Esri News
for Water & Wastewater

Fall 2015

Register for Esri's Second Annual Water Conference

Network, Hear ROI Success Stories, Gain Skills from Esri Instructors, and More

Registration is now open for the second annual Esri Water Conference! Join us in Austin, Texas, this February.

For the first time, Esri is combining water resource and water utility experts to bring you a holistic view of the planet's water supply—and how your great work is helping us preserve its quality, supply, and distribution.

Registering for this year's conference gets you access to

- Proven case studies for improving return on investment (ROI) through geographic information system (GIS) technology.
- More than 15 hours of training in the Hands-On Learning Lab with instructors on location.
- The latest Esri product enhancements.
- Solution engineers who can help you meet your challenges.
- Networking opportunities with hundreds of water professionals.

Register today at **esri.com/events/water**.

Irish Water Honored with Enterprise GIS Award at 2015 Esri User Conference

Utility Consolidates Infrastructure Management on One System

Sarah Alban, Esri Writer

Esri recognized Irish Water with the Enterprise Award for its achievements in GIS at the 2015 Esri User Conference, held July 20–24 at the San Diego Convention Center.

Irish Water is the new national water utility responsible for providing and developing water services throughout Ireland. Incorporated in July 2013 as a semi-state company under the Water Services Act of 2013, Irish Water will bring the water and wastewater services of its 31 local authorities together under one national service provider. To do so, the utility consolidated its operations onto a single GIS platform, Esri ArcGIS. The consolidation took 12 months. In the first month and a half, Irish Water was able to meter more than 1.3 million homes.

"We have all water assets for the whole country in a single geodatabase," Irish Water programme manager Paul Ahern said. "To trade and analyze information off this single source is a huge benefit."

More than 2,000 users currently access the national geodatabase across departments in asset management, operations, workflows, capital investments, strategic planning, and customer services. With such broad adoption of GIS, Irish Water can better deliver water services and increase access to potable water.

The purpose of Irish Water is to safeguard water as a precious natural resource and deliver water services in a way that protects the environment and meets the needs of all citizens and industry, now and in the future.

Contents

Fall 2015

1 Register for Esri's Second Annual Water Conference

1 Irish Water Honored with Enterprise GIS Award at 2015 Esri User Conference

3 Mind the Gap

4 David Totman Named Industry Manager for Esri Global Water Practice

5 City of Fontana Saves $200,000 Annually with Turf Irrigation Web Map

6 Georgia Utility Saves 37.5 Hours per Week with Meter Map

7 Charlotte Water Scores with GIS

8 More than Maps

8 Four Best Practices You Can Adopt Today

10 Thank You to Our Sponsors

10 2015 Special Achievement in GIS Award Winners in Water/Wastewater/Stormwater and Water Resources

Esri News for Water & Wastewater is a publication of the Water/Wastewater Group of Esri.

To contact the Esri Desktop Order Center, call 1-800-447-9778 within the United States or 909-793-2853, ext. 1-1235, outside the United States.

Visit the Esri website at esri.com.

View *Esri News for Water & Wastewater* online at esri.com/waterwrites or scan the code below with your smartphone.

Advertise with Us

E-mail ads@esri.com.

Submit Content

To submit articles for publication in *Esri News for Water & Wastewater*, contact Christa Campbell, industry specialist, at ccampbell@esri.com or Robby Deming, industry writer, at rdeming@esri.com.

Manage Your Subscription

To subscribe, unsubscribe, or make changes to your Esri publications, please go to esri.com/updates.

Outside the United States, please contact your international distributor to subscribe, unsubscribe, or change your address. For a directory of distributors, visit esri.com/distributors.

Circulation Services

For back issues, missed issues, and other circulation services, email requests@esri.com; call 909-793-2853, extension 2778; or fax 909-798-0560.

Mind the Gap

Earlier this year, I received *The Knowing-Doing Gap* by Jeffrey Pfeffer and Robert Sutton. The book argues that organizations lock valuable information in departments and systems—rather than sharing it. By sharing information, they would realize the information's full value and benefit to their organizations. This is a common problem that GIS professionals encounter when looking for information from other business systems. Through conferences, industry events, and webinars, I've had the chance to notice a common theme from many water utility GIS users. Many of them simply didn't know that a fix to the challenges they were encountering was already available. I can't tell you how many times I've heard, "Esri makes something that solves my problem? I had no idea."

We need to fix this knowing-doing gap!

It's hard to stay updated on the latest technology solutions and to know which ones have actually helped people facing your challenges. Change in any industry can result in a knowing-doing gap, and I would like to close that gap in the way that's most valuable to you. To that end, here are five resources from Esri that most people have no idea are available to their organizations:

1. New Water Website

Esri has gathered resources just for you—to help yourselves, your executives, your contractors, and others, get started with ArcGIS at your utility. Visit esri.com/water.

2. The White Paper *Implementing ArcGIS for Water Utilities*

If you want to know how to get the most out of ArcGIS, this is the white paper to read. You'll find your starting point along with examples so you can put a strong GIS plan in place. Download the white paper at esriurl.com/A4WUwhitepaper.

3. Water Solutions

Yes, Esri makes solutions just for you. We call them ArcGIS for Water Utilities. Get started with Esri solutions for water utilities, complete with descriptions and demos at esriurl.com/watersolutions.

4. Customer Success Stories

You're getting work done every day. Sometimes we're lucky enough to hear your stories. Share your stories by reaching out to the Esri water team, and view your peers' stories online. One of our favorite success stories right now is from the White House Utility District (WHUD) in Tennessee. See how WHUD is saving millions with a GIS platform in a video at esriurl.com/whud.

5. Esri Water Conference—Austin, Texas, USA

The second annual Esri Water Conference will be expanding on the inaugural conference with the inclusion of water resources. Come get the latest on proven ways to solve today's water utility and water resources challenges with GIS. Information for the Esri Water Conference can be found at esri.com/events/water.

My goal is to help close the knowing-doing gap. Now you know about the tools at hand. The question is, what will you do?

I look forward to hearing about your achievements in person at the conference in Austin.

Jim Higgins
Director, Esri Global Water Practice

David Totman Named Industry Manager for Esri Global Water Practice

David Totman
Industry Manager—Global Water Practice
Redlands, California
dtotman@esri.com
909-793-2853, ext. 2734

David Totman is the new industry manager of the Esri global water practice, providing thought leadership and market direction. He has been using GIS for over 25 years in business process optimization, project analytics, and infrastructure management.

Now focused on water, Totman previously served as the industry manager for Esri in the public works; architecture, engineering, and construction (AEC); and survey markets. Before joining Esri, he served as the manager of asset management for Colorado Springs Utilities, one of the largest four-service, municipally owned utilities in the United States. He was educated in chemistry at Rensselaer Polytechnic Institute and received his bachelor of science degree in geological engineering from Arizona State University (ASU). His graduate work at ASU included a research assistantship with the College of Construction and thesis development in groundwater transportation methods.

He has served on the Arizona Geographic Information Council (AGIC) and has been a member of the Geospatial Information & Technology Association (GITA) since its AM/FM International days. He currently manages the Esri corporate membership in the American Water Works Association (AWWA) and the American Public Works Association (APWA), and he is a voting board member of the Open Design Alliance (ODA). As a member of the American Society of Civil Engineers, he serves on multiple committees, most notably the Utilities Engineering and Surveying Institute (UESI) as the executive committee chair for the Asset Management Division and executive committee vice-chair for the Geomatics Division.

Previous Water Experience Highlights

- Groundwater Hydrologist with Arizona Department of Environmental Quality: Most notably, used GIS to assess N15/N14 isotope ratios as tracer to groundwater pollution from nitrates
- GIS Supervisor of Arizona Department of Water Resources, Adjudications Division: Used GIS to determine aquifer-safe yield in water rights adjudication cases in Maricopa County Water Superior Court
- Senior Scientist for Lockheed: Developed GIS-based analytical tool associating hyperspectral imagery with GPS-located Total Dissolved Solids (TDS) readings in the Great Lakes
- Managing Consultant for Berger & Co./Modis/Idea Integration: Architected enterprise technology solution for Colorado Springs Utilities in response to its Sanitary Sewer Compliance Order on Consent
- Manager of Asset Management at Colorado Springs Utilities: Supported property acquisition and asset management program to the $1.2 billion Southern Delivery System (SDS) water project, developed predictive algorithms for water main breaks, and operationalized a hydrant risk model for fire flow and hydrant flushing programs

Join Totman's @EsriWaterGuy Twitter account to follow his new video series on updates regarding everything in water.

City of Fontana Saves $200,000 Annually with Turf Irrigation Web Map

The City of Fontana, California, serves a population of over 200,000 people. The city irrigates approximately 530 acres of urban landscape, including parks and parkways. Staff wanted to ensure the city wasn't applying unnecessary irrigation to urban landscape. Fontana's analysts asked the GIS team to provide a map solution that would display—in one web application—each of the city's 550 meters' real-time water use. The map would expand Fontana's mission to reach zero water waste during an ongoing California drought.

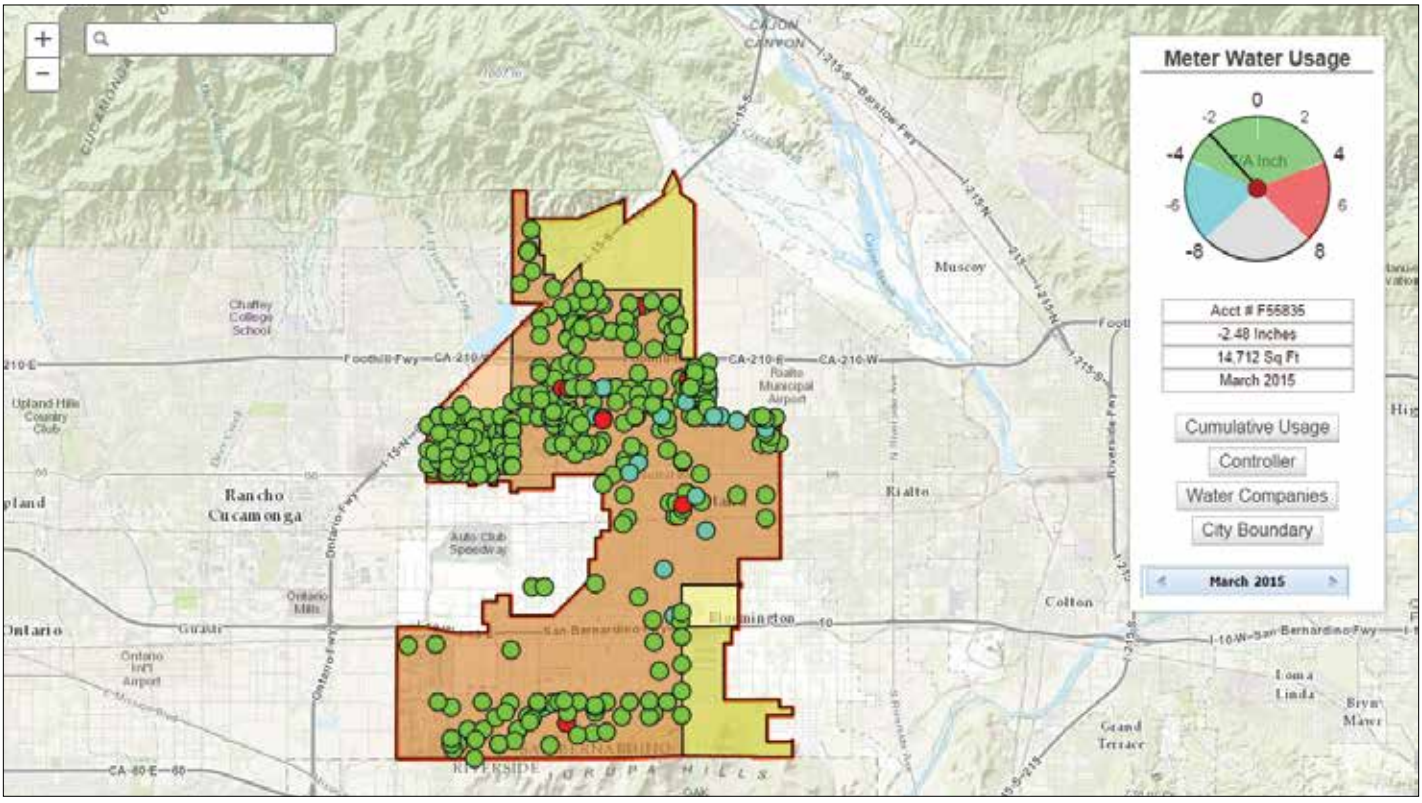
What Did the City of Fontana Do?

Fontana had been collecting its water metering and landscape data for years. Bringing this information into the city's GIS allowed staff to make a prototype of a map service in ArcGIS Online. The map service shows in real time how many inches of water are applied per meter. Staff can compare this actual watering to budgeted watering through a calculation that converts inches to gallons, and gallons to dollars. The automation eliminates the previous manual workflow requiring staff to sift through hundreds of data pages and spreadsheets. Through radio telemetry, office staff can actually modify water application for individual meters, based on what is on the web map. The city estimates a $200,000 annual savings. The web map has helped the city conserve water, part of Fontana's mission to better serve residents. The application has also been used to help Fontana abide by recent regulations enacted in California to help reduce water use by 25 percent during severe drought. Selected city staff now have access to the maps on any device, whether in the field or office, to monitor actual versus budgeted watering.

Could You Use This?

Water agencies wishing to reduce water waste for emergency legislation compliance and cost savings can use web map services to better understand real-time water application. ArcGIS Online enables users across water utilities to compare actual to budgeted water application so teams can take action to curb water waste and better reach targets.

For more information, contact Rogelio Matta, Senior Administrative Analyst at rmatta@fontana.org.



↑ Mapping dashboards help Fontana monitor water use and make quick, informed decisions to ensure compliance with California water-use regulations.

Georgia Utility Saves 37.5 Hours per Week with Meter Map

Clayton County Water Authority provides water, sewer, and stormwater services to more than 75,000 customers in six cities south of Atlanta, Georgia. Clayton County has a transient population, with people moving in and out. Meter technicians service approximately 800 accounts a day, turning meters on and off as needed. In the past, routing the day's tasks was a manual process that took each technician up to an hour.

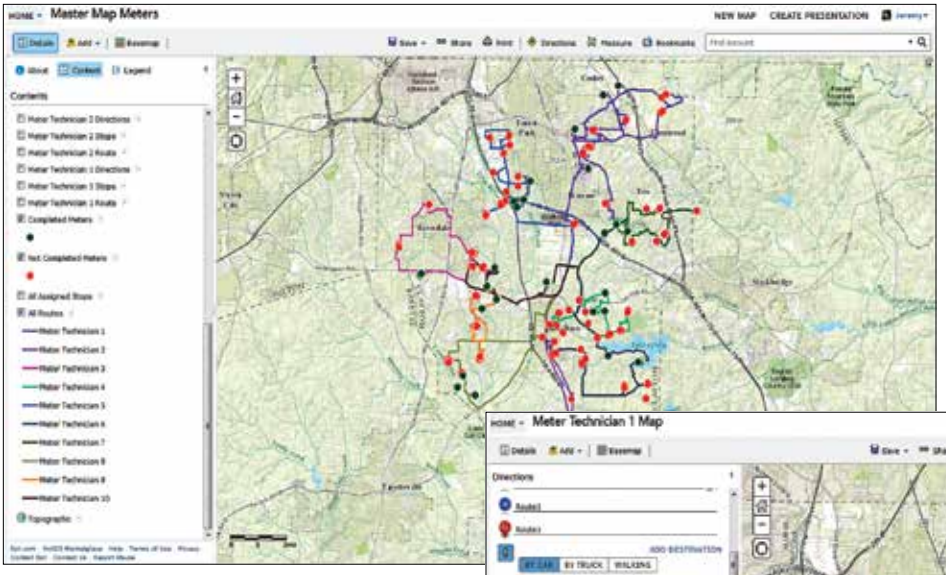
What Did Clayton County Water Authority Do?

The water authority set up ArcGIS Online to automate route planning. Each morning, personnel export a text file from the customer service system. This CSV file gets geocoded as a batch file and dragged onto a master web map. Next, each technician's assignment is filtered to an individual web map, named for the technician, and accessed in the field via ArcGIS Online. Each map includes a basemap, stops layer, route, directions widget, and tasks (turn off/on). Managers and supervisors can view all the day's routes on a single web map that also allows them to see when technicians mark accounts as being completed. Technicians can receive new stops throughout the day, via phone or email, and easily add them to the map and use them to rebuild routes in the field.

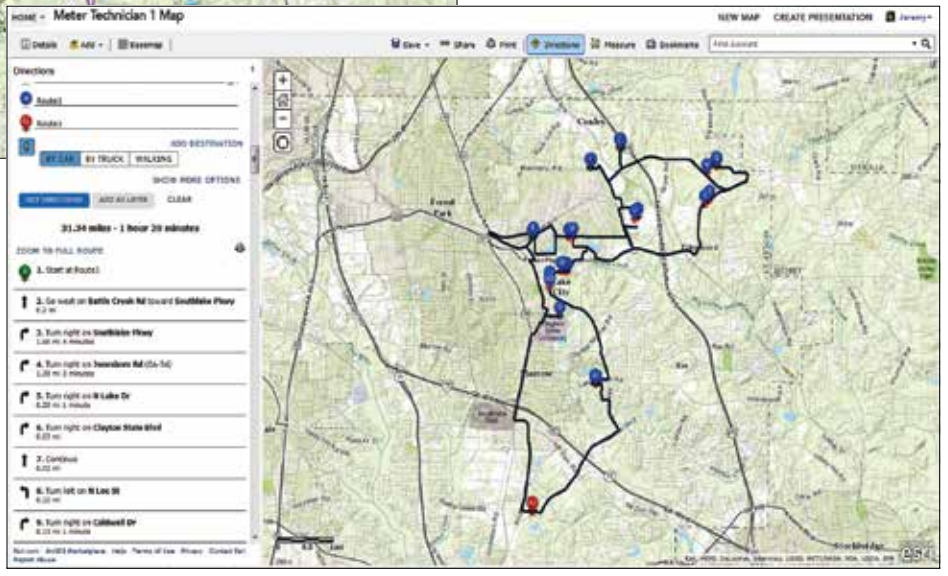
Could You Use This?

If you would like to streamline route planning, speed field tasks, and gain visibility into meter-reading progress, Esri technology can help you. Clayton County Water Authority estimates that it saves 45 minutes per technician, per day. The hour-long planning process has been reduced to minutes. Technicians complete more work, faster. Supervisors also have greater accountability for technicians.

For more information contact Bryan St. Mary, GIS coordinator, at bryan.stmary@ccwa.us.



↑ Maps show the day's routes and stops for each technician.



↓ ArcGIS Online maps provide detailed routing directions for each technician.

Charlotte Water Scores with GIS

Assessing Infiltration and Exfiltration of Groundwater in a Sanitary Sewage Collection System

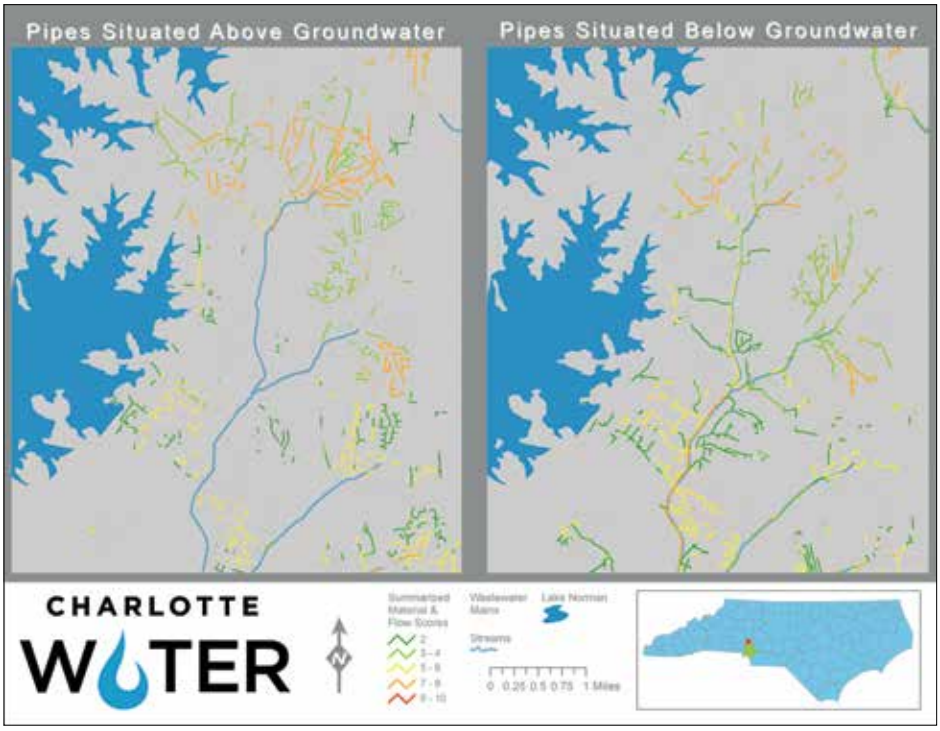
By Meredith Moore, Business Analyst, Charlotte Water

I recently completed a nine-month research and analysis project for Charlotte Water. Charlotte Water's sanitary sewer pipe network needed a simple scoring system—one incorporating groundwater elevation, sewer pipe elevation, pipe material, and volume of sewage carried by those pipes. A score would quantify the risk of sewage getting out of the pipe or of groundwater getting into it.

Thanks to groundwater sampling from 2000, we knew we needed this scoring system. The sampling found high concentrations of fecal coliform bacteria in groundwater, specifically where sewer pipes sat above the water table. Damaged pipes were letting sewage leak into the surrounding soils and groundwater. Some bacteria reached our streams, potentially harming water resources.

We noticed lower bacterial concentrations where sewer lines sat under the water table. Here, pressure kept sewage from leaking out of the pipe. However, groundwater could infiltrate damaged pipes; as a result, Charlotte Water was sometimes using its treatment capacities to treat groundwater unnecessarily.

Of course, not all sewer lines above the water table leaked sewage into surrounding soil, and not all sewer lines below the water table were being infiltrated by clean groundwater. Charlotte Water needed a way to determine which pipes were at greatest risk for this exfiltration and infiltration. We needed to quantify this risk.



↑ Mapping pipes above and below groundwater reveal potential leak and infiltration locations.

A Sound Groundwater Scoring System

Charlotte Water had a wealth of GIS data. This included sewer pipe elevation, which we could compare to groundwater elevation (i.e., the water table). To do this, I had to build a GIS layer for groundwater elevation. I created this layer by using regression analysis on slope, elevation, and known groundwater elevation values. To test my layer's accuracy, I cross-referenced my layer with already documented infiltration locations from initial closed circuit television (CCTV) investigations. The layer was accurate!

Now I could compare the water table elevation to our sewer pipes' elevation. I divided the pipe into two datasets, for pipes above the water table and for those below. Then I assigned each pipe a score according to its material and the volume of sewage it carried.

For material type, a score of 5 indicated a highest-risk pipe (material type: terra cotta) and a score of 1 indicated the lowest-risk pipe (material type: PVC).

For volume, I used consumption data collected from November 2014, which tracked individual meters through sewer pipes and down to wastewater treatment plants. November represented a typical month of consumption, excluding the high-watering months of summer; we

> "This tool and other tools like it are part of the customer service kit we know we will have to continue to replenish as we move towards heightened operational resiliency."
>
> —Charlotte Water Continuous Improvement Officer Regina Dobson Cousar

continued on page 9

More than Maps

Cut Costs, Save Water through Spatial Asset Management

Water utilities face unprecedented challenges, from severe drought and flooding to innumerable leaks and main breaks. At no point has the pressure to increase efficiencies been greater.

Fortunately, advancements in technology have better equipped water professionals to handle these challenges.

According to the American Water Works Association, one of the best ways to gain efficiency starts with your asset management.

Asset Management for Efficiency

Smart asset managers must answer four questions:

1. What assets do we have?
2. Where are they?
3. What are their conditions?
4. How are they performing?

Your utility probably has this data. But it may live in many systems, such as billing and work order management systems. It may even live on paper blueprints. There's now an easy-to-use technology solution for hosting all this data in one place.

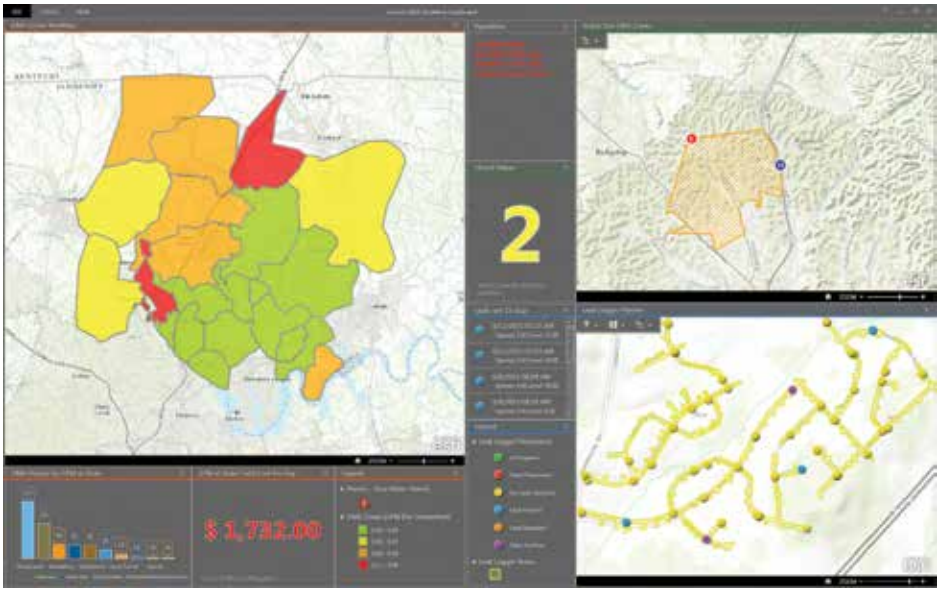
ArcGIS for Asset Management

Water utilities have started realizing million-dollar gains by integrating all their asset information into their geodatabase. The key here is understanding that GIS is no longer a one-team mapping system. It's a platform capable of integrating all your asset data in one place—becoming your single source of truth for smarter decision making.

Six Ways to Save with GIS

Connecting your data on one platform means cutting costs. Here are six ways utilities today are saving water—and money—with a GIS platform approach:

- **Using digital data collection forms**
  Digital forms eliminate your need for paper notepads. Let your workers enter data from the field. This reduces errors, cuts labor hours, and eliminates lag time in data updates.
- **Routing field crews faster**
  Get your crews to inspection and maintenance sites by taking the fastest, shortest way possible. Easily configured applications show your crews the smartest route from job site to job site. You save trips, gas, and time—and your employees get the job done faster.
- **Clustering workloads**
  Cluster workloads on a map to see where you can send one crew to get all the jobs done. Spatial analytics lets you determine the exact resources needed to maximize productivity.
- **Providing faster emergency response—and prevention**
  When a main breaks, you need real-time updates. Push these to your phone so you know the current water loss, the crews' location as they get to and work on the job site, and milestones in emergency response. Your GIS mapping applications become your bird's-eye view for situational awareness.
- **Prioritizing data-driven capital improvements**
  Make stronger decisions about which assets need your attention today so you leverage the full value of your infrastructure investments.
- **Quantifying water loss**
  You can actually reduce water loss with spatial analytics. New tools let you quickly pinpoint underground leaks and target leak response as situations unfold.



Join Your Fellow Utilities

Face your challenges with today's proven solutions. To learn more about how utilities are transforming their GIS technology into a proactive powerhouse of actionable intelligence, visit esri.com/water.

Four Best Practices You Can Adopt Today

1. Capture your workforce's institutional knowledge.

As your most seasoned workers near retirement age, capture their many years of experience. By configuring your GIS to collect information, you will have digital records of employees' knowledge after they leave. And this can be done easily.

2. Equip your field crews to update data in real time.

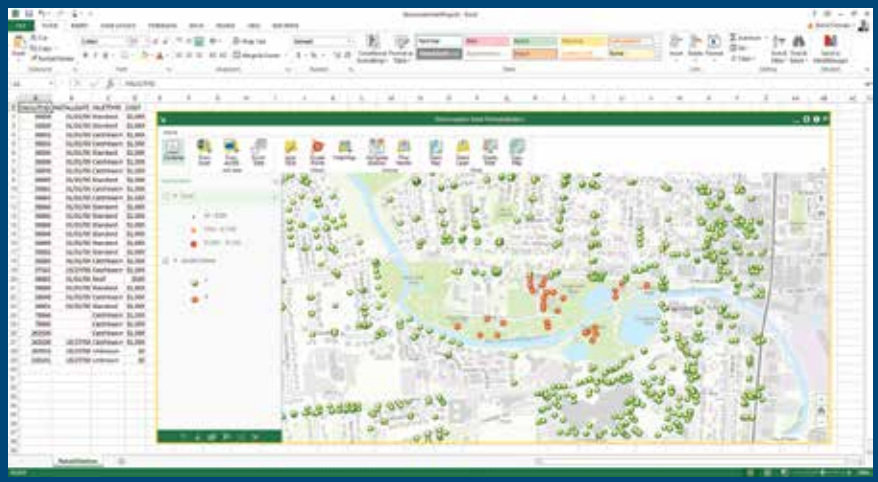
Your asset inventory is only as accurate as your data. By collecting data in real time, such as through mobile apps that instantly update your utility's geodatabase, you reduce errors resulting from manual entry and reentry. You also nearly eliminate lag times for GIS updates. Many GIS applications today can be configured with little or no coding to offer this functionality.

3. Give your office engineers and managers an easy way to understand data.

Your decision makers don't have to know GIS to benefit from spatial analytics. Today's GIS includes preconfigured maps and apps that let supervisors and analysts easily interact with data. There is even a free app that lets you make rich maps directly from Microsoft Excel. These maps highlight relationships within business-critical data, so your decision makers can determine where their resources are most needed.

4. Collaborate with accountants.

Financial applications can interact directly with your asset inventory. This puts every asset into a fiscal light, which helps your accountants identify areas to improve the bottom line.



Charlotte Water Scores with GIS

continued from page 7

also discarded large water consumers such as the local soda bottling facility. (While customer consumption data does not necessarily equal sewage volume in a collection system, it was a good approximation for our needs.) A score of 5 indicated the highest-volume-carrying pipes, and a score of 1 indicated the lowest-volume-carrying pipes.

Finally, I summarized the pipes' material and volume scores. My two output datasets for pipes above and below the water table showed us the potential risk of each pipe for exfiltration and infiltration. The local stormwater utility, Charlotte-Mecklenburg Storm Water Services (CMSWS), can use the scores for sewer pipes above the groundwater elevation to target water quality monitoring efforts in high exfiltration-risk areas. The utility can use the scores for pipes under the water table to evaluate inflow and infiltration in Charlotte Water's collection system.

Both datasets have the potential to help prioritize sewer line rehabilitation and repair plans.

"By scoring our pipes, we can be more strategic about field service activities," Charlotte Water continuous improvement officer Regina Dobson Cousar said. "Being strategic about reactive repairs—and hopefully in the future, much more predictive about preventive repair—will assist us with our goal to be efficient and effective stewards of community resources."

About the Author and This Project

This project was Meredith Moore's capstone project to earn a master of geographic information systems (MGIS) degree from Penn State University. Moore was chosen as Penn State's Esri Development Center Outstanding Student of the Year (2015) for her performance in this project.

If you have questions about this article, contact Moore at msmoore @charlottenc.gov.

Thank You to Our Sponsors

Steel

Cityworks

itpipes.com

KISTERS

Cast Iron

CH2MHILL.

Concrete

DHI

EMA

lucity

PIPELOGIX

PVC

Black & Veatch

GISi

Innovyze

RouteSmart

Woolpert

2015 Special Achievement in GIS Award Winners in Water/Wastewater/Stormwater and Water Resources

Esri congratulates its 2015 Special Achievement in GIS (SAG) Award winners in water/wastewater/stormwater and water resources.

1. White House Utility District, USA
2. Cyprus Water Development Department, Cyprus
3. Water Utility of Thessaloniki, Greece
4. Samenwerkingsverband Waterkracht, The Netherlands

PennWell®

Providing resources, data, customers, and audiences to make your business a success.






Industries Served:

Oil & Gas | Power | Hydropower | Renewable Energy | Fire | Public Safety
Aviation & Defense | Water & Waste Management | Dental
LEDs & Lighting | Cabling & Broadband | Optoelectronics

PennWell®

www.pennwell.com

380 New York Street
Redlands, California 92373-8100 USA

Presorted
Standard
US Postage
Paid
Esri

148016 INLD39.5M11/15sp

Esri Water CONFERENCE 2016

February 9–11, 2016 | Austin, Texas

Join us at Esri Water Conference 2016 in Austin, Texas, to discover how the power of location can help us all better manage and preserve our most precious resource.

Register at esri.com/water2016.