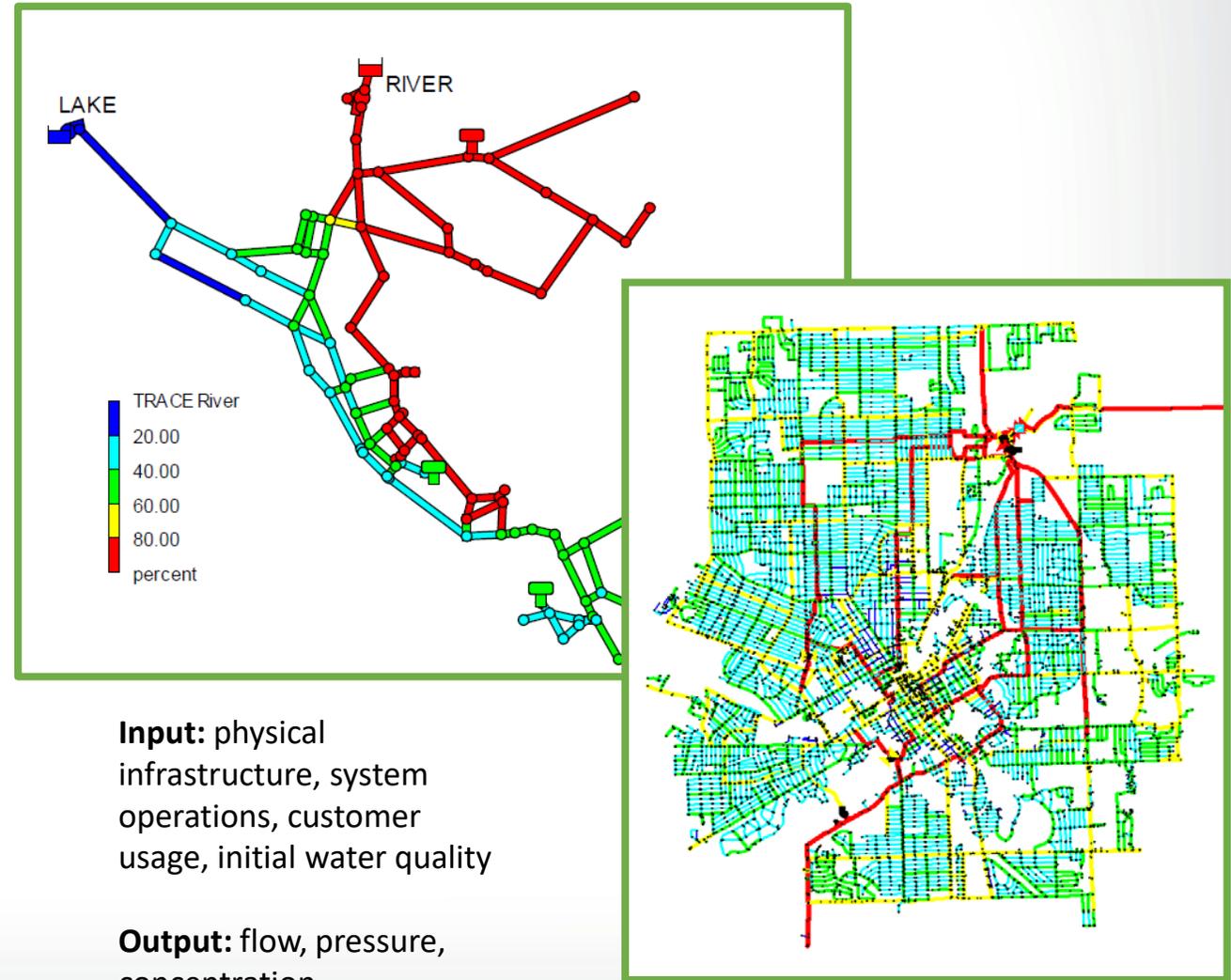
- EPANET software, uses, and status
- Advancements over the last decade
 - Security and resilience
 - User interface
 - Open source project
- Future vision for working with community





EPANET Software

- Models and simulates hydraulics and contaminant transport within a drinking water distribution network
- Free on EPA's website
- More than 50,000 downloads per year
- Utilized by private sector
- Available for education purposes
- Primary tool for innovation in field
- Latest release 2.00.12 in 2008



Uses of the EPANET Software

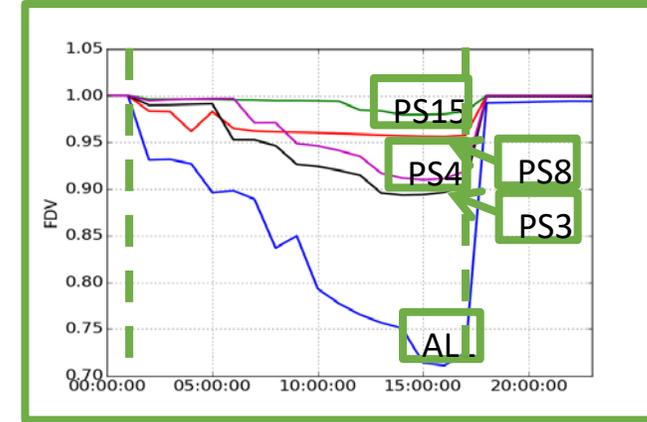
Planning for the Future



Replacing Aging Infrastructure

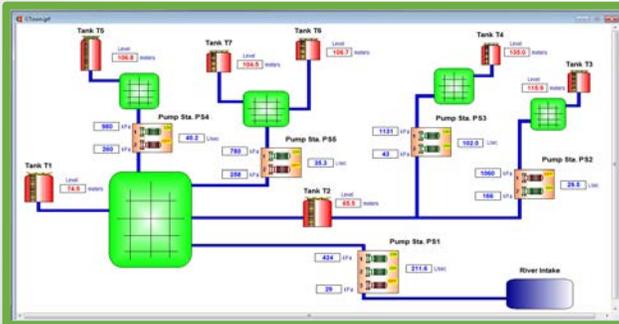


Preparing for Emergencies

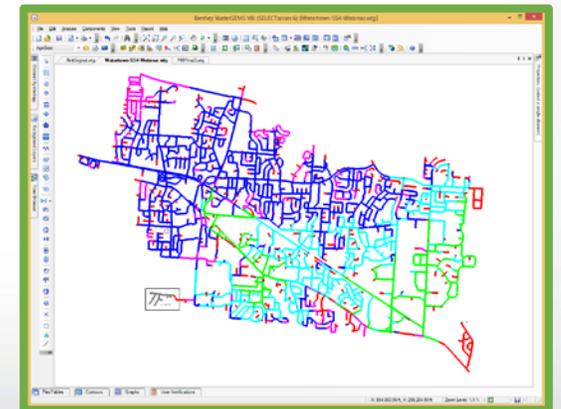
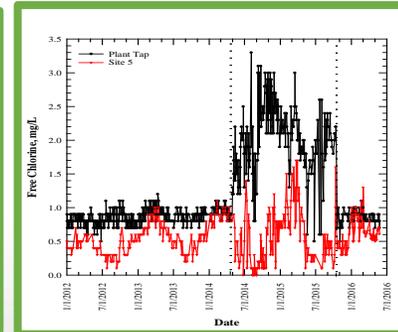


Real-time operations and decision-making

Optimizing Operations



Solving Regulatory Problems





EPANET Stakeholders

- Water utilities (especially small and international systems)
- EWRI Water Distribution Systems Analysis (WDSA) Committee
- AWWA Environmental Modeling and Applications (EMAC) Committee
- Researchers and students
- Engineering consultants
- Private sector (e.g., InnoVyze, Bentley, CitiLogics)



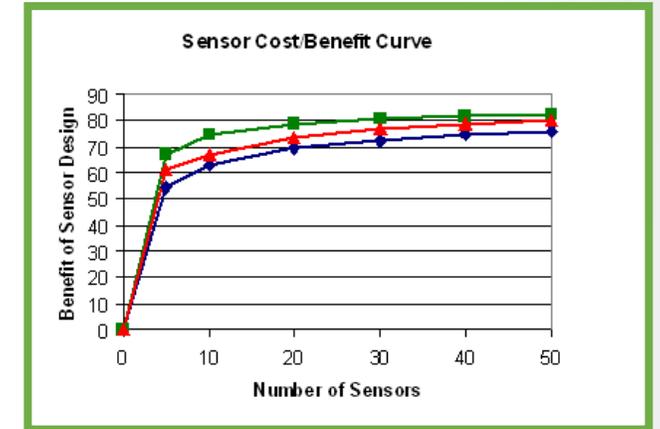
EPANET Software Status

- Latest release 2.00.12 in 2008
 - Windows executable
 - Source code
 - Programmer's toolkit
 - User manual
- EPA GitHub Site
 - Source code also available at:
<https://github.com/USEPA/Water-Distribution-Network-Model>

The image shows two overlapping screenshots. The background screenshot is the cover of the 'EPANET 2 USERS MANUAL'. It features the EPA logo and text: 'United States Environmental Protection Agency', 'EPA/600/R-00/057 September 2000', 'EPANET 2', 'USERS MANUAL', 'By Lewis A. Ross', 'Water Supply and Water Resources Division', 'National Risk Management Research Laboratory', 'Cincinnati, OH 45260', and 'NATIONAL RISK MANAGEMENT RESEARCH OFFICE OF RESEARCH AND DEVELOPMENT U.S. ENVIRONMENTAL PROTECTION AGENCY CINCINNATI, OH'. The foreground screenshot is a GitHub repository page for 'USEPA / Water-Distribution-Network-Model'. It shows repository statistics (20 watches, 21 stars, 69 forks), navigation tabs (Code, Issues, Pull requests, Projects, Insights), and a commit history table with columns for commit message and time ago. The commit history includes: 'Update README.md' (3 years ago), 'Suppressing secure string related deprecation warnings' (4 years ago), and 'Update README.md' (Latest commit e1671cc on Oct 6, 2015). Below the commit history is the 'README.md' content, which includes the title 'Water-Distribution-Network-Model', a subtitle 'ORD Water Distribution Network Model (AKA "EPANET")', and an 'Introduction' section stating: 'This is the official EPANET source code repository maintained by US EPA ORD, NRMRL, Water Supply and Water Resources Division located in Cincinnati, Ohio. EPANET performs extended period simulation of hydraulics and water quality within potable water distribution networks. EPANET source code is written in the C Programming Language and released in the Public Domain.'

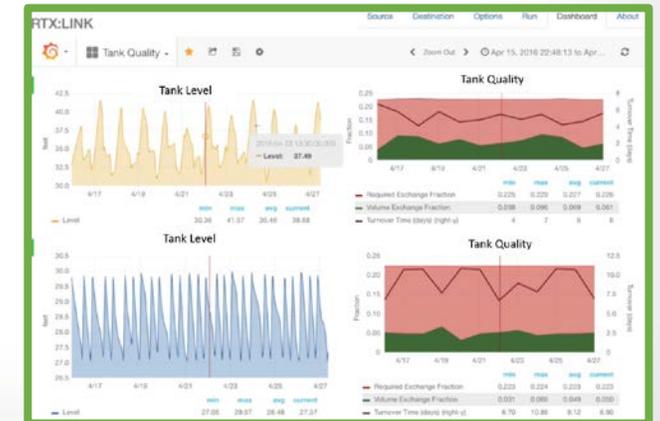
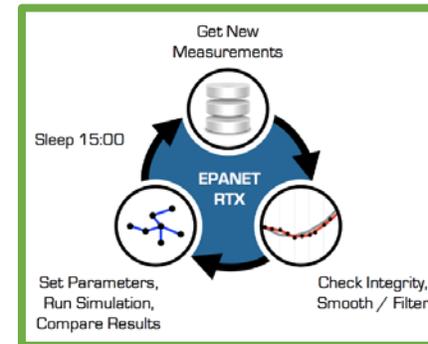
● TEVA-SPOT Sensor Placement

- Evaluates contamination based threats and their consequences
- Locations selected to minimize the number of people impacted, the extent of contamination, or the detection time



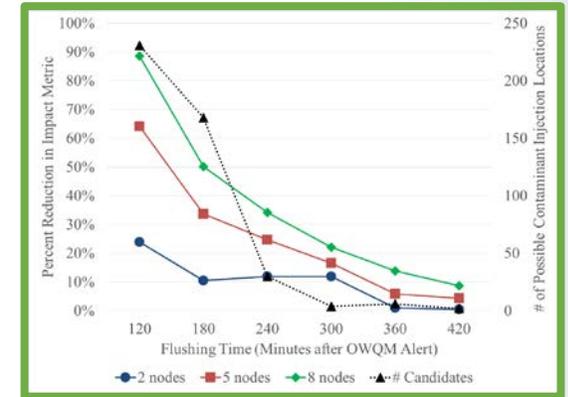
● EPANET-RTX

- Suite of software libraries to integrate network model with SCADA operational data
- Real-time analytics for automated and routine capability to forecast, hind cast, and simulate response actions



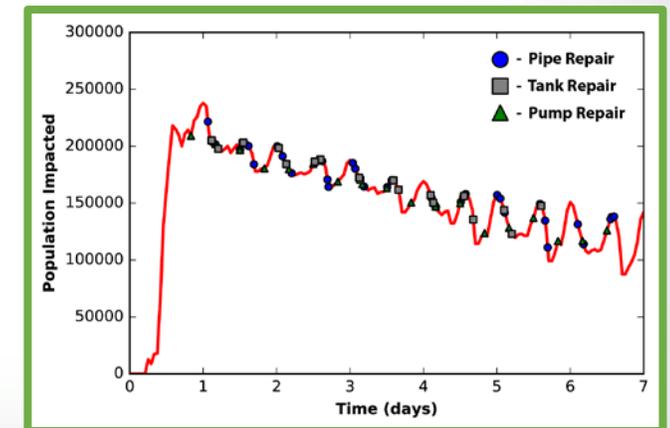
● Water Security Toolkit (WST)

- Evaluates response actions that could be taken following a contamination incident
- Optimizes locations for monitoring, taking grab samples, flushing, and booster disinfection
- Identifies likely source of contamination



● Water Network Tool for Resilience (WNTR)

- Simulates disaster scenarios such as earthquakes, power outages, floods, loss of access to source
- Predicts damage to infrastructure, calculates resilience metrics, and evaluates response and mitigation strategies to improve resilience





Advances – User Interface

- SWMM and EPANET user interfaces
- Upgrades software best practices
 - GitHub repository, integrated continuous testing, new quality assurance plan
- Allows better integration with GIS
- Allows python plug-ins for more user flexibility
- Bug fixes and beta testing ongoing within EPA

USEPA / SWMM-EPANET_User_Interface

Code Issues (163) Pull requests (2) Projects (0) Wiki Insights

No description, website, or topics provided.

1,513 commits 17 branches 7 releases 7 contributors

Branch: master New pull request Find file Clone or download

TongZhai Merge pull request #91 from USEPA/dev-ui Latest commit 14d96df on Oct 30, 2017

.idea	change move_distance into dx, dy	a year ago
doc	update note about undo-redo capability	5 months ago
src	Merge pull request #91 from USEPA/dev-ui	5 months ago
test	GeoJson import files for EPANET	11 months ago
.gitignore	Start Python-friendly wrapper of SWMM output API, similar to EPANET's...	2 years ago
EPANET_UI_Example.png	screen grab legend update	8 months ago
README.md	Update README.md	a year ago
SWMM_UI_0.png	screenshot0 update	2 years ago
SWMM_UI_Example.png	updated UI example	5 months ago
SWMM_UI_Map_Relief_River_Urban...	display raster and vector layers with QGIS	2 years ago

README.md

SWMM-EPANET_User_Interface

User interfaces for EPA SWMM and EPANET models implemented in Python using Qt

- doc: documentation
- src: source code
- test: automated tests and interactive user interface tests

https://github.com/USEPA/SWMM-EPANET_User_Interface



Advances – Open Source Project

- 2016 Federal Source Code Policy
- Community-based software development for drinking water infrastructure modeling
- Supports efficiency, mission effectiveness, transparency and public interaction
- Leverages existing development communities
- Documents, shares, and allows for input on:
 - Development roadmap (e.g., new features)
 - Testing and QA
 - Release schedule
 - Contributor guidelines





EPA EPANET Team

- National Risk Management Research Laboratory / Safe and Sustainable Water Research Program
 - Michael Tryby, Environmental Engineer
 - Jonathan Burkhardt, Chemical Engineer
 - Regan Murray, Supervisory Scientist
- National Homeland Security Research Center / Homeland Security Research Program
 - Robert Janke, Physical Scientist
 - Terra Haxton, Environmental Engineer



Future Role to Support EPANET

- Work with stakeholder community to create development roadmap
- In partnership with community, continue to provide free version of EPANET
- Continue research related to supporting statutes, states and local communities
 - Infrastructure improvements, security and resilience, fate and transport of contaminants
- Provide training to states, communities, and regions (via EPA grant to U Texas)

