Safe, Resilient, and Customer Focused Infrastructure

Society of Utility and Regulatory Financial Analysis

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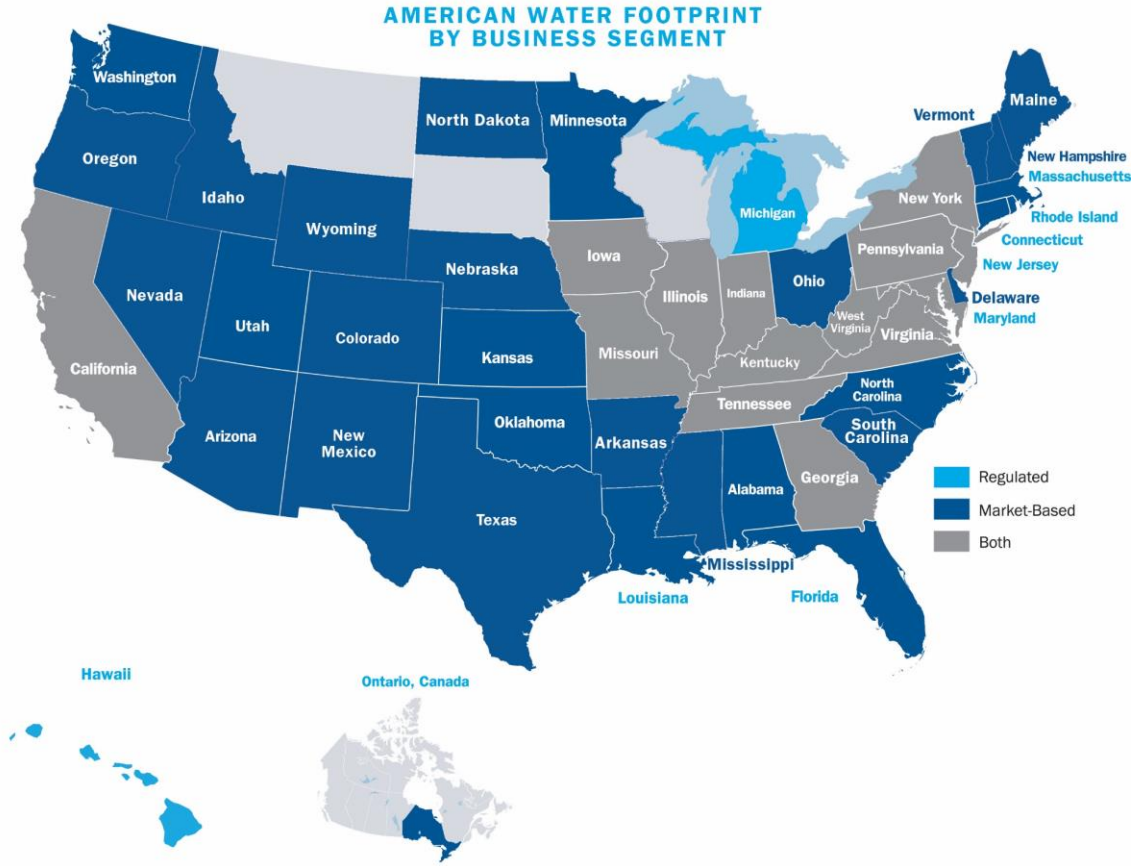
AMERICAN WATER

WHO WE ARE

We are the largest and most geographically diverse publicly traded water and wastewater service provider in the Unites States.

- We serve a broad national footprint and a strong local presence.
- We provide services to approximately 15 million people in **46 states** and Ontario, Canada.
- We employ **6,900** dedicated and active employees and support ongoing community support and corporate responsibility.
- We treat and deliver more than **one billion** gallons of water daily.



Safe

Drinking Water Regulations Continue to Evolve

1970s

21 Contaminants were monitored in public water supplies

1979

Monitoring of disinfection byproducts

1990s

Regulating copper and lead particles in piping network

Today

EPA public health advisory for Perfluorooctanoic Acid (PFOA) of 70 parts per trillion

89 Contaminants Regulated

Measuring Purity – Down to Parts per *Trillion*

- Your rich uncle passes away and leaves you $143,000,000. However, in counting your inheritance, you discover that 1 cent is missing.

- That is 70 parts per trillion.

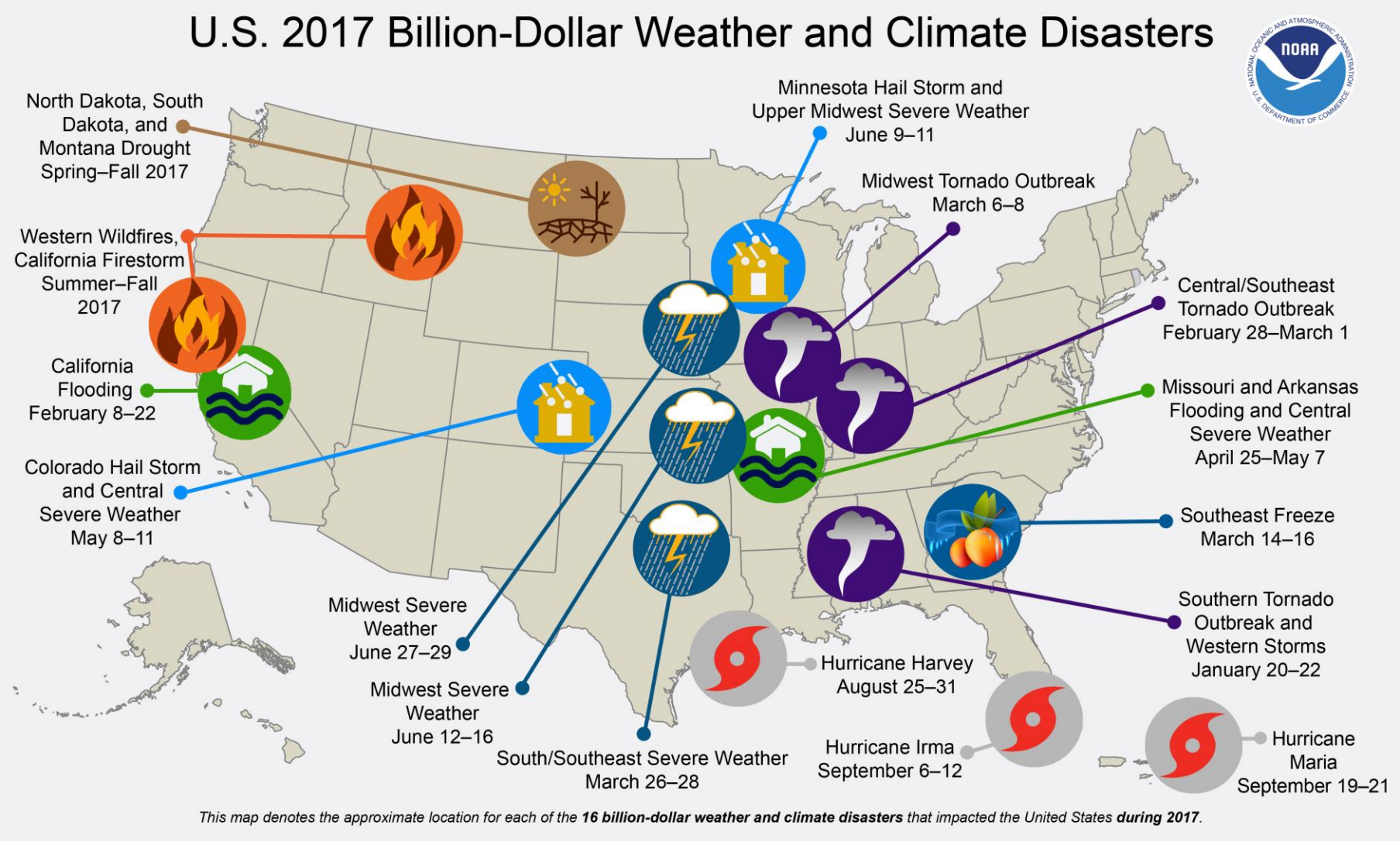
Estimated AW Cost of Removing PFOA is $50+ million

Quality is Never off the Clock

- **Real Time Water Quality Monitoring**
  - Provide real-time notification of water quality anomalies so that effective response actions can be implemented


Resilient

2017 United States Natural Disasters



A History of Extreme Events – Last 7 Years

1. April 2011 - Cairo, IL Flood
   - Levee Detonated to Relieve Rising Flood Waters
2. May 2011 - Joplin, MO EF-5 Tornado
   - Deadliest US Tornado of Record
3. August 2011 - Hurricane Irene
   - 7th Costliest Hurricane in US History Impacts NJ, NY and Northeast
4. September 2011 - Tropical Storm Lee
   - Record Flooding in PA, NY, NJ
5. October 2011 - Nor'easter
   - Widespread power outages across 12 States
6. June 2012 - Derecho
   - Most Destructive and Deadly Thunderstorm in North American History
7. October 2012 - Superstorm Sandy
   - 2nd Costliest Hurricane in US History. 14 foot storm surge, 1,100 mile wide
8. 2012-2016 - California Drought
   - 4-year drought of historic proportions
9. 2015 - Algal Toxin Threat on Ohio River
10. Winter 2013-2014 - Polar Vortex
    - Record low temps in Midwest, NJ & NY
    - Largest power outages (>715,000) in PA history due to ice storm
11. April-May 2017 - Flooding in MO
    - 14 locations with record flooding, including multiple locations along Meramec River
12. Oct-Dec 2017 - California Wildfires
    - Thomas Fire in Ventura (>281,000 acres destroyed) is largest destructive fire in CA's history

Effect of Climate Variability On Water Utilities

Extreme Weather Projections

- More frequent/intense heat waves and droughts = higher peak demands and reduced SW and GW supplies
- More frequent/intense rainfall & variability
- More extreme storms = more frequent/widespread power outages
- Deteriorating water quality (turbidity, salinity, algae)

Water Utility Impacts

- Increased plant and pump station capacities, additional supply development, demand management
- More flood protection of infrastructure; larger dam spillways
- More emergency power capacity (standby generators, alternative fuels)
- Enhanced / advanced treatment, alternative supply development

Case Study: Pre-Hurricane Irene at Hershey, PA

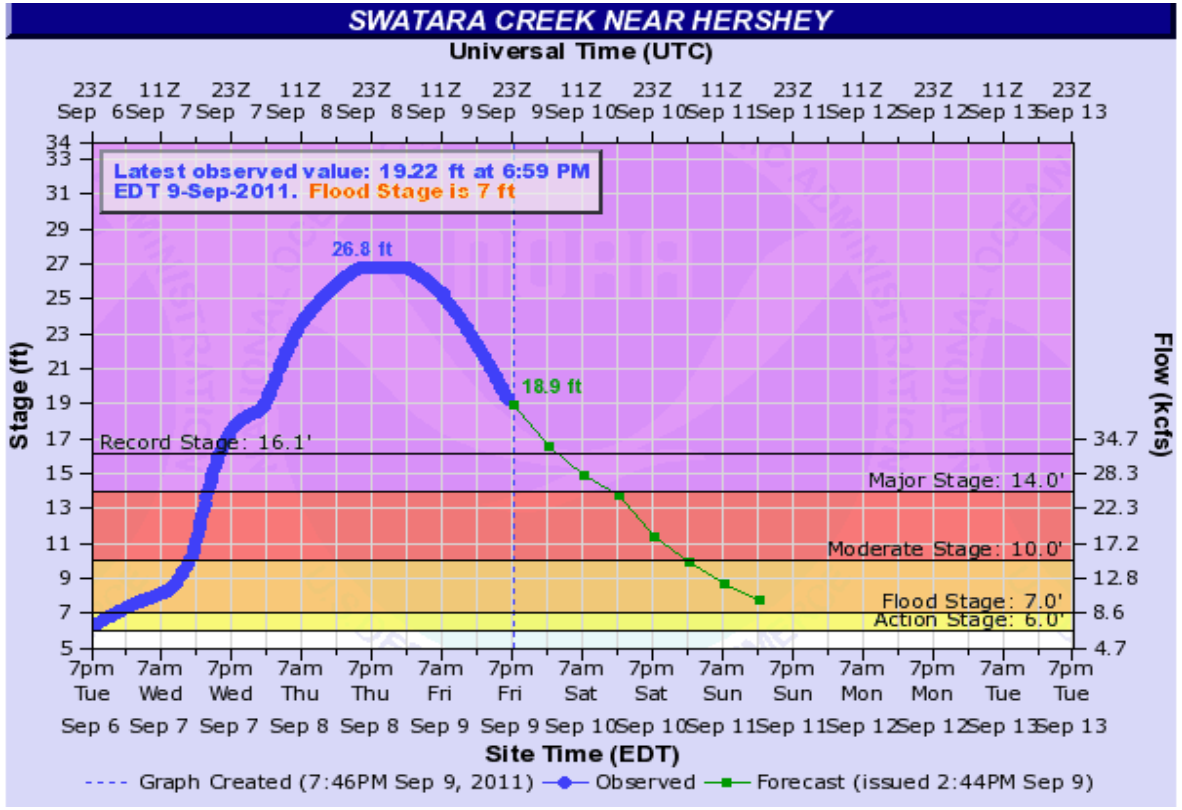
Raw Water Pump Station (built 1992)

- Hurricane Irene occurred on August 27, 2011 and was immediately followed by Tropical Storm Lee on September 7, 2011.
  - 13.6 inches of rainfall between the two storms

Case Study: Post-Hurricane Irene at Hershey, PA

Hurricane Irene: New flood record by 10 feet

- After experiencing 13.6 inches of rainfall, the Swatara Creek reached a record high crest of 26 feet. This smashes the previous record high by nearly 10 feet!
- The flood stage of the Swatara Creek is 7 feet



Hershey PA Case Study: Water Service Uninterrupted

Water service to customers remained uninterrupted because of effective facility design …and the dedication of the operating staff

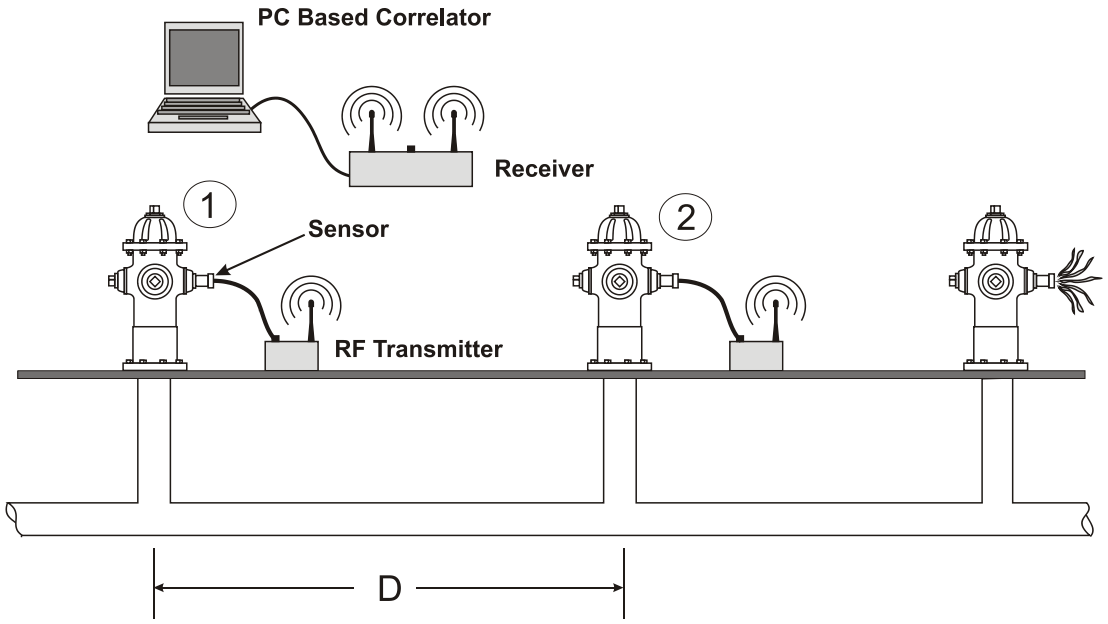
NJ – Raritan Millstone WTP raised Flood Wall

- R-M plant provides water to nearly 1 million people.
- Raising the existing floodwall: $37 million


Customer
Focused
AMERICAN WATER

Buried Pipe Acoustic Condition Assessment

Low frequency acoustic pressure waves are used to assess the condition and remaining thickness of underground piping.



Benefits

- A method to non-intrusively measure the condition of water mains
- Detect pipe weaknesses before main breaks occur
- No disruption to service while mains are being tested

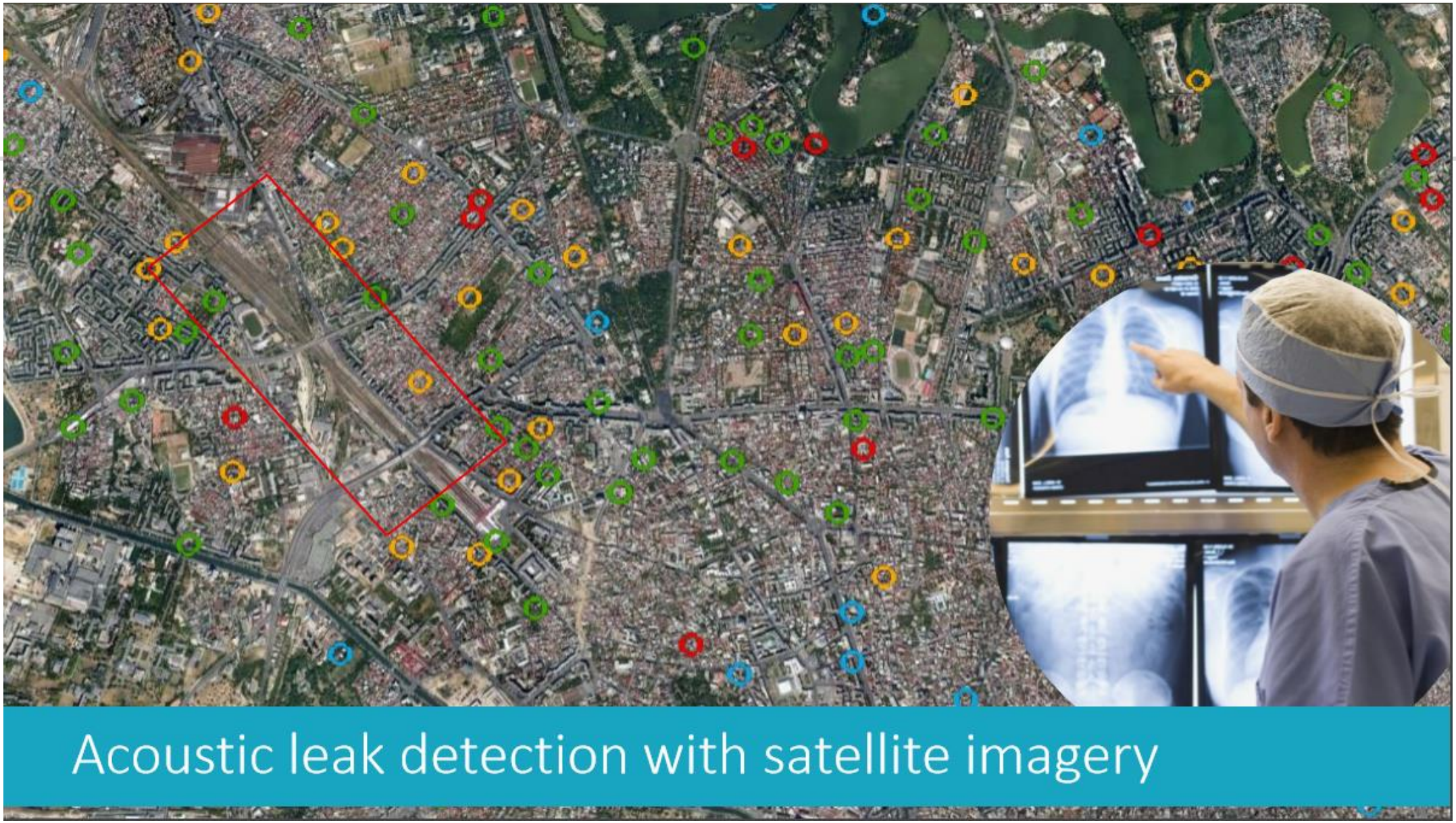


Photo Courtesy of Utilis Inc.

Pipe Rehabilitation Technologies

- Trenchless Technologies
  - Minimizes the space required to perform construction
    - Reduces dig-ups and Costs associated with repaving
  - Reduces time of disturbance
- Spray Lining
  - Rehabilitates Existing Infrastructure
    - Increases Usable Life
  - Eliminates the need to remove old pipe
    - Limited Construction Disturbance

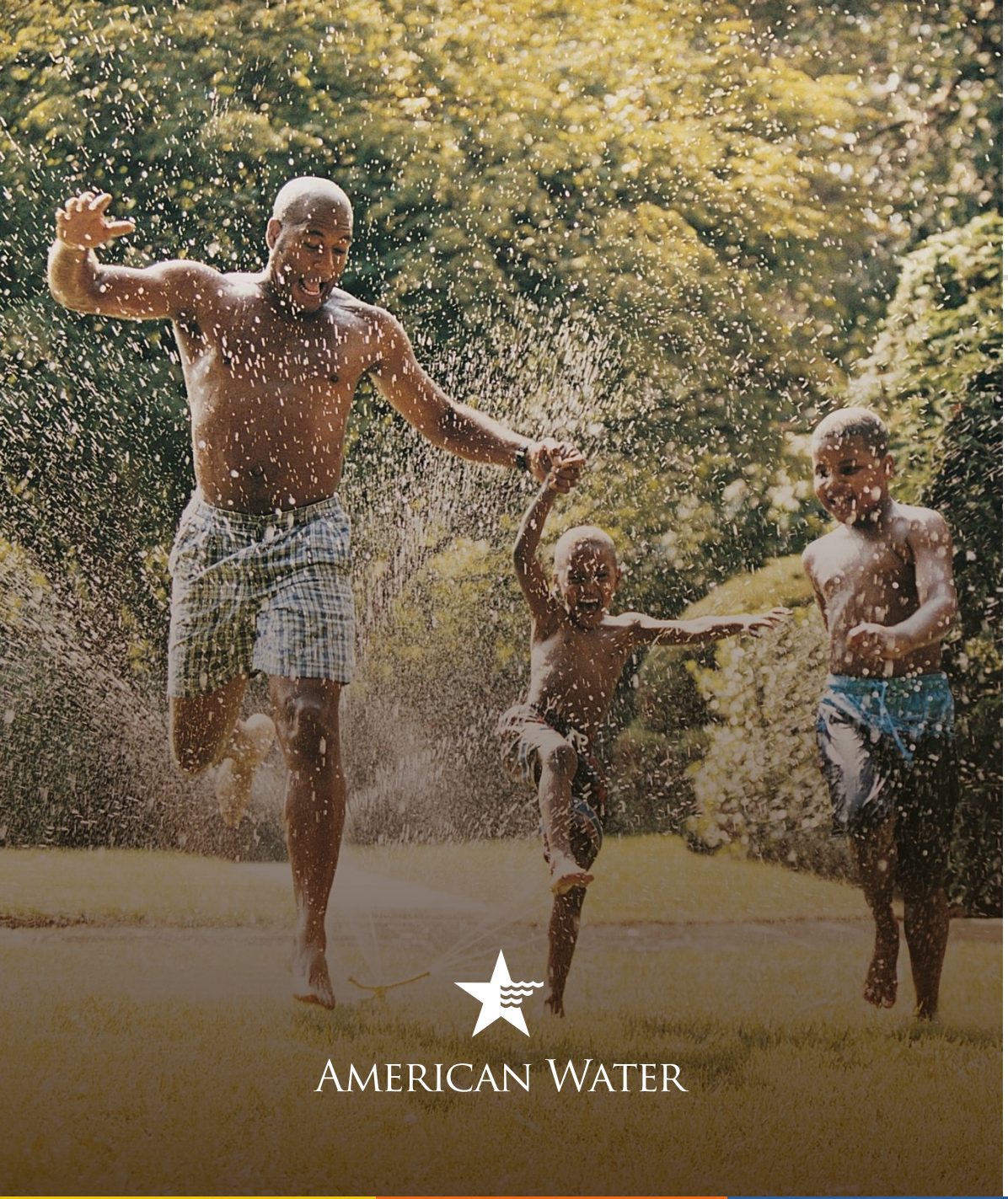
BEFORE

Visual Inspection with Drones

- Inspection
  - Efficient way to monitor and assess the condition of essential infrastructure
  - **Safer** for crews to access difficult sites (floods, bridges, etc.)
- GIS Mapping
  - 24x higher resolution than Google – valves visible
- *Drones are carefully maintained and pilots adhere to all regulatory and safety requirements*

Smart Irrigation Technology

- Automated and remotely controlled irrigation equipment
  - Prevents over watering during wet weather
    - Convenient control from a smartphone
- Summer 2017 pilot program in Rumson, NJ, was performed with great success.
  - Results show a 28% savings in irrigation water



Summary

- Water Quality regulations, aging infrastructure and weather extremes all present increasing challenges
- Delivery of water is capital intensive
- Over 50,000 water utilities in the US; many will struggle to provide safe, reliable service
- New technology will enhance effective service to customers

Thank You!

Questions?