

Briefly Noted

Space42, Microsoft Join Map Africa Initiative

Many of Africa's official maps are fragmented, outdated, or hard to access, leaving governments and businesses to make major decisions with inaccurate or incomplete data. Within five years, Esri's Map Africa initiative aims to deliver high-resolution, scalable geospatial data across all 54 African countries, benefiting more than 1.4 billion people. Now, Space42—a United Arab Emirates-based AI and space technology company—along with Microsoft will partner with Esri to provide African nations with locally managed geospatial data. Space42 will lead fundraising and project management and provide satellite imagery. Esri will orchestrate basemap production using its GeoAI and remote sensing capabilities, while also supporting regional hubs that build local capacity. Microsoft will provide secure cloud infrastructure and an AI framework through Azure to support data processing, sharing, and integration at scale. To learn more about Map Africa, go to links.esri.com/MapAfrica.

New E-Commerce Experience for Demographic Data

Organizations can now purchase updated, authoritative demographic datasets via Esri's new e-commerce experience in the Esri Store. "Organizations will have access to current-year and five-year estimates for more than 2,000 demographic and socioeconomic characteristics in the United States, as well as census and American Community Survey (ACS) information, consumer spending trends, market potential, and more available on demand to fit their workflows," said Rob Elkins, Esri's director of product management. Go to esri.com/store to explore the data.

Integrating Everything, Everywhere with GIS

There was a palpable buzz in the air during the 2025 Esri User Conference (Esri UC), held July 14–18 in San Diego, California.

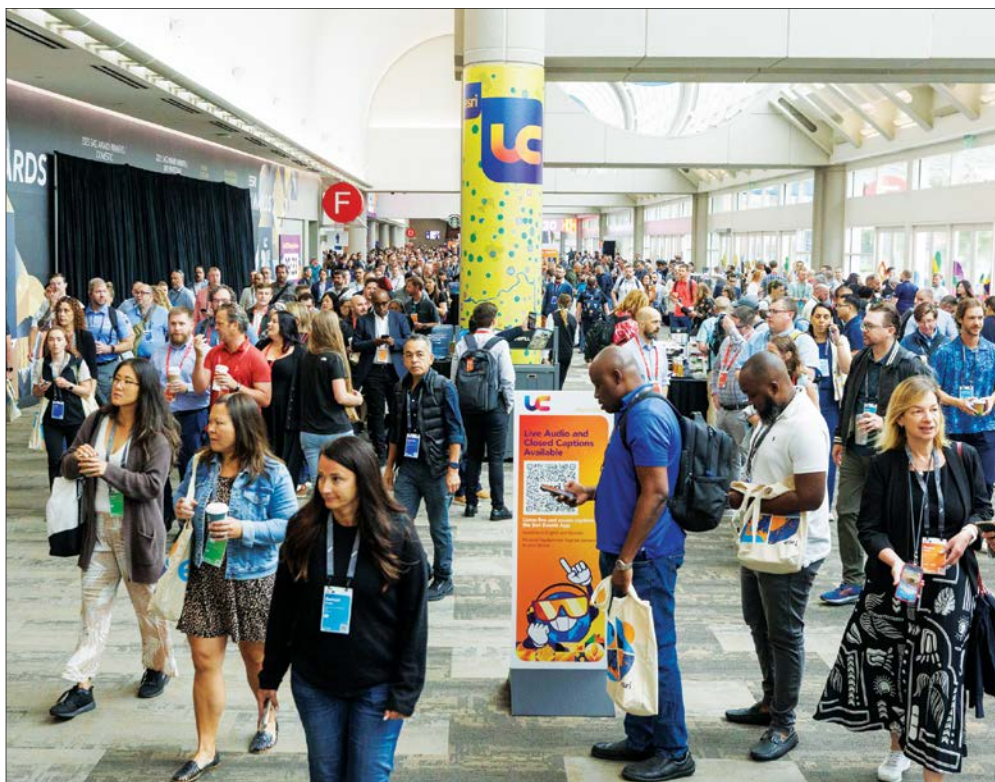
"Vibes are high. Everyone's kind of jazzed," said Layne LeBleu, who was the GIS and asset management analyst for the City of Hillsboro, Oregon's Public Works Department at the time. This was LeBleu's fourth time attending the Esri UC. In addition to watching the Plenary Session—which always makes him feel like "I can change the world"—he said he appreciated seeing other GIS users "talking about the cool work they've been doing."

Irene Egbulefu, a GIS analyst for Travis County, Texas, who has used the technology for more than 15 years, was enthusiastic about her third Esri UC.

"[I'm here] to learn innovations in GIS, see what's going on, and what's new," she said. "My company uses a lot of GIS, so we need to be up-to-date."

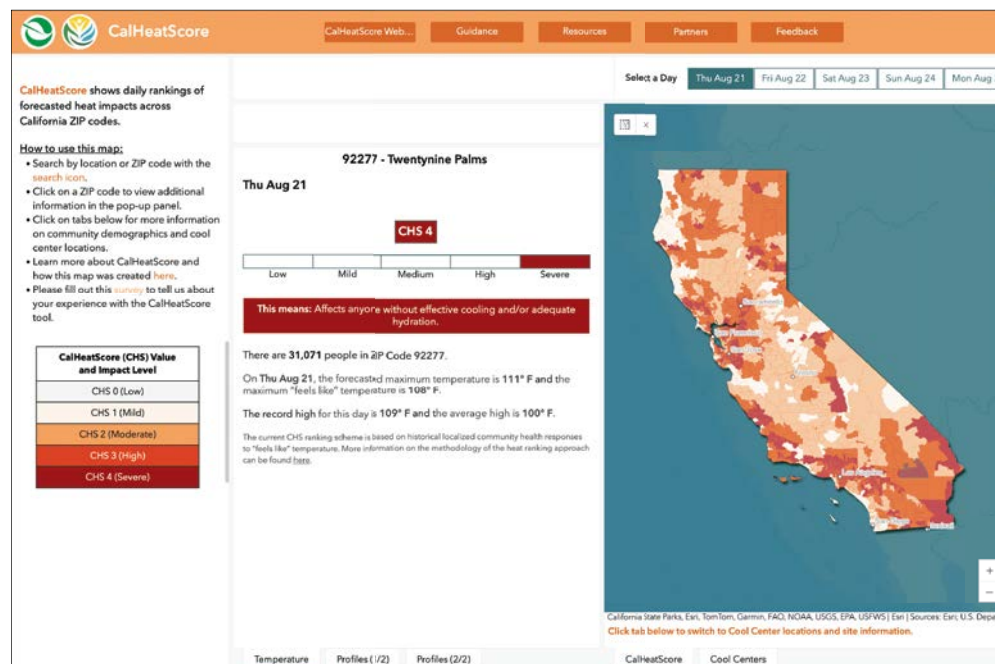
"It's a great way to be exposed to all sorts of cool technologies, ideas, and techniques," said Alyssa Gunning, a GIS analyst II for the City of Rocklin, California. "One of the best ways to learn is by talking with other people [and] seeing what they're doing,"

continued on page 4



↑ More than 15,000 people attended the 2025 Esri User Conference (Esri UC) in San Diego, California.

California Leads the Way in Preparing for Extreme Heat



↑ CalHeatScore ranks heat risk on a scale from 0–4 at the ZIP code level.

When warm temperatures rise above average levels, especially for several days or weeks in a row, the consequences can be dire. In September 2022, a 10-day heat wave in California brought temperatures of 109 degrees Fahrenheit to Long Beach and 116 degrees to Sacramento, killing 395 people, according to state health officials.

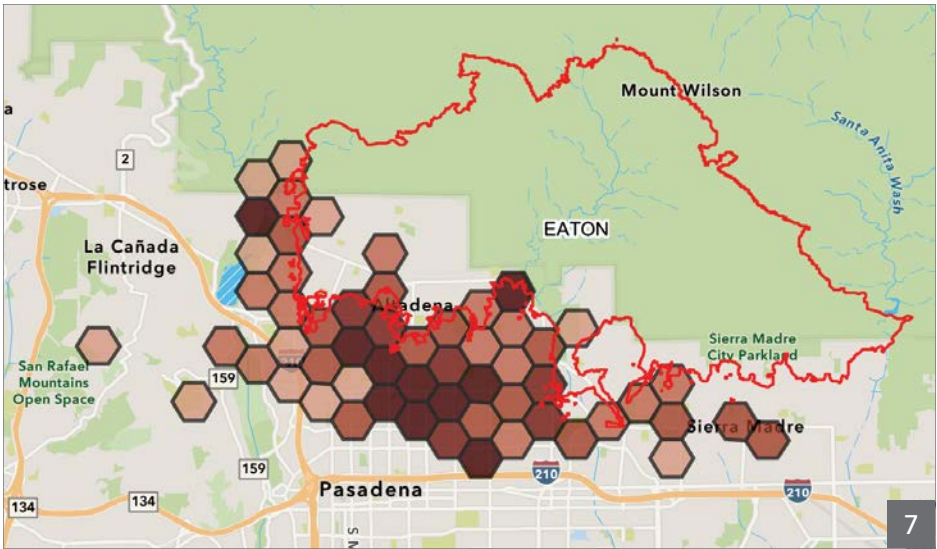
"Extreme heat kills more people than any other climate hazard combined—more than wildfire, more than hurricanes," said Walker Wieland, environmental program manager for California's Office of Environmental Health Hazard Assessment (OEHHA). "But extreme heat doesn't have eye-catching graphics or images to make people aware of its dangers."

During extreme heat events, more people get sick, and some die. Yet, according to Wieland, public awareness of extreme heat's dangers—and what to do when it strikes—remains low.

"A lot of people just think, 'I'm going to tough it out. I've felt heat like this in the past, so I'm just going to continue with all my planned activities for the day,'" he said. "But that can have really dangerous and sometimes deadly consequences."

To help people across California prepare for and stay safe during extreme heat events, Wieland and his team developed CalHeatScore, a first-of-its-kind

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After the devastating Pacific Palisades and Eaton fires ravaged Southern California neighborhoods in January 2025, thousands of homeowners were left wondering whether their soil was contaminated with toxic debris. Brianne Gilbert and her team at Community Action Project LA have stepped in to help, using GIS to collect and map soil test data.

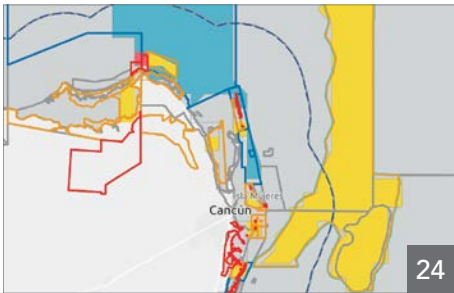


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YPN Turns 10!

“YPN has empowered thousands of people, built bridges across experience levels, and reinforced the power of community in the GIS profession.”

Raquel Perez, YPN Founder

Celebrating a Decade of Empowering Young GIS Professionals

For 10 years, the Esri Young Professionals Network (YPN) has encouraged newcomers to the GIS profession to build community, enhance their skills, and give back to those following in their footsteps.

“YPN was created with three core goals: to provide a space for GIS learning and skill building; to facilitate professional connections and community collaboration; and to foster leadership development through mentoring, speaking, and volunteering,” said Raquel Perez, Esri senior industry marketing manager and the founder of YPN. “For over 10 years, it has supported career progression from newcomers to seasoned professionals, often serving as a platform for mentorship and knowledge-sharing.”

What began as a grassroots program for Esri employees in 2015 quickly expanded into the broader GIS community through Esri events. Now, YPN—founded on the pillars of learn, connect, and lead—has nearly 20,000 members around the globe, 10 chapters across the United States, an ambassador program, established partnerships with professional organizations, and a robust presence at major GIS industry events.

“Over the past decade, YPN has evolved from an initiative inside Esri to a cornerstone of the GIS community,” said Perez, who remains a driving force behind the organization. “It’s not just a network, it’s a movement.”

The Genesis of YPN

The impetus for starting YPN was simple enough: An Esri director noticed at a conference that many young people were eager to make connections but perhaps felt overwhelmed by the process. So he reached out to Perez to see what to do about that.

She invited a handful of young professionals to share their ideas for what a networking group might look like.

“We wanted to get their perspective on what would be important to them,” Perez recalled. “A

lot of the conversation focused on the fact that they were young, just stepping out into their careers, and had the opportunity to attend conferences but didn’t know where to start.”

For Esri’s next event—the 2015 Esri FedGIS in Washington, DC—Perez put together a set of professional development sessions and a networking event geared toward young professionals. Since then, YPN has ensured that every Esri event includes sessions and networking opportunities for young people and folks who are new to the industry to get oriented and build connections. At events with a trade show or expo, such as at the Esri User Conference (Esri UC), Perez staffs a YPN booth that people can easily find to ask career questions, get feedback on their résumés and portfolios, and mingle with other GIS professionals.

A Great Way to Envision and Build a Career

YPN’s growing presence at conferences over the past 10 years has given young professionals a stronger foundation for exploring opportunities and launching their careers.

“It’s really overwhelming to attend a conference when you’re in college or just starting out in your career. You hear all these presentations from people who have been in the profession for 10 or 20 years, and they’re talking at a really high level, and you want to ask a question but don’t even know how to approach them,” said Sophia Garcia, Esri’s equity and civic nonprofit lead, speaking from experience.

She has been attending the Esri UC since she was in college and got involved with YPN right from its inception, when she was just finding her footing in GIS. Garcia—who has worked for local government, nonprofits, small consultancies, and now a large GIS company—has leveraged contacts she’s made through YPN, other professional organizations such as the Geospatial Professional Network (GPN), and conferences to orchestrate her career moves.

“Via YPN and other events and organizations I participate in, I was able to see people who had jobs that were centered on the community or equity space, and talking to different GIS professionals helped me envision the kinds of positions I wanted,” she reflected.

Taylor Hawkins, a recent graduate of California State University, Stanislaus, who worked as a student assistant at the 2025 Esri UC, also sees YPN as a great resource for envisioning and shaping a career in GIS.

“I’m interested in the networking opportunities available through YPN to help me find a career path,” said Hawkins, who studied sociology, geography, and environmental resources, and likes how GIS can connect some of the more theoretical concepts of sociology. “I’m also looking forward to joining a chapter and having a community of other GIS professionals to help me keep up with what’s going on and point me in the direction of job opportunities.”

YPN’s Legacy, Today and Tomorrow

For anyone looking to develop their skills, grow in their careers, and meet new people in GIS, YPN offers a range of resources and events.

Local chapters—from California to Maine and Minnesota to Texas—hold regular in-person meetups to help incoming GIS professionals connect and build relationships with mentors. This is in addition to the YPN events hosted at every Esri conference.

The YPN Ambassador program—open to anyone who wants to deepen their involvement in the organization—offers three levels of participation. Participants can become a YPN Ambassador who purposefully engages with other members, a YPN Content Ambassador who publishes articles and blog posts relevant to the YPN and GIS communities, or a YPN Event Ambassador instrumental in hosting, attending, and speaking at YPN events. All three ambassadorships are eligible to earn contribution points toward the Geographic

Information Systems Professional (GISP) certification—another way for GIS professionals to strengthen their standing in the field. (For more information on earning GISP contribution points by becoming a YPN Ambassador, visit links.esri.com/ambassador.)

Those further along in their GIS careers can become mentors through YPN to help up-and-comers shape their careers and set themselves up for leadership.

“I look back on YPN’s evolution over the last 10 years, and I’m just amazed that we’ve been able to build something so special,” reflected Perez. “YPN has empowered thousands of people, built bridges across experience levels, and reinforced the power of community in the GIS profession.”

Perez sees YPN’s 10-year anniversary as a moment to not only reflect on YPN’s past achievements but also envisage how the organization will continue influencing the future of geospatial technology and leadership—an undertaking that is near and dear to Esri president Jack Dangermond.

“Maps and GIS play a crucial role in the management and evolution of our world, but this requires more than technology. It requires geographic thinkers—those who look at problems holistically, leveraging the science of geography to develop an understanding of how to create a better future for everyone,” he said. “The YPN community is so important for this future, providing an opportunity to learn from one another and share the knowledge we need to create a more sustainable world.”

If you’re a young professional looking to enhance your credentials, boost your technical skills, or build your portfolio, check out page 31 to learn about the new GISP-E certification, and head to page 32 to find out how to participate in the 30-Day Map Challenge. Also, visit esri.com/ypn to get involved in YPN.

↓ Esri’s Young Professionals Network (YPN) helps those who are new to the GIS field make connections and improve their skills.



Integrating Everything, Everywhere with GIS

LeBleu, Egbulefu, and Gunning joined more than 15,000 GIS professionals who attended the conference in person, along with over 14,000 virtual participants, to learn about how GIS is Integrating Everything, Everywhere—the theme of the conference. By attending the Plenary Session presentations, joining technical sessions, and networking, attendees from around the world discovered and shared ideas for applying emerging technologies, such as geospatial AI, new spatial analysis capabilities, the latest Esri integrations, and exciting advancements in 3D mapping and virtual reality.

“Our world is evolving rapidly,” Esri president Jack Dangermond said to a rapt Plenary Session audience. “These challenges suggest that we need a new approach that integrates our collective knowledge [and] creates a better future.”

GIS practitioners are leading this new approach, using geospatial technology every day to address big issues and effect meaningful change.

“[All of you are] applying the concepts of geographic knowledge to making the world a better place,” Dangermond said.

While the entire conference featured inspiring stories of applying and pushing the limits of GIS, the user presentations

during the Plenary Session offered a microcosm of the innovative work Esri users are doing with GIS technology.

Making Airport Travel Safer in San Francisco

At San Francisco International Airport (SFO), GIS experts have integrated multiple systems into the airport’s GIS to build a 3D digital twin that allows them to map and manage more than half a million assets.

The airport is essentially “a small city that never sleeps”—according to Josephine Young, director of infrastructure information management at SFO—and has more than 700,000 features in its GIS. These features include natural gas and jet fuel lines, airfield lights, planes, parking garages, and more than 15,000 rooms.

The new Airport Integrated Operations Center is a centralized software system designed to enhance operational management and coordination. It integrates with the SFO Integrated Dynamic Twin, a virtual representation of the airport. Supported by this dynamic digital twin, SFO’s new operations center “will act as the nerve center of the airport...to make sure that there’s a seamless guest experience,” Young said.

For example, a map of airport lights within the Integrated Dynamic Twin allows electricians to easily identify light bulb types before making repairs, explained Guy Michael, GIS principal at SFO. This streamlines airport maintenance and allows technicians to make repairs more quickly.

“This saves time, increases safety, and minimizes impacts to our operations,” he said while demonstrating how building information modeling (BIM) is integrated into the new digital twin, which spans the entire airport and updates in real time.

Finding the Best Transmission Corridors

Aurecon, an international design, engineering, and advisory firm, is developing HumeLink—a massive energy infrastructure project to construct new transmission lines across New South Wales, Australia. While working on this project, which aims to bring renewable energy to consumers, the GIS team had to determine the best way to communicate hundreds of

→ Guy Michael (left) and Josephine Young (right) demonstrated San Francisco International Airport’s Integrated Dynamic Twin.



↑ Martin Russell (right) showed how Aurecon used GIS to develop risk and opportunity scores for various energy transmission corridors.

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map layers and attributes to the design team to find the best corridor for each transmission line.

To address this, the firm built the Root Planning assessment tool, which enables the GIS team to map and quantify data layers, like soil and slope, into risk and opportunity scores. From there, the tool creates a corridor of least impact, according to Martin Russell, Aurecon's director of GIS, environment, and planning. The data is displayed in hexbins—a grid used to aggregate spatial data—for simplified visualization.

"We believe it's essential that these simplified maps can be interrogated in detail while telling a simple story," said Russell.

Another tool the team developed is Aurecon Air. This collaborative platform for regulatory reporting and public approval is supported by ArcGIS Enterprise on Kubernetes. The platform uses interactive dashboards, charts, and 2D and 3D apps to communicate with stakeholders across the project team.

These tools have enhanced collaboration and improved project coordination and delivery.

"The key to this complex project is to make our delivery simple and well understood through a suite of digital design tools powered by GIS," Russell said.

When Health Care Meets Location

Representatives from CVS Health, a provider of health care and pharmacy services, explained how the organization leverages a range of GIS-based tools to make the world of health care easier to understand and navigate.

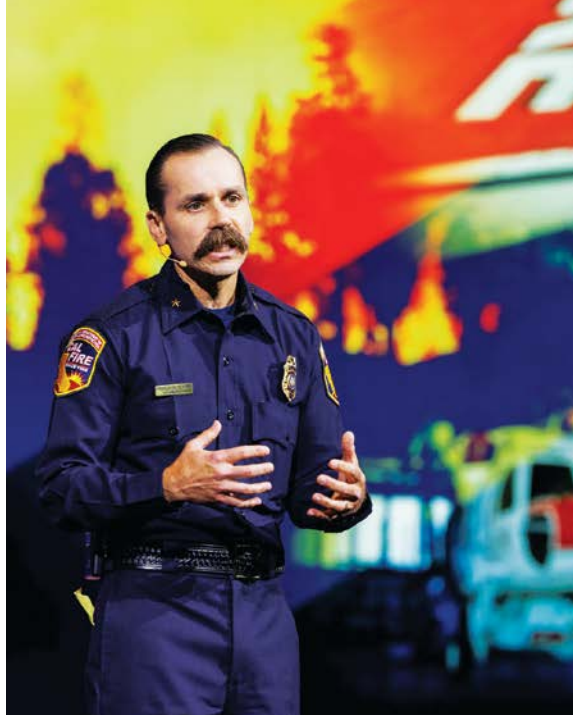
For example, when Texas suffered a major power crisis in 2021 due to winter storms, CVS quickly coordinated disaster response across dozens of teams working with siloed data. This led to the development of the Crisis Command Central app.

The app places assets in geographic context and provides real-time visibility into operations and potential hazards across the business. Now, when a severe storm occurs, the CVS team can check a dashboard, built with ArcGIS Dashboards, to see which stores are operational, which colleagues are affected, and which medication deliveries are vulnerable.

CVS Specialty, the specialty pharmacy branch of CVS, uses the same GIS technology to track, manage, and reroute medication during extreme weather events, explained Matt Anderson, the lead director of clinical social data intelligence at CVS Health. This is critical because delayed shipments can put consumers' health at risk.

The CVS Health mobile app serves as a comprehensive tool for managing various aspects of health and wellness, including prescriptions and in-store shopping. This app also brings location-aware enterprise data into the everyday consumer experience. Geographic context helps inform daily transactions by integrating data and real-time weather information, so consumers have store and services information available at their fingertips.

↓ Eric Hamilton (left), Matt Anderson (center), and Sean Horman (right) of CVS Health showed several apps that help employees and customers make sense of critical health care information.



← Phillip SeLeague, staff chief of fire intelligence, described how the California Department of Forestry and Fire Protection (CAL FIRE) uses remote sensing.

Empowering Future Generations Through Science, Data, and Education

The Plenary Session concluded with a presentation from students at the Colegio Agustiniiano in Chitré, Panama, and their director, Sister Esther María Rodríguez Aranda, who focused on educational transformation through GIS.

During the COVID-19 pandemic, Rodríguez Aranda began to wonder if the school was preparing the children for the uncertain future that lies ahead. After a student introduced her to GIS, Rodríguez Aranda began a quest to introduce geo-spatial analysis tools into the school's curriculum.

Rodríguez Aranda worked with Esri to start a GIS program that would connect education, science, and technology. The program began with 17 students and 3 teachers and has since grown to more than 300 students, with 100 trained specifically in remote sensing.

"Now they map, analyze, create, and lead solutions for the community," said Rodríguez Aranda.

Nieves Joel Pérez Moreno, Ricardo Enrique Sanchez Gonzalez, and María José Sepúlveda Calle—students at the Colegio Agustiniiano in Chitré—led individual presentations on topics such as artificial lakes impacted by drought, urban expansion in Panama, and biodiversity research.

The final presentation was from student Francesca Angelli Cravioto Salvatierra, who analyzed urban expansion in her hometown of Chitré. The results of her analysis show increased population growth in the central part of the city and a corresponding rise in land surface temperatures. Cravioto Salvatierra stressed that this is a call to action.

"We need digital, accessible tools like maps that anyone can use," she said. "Chitré's future shouldn't be a guess. It should be a choice, one made with information, clarity, and vision."

Rodríguez Aranda echoed this sentiment in her closing remarks, emphasizing that students in the GIS program are "learning to map based on real community problems, using the power of data with accessible tools, and committed to sustainable solutions and action that serve the community."

It was a reminder that the call to use GIS to integrate everything, everywhere is not just an abstract idea. Organizing and visualizing data leads to informed decision-making, and this kind of action gives rise to communities that work better together, for everyone.

As Cravioto Salvatierra noted, the future shouldn't be built on guesswork. It should be built on people's shared knowledge, grounded in geography.

↓ Sister Esther María Rodríguez Aranda (left) led four students from the Colegio Agustiniiano in Chitré, Panama, as they demonstrated their impressive GIS skills.

According to Eric Hamilton, assistant vice president of clinical analytics at CVS Health, innovations like this empower operations leads, care managers, analysts, and anyone with an idea to explore, take action, and drive change.

Remote Sensing for Wildfire Management

In California, an integrated and automated remote sensing system—developed by the California Department of Forestry and Fire Protection (CAL FIRE) and powered by ArcGIS—helps airborne research data specialists protect people and resources from wildland fires before, during, and after fire events. This innovative application of GIS won CAL FIRE the Making a Difference Award, presented by Dangermond.

CAL FIRE uses remote sensing and GIS technology to map fire perimeters from aircraft flying 10,000 to 12,000 feet above active fires. This information goes to fire analysts and incident commanders to determine a fire's location and where it may spread.

CAL FIRE research data specialist Logan Hansen described how a flight app—powered by ArcGIS Pro and part of the award-winning system—provides the CAL FIRE team with custom geoprocessing tools, features, and layouts.

"The flight app helps me take [ArcGIS] Pro anywhere—even into the skies," he said, adding that a separate cloud-based app distributes fire perimeter information to operational specialists, public-facing web pages, and more. A dashboard displays fire incident progress, while a map shows spread predictions and risk forecasts.

"Whether it's an operations chief making strategic decisions on an incident or a family who needs to know if it's time to pack a go-bag, behind every perimeter we push from the air is the same goal: Help people act sooner, smarter, safer," Hansen said.



Shape the Future of Desktop GIS

Join the ArcGIS Pro Assistant Early Adopter Community

Esri is building the future of GIS workflows in ArcGIS Pro—and things are getting conversational. With the ArcGIS Pro assistant (currently in beta), Esri is beginning an exciting journey to transform how users interact with spatial data, tools, and documentation.

With continued development and user feedback, Esri aims to create a tool that simplifies workflows and empowers users to solve problems more intuitively. Read on to see what the ArcGIS Pro assistant can do today and how to get started with the Early Adopter Community (EAC).

What the Assistant Can Do Now

The ArcGIS Pro assistant, powered by generative AI, includes the following options:

- **Help:** It answers ArcGIS Pro help documentation questions in a conversational manner.
- **Graph query:** It generates openCypher queries based on a specified knowledge graph schema. These queries can then be used in knowledge graph workflows.
- **Query layer:** The assistant creates query layers by generating SQL queries for a specified database connection and table schemas.
- **Perform actions:** If corresponding AI-assisted actions are available, the assistant performs the actions on request.

What to Expect with the Beta

An endeavor as important as building an assistant doesn't happen overnight. It takes continual testing and iteration to get things just right so users can successfully integrate it in their workflows.

Here are a few things that members of the EAC should anticipate with the beta version:

- **Limited initial interactions:** Currently, only a limited set of actions is programmed into the assistant, with more in development. For anyone who joins the EAC, their feedback in testing new features will help determine what to prioritize in the development process.
- **Varied responses:** The assistant continually learns and adapts, generating dynamic responses that evolve as users refine their interactions. This variability is normal and expected.

How to Get Started

Developing this assistant depends heavily on the ArcGIS Pro user community joining the EAC and trying out the assistant.

EAC members gain early access to innovative features in ArcGIS Pro, including the new assistant. Users who participate in the EAC get to test new features and provide feedback that directly shapes ongoing enhancements made to ArcGIS Pro.

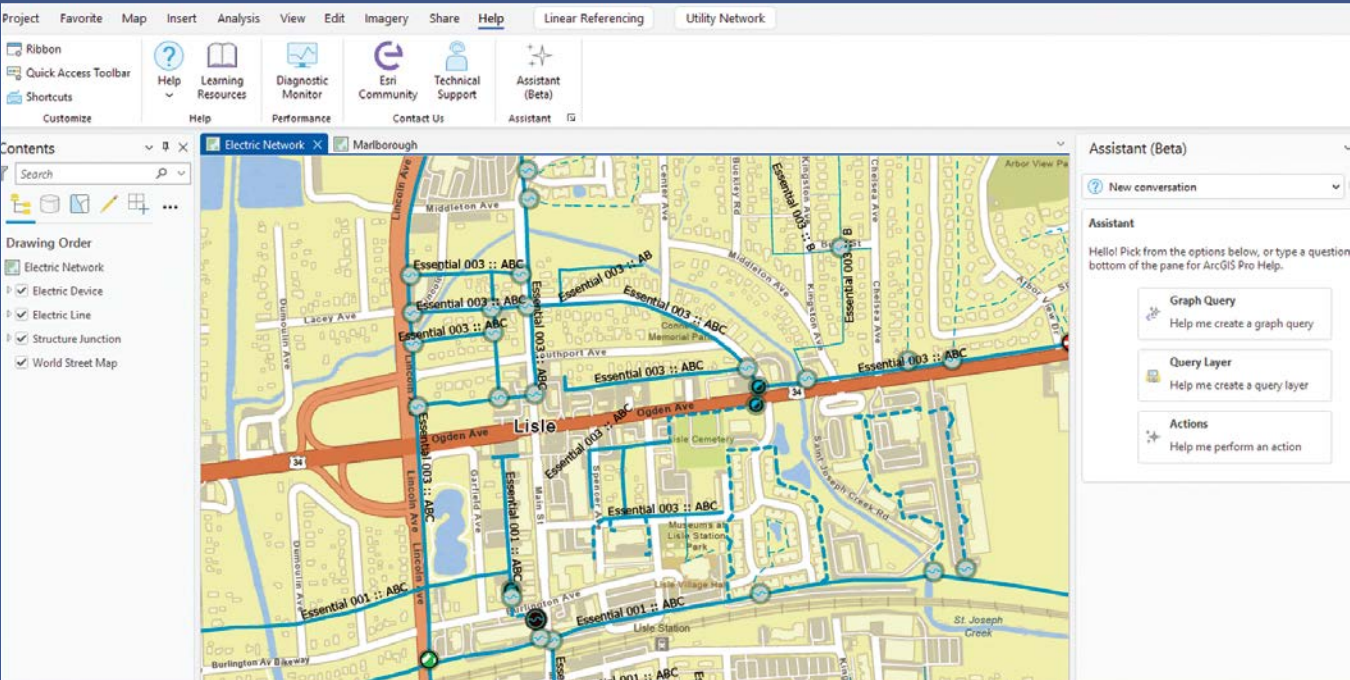
To participate in the ArcGIS Pro assistant EAC, users should follow these steps:

- Apply for access by filling out the survey at links.esri.com/pro-assistant.
- Once accepted into the EAC, install ArcGIS Pro (if needed) and enable semantic search and tool suggestions.
- Download the ArcGIS Pro assistant (beta) from the EAC website.
- Launch the assistant by going to Help and selecting it.
- Now begin exploring!

Exclusive early access is available only to those with Named User licenses in ArcGIS Online and ArcGIS Enterprise, within organizations that allow beta functionality and have the assistant enabled.

The ArcGIS Pro assistant has the potential to transform GIS work for the better. Join Esri in shaping the future of conversational GIS in ArcGIS Pro by signing up for the EAC today at links.esri.com/pro-assistant. Read documentation for the ArcGIS Pro assistant at links.esri.com/pro-assistant-doc.

↓ The ArcGIS Pro assistant (beta) currently supports a limited number of actions, such as creating graph queries and query layers.



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From Debris to Data, Scientists Map Soil Tests Following Wildfires

Brianne Gilbert has spent nearly all of 2025 living in spreadsheets and maps. There, she has cataloged thousands of requests from worried Southern California homeowners wondering whether their soil may be contaminated by what seeped into the ground after the devastating and deadly Palisades and Eaton wildfires in January. More than 16,000 buildings and vehicles—plus all the metals, toxins, and plastics they contained—were consumed by flames.

With funding from the R&S Kayne Foundation, Gilbert has been coordinating efforts by multiple universities through the Community Action Project LA, which aids those affected by the disaster in recovering. That includes helping to collect thousands of soil samples from neighborhood yards. Gilbert and her team have mapped the results using ArcGIS Online and ArcGIS Pro.

As managing director of the Center for the Study of Los Angeles (StudyLA), a research center at Loyola Marymount University, Gilbert normally oversees public opinion surveys, election exit polls, community studies, and outreach to tens of thousands of Los Angeles-area residents—much of it involving GIS. The center is experienced in budgeting for projects, assembling teams, and analyzing collected data. That’s why StudyLA was a natural choice when it came to reaching out to people affected by the fires.

In that work, Gilbert has also learned that a personal touch goes a long way. Homeowners not only sign up using an online form but also reach out directly via email and phone calls. She and her team have reviewed and responded to several thousand emails from homeowners with questions, concerns, and comments about the project.

“So much of it relies on trust,” Gilbert said.

Scraping and Testing Soil

Little has been normal about the wildfires that ravaged Pacific Palisades and Altadena. Despite their relative proximity, the two fires happened in areas with different governance structures. Only

one—the Palisades Fire—happened inside the city of Los Angeles, overseen by the mayor. The other, the Eaton Fire, occurred within the purview of Los Angeles County’s board of supervisors.

The fires also raged in different geographic terrain, with winds carrying ash mostly out to the ocean in one and into neighborhoods in the other. But both fires left a hopscotch pattern of destruction. One surviving home could be surrounded by the ash of others that were razed.

In the several months since the fires, many affected homeowners have been weighing whether to return or rebuild. On top of needing to discard belongings that may have been engulfed or overwhelmed by smoke, they worry about what may have leached into the ground. Private home insurance sometimes covers testing, but not always.

In other wildfires, federal agencies charged with removing hazardous debris might “scrape,” or remove, the top six inches of soil and test the earth below. Then, if needed, they would scrape more off the top and test again. They would continue until the soil was effectively in its pre-fire condition—not necessarily cleaner, but not more contaminated, Gilbert said. That’s what happened following the 2023 Maui Fire in Hawaii, for example.

For the Palisades and Eaton wildfires, the federal government did not test the soil and disposed of just the top six inches, saying that any soil contamination below that level was unrelated to the wildfires. Any additional scraping was considered “over excavation,” unnecessary, and costly, according to the US Army Corps of Engineers quoting the direction it received from the Federal Emergency Management Agency (FEMA). As of early September, the US Army Corps of Engineers reported it had cleared debris from all affected lots that opted into debris removal—4,029 in Pacific Palisades and 5,642 in Altadena.

Without the intervention of Community Action Project LA, homeowners faced several thousands of dollars in costs to test their own soil to either confirm or calm their concerns.

A Need to See It on the Map

The small team at StudyLA working on this project sends messages to homeowners and maintains a database that records who had their soil tested, where, and when. When the results come in, StudyLA anonymizes, aggregates, and maps the data to preserve people’s privacy but also provide some clarity on the impact of the wildfires.

Protecting privacy has been a priority. The results of the testing that homeowners have requested go directly back to them and aren’t shared with anyone else, including government entities or insurers.

“We’re working for the homeowners,” Gilbert emphasized. “We’re doing something to help them right now, wherever they are with their situation.”

Gilbert has relied on ArcGIS to map soil testing, helping ensure that tests are distributed evenly across burn zones.

“I can’t imagine doing it without mapping,” she said. “I just need to see it on the map, and then I can move on from there.”

The StudyLA team uses ArcGIS Online to import the data from Microsoft Excel and map it on layers showing homes that remain standing, those that burned, and those that were affected but are located outside and adjacent to the burn zone. In ArcGIS Pro, the team overlaid the fire perimeter and measured a quarter mile around it.

Critical to Gilbert’s process has been the ability to seamlessly move between ArcGIS Online and ArcGIS Pro, particularly using the Update Data feature to see the latest view without going through a lengthy process each time.

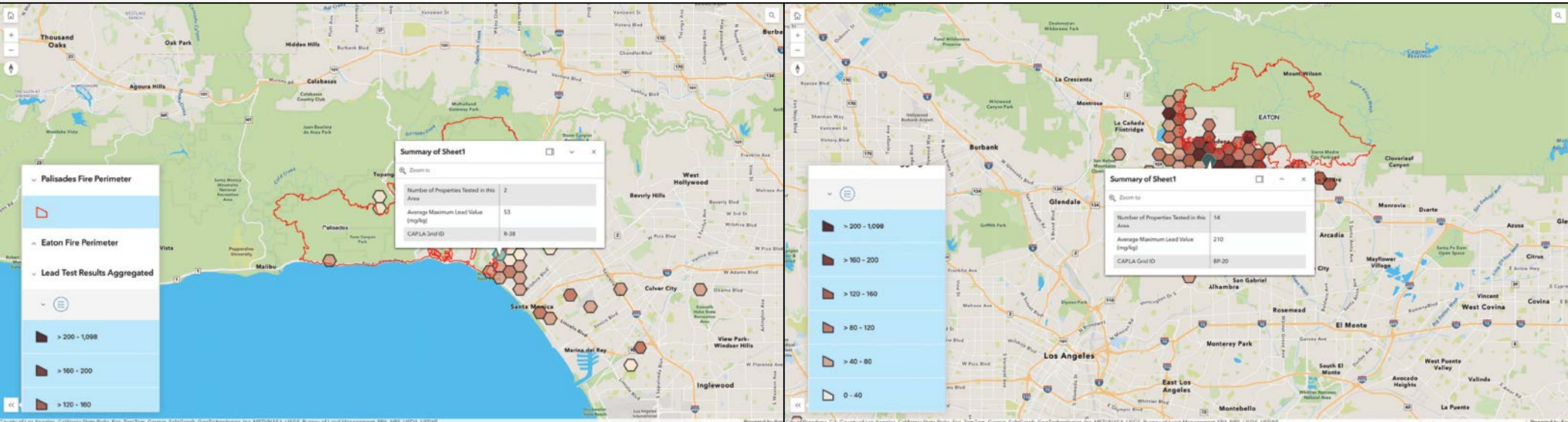
“That’s huge,” she said.

Helping Homeowners

Soil testing could continue for the foreseeable future. Hypothetically, a homeowner with a home standing next to one that burned could get their soil tested and retested and even add a new layer of fresh topsoil. But a year later, if their neighbor begins rebuilding, the dust and dirt would get thrown up into the air again.

“The air doesn’t care where your property boundaries are,” Gilbert said.

She described this as the most meaningful project in her 17 years at the center. Among her many spreadsheets is a tab labeled “Kind Words.” It’s where she goes “if I’m having one of those ‘phew’ days,” she said, “when this project is so overwhelming and taking up so much mental capacity.” The tab has all the notes of thanks she’s gotten from homeowners—who are overwhelmed themselves—for the work her team is doing.



↑ When soil testing results come in, StudyLA anonymizes and aggregates the data to preserve people’s privacy and maps it to show the impact of the wildfires.

↑ During the Eaton Fire, whose perimeter is shown in red, winds carried ash mostly into nearby neighborhoods. Soil testing results show high lead values in some areas.

California Leads the Way in Preparing for Extreme Heat

system that ranks heat risk on a scale from 0 to 4 at the ZIP code level. The online tool, built in ArcGIS Experience Builder, includes a map that divides the state into ZIP codes and shades each one a color ranging from light gray (low risk) to deep red (severe risk), depending on forecasted heat impacts for the current week. A tab displays cooling centers, such as libraries and community centers where people can access air conditioning and hydration. The tool also provides information on why each area has its heat ranking, along with profiles of the population's age ranges, race and ethnicity breakdowns, access to health insurance, number of outdoor workers, and more.

“The tool is unique in its granularity,” said Dr. Amy Gilson, OEHHA’s deputy director for external and legislative affairs. “Getting down to the ZIP code level is key in California because we have a lot of microclimates. It’s also integrated with public health data, so CalHeatScore is well-positioned for individuals and local decision-makers to use.”

“We’re trying to make it as easy as possible for people to get a sense of what heat conditions and risks are like,” Wieland added.

How CalHeatScore Works

CalHeatScore, which launched at the end of 2024 and ramped up as temperatures began rising this May, was inspired by existing warning systems, such as those for hurricanes and tropical storms. The team wanted the system to communicate different risk levels without being overwhelming, so it adopted the 0–4 ranking system to convey low, mild, moderate, high, and severe heat risks.

To get weather and forecast data, the team relies on the National Oceanic and Atmospheric Administration’s National Digital Forecast Database, which uses data from regional Weather Forecast Offices and satellites to provide forecasts and weather models for the entire United States, broken down into a 2.5-kilometer grid. CalHeatScore then compares this weather data to historical climate conditions across the state to determine whether temperatures are below, at, or above average.

Crucially, CalHeatScore also analyzes emergency department visit data and compares those numbers with average climate conditions. This helps form statistical relationships between climate conditions and health impacts. When temperature forecasts rise, CalHeatScore reports expected increases in emergency department

visits, serving as a measure for community health risk. With this information, CalHeatScore can model when temperatures in specific areas may become too hot for people to tolerate.

“This combination of fine-scale climate and weather information along with emergency department data allows us to tell more granular stories of heat and health for every community across the state,” said Wieland.

For example, in Redlands—a valley community known for being hot and dry—it could be 95 degrees. If that aligns with the average temperature for that time of year, and emergency room visits don’t spike at that temperature, CalHeatScore would give Redlands ZIP codes a risk level of 0 (low) or 1 (mild). But on the same day in Forest Falls—a mountain community less than 20 miles away from Redlands—it could be 82 degrees. If the data shows that the average temperature around this time is usually lower, and emergency room visits increase when it’s 82 degrees outside, Forest Falls could receive a risk level of 3 (high) or 4 (severe).

To help people know what to do during extreme heat events, Wieland and his team work with local community organizations to share details about cooling centers. CalHeatScore, available in English and Spanish, also contains information on signs of heat illness and how to stay cool.

“CalHeatScore is a tool that Californians can use to understand heat risk, plan ahead, and keep themselves and their loved ones safe from extreme heat,” said Wieland.

How it works is all the data—the weather forecasts acquired every 24 hours, the historical climate data, and the emergency department visitation rates—is pulled together in Python. The Python script runs at midnight and 5:00 a.m. every day, calculating the increased risk of emergency department visits for each ZIP code. That value is then translated into CalHeatScore’s 0–4 ranking system, with 0 meaning there is no risk for the ZIP code and 4 meaning there is an expected 100 percent (or more) increase in emergency department visitation rates.

This information is updated in ArcGIS Pro as a feature layer, which is automatically pushed to ArcGIS Online. The feature layer sits in a stylized web map and is displayed alongside other data, including a map of cooling centers and dashboards that show population information, such as vulnerable groups in each ZIP code. All this is made available to the public online via Experience Builder.

“With Experience Builder, we’re able to design and put out straightforward messaging, like information about workers’ rights and recognizing the signs of heat-related illness,” said Wieland. “Experience Builder allows us to add educational materials to our scientific data and makes it easy to adjust how we present that information.”

Making the Tool More Granular

Wieland and his team are still in the early stages of creating CalHeatScore and are committed to developing it transparently, alongside local community organizations.

“There are so many new directions that we could go to make this tool more comprehensive, more characteristic of on-the-ground or lived experiences, and more customized by building it in partnership with state and local government and community organizations,” Wieland said.

One idea the team wants to pursue is making CalHeatScore interoperable with other systems, including mobile apps, by developing application program interfaces (APIs).

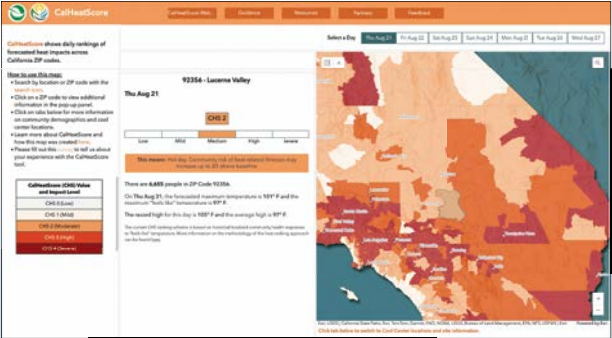
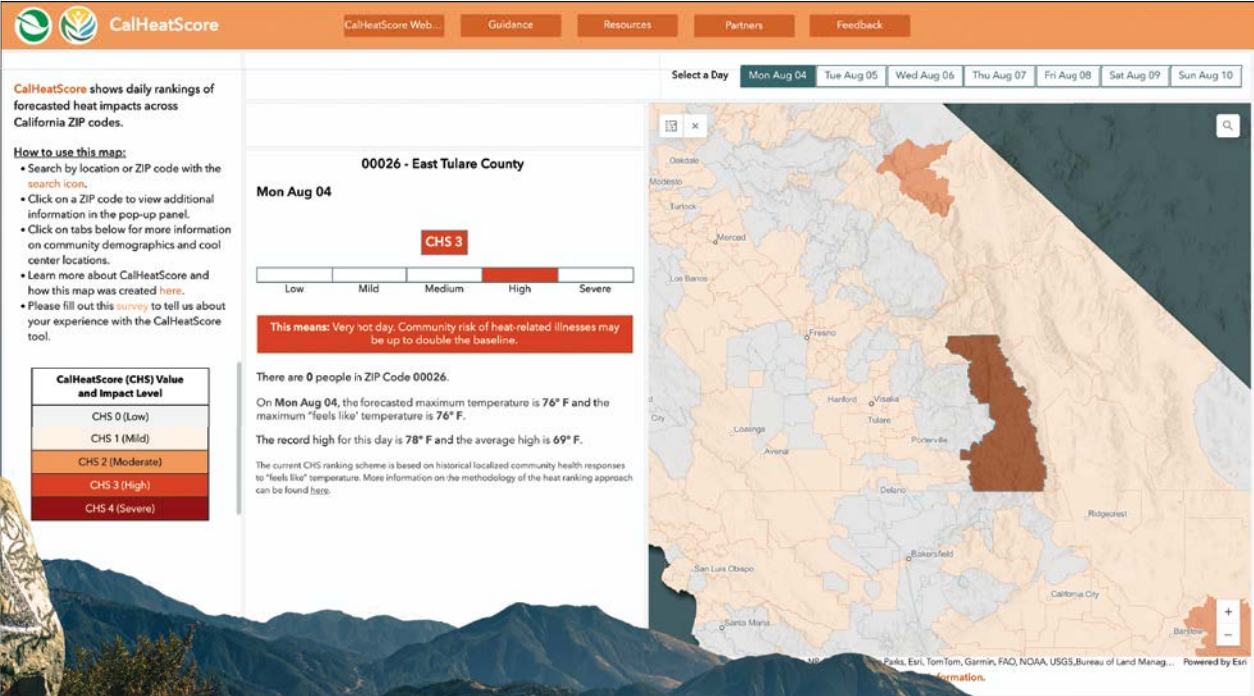
“Having a tool that communicates risks for heat is so much more valuable to have on your phone than just having it on your desktop,” he said. “One of the key benefits that you could potentially get using a mobile app is notifications.”

The idea is to allow users to build a profile in CalHeatScore, where they could input their demographic information, health status, occupation, and more. Then the system could send them customized notifications based on who they are, where they are, and the day’s conditions.

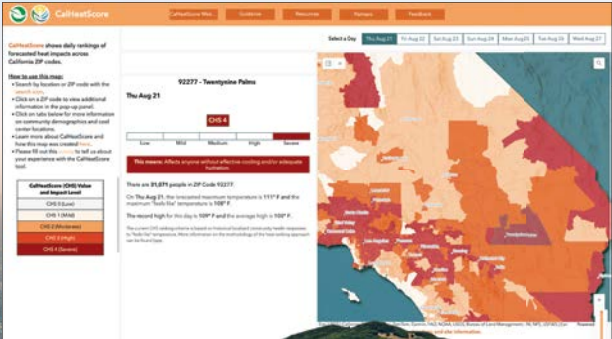
“If you’re an older adult who works outside for a living, for example, the inherent risks of you becoming ill from extreme heat are higher than those of a young individual working indoors who has no pre-existing conditions,” Wieland explained. “If the system knows that you have an increased sensitivity to heat, it could provide you with more targeted messaging. So if it’s 82 degrees, and you’re a young, healthy individual, maybe the score you receive for that day is 0. But if you’re 75 years old, have asthma, and are working outside, maybe you receive a higher rating.”

Another idea is to overlay the CalHeatScore data with air quality index and smoke plume data to better understand how air pollution and particulates affect public health during extreme heat. The team is also developing a data download portal where users can

↓ Breaking down heat risk to the ZIP code level is key in California because there are a lot of microclimates.



↑↓ On the same day, two nearby areas, such as Lucerne Valley and Twentynine Palms, could have different heat risk ratings.



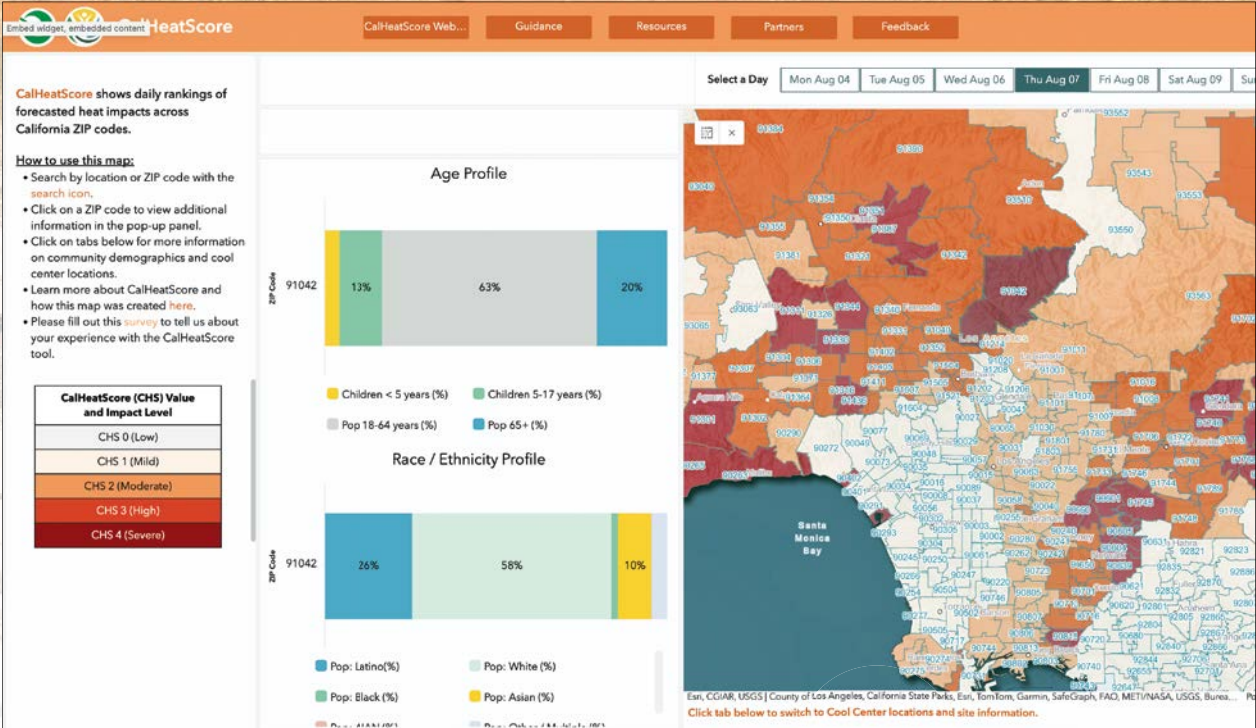
access historical CalHeatScore data for their own research. By next summer, the team hopes to increase the spatial resolution of its heat data—by considering urban heat island effects and localized rural heat, especially in agricultural areas—and expand the heat-related health issues that the tool addresses to include long-term impacts and mortality data.

“Once we come into heat season in 2026, we’re hoping to release an updated version of the tool that has a higher spatial resolution and a more comprehensive picture of what this relationship between heat and health looks like,” Wieland said.

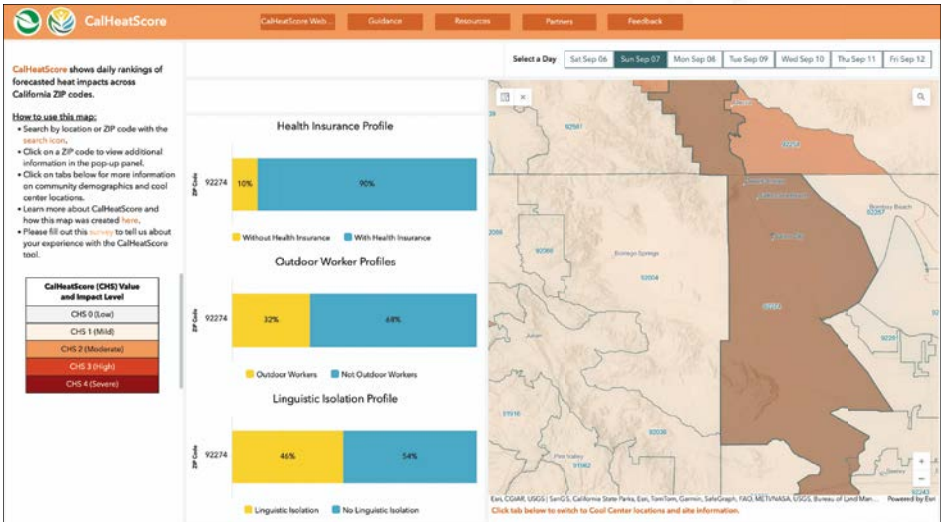
To ensure that the tool is accurate for users everywhere, the team will continue to work with other state agencies, county and city governments, and local community organizations. It also welcomes ideas from California residents and the GIS community on how to improve CalHeatScore.

“We’ll continue building on the tool to make sure it’s based on people’s experience on the ground,” Gilson said.

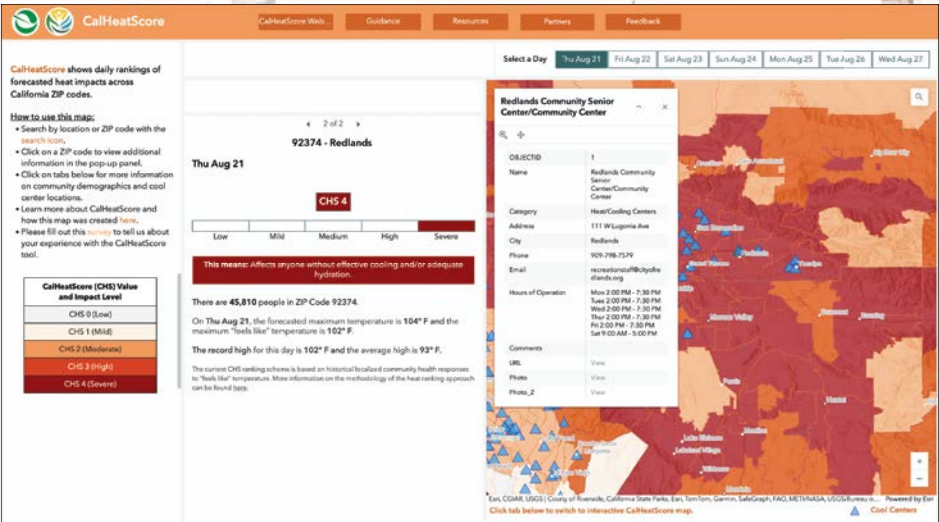
For more information about CalHeatScore or to get in touch with the team, email Wieland at walker.wieland@oehha.ca.gov.



↑ A dashboard displays each ZIP code’s population profile, including age ranges and race and ethnicity information.



↑ Outdoor workers are particularly vulnerable to the effects of extreme heat.



↑ The CalHeatScore team works with local governments and organizations to get information on cooling centers to include on the map.



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How Modern GIS Technology Delivers Key Global Demographic Data Fast

By Mehrshad Nourani, The Coleman Group, Inc.

The United States Census Bureau’s International Database (IDB) is a vital resource for understanding global demographic trends. Built in 2009, this interactive demographic data visualization tool provides comprehensive population estimates and projections for 227 countries and nearly 17,000 subnational areas worldwide.

Making regular updates to the IDB is essential to ensure that users have access to the most

current and accurate data on ever-changing global population characteristics. Early on, the tool pulled from various technologies, but in 2011, Esri partner The Coleman Group, Inc. was brought in to provide technical assistance and contribute to the IDB’s evolution. Since then, the experienced federal government contractor has collaborated with the Census Bureau to integrate the latest developments in apps and Esri technology, creating robust analytical tools for the IDB’s international audience.

Understanding Global Demographic Data
Global demographic data is essential for understanding the world. The data provides critical insight into population trends, age distributions, migration patterns, and more—empowering policymakers, economists, and public health officials to make informed decisions.

Both the US Census Bureau and the United Nations estimate and project global population

figures. Since the 1960s, the Census Bureau has provided data for more than 200 countries, and recently, it expanded its projections to include subnational areas equivalent to counties in the United States. Detailed population estimates and forecasts by age and sex for 2015–2030, along with national projections extending to 2100, can be accessed through the IDB on the Census Bureau’s website.

Using such detailed and wide-ranging demographic data can be challenging, though. It requires reliable data sources and practical analytical tools. Moreover, to present audiences with engaging and valuable narratives based on the data, analysts need a suitable technical framework and appropriate, modern tools.

This is what the IDB ultimately provides. For the past 14 years, app developers and GIS professionals from The Coleman Group have collaborated closely with Census Bureau staff to develop and enhance the configurable platform, ensuring that it delivers useful data products to the public. ArcGIS Pro, ArcGIS Enterprise, ArcGIS Online, and other technologies are key to fulfilling this mission for the Census Bureau and achieving its data dissemination goals.

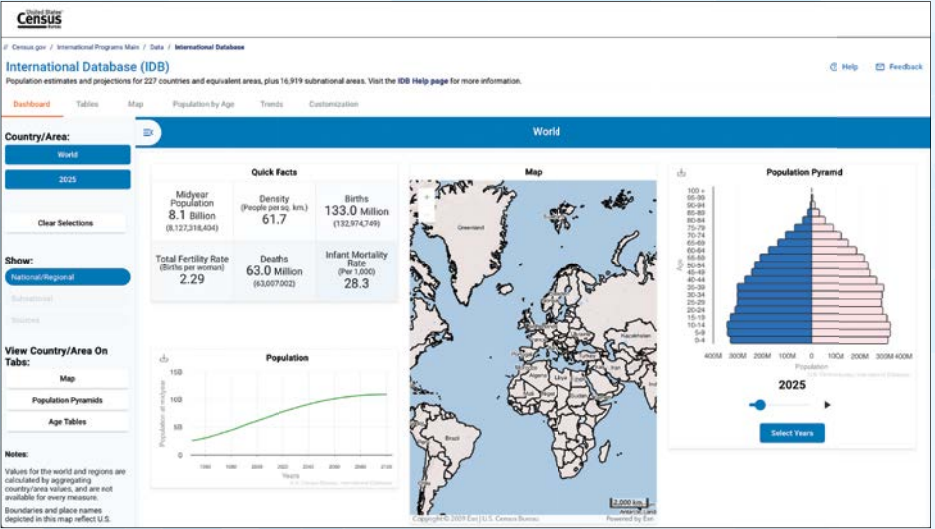
Making Data Delivery Efficient

To meet rising demand for accurate and timely data delivery, the IDB needs continuous improvement. Over the years, The Coleman Group and the Census Bureau have used various technologies—from standalone databases, ArcGIS Viewer for Flex, and Adobe Flash to ArcGIS Online, ArcGIS Enterprise, and ArcGIS Pro.

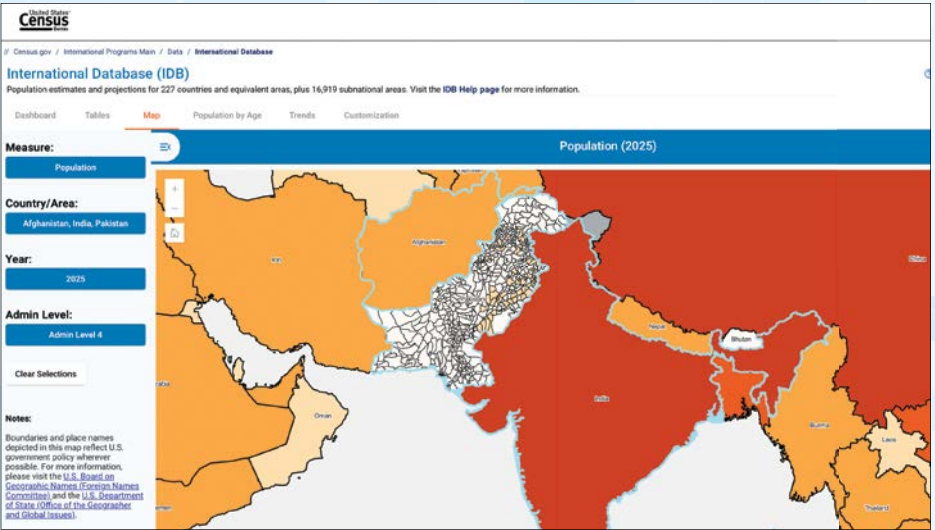
A recent iteration of the configurable platform employed the Esri Leaflet plug-in to ingest and display maps from ArcGIS Server, the back-end server software component of ArcGIS Enterprise that makes the Census Bureau’s geographic information available. Initially, the team created map services by merging demographic data with a world feature layer polygon and publishing a Web Map Service from the ArcGIS Pro environment. While this was effective, the process was time-consuming and complex, involving multiple data deliveries and joins with the polygon. A more efficient method was needed to create map services with each data delivery update.

The teams found a solution in implementing the Census Bureau’s Census Data API, vector tile services, ArcGIS Maps SDK for JavaScript, and ArcGIS Arcade.

Any views expressed in this article—including those related to the applicability of the described methodology and the qualifications or characteristics of The Coleman Group and its contractors—are solely those of the author and do not necessarily reflect the views of the US Census Bureau or the US government.



↑ The International Database (IDB), a data visualization platform from the US Census Bureau, is vital for understanding global demographic trends.

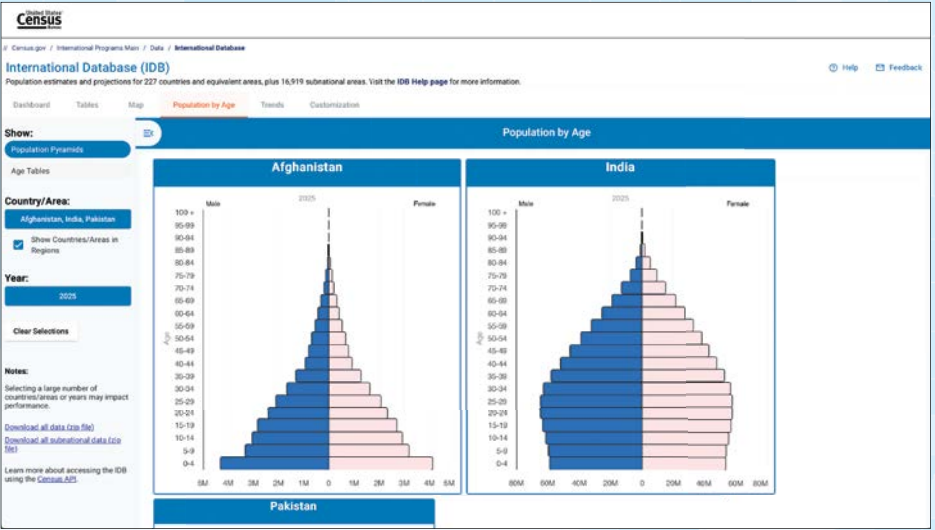


↑ IDB users can view detailed subnational maps at maximum zoom levels.

The screenshot displays the 'Demographic Overview' report in the IDB. It features a table with columns for Country/Area, Year, Total Population, Growth Rate, and various demographic indicators like Life Expectancy and Sex Ratio. The table lists data for numerous countries, including Afghanistan, Albania, Algeria, and others, for the year 2025.

Country/Area	Year	Total Population	Growth Rate	Life Expectancy	Sex Ratio	Median Age
Afghanistan	2025	46,474,805	2.86	75.9	4.89	67.5
Albania	2025	2,551,837	-1.06	83.1	1.09	79.2
Algeria	2025	47,735,685	1.47	20.0	2.91	78.1
American Samoa	2025	43,268	-1.33	218.5	1.99	76.1
Andorra	2025	85,366	-0.13	182.2	1.47	84.9
Angola	2025	38,984,796	3.32	31.3	5.45	65.3
Anguilla	2025	19,763	1.71	27.1	1.72	82.8
Antigua and Barbuda	2025	92,769	1.09	234.2	1.53	78.5
Argentina	2025	45,476,098	0.26	16.6	1.43	78.0
Armenia	2025	2,963,837	-0.45	105.1	1.66	79.9
Aruba	2025	126,492	1.06	70.2	1.82	76.7
Australia	2025	27,062,848	1.06	3.5	1.73	83.7
Austria	2025	9,174,390	0.28	111.3	1.35	82.2
Azerbaijan	2025	10,694,370	0.40	128.4	1.69	78.1
Bahamas, The	2025	415,306	1.08	41.5	1.45	77.3
Bahrain	2025	1,579,544	0.79	2,078.3	1.64	80.6
Barbados	2025	370,183,958	-0.87	1,307.4	2.06	75.6

↑ The US Census Bureau provides demographic data for 227 countries and nearly 17,000 subnational areas worldwide.



↑ Global demographic data offers critical insight into population trends, age distributions, and more.

Enhancing Map Service Performance

Team members from The Coleman Group identified the Census Data API as a viable solution for data delivery. Using the API as a single data source increased efficiency by reducing the number of required data deliveries and improving data integrity. They could use already published feature layers without data, programmatically join the API data, and style features on the client side.

While using the Census Data API addressed several data delivery issues, it negatively impacted map service performance. This was due to the size and detail of the hierarchical geographic boundaries that define political or administrative regions across the globe.

These boundaries are typically organized into levels, each representing a different scale of administrative division. The detail in the countrywide boundaries—administrative level 0—hindered Web Map Service performance at various zoom levels. Additionally, the boundaries for subnational geographies such as states and counties—administrative levels 1–4—were created with similar precision and detail. This meant that boundary generalization wasn't an option because it would have caused the boundaries to become misaligned.

To remedy this, the team chose vector tile services for map service delivery. Vector tiles are small, performative, and fast to load, allowing users to smoothly zoom and scale boundary outlines without losing detail. The Coleman Group also selected JavaScript Maps SDK to build the app to enhance its performance and functionality.

Implementing Multiscale Vector Tiles

The Census Bureau's International Population Division uses the Large Scale International Boundaries dataset from the US Department

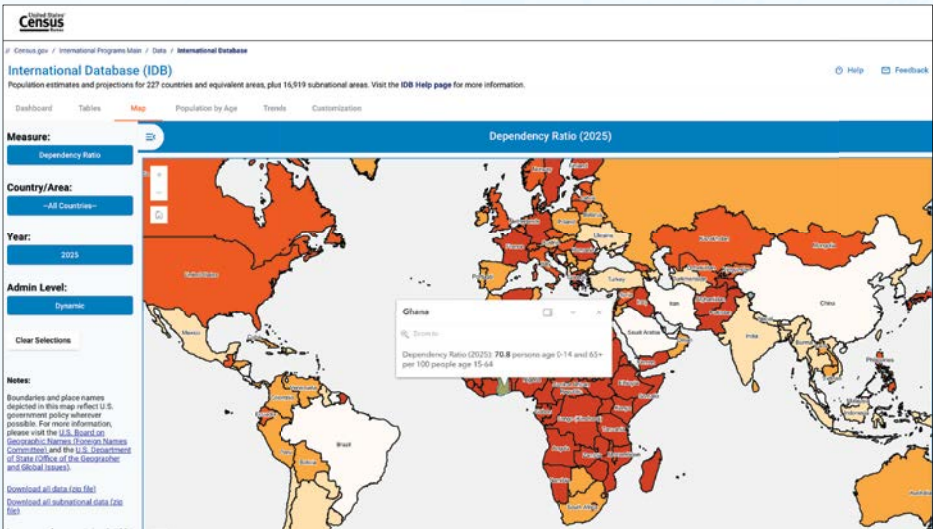
of State as the basis for its country layers, which incorporate subnational geography. The team from The Coleman Group prepared and improved map service performance by creating the world country layer as a custom vector basemap. This map service, which features US government-approved names included in JavaScript Object Notation (JSON) files, allows for dynamic styling and zooming into selected areas without redownloading the entire layer.

The vector tile service performed very well. However, as users zoomed in, the remaining Web Map Service–based administrative levels rendered slowly. So the team decided to create multiscale vector tiles that dynamically adjust to all zoom levels.

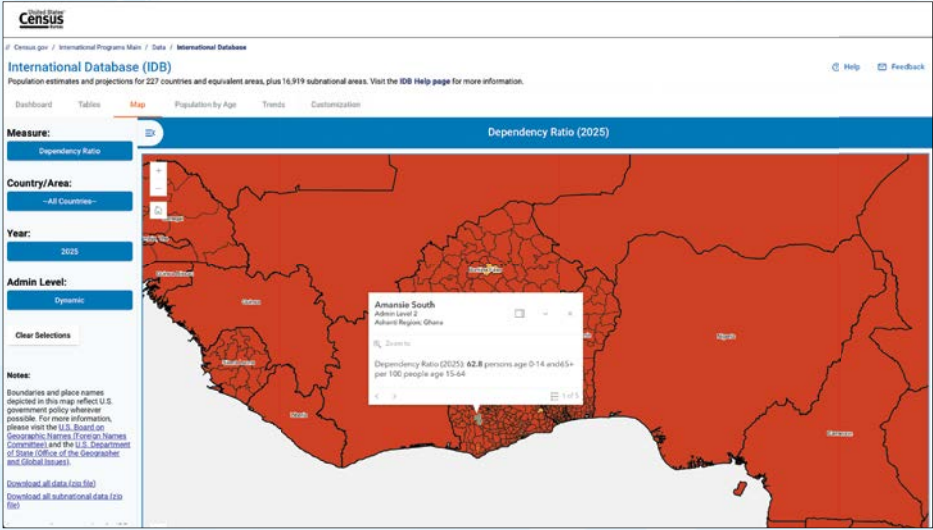
At first, the server couldn't complete the map rendering process. Detailed administrative boundaries were the source of the issue. The overlapping country boundaries consumed excessive server resources, which slowed down the map service. Because generalizing the boundaries would've caused misalignment among administrative levels, the team used the Remove Overlap tool in ArcGIS Pro to create a single shared boundary for the various administrative levels. The boundary was then published as a vector tile service.

Rendering Subnational Data Smoothly

Data is not stored in the vector tiles. Instead, the team associated geometries with country identifiers by creating a unique style layer for each country and putting the country identifiers in the layer attributes. A transparent layer overlaid the vector tile layer, allowing the team to utilize pop-ups from JavaScript Maps SDK to show the country name and data value. Arcade expressions, Esri's lightweight scripting language, supplied the information.



When users select data to measure at subnational levels, the map server loads four image layers corresponding to each administrative level.



When a user selects a data measure for subnational areas—such as population, youth or old-age dependency ratios, or the sex ratio of the population—the map server loads four image layers corresponding to each administrative level. Since the API does not provide subnational data for every country, the app ingests the available information, and the map server renders it using the manual breaks provided.

By default, these layers are visible at progressively higher zoom levels. Once a layer is displayed, it remains visible even when overlapped by another layer while zooming. This functionality offers two advantages. First, at the highest zoom levels, users can view the most detailed subnational maps available for a country, which may correspond to administrative levels 2, 3, or 4, depending on the location. Second, when a pop-up appears, all layers are included, meaning that if a user is viewing administrative level 4, they will also see levels 3 and 2. Additionally, The Coleman Group provided tools to turn off this dynamic subnational layering, allowing users to constrain it to a specific level.

Embracing Emerging Technologies

While the IDB may not be the first app to use vector tile services, the team from The Coleman Group is confident that the processes it implemented with the US Census Bureau can be replicated for similar public and private projects.

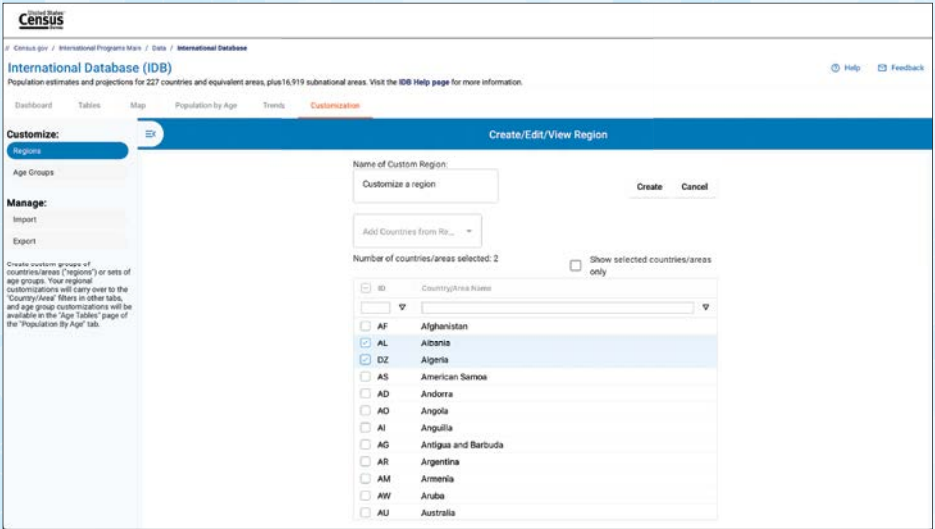
Many technologies go into building apps that can respond and adapt to technological advances, and it is imperative to evaluate new and upcoming technologies to create workflows that

generate modern apps and keep them consistently updated. With the rise of AI, for example, The Coleman Group has initiated an in-house project to help team members enhance their knowledge and skills in this area. The company also recently partnered with several private firms to launch an AI initiative to transform how health-related data gets analyzed and can generate actionable insight. The next step for The Coleman Group is to integrate AI into its app development process alongside GIS technology to enhance data analytics and address its clients' various areas of interest.

A special thanks to Dr. Belinda Coleman, president and CEO of The Coleman Group, and the US Census Bureau's Dissemination and Internet Services Branch and International Population Division for their contributions to this article.

About the Author

Mehrshad Nourani is the chief technology officer for The Coleman Group. Recognized as a leader in geospatial technology innovation, he has spent the last 15 years driving digital transformation across the federal, state, and commercial sectors through advanced GIS solutions and data-driven strategies. Nourani's expertise spans spatial analysis, workflow automation, and the development of interactive web-based GIS platforms. For more information, email him at mnourani@colemangrpinc.com.



Users can customize which data to visualize in the IDB.

Six Ways to Integrate Data in ArcGIS Online and ArcGIS Enterprise

ArcGIS is a comprehensive geospatial platform that offers a wide range of solutions for integrating and managing data.

ArcGIS Online and ArcGIS Enterprise are two Web GIS systems that are foundational to managing GIS data. They power the apps, maps, and web layers that unite and share data across—and even outside of—an organization. Both offer flexibility and comprehensive solutions for integrating data into an organization’s most critical mapping and analysis workflows.

So which data management strategy is best? That depends on factors such as how often the data is updated, where it originates, and the steps involved with getting data into a presentable state. Let’s explore six common methods for integrating data in ArcGIS and highlight some key benefits of each.

Scenario 1 You need an easy and efficient way to integrate data and use it in your ArcGIS organization.

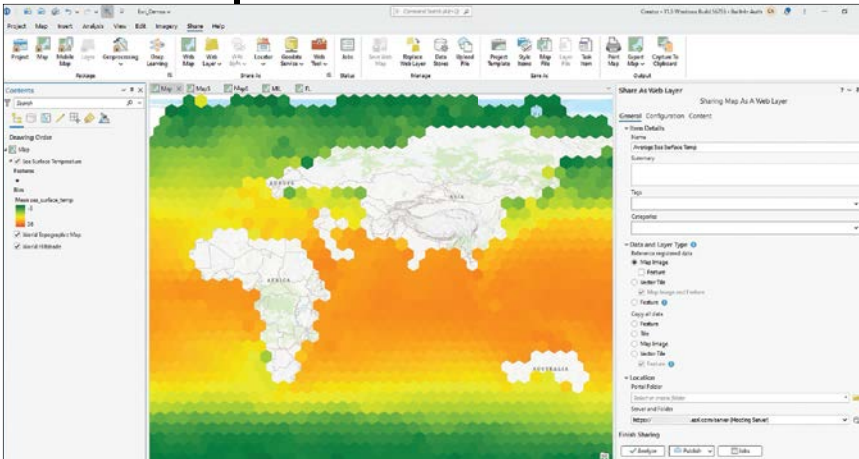
Your data is in a ready-to-use state for mapping, analysis, or reporting, and it doesn’t require cleaning or formatting. You want to ingest a static copy of the data because it won’t be updated or edited.

Solution Add your content directly to ArcGIS Online or ArcGIS Enterprise.

Users can add data from a variety of sources, such as a local drive or network, in many data formats, including CSV, Microsoft Excel, GeoJSON, shapefiles, tile packages, scene layers, imagery, and open source. Once added to ArcGIS Online or ArcGIS Enterprise, this data can be transformed into web layers that are ready for use in web maps, web apps, and analysis tools.

Some file types can be published as a hosted feature layer during the upload process, making the data immediately usable in web maps and apps. With ArcGIS Online, users can even upload data from common cloud storage solutions such as Microsoft OneDrive, Google Drive, and Dropbox.

→ In ArcGIS Pro, users can share web layers with ArcGIS Enterprise.



Scenario 2 Your maps always need to reflect the most current information.

As you create, edit, and analyze data, updates must appear instantly.

Solution Use ArcGIS Pro to share web layers with ArcGIS Enterprise.

ArcGIS Pro seamlessly integrates with the web-based components of ArcGIS. It can connect to various types of data, including files stored on a computer or network drive, data in enterprise geodatabases or cloud data warehouses, and other locations.

This option gives users continual access to the original data source, ensuring that maps and apps always contain the most up-to-date information. Additionally, since users connect directly to their data rather than copy it, this option avoids data duplication.

Once data is shared with ArcGIS Enterprise, it becomes available for editing, querying, visualization, spatial analysis, and collaboration.



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Scenario 3 You need to integrate messy data from your sources, and it must be up-to-date on your map.

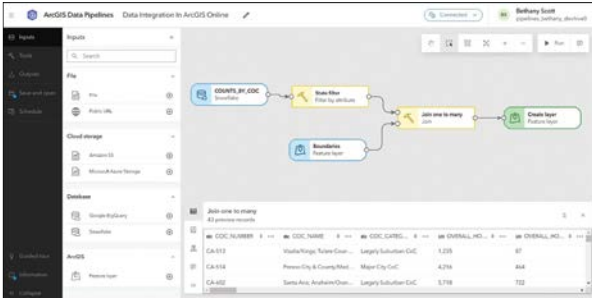
Your data requires some cleanup before it can be integrated and used in ArcGIS. You need a fast and easy solution to transform and ingest the data so you can immediately leverage it in your map layers and keep them current.

Solution Try the ArcGIS Data Pipelines app with ArcGIS Online.

ArcGIS Data Pipelines is a no-code tool that transforms and integrates data with ArcGIS. It provides a fast, efficient way to establish secure connections to cloud-based data stores, such as Snowflake, Google BigQuery, Amazon S3, and Microsoft's Azure Blob Storage—as well as URLs and REST APIs.

Users can schedule automatic data pipelines to run on a recurring basis to keep layers in ArcGIS Online up-to-date as the source datasets change. For data that requires cleaning, formatting, and transformation prior to use, Data Pipelines can be used to speed up and streamline preparation workflows.

Data Pipelines is included with ArcGIS Online for Creator user type licenses and above.



↑ ArcGIS Data Pipelines is an efficient way to establish secure connections to cloud-based data stores.

Scenario 6 Your data must remain in its original system, your maps must be updated regularly, and you need additional customization beyond what other extract, transform, and load (ETL) tools offer.

Solution Try using ArcGIS Data Interoperability to connect to any data source. If you have Python expertise, consider using ArcGIS Notebooks.

The ArcGIS Data Interoperability extension for ArcGIS Pro offers even more integration options for nonnative data sources. It allows users to design data movement among hundreds of systems and apps using a visual programming interface. Data Interoperability works with both ArcGIS Online and ArcGIS Enterprise and can be added to Creator, Professional, and Professional Plus user type licenses.

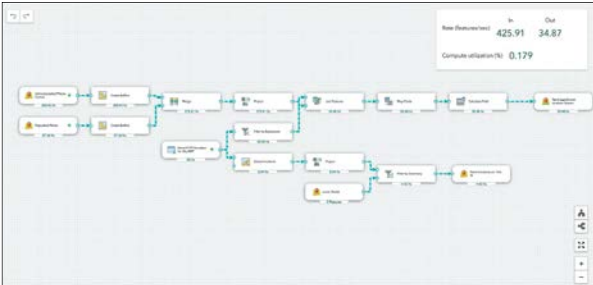
ArcGIS Notebooks is another option for those who have experience with Python. Users can employ ArcGIS Python libraries—Python packages that include ArcPy and ArcGIS API for Python—to simplify automation and streamline tasks, including GIS administration, content management, and analysis. Notebooks can be used to write, run, and schedule Python code to integrate data with ArcGIS Enterprise and ArcGIS Online. Scripts that leverage the ArcGIS Python libraries can be written to run in external Python development environments. Python runtimes in Notebooks also integrate seamlessly with libraries from the open-source Python ecosystem that are required for data workflows.

Scenario 4 Your projects require real-time data processing, and you want to integrate data from Internet of Things (IoT) sensors and other live feeds.

Solution Use ArcGIS Velocity with ArcGIS Online, or ArcGIS GeoEvent Server with ArcGIS Enterprise.

ArcGIS Velocity is the real-time and big data processing and analysis capability of ArcGIS Online. It allows users to import real-time spatial data and store, visualize, analyze, and act on it in their GIS. ArcGIS GeoEvent Server is part of ArcGIS Enterprise, and allows users to consume, visualize, and analyze on-premises streaming data in real time.

This data integration approach is ideal for when organizations need to remotely monitor assets or send automated notifications. Both Velocity and GeoEvent Server natively support HTTP streaming; IoT cloud providers including Microsoft's Azure IoT and Cisco; and messaging technologies such as Apache Kafka, MQTT, and RabbitMQ. There is also support for many major data providers, including FlightAware for flight tracking and Samsara for fleet management.



↑ ArcGIS Velocity allows users to import real-time spatial data into ArcGIS Online.

Another option for ArcGIS Enterprise users comfortable with programming and wanting to integrate data without performing ETLs is to develop custom data feeds. These enable users to access and employ data from sources not natively supported in ArcGIS. The data remains in its source, and ArcGIS Enterprise reads and writes it to a feature service, enabling organizations to create feature layers that reference data from virtually any source—including proprietary REST APIs, public URLs, and databases such as MongoDB.

Scenario 5 You need to securely share or sync data across ArcGIS organizations.

When working with different departments, agencies, or partner organizations, you need to share data without manually transferring files or sending email attachments.

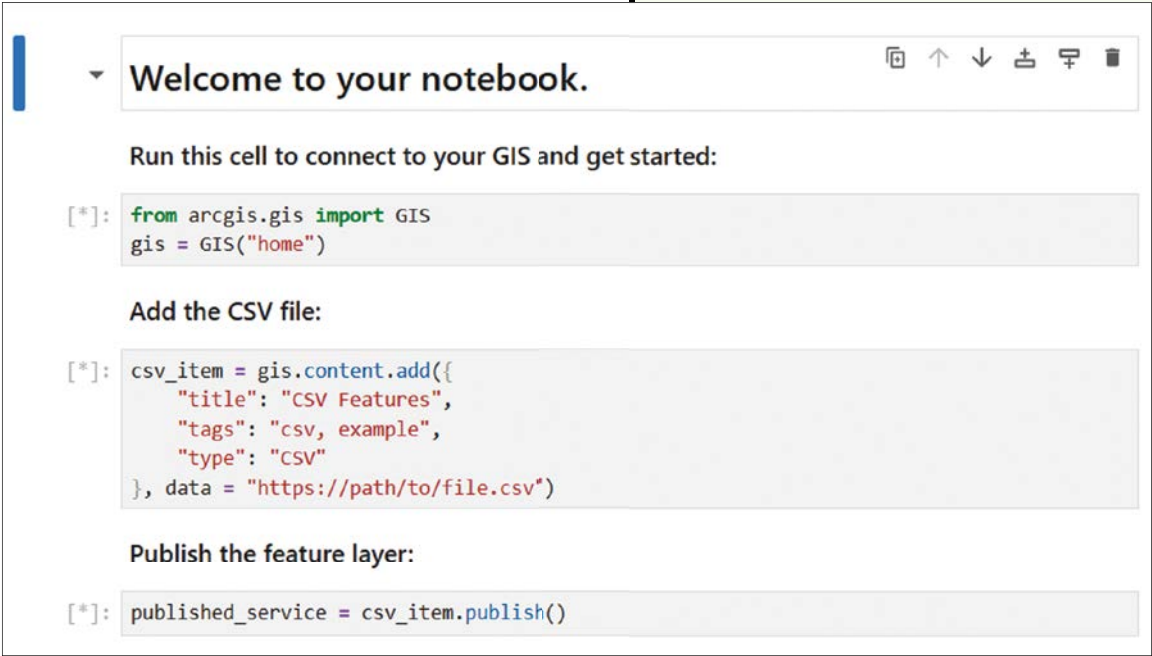
Solution Share data using partnered or distributed collaboration.

Partnered collaboration, where two ArcGIS Online organizations work together, and distributed collaboration—which is between either two ArcGIS Enterprise organizations or an ArcGIS Online organization and an ArcGIS Enterprise organization—enable seamless sharing of maps, apps, web layers, and other content across systems. Once content is shared, updates can be sent automatically, to keep information in sync between systems. This approach requires no scripting expertise, and data can be synced in both directions.

Whether your organization uses ArcGIS Online, ArcGIS Enterprise, ArcGIS Pro, or all three, many options are available to integrate data in a way that meets your organization's needs.

To take a deeper dive into this topic, check out two posts on the ArcGIS Blog: “Seven Ways to Integrate Data with ArcGIS Online” at links.esri.com/seven-ways and “Ten Ways to Integrate Data with ArcGIS Enterprise” at links.esri.com/ten-ways.

↓ Using ArcGIS API for Python in a notebook lets users add and publish a CSV file as a web layer in ArcGIS Enterprise.



For Emergency Snow Removal, Surveys and Dashboards Prove Key

In February 2025, Oswego County, New York, was struck by a record-setting snowstorm that dropped more than 100 inches of snow in four days. The storm caused transportation challenges and widespread structural damage, including the partial or complete collapse of over 220 buildings.

The Oswego County Emergency Management Office activated its Emergency Operations Center for 21 days to coordinate response efforts with local, regional, and state partners. Central to the response was a real-time geospatial system powered by ArcGIS Survey123 and interactive dashboards built with ArcGIS Experience Builder. These tools allowed responders to gain clearer visibility of the situation, prioritize needs, and coordinate assets in a rapidly evolving and resource-constrained environment.

A Survey-Based Call Center

After hearing from home health agencies, meal delivery programs, and other service providers that heavy snow and ice accumulation was preventing them from reaching the vulnerable residents they serve, the Oswego County Emergency Management team brought in outside help. The county stood up a dedicated public call center staffed by Oswego County Health Department employees and operators from the local community assistance hotline, 211 CNY, to identify and track residents' needs. The Health Department call center operated on weekdays from 8:00 a.m. to 4:00 p.m., and 211 CNY handled calls during off-hours to ensure 24-hour coverage.

Call takers from both centers used a custom-built Survey123 form to collect key details about each assistance request, including

whether callers had medical or mobility concerns, if snow was blocking their home's only exit, whether they had safe access to heating, and other risk indicators. Using a set of clearly defined prioritization rules, call takers assigned each request a priority level in real time. This ensured that life safety concerns and medically vulnerable residents were flagged and taken care of first.

All this information flowed instantly into a dashboard, which became a central tool for staff from the Emergency Operations Center and external partners to monitor the volume, urgency, and location of public needs.

Doing "Far More with Fewer People"

To address the growing list of snow removal requests, Oswego County coordinated the deployment of several partners from the National Voluntary Organizations Active in Disaster (VOAD), including Team Rubicon, Mennonite Disaster Services, and members of the New York State Federation of Search and Rescue. Each morning, team leads received assignments during briefings at the Emergency Operations Center, and a designated point of contact distributed additional assignments throughout the day.

The county developed a second Survey123 form for VOAD teams to use to report when they completed a snow removal request—or when they couldn't, and why. Teams could also include notes or photos in the form as needed.

What made this system especially powerful was that both surveys were linked through a shared data field: the address. This connection allowed VOAD teams to open a mobile map showing all pending assignments, click on their assigned address, and submit updates directly from the field. This real-time reporting

fed back into the same dashboard that decision-makers were using, creating a closed-loop coordination system.

Because the dashboard updated in real time, VOAD teams could see new requests as they came in, including those flagged as the highest priority. In multiple instances, mobile teams were finishing one job when a new high-priority request appeared on the map just minutes earlier and only blocks away. This allowed team members to immediately assist another household without returning to staging to get updated assignments.

"This setup allowed us to do far more with fewer people," said Tyler Peet, the emergency management coordinator for Oswego County's Emergency Management Office. "Teams knew exactly where to go, what needed to be done, and when requests were updated—all in real time."

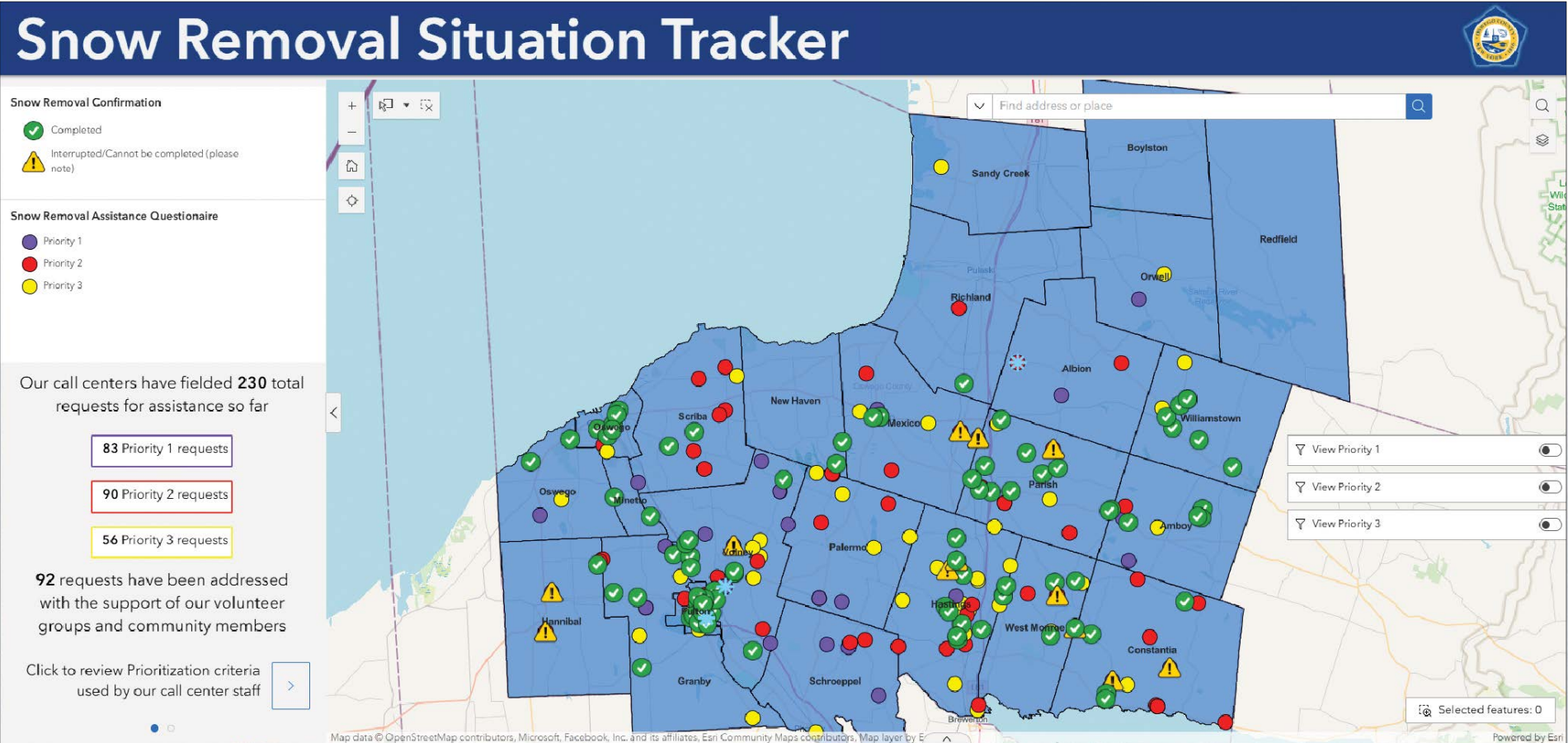
A Clear, Unified View of Activity

The whole system was assembled using ArcGIS Experience Builder, which served as the primary visual interface for decision-makers, VOAD teams, and Emergency Operations Center staff.

Requests for assistance submitted through Survey123 automatically populated a feature layer, placing a color-coded point—to indicate priority level—on a web map. Similarly, data from the second Survey123 form, capturing snow removal requests' completion status, created a separate feature layer with status indicators: green check marks for completed requests, and yellow warning symbols for issues needing attention.

These layers were displayed on a shared map embedded within Experience Builder. This configuration enabled users to filter requests by priority and completion status; access operational notes

↓ In the dashboard, green check marks indicate completed requests; yellow warning symbols show requests with issues; and purple, red, and yellow dots indicate priority levels.



→ The fire department and the public used ArcGIS Survey123 forms to report damage, and this information was displayed on a dashboard.

without revealing personal information; and interact with up-to-date, geospatially organized data. Experience Builder gave emergency responders a clear, unified view of field activity and unmet needs while eliminating the need to manually refresh data.

“By building both the intake and completion surveys in Survey123 and connecting them through a common address field, we created a dynamic feedback loop that updated in real time,” said Matt Goodsell, a communicable disease epidemiologist with the Oswego County Health Department who was tasked with deploying the solution. “Experience Builder allowed us to bring everything together visually so users at every level—call takers, VOAD teams, and decision-makers at the county and state levels—could interact with the same live data in a meaningful way.”

A Quickly Made, Tailored Tool

Oswego County created the Survey123 forms and Experience Builder dashboards within 48 hours of being requested to coordinate snow removal. While the county didn’t have an off-the-shelf tool prepared for this specific scenario, Goodsell was able to build out the framework quickly thanks to his prior experience working with Survey123, Experience Builder, and web maps.

Goodsell previously applied these tools to public health—building and maintaining routine respiratory disease tracking dashboards—and was able to translate that technical skill set along with his understanding of emergency operations into a purpose-built solution for the winter storm response. Goodsell’s familiarity with both the technology and operational needs of emergency coordination enabled him to quickly stand up tailored, effective tools that could be refined throughout the incident.

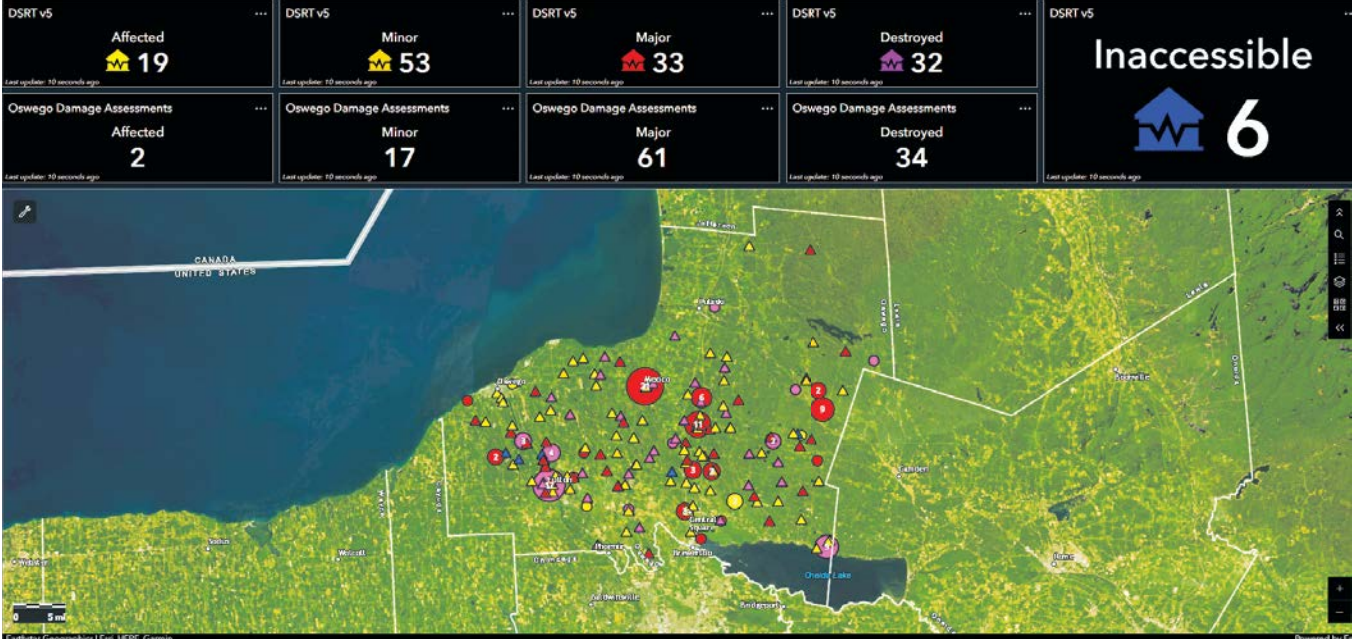
Oswego County is now revising and simplifying the framework for snow removal coordination so it can be deployed even faster in future incidents with only minor modifications. The county is also already exploring its use for evacuation support and disaster debris removal. The system is adaptable for any scenario where the public needs assistance, the county needs to track field work, and decision-makers need to visualize progress in real time.

Responding to and Anticipating Needs

For Oswego County, the need to quickly organize snow removal requests evolved into a real-time operational framework that supported tactical deployment, leadership visibility, and partner coordination. By linking Survey123 forms through a shared data field and visualizing the information in a live dashboard, Oswego County created a system that not only responded to community needs but also anticipated them.

“The strength of our response came from the shared commitment of every agency, volunteer, community member, and responder involved,” said Peet. “When we’re all working from the same information and toward the same goal, coordination becomes much more effective. For us, that goal was taking care of the people of Oswego County—[and] GIS tools helped us stay aligned and focused on what mattered most.”

→ A Survey123 form allowed mobile teams to capture the status of snow removal requests.



In addition to using ArcGIS to coordinate snow removal assistance, Oswego County leveraged the technology for several other critical functions during the storm response, including:

Fire Department Damage Reporting

Fire departments across the county were given access to another Survey123 form with fields for recording notes and hazard evaluations. Firefighters captured this information in the field, feeding it into the same operational dashboard used by the Emergency Operations Center, giving leadership a complete view of structural damage, access challenges, and potential risks to building occupants.

Public Damage Reporting

The public used a separate Survey123 form to submit damage reports, complete with photos and descriptions of structural issues, roof collapses, and flooding concerns. This data helped the county and state evaluate whether the area met thresholds for disaster declaration. It also helped residents quickly document uninsured losses for recovery planning.

↓ Call takers used a Survey123 form to collect details about each request for assistance and to prioritize caller needs.

Utility Plans for the Future by Upgrading Its GIS Today

Based in Omaha, Nebraska, the Metropolitan Utilities District (M.U.D.) serves more than 600,000 residents in the metro area and manages both natural gas and water utilities. For over 10 years, M.U.D. has used GIS technology to streamline workflows and has frequently updated its technology to better serve staff and customers.

In keeping with that ethos, leaders at M.U.D. recently transitioned from ArcGIS Desktop to ArcGIS Pro and implemented ArcGIS Enterprise along with ArcGIS Utility Network. As a result, M.U.D. now has an accurate, real-world data model of its utility assets and operations with full network connectivity.

Iteratively Improving M.U.D.'s GIS

When M.U.D. initially embraced GIS, the utility wanted to replace paper workflows and reduce dispatch calls. So it implemented Utilities Viewer, an app supported by ArcMap that provided staff with access to information via iPads and tough books. But there were limitations. The app required an active internet connection, which wasn't always available, and performance lagged when viewing the entire map area. In addition, syncing with local databases often failed.

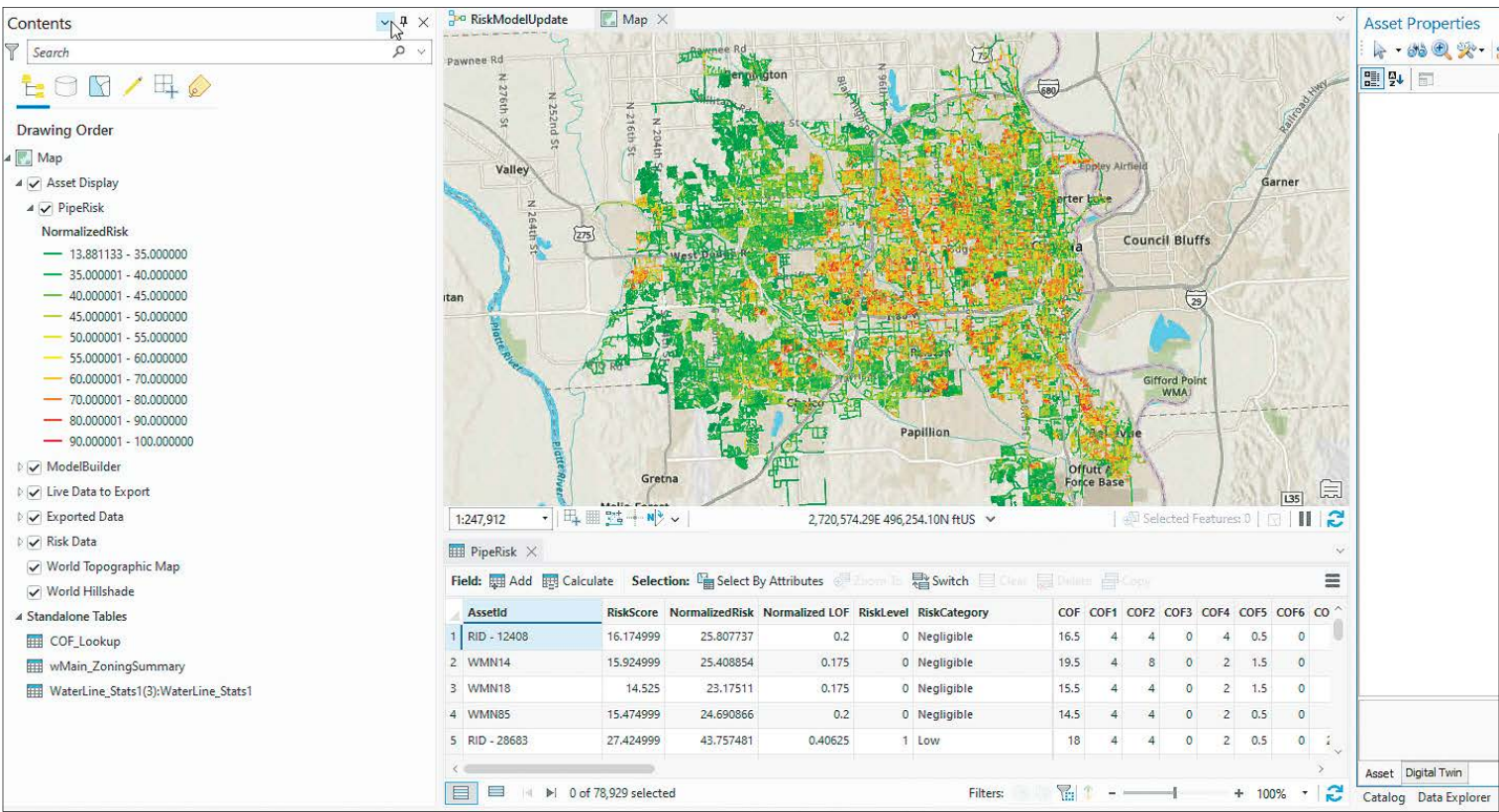
As technology advanced, M.U.D. staff were able to develop new apps and improvements. The organization synced its GIS with SAP to help with resource planning, make field apps faster and more robust, and develop dashboards to showcase data and analytics. Yet staff still struggled to streamline outage and project management. Additionally, regulatory requirements, such as revisions made to the federal-level Lead and Copper Rule, put pressure on M.U.D. to take the next step: implementing enterprise GIS on a modern geospatial platform and upgrading to ArcGIS Utility Network.

Leadership chose to focus on initiatives that would improve system management. These goals included the following:

- Use better-quality data to upgrade and support hydraulic modeling and identify risks.
- Develop an outage management system and a lead service inventory.
- Build a foundation that could support short- and long-term goals, including enabling mobile crews with field apps and high-accuracy GPS receivers to improve efficiency.

Start with Data Cleanup

Staff began the process of upgrading M.U.D.'s GIS by performing a thorough review of the



utility's data to identify data gaps and errors before coming up with a strategy to improve data quality.

From there, staff developed pilot projects based on M.U.D.'s gas and water systems to gain a clear understanding of ArcGIS Utility Network and its features. Working through the steps to set up a gas utility network provided staff with much-needed experience in mapping system data in the Utility and Pipeline Data Model. The team went through several iterations of its gas utility network before achieving the understanding and functionality it sought.

The pilot project also included an architecture review. M.U.D. staff participated in an architecture workshop hosted by Esri. Within a year,

the utility formed a plan to deploy new servers that would provide a robust environment for its ArcGIS Utility Network implementation.

"Take Esri's advice to clean up your data and start with a pilot project. The pilot sets up a workbench that can be modified to meet your needs and support your migration," said Lindsay Dreckman, M.U.D.'s GIS manager. "You will learn a lot and be better prepared for full implementation."

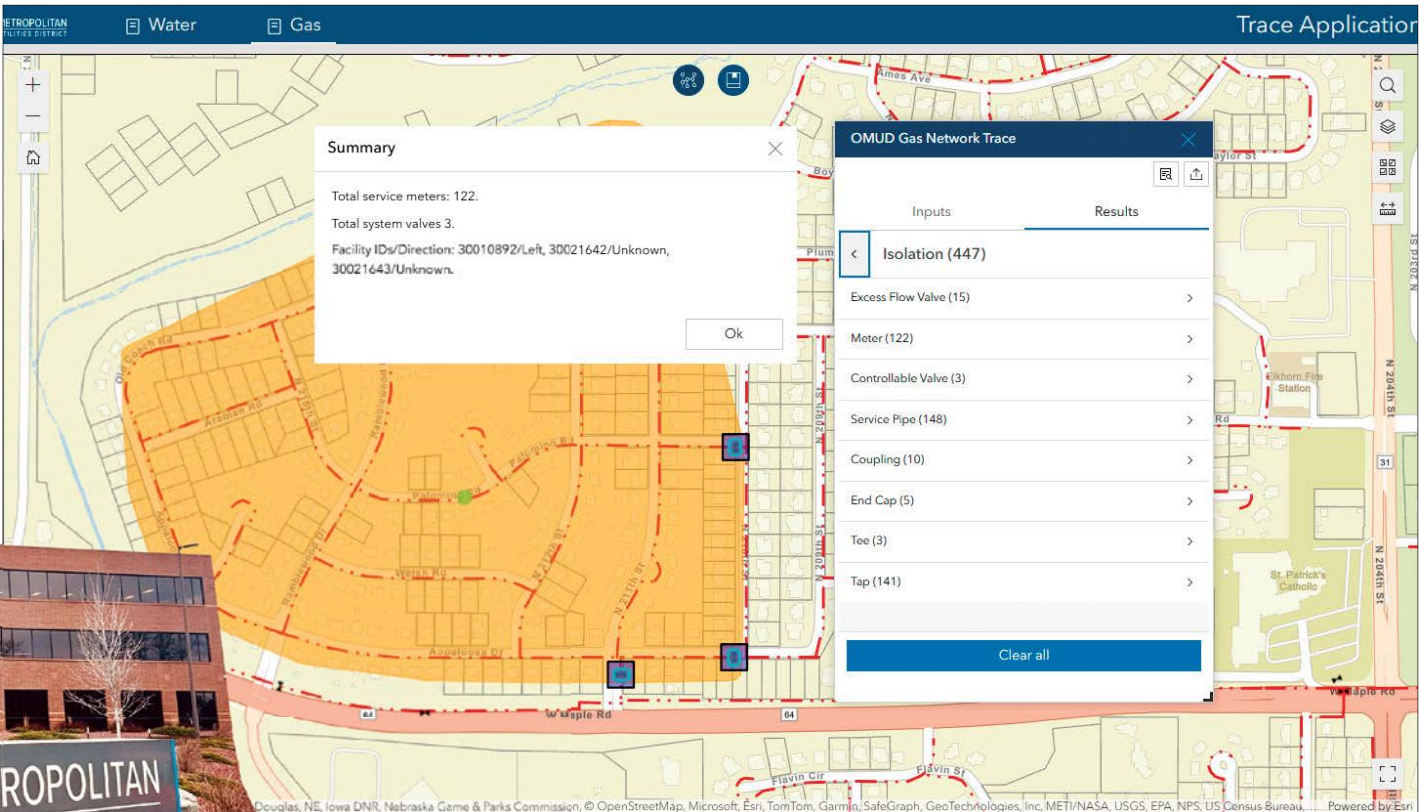
Together with ArcGIS Pro, ArcGIS Enterprise and ArcGIS Utility Network have empowered staff with a central repository for GIS data, powerful desktop GIS capabilities, and GIS-based mobile apps. Now, staff can easily access information and create maps and apps they can

share with collaborators. This has improved existing workflows, enabling the GIS team to support organization-wide initiatives.

Aligning Hydraulic Modeling

M.U.D. staff had been developing a hydraulic model of the district's pipe network prior to implementing ArcGIS Utility Network. Because the hydraulic model demanded high-quality, accurate information, it aligned with the requirements for supporting M.U.D.'s migration to ArcGIS Utility Network.

Once ArcGIS Utility Network was in place, M.U.D. engineering staff moved away from the model built in ArcGIS Desktop and implemented AquaTwin Water, a water system hydraulic



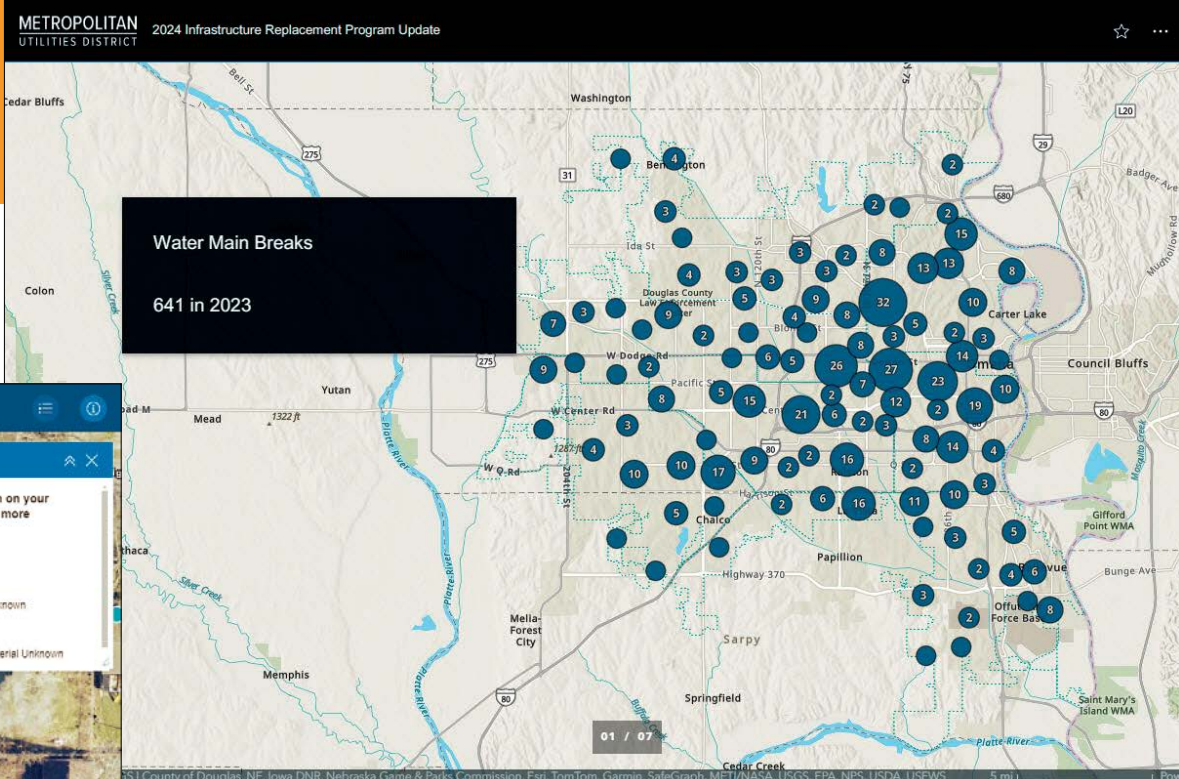
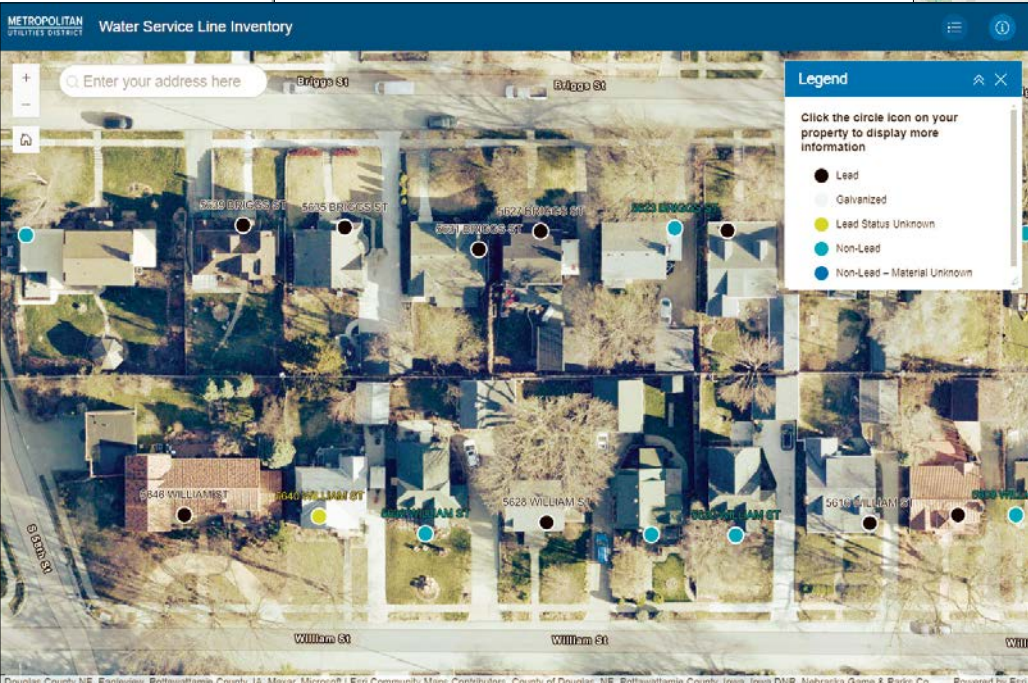
→ An outage app shows mobile personnel how to isolate water and gas mains during emergencies.



→ Risk model results are shared across departments using ArcGIS StoryMaps stories.



← To prioritize replacement projects, the Metropolitan Utilities District (M.U.D.) uses AquaTwin Water in ArcGIS Pro to build risk models.



← M.U.D. built a public-facing app to show customers what their water service lines are made of.

modeling solution from Esri partner Aquanuity that's built into ArcGIS Pro. With ArcGIS Utility Network as the foundation for M.U.D.'s hydraulic model, engineering staff don't have to spend as much time cleaning up data once it's in the model. This is because of ArcGIS Utility Network's rules and connectivity requirements, which consistently generate high-quality data.

"Using data from [ArcGIS Utility Network] has resulted in less time fixing connectivity issues in the hydraulic model," said Evan Martin, M.U.D.'s director of infrastructure integrity. "The built-in connectivity rules ensure good data, which is very important when modeling flow through our system [and] knowing what's connected to what and how the system flows together."

Determining Water Main Break Risks

M.U.D.'s robust water main break information—with digitized records dating back to the late 1950s—is the basis for risk modeling and planning. Staff use GIS to identify critical customers and previous projects in the area, and to review asset information such as a water main's size, material, pressure, and slope. This information feeds the Aquanuity software, resulting in better risk prioritization and more informed capital improvement planning.

Results from the risk model are published to a web map and shared across departments using an ArcGIS StoryMaps digital story. This format enables staff to clearly communicate the risks associated with specific water mains, prioritize capital improvement projects and replacement program strategies, and display project areas and boundaries.

The GIS team has also developed two great maps to communicate how M.U.D. creates a capital improvement plan. One map shows water main break information and material type. This map is shared with the board of directors

to help them understand why capital improvement plans target specific neighborhoods for water main replacement and others don't. The other map visualizes the growth of M.U.D.'s water system. Exploring this map reveals how the system has expanded west through Omaha over several decades.

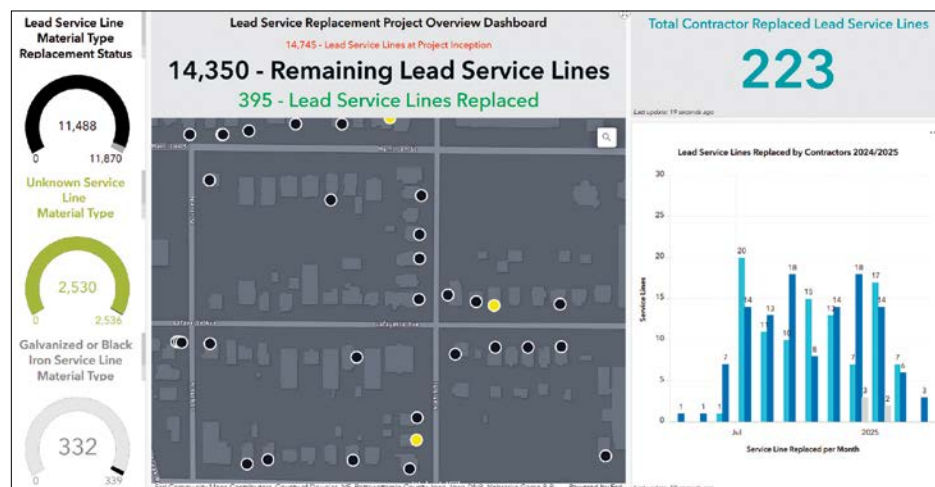
A New, Streamlined Outage App

Prior to modernizing M.U.D.'s GIS, during outages, staff would use a custom lasso tool in ArcMap to select all affected meters. The tool would export this information from the identified area to a spreadsheet. Mobile staff would then use a mobile mapping app to review the valves, clicking on them one by one and seeing how many turns it would take to close each valve. This process was prone to data inaccuracies, which often led to communication gaps between mobile staff and customers.

Shortly after upgrading to ArcGIS Pro, ArcGIS Enterprise, and ArcGIS Utility Network, M.U.D. launched a project to create a new outage app. The GIS team's goal was to build a new tool that streamlined workflows and consolidated multiple solutions into one. Team members used ArcGIS Experience Builder to create an app that leverages ArcGIS Utility Network trace configurations, integrates with SAP and ArcGIS Enterprise, and notifies customers of outages in their area.

Using the app, mobile staff can identify an outage point on a map by tapping a water main. They can then perform a trace that shows which valves need to be closed to isolate a leak or main break. From there, the system automatically generates a polygon of the outage on a web map and sends SAP a list of meters in the outage area. SAP then sends out notifications to affected customers. When the outage is over, another app resolves it and ensures that SAP informs customers.

"Our outage tool...allows for flexibility that is necessary in emergency situations," said Dreckman.



↑ Dashboards show employees and contractors different aspects of the M.U.D.'s Lead Service Line Replacement Program, such as the number of lines replaced per month.

Lead and Copper Rule Compliance

Adhering to the Environmental Protection Agency's Lead and Copper Rule Revisions and preparing for the Lead and Copper Rule Improvements—both of which seek to remove lead from water service lines across the United States—was another initiative that M.U.D. staff prioritized during GIS modernization. They needed to develop workflows and apps that would streamline the process of identifying and replacing lead pipes in M.U.D.'s service area. The GIS team wanted to employ the high-quality data within ArcGIS Utility Network and avoid creating an additional database.

The initial goal was to compile a water service line inventory that could be published to a public-facing map. M.U.D. worked with Esri to create a Python script that employs the trace features in ArcGIS Utility Network to link linear asset data to meter points. M.U.D. is prioritizing lead service line replacements in areas with high densities of homes with infants and children, as well as areas with high concentrations of lead service lines.

It's primarily plumbers, not M.U.D. staff members, who replace the pipes, so the GIS team used ArcGIS Survey123, ArcGIS Dashboards, and ArcGIS Workflow Manager to build solutions that improve collaboration and transparency. Plumbers use a Survey123 form to collect information about the types of materials found at customers' taps, on each side of a valve, and at meters. They can also capture photos at each

location. This helps M.U.D. determine whether pipe replacements are necessary and gather data for state-mandated reporting.

Plumbers also use a dashboard, built with Dashboards, to view their assigned work. Pop-ups powered by ArcGIS Arcade connect plumbers to the pre- and post-inspection surveys. When plumbers submit a survey, Workflow Manager runs in the background so M.U.D.'s staff can complete quality checks and route updates back into the district's GIS. Other dashboards are used to manage work and pipe replacement schedules.

These inventory results now feed into a publicly available map created with Experience Builder. Customers can use the app to see what their household water service lines are made of and learn more about M.U.D.'s Lead Service Line Replacement Program.

Continued Collaboration

As a 20-year member of Esri's Advantage Program, M.U.D. has benefited from close collaboration with its Esri technical adviser and Esri Services representatives. In addition to continuing to work with Esri to refine current workflows and apps, staff at M.U.D. look forward to collaborating with Esri teams on automating reporting and work orders, streamlining corrosion control projects, and improving the as-built process by integrating GIS with Autodesk's AutoCAD software.

MAPPING A CAREER OF QUIET IMPACT

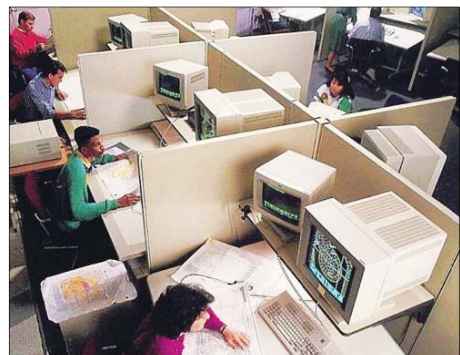
Anthony Powell, IT manager for Houston Public Works in Texas, didn't set out to become a strategic GIS leader, let alone the architect behind one of the most ambitious digital transformations in the United States. It was a happy accident.

While studying architectural drafting by day, he spent his nights digitizing telephone utility assets in a GIS database at a small mapping firm in San Antonio, Texas. That hands-on experience introduced him to spatial data and sparked a passion that would shape his career, beginning in 1988.

"I just fell in love with it," he recalled. "Not just learning the assets but the logic, the GIS side of it—connecting the dots and understanding what goes into that."

By 1992, Powell was helping lead the development of Houston's first Web GIS platform, which made the city's utility data accessible online to staff for the first time.

It was the first step in what would become a decade-long transformation. In a city that spans more than 600 square miles and faces constant pressure from flooding, growth, and aging systems, Powell has quietly helped digitize, modernize, and future-proof Houston's infrastructure.



↑ Anthony Powell, shown here in the green sweater, began his career digitizing utility records.

From Digitizing Utility Plans to GIS Leader

During Houston's first Web GIS initiative in the 1990s, Powell—then a consultant at a private engineering firm hired to digitize the city's utility records—helped manage the team tasked with the project. This work supported the development of a state-of-the-art water utility GIS management system for Houston that would later be called the Geographic Information Management System (GIMS).

The scope was staggering: More than 15,000 utility plan sets totaling over 1.5 million individual paper sheets, plus thousands of maps and countless engineering field books, needed to be digitized. The work extended over

multiple shifts and required clear communication across a large and diverse team.

"That's where I really built my project delivery and supervisory skills," Powell said. "You had to keep the big picture in mind."

The impact of the work was immediate. Mobile crews who once relied on paper drawings stored in file rooms could now access digital maps directly from their trucks—an early example of Powell's people-first approach to GIS.

"We created something they could use anywhere, anytime," he said. "And they loved it."

In completing GIMS, Powell saw the full life cycle of GIS—from raw data to real-world application—and how spatial logic could drive smarter decision-making across Houston's vast public works landscape. It was that end-to-end process, and the variety of challenges it presented, that sparked his deeper interest in GIS and inspired him to explore how technology could be used more effectively in the utility space.

"Afterwards, you look at the extraordinary amount of effort that went into not only learning but building one of the industry's first geospatial web applications from digital data that didn't exist. That was very exciting and definitely my 'wow' GIS moment," Powell said.

That experience not only deepened his passion for GIS but also laid the foundation for a leadership style focused on setting clear goals, building trust, and empowering teams to solve problems creatively.

Leading Waves of Digital Transformation

Houston Public Works is one of the largest accredited public works agencies in the United States. It manages water, wastewater, stormwater, transportation, engineering, construction permitting, and customer water billing.

When Powell joined the department in 2005, GIS was still seen as a back-office tool—known only as the "GIMS system"—and was primarily used to print map books and locate water assets. While the city had made early strides

with Web GIS, the technology wasn't integrated much into daily operations.

Powell had a broader vision: "GIS anywhere, at any time," he said.

With support from the department's GIS manager and the GIS team at the time, they worked together to push GIS out into the field and across the department.

In 2006, Powell led the department's migration from a custom-built GIMS environment to ArcFM, a commercial off-the-shelf solution from Esri partner Schneider Electric, which streamlined daily edits and utility data maintenance. By 2016, Powell was preparing for the department's next digital leap: transitioning to Esri's ArcGIS Utility Network model and building a more modern, robust enterprise GIS environment that could support mobile apps, dashboards, and real-time data across all business units.

To get ready for this, Powell wanted to hear directly from every business unit across the department to understand their operational goals and specific GIS needs. With help from Esri, Powell and his team held workshops with employees in each business unit—including the director's office—capturing how GIS could support their initiatives and operations and where they could implement process improvements. A transition plan was designed around this feedback.

Changing to a new GIS environment was especially critical for emergency response. Now, emergency response personnel can use mobile tools for windshield assessments (rapid field surveys used to locate damage), predictive flood mapping, and automated reimbursement reporting for the federal government.

Embarking on this kind of transformation required more than technical knowledge and skill. "You have to build relationships and maintain trust, especially in a department this large," Powell pointed out.

His strategy of centralizing data while empowering subject-matter experts to manage their own systems within a shared framework advanced collaboration. And through it all, Powell emphasized doing things with consistency, commitment, and discipline.

"It's not just about building solutions," he said. "It's about knowing your customer, understanding their pain points, and building a solution around that information—not the other way around."

The Right Tools for the Job

Powell has worn many hats during his tenure within the Public Works Department, including operations manager, GIS manager, interim chief technology officer, and now interim assistant director. Each role has shaped how he leads, listens, and builds systems that last.

Under Powell's leadership, Houston Public Works transitioned its enterprise GIS environment from on-premises infrastructure to the cloud. This has improved accessibility, resilience, and collaboration across departments.

"The transition has also created additional options in accessing critical GIS information during emergency events," Powell said. "As long as you have power and internet access, you are able to leverage the environment and provide support."

That move laid the groundwork for the department's next step in extending GIS: using AI to collect and manage a massive inventory of transportation assets across the city.

"People suggested that we send crews out with mobile apps," he said. "But since we have millions of signs and signals, that would take years."

Powell partnered with a vendor to use AI-powered image recognition technology to scan 360-degree street-level imagery, extract asset locations, and assess their condition. In weeks, the city had a comprehensive, georeferenced inventory—a task that would have taken mobile crews a decade. That data now feeds directly into Houston's work order system.

Still, Powell is quick to remind his team that technology is only as good as the problem it solves. He encourages his team to explore new technologies—but only after understanding the users and the added value that the solution will provide.

"You've got to know what you're trying to achieve," he said. "Then choose the right tool for the job."

Throughout his career in Houston—navigating change, innovating, and building trust—Powell has come to believe that a successful GIS career is deeply personal and different for everyone.

"There are various levels to having a successful GIS career," he said. "After you figure out the level that satisfies you, accept it, be committed, and be true to it."

For Powell, whether building a system or mentoring a team member, he listens first, solves problems thoughtfully, and never cuts corners. That commitment has defined his four-decade career and continues to shape Houston's GIS future.



↑ Transitioning Houston Public Works' GIS to the cloud has made it easier to access critical GIS information during emergencies.

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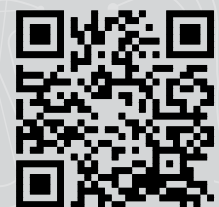
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Seeking to Make Cycling a Viable Mode of Transport, Czech City Relies on GIS

By Katarína Paulíková and Tomáš Zetek, Municipal Studio for Urban Planning and Architecture

Ostrava is the third-largest city in the Czech Republic by both area and population. This metropolis—home to 295,000 residents—aims to become a cycling-friendly city where people regularly ride bikes as part of their daily routine. The urban environment supports this goal, and it aligns with the broader objectives of the city's strategic plan.

The current situation in Ostrava, however, isn't so conducive to cycling. The city's polycentric layout, long distances between key locations, and robust road network reinforce residents' car-centric approach to mobility. As in many other Czech cities, the majority of residents perceive cycling as a hobby.

In May 2024, Ostrava's city council approved the new Cycling Transport Strategy created by the Municipal Studio for Urban Planning and Architecture (MAPPA). The strategy's authors drew inspiration from a methodology developed in the Netherlands—a country that reportedly has more bikes than people. It centers on five principles that make cycling infrastructure work in any city, regardless of its size, topography, or climate: routes must be connected, direct, comfortable, safe, and visually appealing.

MAPPA used ArcGIS Field Maps to collect data on specific streets and public spaces to see how these principles could be applied in different situations across the city. The organization then used ArcGIS Experience Builder to build an app that shows well-connected bike paths, lanes, and streets with reduced traffic, where cyclists could move around Ostrava safely and smoothly.

The strategy's ultimate goal is to shift residents' mindset from viewing cycling as just a sport to embracing it as a regular mode of transport.

↑ Ostrava is trying to make cycling part of daily life.

Finding Answers with Data

As the team from MAPPA began developing the strategy, several key questions came to mind. So MAPPA's data specialists used ArcGIS Pro to analyze available city datasets and Field Maps to conduct new field surveys. Here are some of the questions urban planners and transportation specialists asked, as well as how GIS filled in the knowledge gaps.

Which intersections should be redesigned first, and which missing links would benefit cyclists the most?

To build a well-connected network, cyclists must be considered on every street and in every significant public space. When deciding which crossings and connections to prioritize, MAPPA focused on the continuity of current infrastructure, the number of people—both residents and visitors—who would be affected, and average bicycle-based travel times.

What are Ostrava's cycling conditions like today?

To make cycling a more competitive mode of transportation, routes should be short and free from detours. In Ostrava, this means that different types of streets may need to be adjusted. Comparing a street's current state with proposed cycling infrastructure helps identify where changes are needed most.

Based on this, MAPPA was able to classify routes as suitable, acceptable, or unsuitable. This prepares the city to make traffic regime changes at opportune times, such as when performing planned repairs on water or sewer infrastructure.

Can cycling tracks—separate bike lanes—fit on specific streets?

On streets where cars travel faster than 30 kilometers per hour (about 18 miles per hour), the safest option is to separate cycling infrastructure. But to make this possible, the street must be wide enough.

So the team from MAPPA analyzed street widths using Ostrava's Digital Technical Map, a federal government-mandated map of the city's infrastructure. The team measured the space between buildings, including sidewalks, and found that in residential areas, more than 83 kilometers (50 miles) of streets are wide enough to accommodate some type of separate cycling path.

Where do road improvements need to be made, and how?

When cyclists are comfortable, they have a more pleasant experience, encouraging more people to commute by bike. But if

traffic regimes are not well connected or feel unclear or unsafe, cycling becomes frustrating, and fewer people choose it as a mode of transportation.

In the summer of 2023, the MAPPA team used Field Maps to gather data throughout Ostrava on road surface conditions and other factors that affect safety. A year later, flooding damaged several cycling paths, so MAPPA updated its surface quality data to include these new damages.

What does the public think about cycling?

Areas around cycling paths should be well lit, well maintained, and clean. High-quality surfaces, ample bicycle parking, and regular upkeep of paths also play an important role. In places with visually or functionally poor environments, the city should try to make various improvements.

In May 2022, residents of Ostrava had the opportunity to fill out perception maps related to cycling conditions in the city. Nearly 350 respondents participated, making almost 800 comments on the map. Responses indicated that dangerous spots were concentrated in residential centers and along major traffic corridors, known as urban avenues.

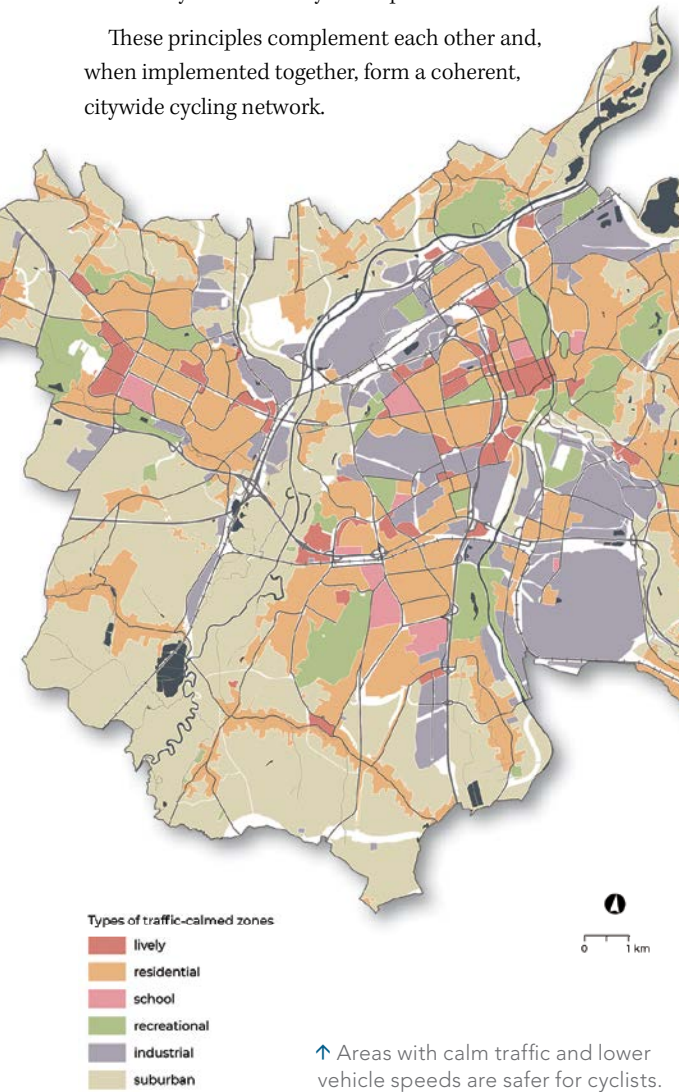
Data Shapes Design

The analysis done on these key questions gave MAPPA specialists valuable insight for planning new cycling infrastructure. It helped them identify which streets have the most potential for improvement and which measures would be most effective in each location.

The new cycling strategy that came out of the analysis organizes Ostrava’s cycling network around three main principles:

- Bolstering regional connections, which are longer-distance routes that link city districts to surrounding towns.
- Improving urban avenues and main streets—the major corridors that form the backbone of Ostrava’s cycling system—by ensuring dedicated space for each mode of transport.
- Expanding traffic-calming zones, or areas with low speed limits (no greater than 30 kilometers—or about 18 miles—per hour) where cyclists can safely share space with motor vehicles.

These principles complement each other and, when implemented together, form a coherent, citywide cycling network.

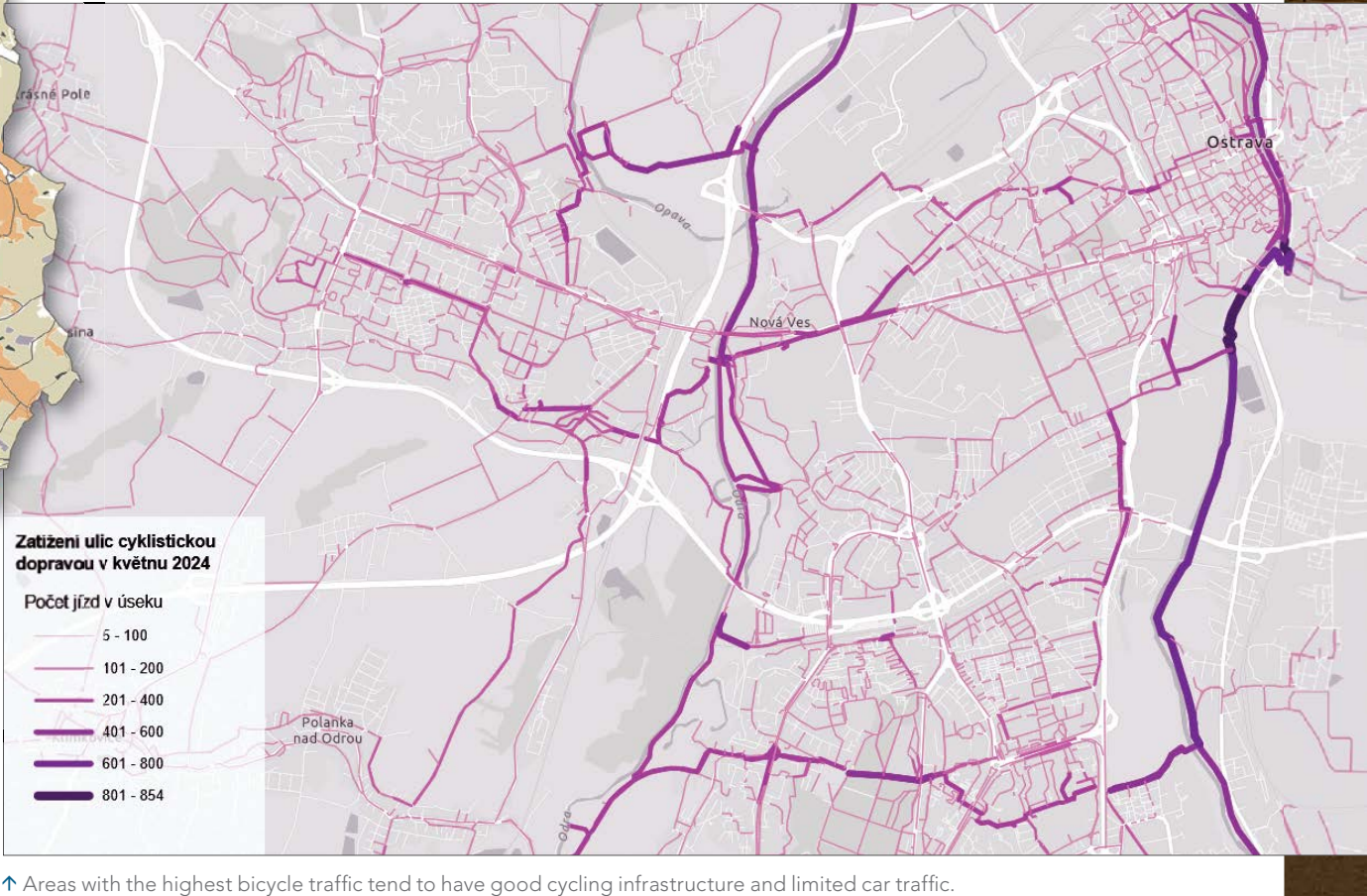


All the Data in One Place

To present all the data and analysis to the public, the MAPPA team used ArcGIS Experience Builder in combination with Microsoft Power BI to create a web app. It has several thematic sections.

The home page provides details on Ostrava’s current cycling infrastructure, covering road surface quality, traffic regimes, and available support facilities. This is the data—including photos of certain features—that the team collected using Field Maps. The full dataset will be updated every two years, with ongoing updates in between.

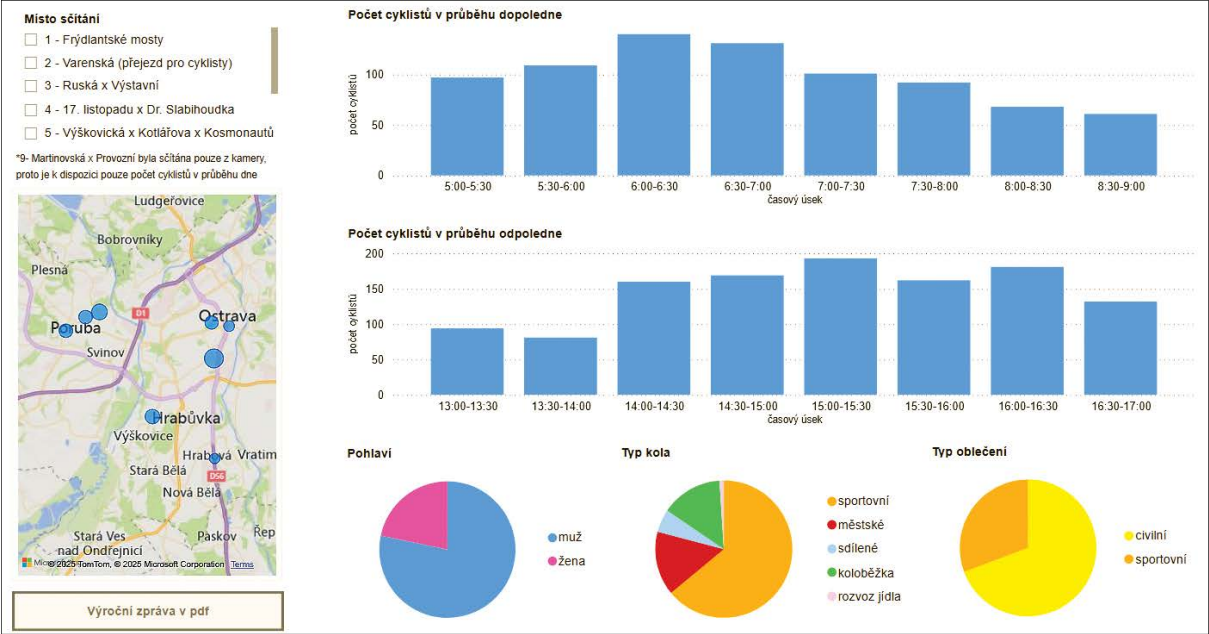
Another tab shows the routes cyclists take through the city. The map uses data from Ostrava’s Bike to Work event, which a nongovernmental organization called AutoMat holds every May. This data is illustrative and should be interpreted in context with the number of participants each year. MAPPA has been collecting this information since 2020 and matching it to specific road segments with a degree of approximation. The team has observed that the busiest areas tend to be those with good cycling infrastructure and limited car traffic.



The city also monitors cycling traffic using 10 automatic counters that operate 24 hours a day, along with an annual manual count at select intersections. In 2024, MAPPA introduced a mobile app for the manual count to streamline data collection and reduce errors during data processing. Beyond counting cyclists, the system also tracks cyclists’ genders, bike types, and clothing to help city leaders understand how new measures affect cycling behavior over time.

All this cyclist data is shown in a Power BI dashboard embedded into the app’s third tab. On the left-hand side, users can select a location, and the charts on the right-hand side display the counts taken throughout the day. A detailed annual report about the counts is also available.

Since 2020, MAPPA has been collecting information about Ostrava’s local bike share program, operated by Nextbike. A map in the fourth tab of the app shows the locations of individual bike share stations. Clicking on a station reveals the number of bike rentals, returns, and total turnover for each station for a given year. This data informs decisions about the service’s future operations.



A Microsoft Power BI dashboard shows the results of cyclist counts.

The Future of Cycling

With Ostrava’s new Cycling Transport Strategy being put into practice, the city aims to increase the share of travelers who choose cycling as their primary form of transport from 4 percent to 15 percent by 2040. With MAPPA updating the strategy and action plan—and working with road managers, developers, and the public—the future of cycling in Ostrava looks promising.

For more information about Ostrava’s cycling strategy, visit mappaostrava.cz or email Tomáš Zetek at zetek@mappaostrava.cz.

About the Authors

Katarína Paulíková is a GIS specialist at MAPPA, and Tomáš Zetek is a communications specialist at MAPPA.

From Snapshots to Solutions: Construction Photos Become Collaboration Tools

When managing extensive construction projects with hundreds of workers spread across multiple teams and expansive project sites, traditional documentation approaches break down fast. Esri partner Aegean Energy Group is no stranger to leveling up operations on projects like these. Its Maps to Megawatts solution, built on the ArcGIS platform, supports large-scale renewable energy projects through development, on-site analysis, site control, and reporting.

On several recent infrastructure projects that Aegean Energy Group was brought into, a simple innovation transformed not just how teams captured construction progress but also how the entire workforce collaborated. “Pic of the week” started as a basic employee engagement tool and has now evolved into something far more powerful: a next-level collaboration mechanism that fundamentally changed how specialists across disciplines work together.

A Simple Solution with Additional Benefits

Large-scale construction projects generate massive amounts of visual data. On several of Aegean Energy Group’s recent projects, teams used ArcGIS Survey123 to capture their progress. Each project generated 1,000 to 1,500 observation photos per week across hundreds of miles of active construction. With thousands of unique structures being built—each requiring custom approaches—visual documentation became critical not only for tracking progress but also for meeting regulatory compliance across multiple oversight agencies.

The traditional collaboration approach of holding weekly meetings, filling out paper reports, and keeping scattered photo archives simply couldn’t keep pace. Maps to Megawatts captures each stage of a project with apps that document and guide complex phased workflows. Instead of teams operating in silos, workers and specialists can see the broader picture, while management can maintain oversight across long distances.

“At the end of our weekly calls, on every project, we have traditionally reviewed the best pictures,”

said Kenneth “Woody” Duncan, senior vice president of technology for Aegean Energy Group. “It became difficult to coordinate everyone’s schedule, especially the field inspectors...so we had to have [meetings] just with senior management.”

But Duncan and his team didn’t want to lose the process of sharing and reviewing workers’ photographed observations, so they developed the “pic of the week” contest with a straightforward concept: Each week, Aegean Energy Group’s technology team reviewed all the photos captured through workflows powered by ArcGIS technology and selected about a dozen of the best shots from each project. The team then compiled these photos into a Survey123 voting form and emailed it to all project workers, who voted for the best shots. Weekly winners received a \$25 gift certificate, and monthly winners earned larger prizes.

But the real innovation wasn’t the competition—it was making voting mandatory. Since participation was tracked, managers immediately knew who wasn’t reading weekly email updates that contained critical information about new field maps, apps, survey changes, and operational procedures.

“It became an accountability mechanism, so if someone complained that their field map wasn’t working, we could see if they hadn’t voted, which meant they hadn’t read the email,” said Duncan.

An Unexpected Collaboration Catalyst

Within weeks of starting the “pic of the week” contest, something remarkable happened: Cross-disciplinary review emerged organically. Safety specialists looking at the photos spotted workers without proper safety equipment. Civil engineers flagged environmental concerns like improper berms that could cause erosion issues. Environmental teams caught construction activities that might impact protected areas.

This wasn’t planned—it evolved naturally as specialists examined the same visual data through their professional lenses. In addition to having various teams engage in separate

inspection processes, the weekly photo contest created what amounted to continuous peer review across all disciplines.

“It was such a ‘wow’ moment! We had certain simple intentions but ended up with real pearls,” said Duncan. “Anything in construction that enhances a safety culture is embraced, and even the pic of the week plays a part.”

The contest unexpectedly sparked new dialogue about safety and environmental compliance, and everyone began looking out for one another.

Technology Enabling Human Connection

The success of the “pic of the week” contest relied on ArcGIS platform integration. Survey123 captured the observations and photos, and ArcGIS Online hosted all the data, including the weekly voting forms. Technology was simply the enabler; the real power came from engaging human expertise.

The competition drove quality improvements. Teams took better photos, knowing that they might be featured. And over hundreds of weeks of construction, this created an exceptional visual archive of project progress that serves as both historical documentation and an operational resource.

The photos are just one part of the ongoing documentation and feedback that have addressed some fundamental challenges in construction communication. Maps to Megawatts uses Site Scan for ArcGIS to process regular drone imagery of each step in a massive project, adding an eye-in-the-sky view to the on-the-ground documentation—and these photos are included in pic of the week as well. Instead of driving out in trucks for review or sorting through pages and pages of drawings, teams can instantly view current conditions in the drone imagery and collaborate on solutions.

“What is really interesting is that we make general observations all day long, and we have found that 85 percent of the time, there are no issues during construction—most observations and photos are really just capturing progress,”

said Duncan. “The drone imagery similarly also allows different audiences to review construction progress and to make sure that everything is going according to plan.”

Compounding Returns

The benefits of the contest multiplied over time. Photos captured crucial details as crews competed for recognition. Documentation became more comprehensive as teams knew their work would be showcased. Issue identification accelerated as multiple disciplines reviewed the same visual data.

Perhaps most significantly, it created cultural change. The traditionally adversarial relationship between contractors and owners—described by one project leader as a “tug of war”—transformed into collaborative problem-solving. Everyone was looking at the same pictures, seeing the same challenges, and working toward the same solutions.

Other construction companies have also adopted the approach. At a recent industry conference, another project manager described implementing the “pic of the week” contest with great success, showing validation from the broader construction community.

What began as employee engagement evolved into operational intelligence. The weekly photo review process became a continuous quality control mechanism, catching issues early, while they were still manageable, rather than after they became expensive problems requiring rework.

For regulatory compliance, the documentation improved collaboration with oversight agencies, streamlining approvals and variance requests. Regulators could see exactly what was happening, enabling them to rely less on written reports.

As the construction industry increasingly embraces digital workflows, the lesson is clear: Technology succeeds when it enhances human expertise rather than replaces it. A simple photo competition powered by GIS became a catalyst for improved documentation and cross-disciplinary collaboration.



How the Asia-Pacific Region Is Taking Climate Action

Scientific Currents

By Dr. Dawn Wright
Esri

For nations in the Asia-Pacific region—including Japan, South Korea, China, Australia, New Zealand, Indonesia, the Philippines, and a host of small island developing states (SIDS)—there is little debate about the realities and dangers of rising sea levels, changing weather patterns, increasing temperatures, and other human-caused climate anomalies. In 2022, this area, which has been called the world’s most disaster-prone region, experienced a disproportionately high number of natural disasters, causing over 7,500 deaths and impacting 64 million people. Most of the debate surrounding these events focuses on how to make communities in the Asia-Pacific region more adaptable and resilient.

Climate resilience is a top priority for the Pacific SIDS, and island leaders are vocal about the international support their communities need. Regional organizations such as the Pacific Community (known by the acronym SPC) and the Secretariat of the Pacific Regional Environment Program (SPREP) foster collaboration among member nations on cross-sector scientific and technical projects focused on climate change mitigation and adaptation, disaster resilience, sustainable ocean management, sustainable tourism, and cultural preservation. Esri, its distributors, and some business partners are working with SPC and SPREP, helping members leverage geospatial technology more effectively as they prepare for and adapt to evolving climate realities.

While all these nations experience the acute impacts of climate change, they vary in their commitments to adapting and building resilience. To help, Esri emphasizes the importance of spatial analysis and effective information sharing, implemented within an integrated geospatial infrastructure of hubs, dashboards, ArcGIS StoryMaps stories, and mobile apps. Geospatial apps for SIDS support a range of uses, from siting marine protected areas and deciding on optimal locations for offshore renewable energy infrastructure to promoting tourism with compelling maps and planning local resilience strategies. Esri often provides consulting services to governments of low- and middle-income SIDS to help them modernize official statistics for land administration, national mapping, and health information systems, as well as their national disaster response management efforts.

None of these issues can be tackled by governments alone; rather, they are matters that affect whole societies and require significant cooperation between the public and private sectors. Yes, governments should lead, but the private sector frequently offers the greatest innovation, funding, and motivation to make climate action a sustainable reality. Simon Hill, the leader of Esri's national government and public safety team in the Asia-Pacific region, often talks

about the powerful duality of people and processes that ultimately makes the difference: Strong leadership drives process change.

What's happening in the Asia-Pacific region is a huge opportunity for spatial technology. People there need integrated geospatial infrastructure to connect disparate data so they can analyze it in context and make critical decisions. For island nations, it is now possible to integrate environmental data with demographic and census data, and map detailed aspects of everyday life, various ecosystems, and more. This is key to tackling the current challenges that SIDS face and seizing opportunities in the future.

To that end, Esri is deeply involved in the SDG Data Alliance ([sdg.org](https://sdgdataalliance.org)), an open, community-driven, multi-stakeholder partnership led by Dr. Greg Scott of the PVBILIC Foundation that aims to bring GIS to developing nations around the world to help them achieve the 2030 Sustainable Development Goals, or SDGs. For SIDS in particular, the SDG Data Alliance has evolved into one of the world's leading initiatives for creating open datasets, maps, and web apps—and, hence, brings opportunity, access, and equity to underserved communities. The SDG Data Alliance does this by supporting the creation of country-level geospatial action plans ensuring that geospatial information is developed, maintained, and accessible. These plans are supported by SDG Data Hubs, which enable governments and other organizations to report and monitor progress toward achieving the SDGs.

Since the inception of the SDG Data Alliance in 2021, Esri—as a founding partner—has provided grants of ArcGIS technology, suites of SDG-specific GIS solutions, and in-kind Esri Professional Services support to bolster the geospatial capacity of developing nations. All these efforts assist governments and other organizations in building their own tools to report progress on the SDGs, support national development priorities, and communicate the status of those priorities to key stakeholders and the international community.

The SIDS Global Data Hub (sids.sdg.org) aids island nations in using geospatial technology to build a more resilient future. A major accomplishment for the SDG Data Alliance is the planned rollout of 10 country-level SDG Data Hubs for SIDS, including Fiji, Palau, Tonga, and Tuvalu, as well as Antigua and Barbuda and

→ Esri helps nations in the Asia-Pacific region leverage geospatial technology to prepare for and adapt to changes in weather, sea level, ecosystems, and more.

↓ The SIDS Global Data Hub for small island developing states (SIDS) helps these nations use geospatial technology to build resilience.



About the Author

As Esri's chief scientist, Dr. Dawn Wright strengthens the scientific foundation for Esri software and services while also representing Esri to the scientific community. A specialist in marine geology, she is an elected member of both the National Academy of Sciences and the National Academy of Engineering, having authored and contributed to some of the most definitive literature on marine GIS.



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Charting the Course Toward Resilient Prosperity

To find out more about the climate actions Esri and its collaborators are taking throughout the Asia-Pacific region, see the following:

- The Digital Atlas of Australia (digital.atlas.gov.au), an Australian government initiative that's democratizing access to data and analysis for federal, state, and local governments and the public
- The 100 Island Challenge (links.esri.com/100-islands), a global initiative studying coral reef ecosystems
- Digital twin solutions to monitor sea level rise in Tuvalu: links.esri.com/tuvalu
- Fiji using location intelligence to guide climate action: links.esri.com/fiji
- How GIS is helping make cities livable in Japan, Australia, and elsewhere: links.esri.com/green-cities
- How the Philippines is developing a shared "disaster imagination" to strengthen resilience: links.esri.com/imagination
- Singapore's urban redevelopment solutions: links.esri.com/singapore
- The Pacific Geoportal (pacificgeoportal.com), which is currently under development to empower students, educators, and GIS professionals throughout Asia Pacific with no-cost access to geospatial resources

Grenada in the Caribbean, and the Maldives, Mauritius, and Seychelles in the Indian Ocean. This is thanks to the continued technical support of Esri, along with a renewed grant from the W.K. Kellogg Foundation. Scott has also led a concerted effort to add more partners to the SDG Data Alliance, resulting in a new partnership agreement with the SPC to support collective SIDS initiatives and a new agreement with Esri partner Fugro to support the needs of SIDS—initially in the Caribbean but eventually extending to Asia Pacific.

These are just a few of the many climate action developments that Esri is involved in with users and partners across the planet. At Esri, we remain in a mode of what I call “purposeful frenzy” as climate change continues to pose a critical challenge requiring immediate and effective action. I hope these developments will encourage and inspire you to participate in some of these programs or spread the word about them whenever and wherever possible, especially if you reside in or advocate for the Asia-Pacific region.

Empowering Conservation Through Community and Collaboration

As the conservation landscape evolves and the world grows more connected, it has never been more important for data to be accessible, reliable, and comprehensive. This year, a significant addition to ArcGIS Living Atlas of the World made waves: ProtectedSeas, a pioneering project committed to mapping and sharing global ocean protection data, is now part of this influential geographic resource.

This exciting collaboration not only elevates the visibility of vital data on marine protected areas (MPAs) but also underscores the transformative power of community-provided content, expert curation, and the far-reaching benefits of making these resources available to all.

A Formidable Collaborative Initiative

ProtectedSeas is more than a dataset; it is an ambitious, collaborative initiative aimed at enhancing understanding and stewardship of the planet's marine environments. By providing detailed, standardized, and up-to-date information on MPAs and their regulations, ProtectedSeas empowers decision-makers, researchers, coastal communities, and advocates worldwide.

ProtectedSeas' contributions to ArcGIS Living Atlas—the world's largest authoritative collection of curated geographic information—marks a major milestone in the quest for healthy oceans.

Strengthened Marine Conservation Offerings

At its core, ArcGIS Living Atlas is a dynamic repository of geographic knowledge. It brings together authoritative maps, layers, apps, and datasets from a worldwide network of contributors.

ArcGIS Living Atlas thrives on collaboration and community. It draws from government agencies, nongovernmental organizations (NGOs), academics, researchers, and passionate individuals who provide rich, trustworthy, authoritative data to millions of users every year.

By adding data from ProtectedSeas, ArcGIS Living Atlas strengthens its marine conservation offerings. Users can now explore up-to-date spatial representations of MPAs, complete with legal regulations and management information. This integration means that policymakers, educators, and explorers have seamless access to crucial data that can inform research, drive action, and inspire stewardship.

A Vibrant Network of Contributors

ProtectedSeas' journey to ArcGIS Living Atlas is a testament to how important

community-provided content is to understanding what's happening around the globe today.

Geographic data is never static; it grows, shifts, and refines as the world evolves. ArcGIS Living Atlas relies on a vibrant network of contributors to ensure that its collection remains relevant and robust. Community-provided content, like that from ProtectedSeas, brings local expertise, fresh perspectives, and real-world insight that centralized data sources alone can't match.

The model of open contribution that ArcGIS Living Atlas relies on also fosters a spirit of shared responsibility. When communities, organizations, and individuals add and refine data, they become invested in its accuracy and impact.

In the case of ProtectedSeas, the organization's firsthand knowledge and ongoing engagement with marine protection efforts ensure that the information it provides is both current and deeply informed by those closest to the issues.

Rigorous Curation Ensures Quality

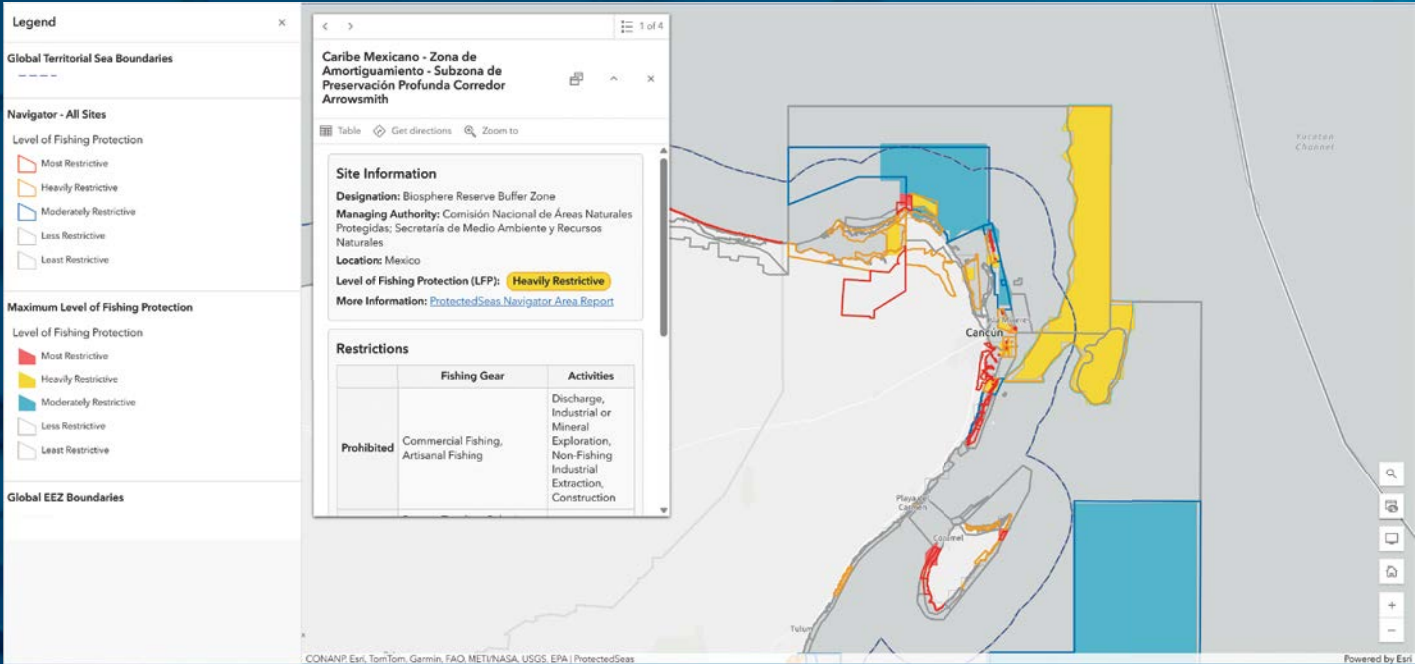
The value of any dataset lies in not only its breadth but also its reliability and usability. ArcGIS Living Atlas is known for its rigorous curation: Every contribution is reviewed, validated, and enhanced to meet high standards of quality. This process ensures that users—from scientists to students—can trust the data they find.

ProtectedSeas' inclusion in ArcGIS Living Atlas ensures that the project's meticulous

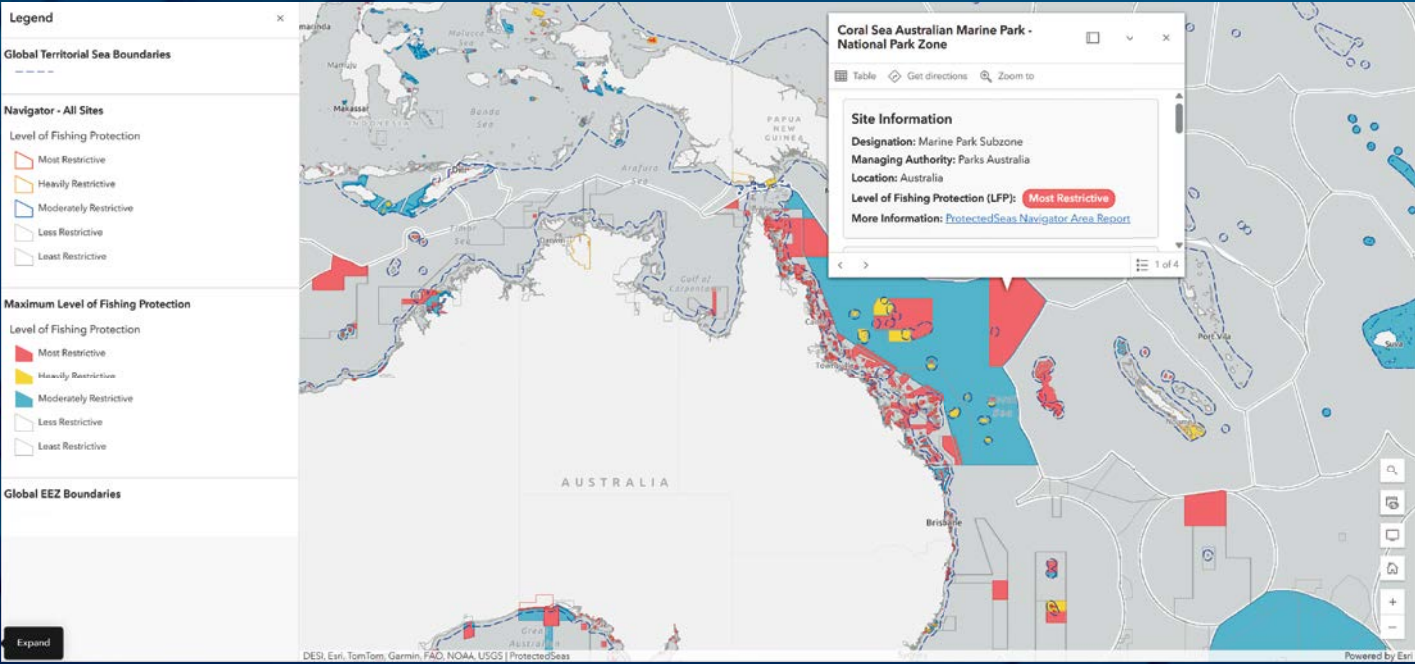
research is bolstered by the ArcGIS Living Atlas team's commitment to excellence. ProtectedSeas doesn't simply upload data that could easily be forgotten; the ArcGIS Living Atlas team integrates, visualizes, and updates the organization's datasets to reflect the latest developments in marine protection policy and practice. The result is a resource that is both comprehensive and actionable.

Wide Availability Democratizes Data

Perhaps the most profound outcome of this collaboration is that high-quality ocean protection data is now available to the public. Anyone, anywhere can access and use ProtectedSeas' datasets. Whether you are a scientist tracking biodiversity, a student



↑ Using data from ProtectedSeas, this map highlights marine protected areas (MPAs) and the associated levels of fishing protection off the east coast of Cancún, Mexico.



↑ A map made with data from ProtectedSeas shows the complexity and detail of marine protection efforts off the northeastern coast of Australia.

→ In ArcGIS Living Atlas of the World, users can combine data from ProtectedSeas with other curated content to gain deeper insight.

learning about oceanography, a policymaker drafting new regulations, or a concerned resident advocating for your local coastline, you have authoritative, up-to-date information from ProtectedSeas available at your fingertips in ArcGIS Living Atlas.

This high-use, open-access model democratizes data. It bridges the gap between knowledge and action, making it possible for communities around the world to participate in decision-making and advocacy. The widespread availability of ProtectedSeas' data means that marine conservation efforts can be more informed, more inclusive, and ultimately, more successful.

Real-World Uses of the Data

Having ProtectedSeas' data in ArcGIS Living Atlas is already making a difference. Researchers leverage these layers to identify gaps in protection, assess compliance with international agreements, and track conservation outcomes. Coastal planners and local governments use the data to align new developments with ecological priorities. Educators employ the data to bring the ocean to life in classrooms. And NGOs use the maps to engage with the public and advocate for stronger protection of the world's oceans.

Moreover, the integration of ProtectedSeas' data into ArcGIS Living Atlas facilitates

cross-sector collaboration. Conservationists, scientists, policymakers, and the public can all start from the same trusted information, building partnerships and strategies that are grounded in shared facts.

A Tool that Grows in Value and Utility

Adding ProtectedSeas' data to ArcGIS Living Atlas is more than a technical upgrade; it is a symbol of the possibilities when communities, experts, and technology collaborate. As more organizations contribute their knowledge to ArcGIS Living Atlas, and as curation continues to ensure the quality of this data, the tool will only grow in its value and utility.

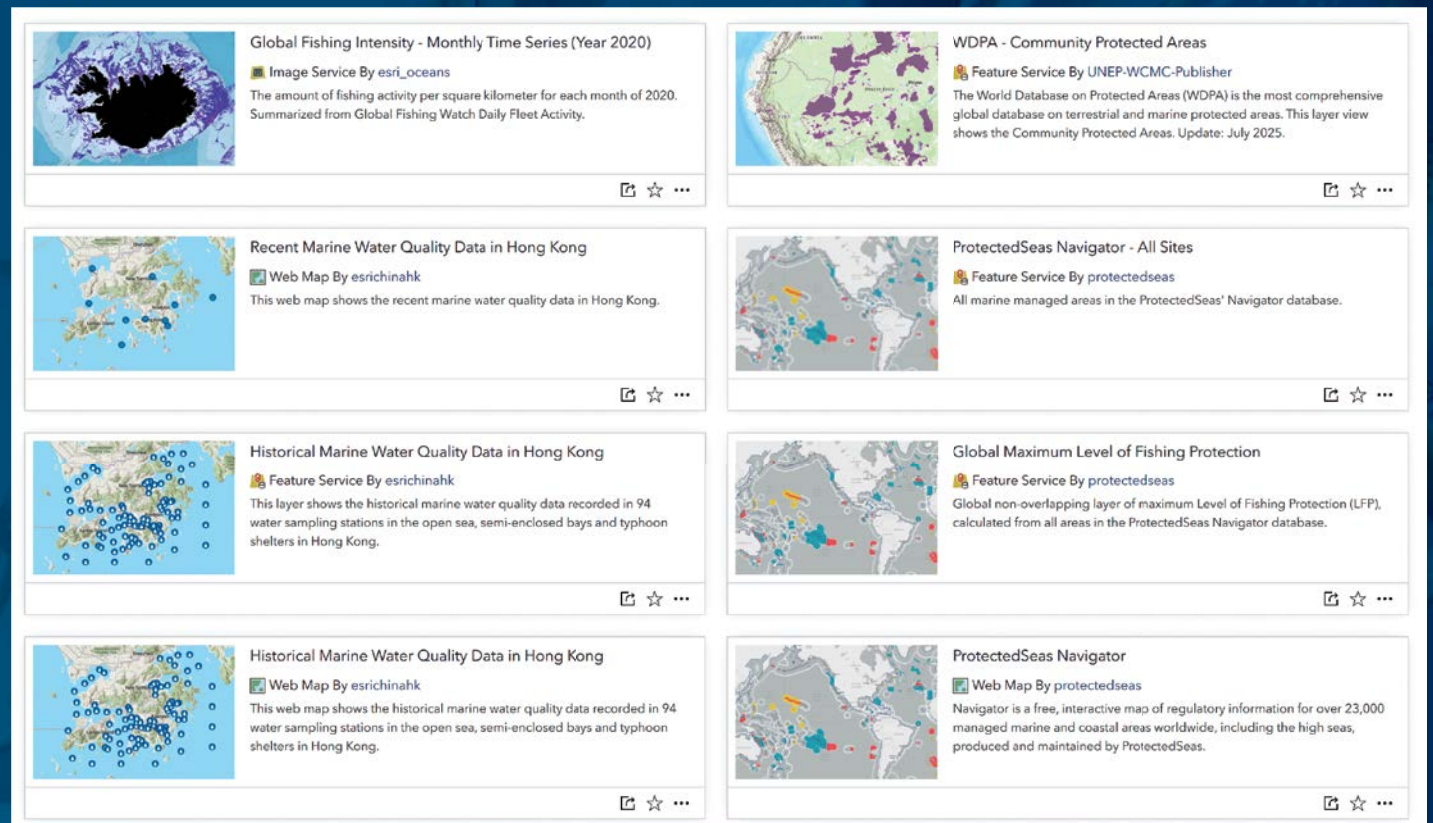
Looking ahead, the ArcGIS Living Atlas team expects to engage in more collaboration, receive richer datasets, and make a deeper impact. ProtectedSeas' contributions will undoubtedly inspire others to share their data with ArcGIS Living Atlas, knowing it is a platform where data not only lives but also thrives—and constantly evolves to meet the challenges of a changing world.

Charting a Course Together

The oceans connect everyone around the world, and protecting them requires communities of all sizes to work together.

Integrating ProtectedSeas' data into ArcGIS Living Atlas is a powerful example of how open, curated, and community-driven content can drive positive change. By making high-use, high-quality data available to everyone, people everywhere are empowered to understand, protect, and celebrate our blue planet.

As you explore the new marine protection layers in ArcGIS Living Atlas (arcgis.com/living-atlas-of-the-world/protectedseas), remember that every map tells a story, and every story has the power to inspire action. Let's continue to build, share, and steward the world's knowledge, together.



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With Maps and AI, Startup Simplifies Complex City Planning Information

Johns Creek, Georgia, has long embraced innovation in its municipal services. Home to more than 80,000 people in the northern Atlanta metro area, the city has promoted many projects to improve the quality of life for residents, including large-scale redevelopments to create walkable neighborhoods and upgrading utility infrastructure. Recently, city officials applied that forward-thinking approach to communicating with residents about long-term planning.

With a quickly growing portfolio of active plans affecting everything from transportation and parks to zoning and comprehensive planning, city leaders needed a better way to centralize information, simplify public access, and provide context on policy in both documents and maps. Esri startup partner Konveio (konveio.com) had the solution.

Founded in 2020, Konveio helps community leaders communicate project details with stakeholders from start to finish. Konveio is an ArcGIS technology-connected engagement platform for planners with two flagship offerings: Engagement Hub and Plan Hub. These hubs help cities facilitate public participation, making plans and policy documents easier to access and understand.

Konveio's solutions are built to support existing workflows, requiring no special software or training—ideal for staff who typically work with PDFs and ArcGIS Online. The company's products seamlessly integrate with ArcGIS Experience Builder, enabling geospatial data to interact with policy documents in new and more accessible ways.

Addressing Communication Challenges

Before partnering with Konveio, Johns Creek faced the same challenges common to many other municipalities. Planning documents were hosted as static PDFs across various department webpages, fragmented by topic in a way that was difficult for staff and residents to explore and cross-reference. The content was also dense, jargon-filled, and difficult to navigate.

For city staff, answering residents' routine questions—such as "What new road projects are being planned in my neighborhood?"—required manually searching through multiple documents, which cost time and increased the risk of misinformation. Meanwhile, the city's GIS data, which was hosted in ArcGIS Online, was not connected with these documents, so spatial insight was rarely meaningfully linked to policy information.

To address these challenges, Johns Creek deployed Konveio's Plan Hub as a new feature of the city's website. The hub is fully integrated with Experience Builder, creating an AI-powered, geospatially enabled framework for city plans that is directly embedded into the website.

Accessible Information for Staff and Residents

The Johns Creek website now features a visually engaging, tile-based layout of adopted plans, each with its own detailed page, glossary, and AI-powered assistant that allows users to ask questions in everyday, nontechnical language, such as "What are the long-term goals for parks in the city?"

"Konveio has made our city plans more accessible," said Jennifer Chapman, senior communications manager at the City of Johns Creek.

Konveio's Explorer view allows users to search across all plans at once or filter by status, like "adopted" or "draft," and provides results with clickable page references. For example, when searching for parking policies, the platform

identifies which plans contain relevant policies—such as the Transportation Master Plan and the Recreation and Parks Master Plan—while clearly showing which documents are not relevant to prevent user confusion. The AI assistant pinpoints where each policy is mentioned and generates concise summaries to help users quickly grasp key takeaways. In a pop-up window, users can then click on links to open the source pages in the document, streamlining navigation and reducing the time it takes to find precise information.

It is Konveio's integration with Experience Builder, however, that represents the biggest transformation for Johns Creek. This is how Konveio redesigns planning communication so that, instead of being a document-based process, it is a spatially informed decision-making support tool.

By embedding Konveio into an Experience Builder app, Johns Creek allows users to interact with a citywide map layered with GIS data, including information such as park locations, zoning districts, or bike lanes, and instantly retrieve related planning policies. When a user clicks on a location like Cauley Creek Park, that triggers Konveio's AI-powered map function. The system automatically surfaces excerpts from the Recreation and Parks Master Plan that relate to that specific park, including details about its development phases, short- and long-term goals, and direct links to supporting documentation.

Because Konveio's AI search is connected to both document content and GIS layers, it acts as a real-time bridge between spatial data and narrative policy. It doesn't just show a location; it also explains the "why" behind the planning decisions made for that location.

"Integrating with ArcGIS lets us explain planning decisions in a spatial context, which shows residents exactly what's planned for their community—and why it matters—without them having to dig through dense documents," said Chapman. "Our communication is clearer, faster, and a lot more helpful."

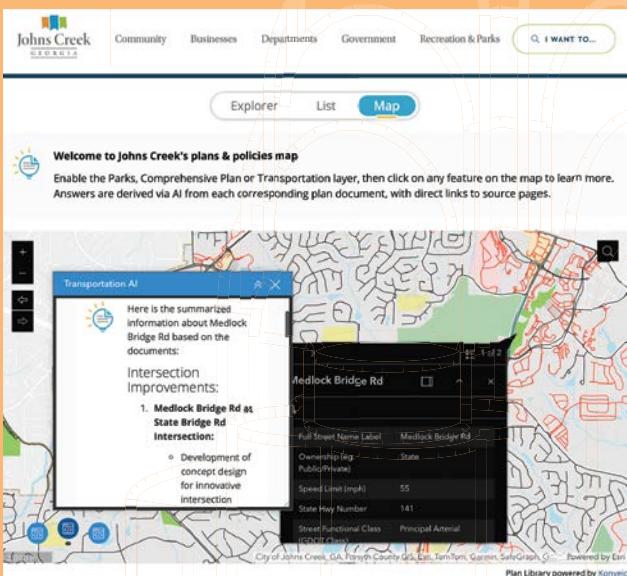
Furthermore, the system is adaptive. As staff update GIS layers or upload new versions of planning documents to Konveio, the integrations update automatically. This ensures that the map always reflects the latest data and insight without requiring manual syncing—a major time-saver for the city's IT and planning departments.

Enhancing Communication and Trust

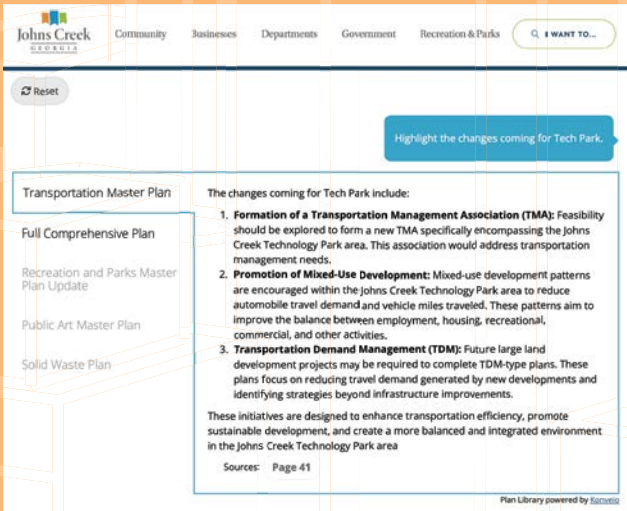
Johns Creek's new Plan Library, available at johnscreekga.gov/city-plans, has significantly enhanced public access to complex planning materials. Residents can now quickly find relevant information without scrolling through entire PDFs or calling city staff. The AI assistant reduces information barriers, and glossary features help decode jargon for everyday users. Translated versions of documents support inclusivity, ensuring that more residents can engage meaningfully with the content.

From the administrative side, the city gains visibility into what questions residents are asking, helping staff tailor future documents, FAQs, and community engagement efforts. Staff also spend less time fielding repetitive questions and cross-referencing plans, freeing them up to focus on higher-value work.

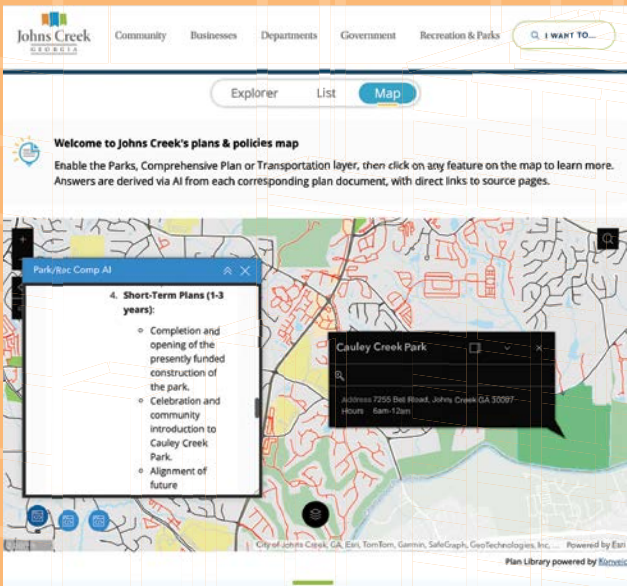
Perhaps most critically, the Experience Builder integration has turned spatial exploration into an educational tool. By tying policy content to locations, Johns Creek helps residents understand not only what is planned but also why and where—boosting transparency and building public trust in the city's plans for the future.



↑ In Konveio's Plan Library, when users select a feature on the map, the AI assistant summarizes policy information and provides links to relevant web pages.



↑ Users receive AI-generated answers to their questions, drawing data from all relevant city planning documents.



↑ Konveio's platform, integrated with ArcGIS Experience Builder, explains why certain planning decisions were made for specific locations.

For more information on the Esri Startup program, go to links.esri.com/startup.

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Chronicling Progress and Showing Vision

To celebrate the United Arab Emirates' (UAE) 53rd National Day, the country's Federal Geographic Information Centre (FGIC) launched the Union Atlas, a landmark national reference that not only documents the country's transformational journey over five decades but also captures its vision for the future.

Developed by the FGIC in close coordination with government and academic organizations—and using cutting-edge ArcGIS technology with help from **iSpatial Techno Solutions** (ispatialtec.com)—the Union Atlas combines geospatial and business information with development indicators, portrayed via aesthetically enhanced aerial photographs, satellite imagery, and maps. The information contained in the atlas covers a wide range of sectors, including education, health, energy, water, transportation, telecommunications, population, environment, culture, heritage, and geospatial information. Available as both a digital platform (atlas.fgic.gov.ae) and a printed book, the atlas offers a rich, immersive experience supported by ArcGIS Enterprise, ArcGIS Dashboards, ArcGIS Hub, and ArcGIS StoryMaps.

The Union Atlas is designed to support decision-makers, planners, researchers, and the public. It integrates interactive maps, time series data, and multimedia to visualize national growth, promote data-driven governance, and inspire innovation.

The initiative aligns with the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) working group's Integrated Geospatial Information Framework (IGIF), which seeks to strengthen national geospatial data management. It also reinforces the UAE's leadership in building a modern spatial data infrastructure.

The Union Atlas has been featured at key events, including at the International Society for Photogrammetry and Remote Sensing's (ISPRS) GeoSpatial Week in Dubai, where the FGIC showcased its strategic role in organizing the geospatial sector at the national level. The atlas has also helped the FGIC demonstrate how geospatial intelligence, national vision, and Esri technology can collectively empower nations to preserve their history while planning for a smarter, more sustainable future.



↑ The Union Atlas illustrates the United Arab Emirates' transformation over the past 50 years while also capturing the country's vision for the future.

Centralized GIS Data Makes Water Pollution Utility More Agile

The Greater New Haven Water Pollution Control Authority (GNHWPCA) operates and maintains an extensive sewer system in New Haven, Connecticut, including 555 miles of pipeline, 30 pumping stations, and an advanced secondary wastewater treatment plant with a capacity of 40 million gallons per day. At times, GNHWPCA staff found it challenging to manage this extensive infrastructure due to outdated plans, inaccurate database information, and limited methods for data sharing and collaboration.

As part of a comprehensive long-term plan, GNHWPCA leadership decided to create a primary GIS database for hydraulic modeling and pipe risk assessments. The authority hired **Langan** (langan.com) to centralize its GIS data. According to Ricardo Ceballos, GNHWPCA senior engineer and GIS manager, it was important to partner with a responsive firm that is familiar with the latest ArcGIS technology for stormwater and sewer utilities.

Today, the GNHWPCA uses ArcGIS Enterprise and ArcGIS Utility Network to manage Call-Before-You-Dig requests, daily inspections for manholes and pipes, videos from closed-circuit television (CCTV) inspections, outage planning, and maintenance records. Overall, the GNHWPCA's integration of GIS technologies has greatly improved its wastewater infrastructure management, leading to more efficient operations and better public service.

"We are continuously finding new ways to streamline our business workflows and deliver easy-to-use decision-support apps and tools for our stakeholders," said Ceballos.

Using ArcGIS Enterprise and ArcGIS Experience Builder, the authority has launched web and mobile apps that enable a broader audience—both internal users and the public—to access and understand the data. This has improved reporting and given staff greater insight into daily operations.

For example, the GNHWPCA Public Viewer provides customers with a simplified view of the data, while the Plan Review and Flow Metering app gives staff the tools they need to monitor the system, and plan developments and expansion. Apps like these, combined with ArcGIS Utility Network, now allow staff to complete tasks that once took days in as little as one hour.

Ticket processing for the Call-Before-You-Dig program is now automated, allowing contractors to receive accurate maps of the sewer system. This has helped the GNHWPCA reduce its Call-Before-You-Dig staffing by 75 percent while increasing efficiency and improving compliance, data consistency, and cost avoidance. Additionally, staff can now identify which customers are affected by an outage with just a few clicks rather than performing manual upstream traces. Staff can also more easily locate the source of fats, oils, and grease discharge by quickly identifying food processing facilities upstream from a sewer backup.



↑ Staff at the Greater New Haven Water Pollution Control Authority (GNHWPCA) now have better access to data and a clearer understanding of what's happening across the network.

Esri partners represent the rich ecosystem of organizations around the world that work together to extend the ArcGIS system and implement it in distinct ways to solve specific challenges. Find partners that meet your needs at esri.com/partners.

GIS Department Transforms from Cost Center to Revenue Generator

For many architecture, engineering, and construction (AEC) firms, managing both internal and client-facing GIS IT infrastructure is a continual challenge—especially when trying to build and scale client-facing solutions.

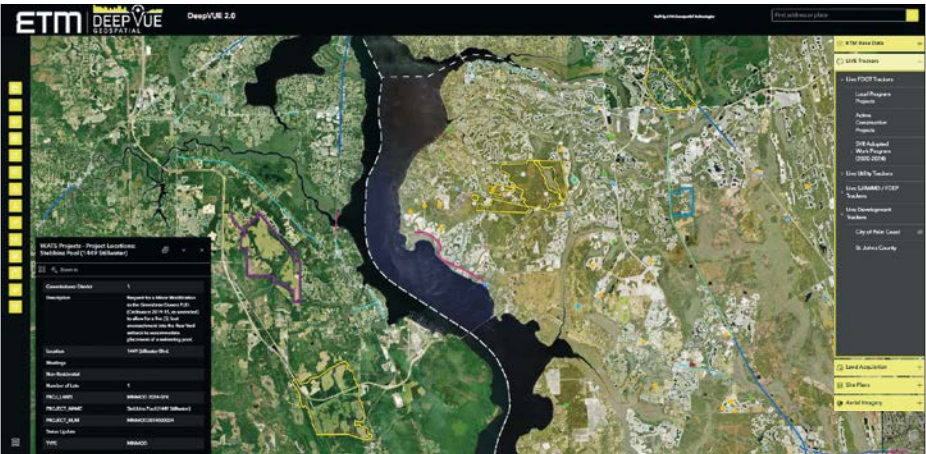
England-Thims & Miller, Inc. (ETM)—an AEC firm (and Esri partner) specializing in infrastructure development, engineering, planning, construction, and asset management—sought a reliable, secure, and scalable environment to support its growing suite of GIS-based client services. Leveraging the Esri Partner Network, ETM turned to fellow Esri partner **ROK Technologies** (roktech.net) to modernize its GIS infrastructure. In doing so, ETM transformed its GIS department from a cost center into a revenue-generating business unit.

First, the team from ROK Technologies migrated and deployed ETM’s solutions to ArcGIS Enterprise. The team also implemented ArcGIS Monitor on Amazon Web Services (AWS), paving the way for ETM to focus on client-facing services and apps. This fully managed cloud-hosted environment ensures operational continuity and data security while offloading IT overhead and improving performance and availability.

Now, ETM’s GIS team can create highly customized geospatial analytics and asset management tools for clients, giving them more actionable insight and operational efficiency. For example, ETM developed DeepVUE Geospatial—which is built in ArcGIS Enterprise and integrates with OpenGov, a financial management solution for local governments—to provide users with customized geospatial analytics and asset management tools.

By migrating to the cloud and adopting ROK Technologies’ GIS managed services, ETM has shifted its focus from infrastructure management to solution development. As a result of this modernization effort, ETM’s GIS department has accelerated solution delivery and enhanced service offerings, allowing smarter decision-making both internally and for the firm’s clients.

This effort highlights ETM’s commitment to delivering the best possible solutions to its customers. And the company’s collaboration with ROK Technologies serves as an example of how GIS modernization can streamline business operations, encourage innovation, and drive profit generation.



↑ DeepVUE Geospatial offers customized geospatial analytics and asset management tools.

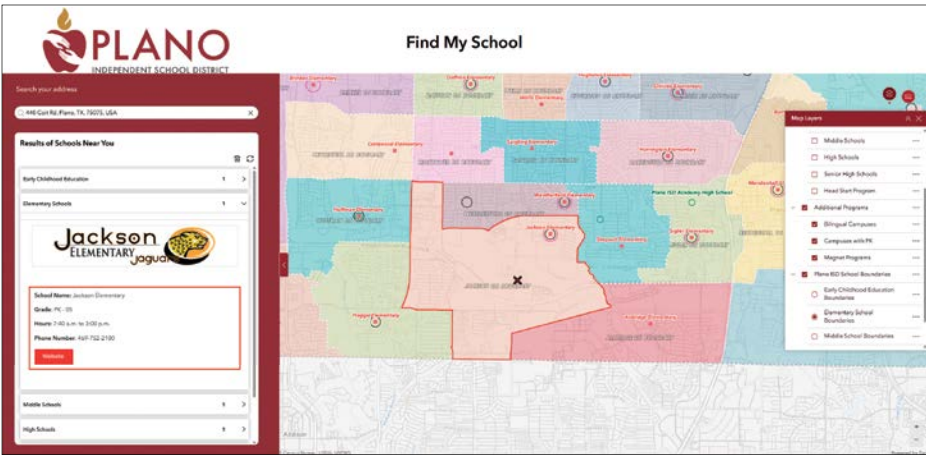
Helping Families Make Informed School Enrollment Decisions

Plano Independent School District—one of the largest in the Dallas-Fort Worth, Texas, metro area—serves over 48,000 students across more than 70 campuses. When the district recently made significant changes to school boundaries, families inundated administrators with questions about where their children should be enrolled. The district didn’t have an easy way to match home addresses to school zones, leaving families frustrated during the critical annual enrollment period.

To address this challenge, Plano Independent School District partnered with **Blue Raster** (blueraster.com) to develop an intuitive, web-based school locator tool. The goal was to create a spatial solution that would streamline the enrollment experience and reduce the administrative burden on district staff. The solution needed to meet the needs of students, families, and district staff—and be quick, accessible, and flexible in the long term.

The Find My School app that Blue Raster developed allows families to view their children’s current school enrollment paths and how those could change if students enrolled in a magnet program or moved to another location within the district. Built using ArcGIS Experience Builder and ArcGIS Online, the app is available on desktop and mobile devices. It integrates the ArcGIS World Geocoding Service and a custom-configured Near Me widget to match home addresses with school assignments. Blue Raster’s design team created custom pop-ups that show each school’s name and its grade levels, along with its phone number, hours of operation, website link, and logo—all wrapped in a custom HTML color-coded box based on grade-level breakdowns. The solution also allows district staff to easily update boundaries and program offerings as they evolve.

Since its launch, the app has received over 25,000 views and averaged more than 200 visits per day. By centralizing school boundary information in a user-friendly format, Find My School has dramatically reduced frustration and empowered families to make informed decisions. The app also supports the district’s broader goals of providing equitable access and fostering student success. District staff plan to integrate Find My School with other student information systems to create a more seamless experience for students and families.




↑ When users input an address, Find My School returns relevant information about nearby schools and district-wide programs.

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Lessons on Balancing Innovation and Ethics in Geospatial Technology

From the Meridian

By Dr. Gary M. Langham, American Association of Geographers

The rapid evolution of geospatial technology has created unprecedented opportunities for innovation, but it has also raised critical ethical challenges that demand urgent attention. As a society, how can we balance the benefits with the risks? How can we ensure that locational data serves the public interest rather than allowing financial interests to dominate? What are the responsibilities of those who use locational data?

To explore such questions, the American Association of Geographers (AAG) partnered with Esri and the University of California, Santa Barbara, in 2022 to convene experts to consider the ethical issues of locational data. The group was tasked with generating examples to illustrate the inherent risks of using locational data and to provide context for educators and ethicists. One outcome was an open-source publication called “Locational Data and the Public Interest” (available at links.esri.com/LDPI), which was recently re-released by the Institute of Electrical and Electronics Engineers (IEEE)—a professional organization that seeks to advance technology for the benefit of humanity—in *IEEE Transactions on Technology and Society*.

As one of the coauthors of “Locational Data and the Public Interest,” I emphasize the need to center ethical considerations in both academic training and professional practice. While the report covers an array of needs—from a research agenda and educational goals to regulatory recommendations and how to engage the public—Section VI offers critical insight. It examines the real-world impacts of locational technologies on marginalized communities, offering invaluable case studies for fostering ethical awareness and accountability in the geospatial ecosystem. These examples underscore the importance of integrating GeoEthics—a framework that prioritizes privacy, equity, and inclusivity—into every stage of geospatial technology development and application.

The Power and the Peril

Locational data has the dual capacity to empower and harm, as vividly illustrated by examples in the report. From workplace surveillance to unintended biases in algorithmic systems, these

cases reveal how technologies designed for efficiency or convenience can exacerbate existing power imbalances.

For instance, companies using location analytics to closely monitor worker productivity highlight the tension between operational efficiency and worker rights. The potential for data from period tracking apps to be weaponized in the United States—amid tightening restrictions on reproductive health—demonstrates how locational information can be repurposed for surveillance, violating personal autonomy. And when users of a free fitness app inadvertently exposed sensitive military outposts by tracking their workouts, it illustrated the risks of open data sharing without rigorous ethical review.

These cases are not anomalies but are rather emblematic of systemic issues in the geospatial ecosystem. Studying them provides concrete material for educators and trainers to explore the societal implications of locational data, moving beyond abstract principles to grounded, actionable discussions.

Teaching GeoEthics by Example

The examples noted in “Locational Data and the Public Interest” serve as powerful tools for academic instruction and professional training. By embedding concrete case studies into curricula, educators can:

- Foster critical thinking: Students can analyze the worker productivity case to debate the ethical limits of employee monitoring. Questions might include: “How does location tracking intersect with labor rights?” and “What safeguards could prevent misuse?”
- Emphasize intersectionality: One case study highlights how a delivery service provider allegedly excluded predominantly Black neighborhoods from fast delivery, which illustrates how algorithmic bias perpetuates systemic racism. This case invites discussions on data equity and inclusive design.
- Explore dual-use dilemmas: A GPS-powered app that sought to guide migrants to water while displaying poetry to support their emotional well-being

sparked legal and ethical controversy before its release. This example challenges students to weigh humanitarian intent against potential legal repercussions.

Such exercises cultivate mindsets that prioritize ethical foresight, encouraging future professionals to anticipate unintended consequences and engage affected communities in technology design.

Recommendations for Ethical Practice

Section VI of “Locational Data and the Public Interest” outlines 20 recommendations for addressing the ethical challenges posed by location technologies. Key strategies with direct relevance to education and training include the following:

- Collaborate with affected communities: Engage marginalized groups in all stages of geospatial projects, from design to implementation. For example, involving Indigenous communities in land-use mapping ensures respect for traditional knowledge and sovereignty.
- Work to mitigate biases: Tools such as GeoAI can perpetuate spatial inequities if trained on biased datasets. Courses should teach methods for auditing and correcting biases, such as participatory GIS techniques.
- Encourage ethical peer review: Journals and conferences should require authors to address the societal implications of their work, including data privacy and equity considerations.

These recommendations align with emerging best practices in responsible innovation, such as the European Union’s Artificial Intelligence Act and IEEE’s Ethically Aligned Design framework.

Building a Culture of Accountability

The geospatial community must move beyond self-regulation. Section VI advocates for enforceable standards, including the following:

- Informed consent protocols: Require clear, accessible user agreements for location data collection.
- Algorithmic transparency: Mandate public disclosure of how locational algorithms impact marginalized groups.
- Third-party audits: Conduct independent reviews of corporate and governmental geospatial practices to ensure compliance with ethical guidelines.

Academic programs can prepare students for this shift by integrating regulatory frameworks such as the General Data Protection Regulation and the California Consumer Privacy Act into coursework, emphasizing the legal dimensions of GeoEthics.

Ethics as a Foundation, Not an Afterthought

The examples and recommendations summarized here are not merely cautionary tales—they are also blueprints for transformative change. By embedding these lessons into academic curricula and professional training, a new generation of geospatial practitioners will view ethics not as an afterthought but as a foundational pillar of their work.

As location technologies continue to reshape the world, the geospatial community has both the responsibility and the opportunity to ensure that these tools serve the public interest—protecting privacy, advancing equity, and empowering communities.



About the Author

Dr. Gary Langham is the executive director of AAG. Previously, he served as vice president and chief scientist at the National Audubon Society. In 2000, Langham founded the Neotropical Grassland Conservancy to foster grassland research with grants and equipment. He completed a National Science Foundation-funded bioinformatics postdoc at the University of California, Berkeley, and earned his PhD in ecology and evolutionary biology from Cornell University.

Early-Career GIS Professionals:

Get Ahead with a GISP-E Certification

By Tony Spicci, GIS Certification Institute

For GIS students, recent graduates, and entry-level geospatial technology professionals, building credibility early is key.

Many people in the GIS industry have heard of the Geographic Information Systems Professional (GISP) certification—a designation awarded to qualified individuals who have at least four years of professional experience, meet the portfolio review requirements, and pass the GIS Certification Institute's (GISCi's) core technical exam. But what about early-career professionals who aren't ready for the full credential yet?

This is where GISCi's new PreGISP program comes in. Known as the Emerging GIS Professional (GISP-E) certification, it is designed for GIS professionals at the beginning of their careers to show their budding dedication to the field and to ongoing professional development.

How to Become a GISP-E

GISCi launched the PreGISP program as a pathway for emerging GIS professionals to start preparing for the GISP credential. The GISP-E is a short-term credential that serves as a precursor to the GISP and can only be earned once. It expires after three years and cannot be renewed.

Becoming a GISP-E requires two steps:

- Pass the PreGISP exam, an early-career version of the GISP exam that draws on learning outcomes from hundreds of geographic information science and technology (GIS&T) courses and provides a comprehensive assessment of a candidate's educational experience.
- Agree to abide by the Geospatial Code of Ethics (gisci.org/Learn-More/Ethics) to enhance public trust in the discipline.

The GISP-E certification is ideal for undergraduate and graduate GIS students, recent graduates preparing to enter the job market, career changers entering the geospatial field for the first time, and early-career professionals planning long-term growth. Candidates who earn the credential may put GISP-E after their names in their email signatures, on business cards, and in their social media profiles to signify their accomplishment as an emerging GIS professional.

The Advantages of an Early-Career Certification

The PreGISP exam covers key areas such as geospatial data concepts, cartographic and visualization techniques, analysis methods, data management and modeling, and remote sensing. Taking the exam gives candidates a diagnostic view of their own strengths—and areas they may want to focus on to gain more practical experience.

Earning the GISP-E certification gives candidates a good understanding of what's expected when pursuing the full GISP. It helps candidates identify what work to begin tracking, which types of training courses to pursue, and where to volunteer. It also helps them identify gaps in their experience that they can address early. Essentially, it acts as a road map for career growth in the GIS profession.

Becoming a GISP-E demonstrates initiative, self-awareness, and a commitment to professionalism. It shows potential employers that a candidate is not only technically capable but also thinking strategically about their long-term role in the field. In interviews, the

GISP-E designation also gives job applicants a clear edge when discussing GIS concepts, ethics, and industry standards because they have a certification to back up their views.

How to Sign Up and Prepare for the Exam

It can be overwhelming for early-career professionals to determine where they stand. The PreGISP program helps students and recent graduates build confidence and take ownership of their GIS learning journeys.

To register for the PreGISP exam, go to links.esri.com/PreGISP. Exams are offered in alignment with US university semesters in late April and November. The PreGISP exam is proctored online through Pearson VUE testing services. While there is a small exam fee, no portfolio or other eligibility requirements are needed to earn the certification.

For a well-rounded study experience, explore the University Consortium for Geographic Information Science's GIS&T Body of Knowledge, available at links.esri.com/gist-bok, and find relevant training courses from Esri Academy at esri.com/training.

Invest in the Future Now

The GISP-E certification isn't a practice test—it's a career development milestone. For students and new professionals, it bridges the gap between academic learning and professional certification. It also helps emerging professionals think like a GISP before they officially become one.

About the Author

Tony Spicci, GISP, is the executive director of GISCi, a nonprofit 501(c)(6) organization that promotes the advancement of proficient GIS professionals through its international GISP and GISP-E certification programs. Spicci spent more than 30 years working for the State of Missouri and volunteering with the Boone County Fire Protection District before dedicating his retirement to strengthening the GIS community.



Take On the 30-Day Map Challenge

In November, cartographers around the world are taking part in the 30-Day Map Challenge, an annual social mapping challenge that encourages participants to make a new map every day for 30 days. Held each November since 2019, the 30-Day Map Challenge focuses on practical cartography, according to its creator, Topi Tjukanov, a GIS engineering manager based in Finland.

Tjukanov posts the categories for each year—ranging from points, lines, and polygons to vintage style—on 30daymapchallenge.com. Many cartographers who participate in the challenge learn new mapping techniques and approaches. Some share their work on social media, inspiring others to level up their own cartography skills.

Creating a Map a Day for a Month

The story of this project began in 2019 when Tjukanov was riding a bus to work in Helsinki. While browsing posts on Twitter—now called X—he came across an online event called Inktober which challenged artists to create a new ink drawing based on a different theme each day in October and post their work to social media.

“At the time, I was already making a lot of maps, and I figured others might enjoy doing the same, especially with some creative structure,”

Join members of the ArcGIS Pro team and others across Esri in taking on the 2025 30-Day Map Challenge. Be sure to share your creations on your preferred social media platform using the hashtags #30DayMapChallenge and #ArcGISPro.

said Tjukanov, noting that creating 30 maps in 30 days would likely be a real challenge. “I never expected it to catch on the way it did.”

When Tjukanov posted his idea on Twitter back in 2019, “the response exploded,” he said. “It became clear there was a real appetite in the [mapping] community for something like this.”

Advancing Skills—and Careers

Tjukanov's success in creating and organizing the annual project helped him land his current role at Mapbox, he said. Many participants have advanced their careers or gained new skills because of the challenge, he added.

“One of the best parts has been seeing people gain the confidence to share their work publicly for the first time and then grow from there,” he explained.

Shira Ellenson, an Alaska-based cartographer and senior geospatial analyst at Esri partner Dewberry, said her first experience with the challenge in 2024 inspired her to try new mapping approaches and share her work online. When she participated in the challenge, she saw it as a way to put together a mapping portfolio.

“Not only was it a really fun process, [but] it inspired me to go outside my comfort zone to try new tutorials, software, and geoprocessing tools,” she said.

Creating 30 new maps from scratch is indeed a challenge, according to Ellenson, which is why, for the 2024 challenge, she made about 20 new maps and revised others she had already created.

"Many of the maps I designed for the contest aren't ones I'd typically make for work, but having the space to flex creative muscles was a great opportunity," she said.

For example, one challenge map that Ellenson created was inspired by a climbing trip she took

in Jordan. Using color, topographic details, and iconography, the map evokes the country's history and arid landscape while providing the impression of looking up at the mountainous terrain—just as a traveler on the ground would.

Another of Ellenson's maps, inspired by a tutorial from Esri cartographer and ArcGIS Online blogger John Nelson (esriurl.com/nelson), won Best Artistic Map in the 2025 Women in GIS map contest and second place in the professional category of the GIS Certification Institute's 2025 map contest. Titled "Tracking the Buzz: 20 Years of Honey Bees," Ellenson's map uses hexagons to evoke beehive cells and illustrate changes in honeybee colony numbers from 2002 to 2022.

Steady Participation Despite Social Media Changes

While the fragmentation of social media has posed challenges for how participants share their work, Tjukanov said such changes have led to new spaces for the community to grow.

"It's hard to predict exact numbers," he said, "but participation has remained strong every year."

In 2024, he noted, one LinkedIn post related to the challenge received more than 50,000 views, while thousands of maps were shared on X throughout November.

"I expect a similarly strong turnout in 2025, especially as more people across different platforms get involved," he said, adding that the challenge is meant to be open, welcoming, and tool-agnostic.

“Whether someone is an experienced GIS professional or just experimenting with mapping for the first time, there’s space for everyone,” he said. “That’s been key to keeping it fun and inclusive year after year.”



↑ It's challenging to make 30 maps in 30 days, but participants like Shira Ellenson—whose work is shown here—say it's worth it.

↑ For day four of the 2024 30-Day Map Challenge, Ellenson used hexagons to show changes in honeybee colony numbers from 2002 to 2022.

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Mapping Resources and Inspiration

30-Day Map Challenge participant Shira Ellenson relied on the following resources and sources of inspiration when making her 2024 challenge maps, using software such as ArcGIS Pro, Adobe Illustrator, and Adobe Photoshop.

- For choosing color palettes: color.adobe.com
- For custom icons: thenounproject.com
- For fonts: fonts.adobe.com
- For inspiration: behance.net
- For learning something new on the ArcGIS platform: youtube.com/@JohnNelsonMaps

Maps and Language:

Two Tools that Help Us Be Human

The Relevance of Cartography

A Cartographer's Perspective

By Dr. Georg Gartner

International Cartographic Association

On first thought, language and maps may seem very different from one another. Language is what people use to speak and write. Maps are what people use to find places. Digging a bit deeper, however, reveals that these two modes of communication are actually quite similar.

Both are human inventions. Both help people understand their environments and how to live together in a complex world. In many ways, language and maps do similar work: They show us where we are, what matters, and how we can move forward.

Just as language enables us to orient ourselves in the mental and cultural world, maps help us orient ourselves in physical and social space. They are not only tools for information or travel—they are tools for human life itself.

Tools for Thinking

Language helps us organize our thoughts. We use it to describe things, ask questions, and express complex ideas. Maps do something similar: They help us make sense of the space around us. They show us size, direction, and connection. In both cases, we take something too big to hold in our minds and place it into a system we can understand.

This means both language and maps are cognitive tools. They are part of how we think—not only about the world but also about ourselves.

Tools for Acting

Language is also a tool of action. We use it to give instructions, make decisions, influence other people, and work together. Maps function in a similar way. They help us plan, choose paths, and make movements. Whether used by a hiker in the mountains or a politician drawing borders, maps guide people's actions in the real world.

Again, we see a shared function between language and maps: Both systems help us go from thought to action.

Systems for Communication

Language is our main method of communication. It allows us to share feelings, knowledge, memories, and questions. Maps also communicate—through symbols, shapes, and colors. A good map can speak across language barriers, cultures, and even time.

In this way, both language and maps are media for passing on information—from person to person and generation to generation.

Models of the World

One important thing to remember is that neither language nor maps show “the truth” directly. They are models—tools that simplify, focus on certain details, and omit others. Language is not reality; it is a way to describe it. A map is not the landscape; it is a representation of it.

Because of this, both tools are powerful. They shape how we see the world, what we notice, and what we ignore.

Carriers of Power

With the power of language and maps comes responsibility. Who writes the language? Who draws the map? These are not small questions. Language shapes how we think about identity, history, and truth. The same is true for maps: they define borders, make political claims, and include or exclude people.

So language and maps are not neutral. They can be used to support power or challenge it.

Cultural Meaning

Both language and maps carry deep cultural meaning. The words people use come from their traditions, values, and past. Likewise, the symbols, place names, and colors employed in maps reflect what a society deems important.

In this way, language and maps help people keep and share their cultural identities.

Always Changing

Language continually evolves. New words come into fashion and old ones fall out of use. Social media, new technology, and global communication all shape the way we speak. Maps also change. Digital tools such as GPS and GIS allow people to make and update maps in real time. Changes to the environment, migration, and politics also create new mapping needs.

What this means is both systems are dynamic. Language and maps grow and evolve with us.

Tools for Creativity

We must not forget the creative aspects of these two systems. Language is not only for facts—it also gives us poetry, stories, jokes, and songs.

Maps, too, are not only for navigation—they are used in art, protest, games,

and fiction. Think of mind maps or fantasy maps. These are ways humans use structure and space to express their feelings and ideas.

Thus, both language and maps are not only technical, but they are also poetic.

A Critical Perspective

Of course, the idea that maps and language are helpful tools sounds positive, but these modes of communication must also be viewed through a critical lens. These tools don't just show us the world—they also shape it. This means they can also limit our view. Languages may ignore or erase underrepresented voices, and maps can leave out certain people.

AI systems, for example, now use language and maps based on data that may carry old stereotypes or perpetuate inequalities. If we are not careful, we risk building systems that repeat those same exclusions on a much larger scale. So while language and maps help us make sense of the world, they can also hide, distort, or even control it. Being aware of this is essential—especially in a time when machines also employ these tools for us.

In the Age of AI

AI can already write text, answer questions, and draw maps. These AI systems are fast and powerful. But we should always remember that they still rely on tools that were made by humans, for humans.

The basic functions of language and maps—to help people think, act, communicate, and understand—will not disappear, but they may change. And we must ensure that these changes still support people, not just machines. Because in the end, language and maps are more than tools. They are part of what makes us human. They connect us to each other—and help us find our way not only on Earth but also in our minds, cultures, and the future.

Hola

Kon-nichiwa

Hello

Bonjour

Ni Hao

Sawubona



About the Author

Dr. Georg Gartner is a full professor of cartography at Vienna University of Technology in Austria. He is currently serving his second term as president of the ICA.

Lost Without Translation

By Patricia Flores White, City of New Braunfels

When data is presented in a language or format that people can't understand or relate to, it essentially becomes invisible.

For too long, maps and data products have spoken primarily to experts, policymakers, and funders, often relying on academic language, technical symbology, or digital formats that exclude the very communities they aim to represent. This creates a disconnect—a breakdown in understanding, representation, and trust.

If someone can't read a map's labels, distinguish its colors, interpret its symbols, or see themselves reflected in the structure of the map, then the data fails. And when people can't see themselves in the data, they can't act on it. This isn't just a usability issue—it's a matter of equity, belonging, and empowerment.

This reality became clear to me when, as a nonprofit development director, I decided to use GIS to create a fundraising campaign based on a cognitive, data-driven appeal rather than one rooted in emotion. I collaborated with the Geospatial Centroid at Colorado State University to map health disparities, poverty, and social vulnerabilities across tribal lands. The project aimed to build a compelling, data-driven case for supporting tribal programs and policy initiatives.

The maps were originally designed for donors, but the communities themselves responded most strongly. Tribal members reached out asking for more maps, more data, and more ways to make sense of their experiences.

For many, it was the first time they saw their lived experiences plotted spatially. GIS didn't just tell their story through the data—it helped them claim it. Data-driven maps became a language that their reality had never been spoken in before.

That feedback revealed something critical to me: data equity isn't only about what's mapped; it's also about who gets to see, understand, and use the map.

This same challenge resurfaced in a new space when I began working in city government. As the GIS analyst for the City of New Braunfels, Texas, I found myself tucked between the culturally rich cities of Austin and San Antonio, where I encountered another gap in inclusion: language.

As I was using ArcGIS Business Analyst to generate an at-risk population profile infographic, it became clear to me that more than 27,000 residents in nearby San Antonio speak only Spanish and over 53,000 Spanish-speaking residents don't speak English very well. In New Braunfels and across Central Texas, Mexican American heritage is a defining thread of many communities. Yet no out-of-the-box or dynamic solution existed to produce bilingual infographics. As a result, large portions of the population I served were left without equitable access to open data.

This was an inflection point for me. It reshaped the way I approach mapping. Now I see GIS as not only a tool for performing analysis but also a platform for fostering inclusion.

With the city's support, I spent a couple months translating 23 public-facing English infographics into Spanish. As a bilingual speaker of both languages, I developed a translation key that ensured both consistency and cultural nuance. I then used a large language model (LLM) as a cross-checking tool to help refine phrasing and avoid word-for-word dictionary lookups. This approach combines human insight with emerging technology to move beyond literal translation. The result is a translation key and 23 templates for generating bilingual infographics that other cities can adopt. (Download the templates from the City of New Braunfels' ArcGIS Hub site at links.esri.com/NB-opendata.)

This July, I brought the translated set of infographics to the Esri User Conference (Esri UC), where I connected with Esri's distinguished Business Analyst and geoenrichment product engineer Helen Thompson. Together, we saw the potential to scale this work—not just for the City of New Braunfels but also for any bilingual community seeking access through language.

GIS professionals are uniquely positioned to advance equity by designing map products and data tools that are visually inclusive, linguistically accessible, and grounded in the voices of the people they represent. We're already seeing what's possible.

- A map called *Jamaica's 14 Parishes: A Tactile Map for Inclusive Access* received the 2025 Universal Design and Accessibility award at the 2025 Esri UC. Author Jevaughn Henry created this map to be printed on swell paper for people with visual impairments to read through touch.
- An ArcGIS StoryMaps story called "Braceros Across the United States-Mexico Border" won the Digital Humanities and Popular Culture award in the 2024 ArcGIS StoryMaps Competition. It illustrates a participatory mapping effort by an organization called the Abuelas Project that invites descendants of Mexican bracero farmworkers to cocreate a multimedia narrative of migration, labor, and their own memories.

These projects remind us that equity in GIS doesn't begin and end with good data—it lives in the choices we make when we design products for people to use.

Every map, dashboard, and infographic offers an opportunity to ask, *How can I extend the limits of inclusion?* To act on this question, GIS professionals should consider the following three design principles:

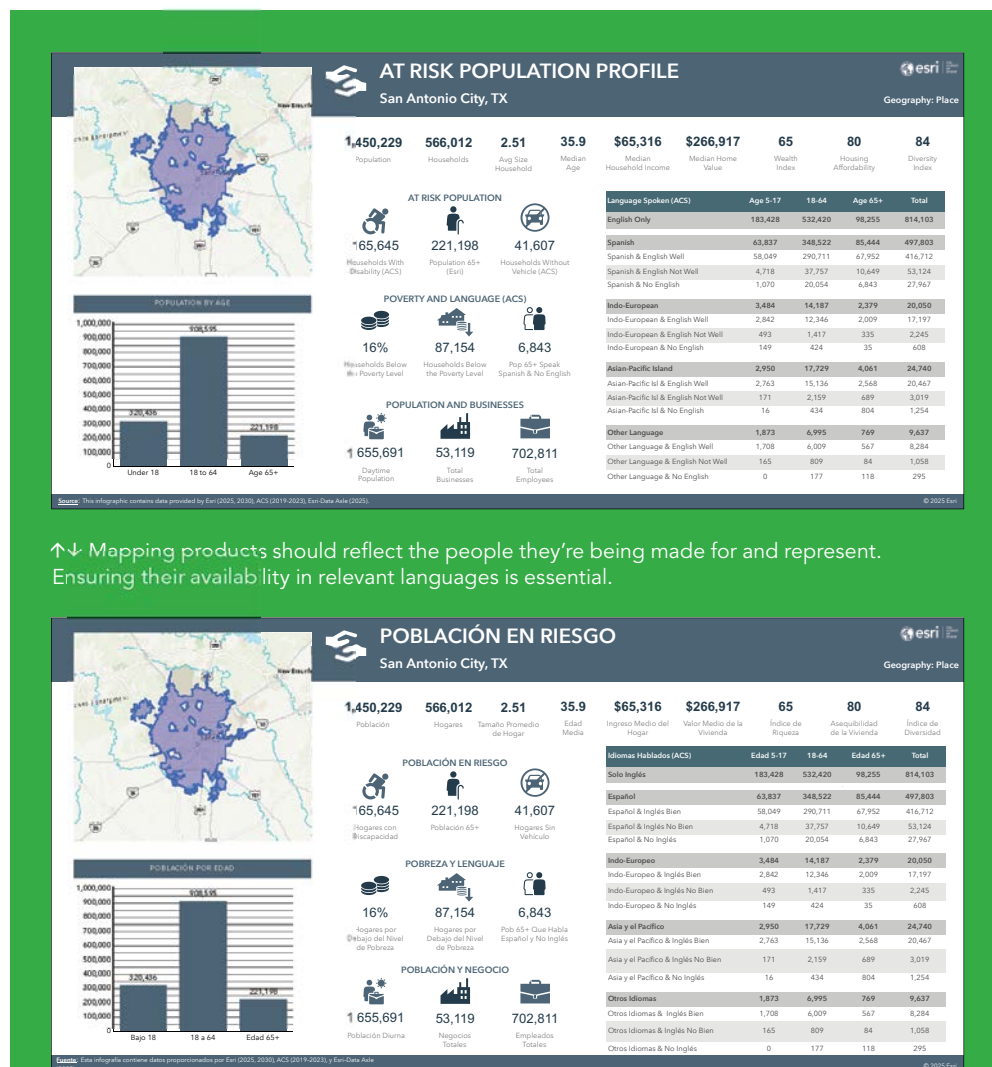
- **Design for visibility.** Think about who can see and understand your data.
 - Use accessible color palettes, such as those that are colorblind-safe; legible fonts; and intuitive symbology.
 - Ensure that products are compatible with screen readers.
 - Include alternative formats like audio, braille-ready PDFs, or printable materials.
- **Design for belonging.** Consider who would feel reflected in the product you're developing.
 - Translate narratives, labels, and symbols into the language(s) your audience speaks.
 - Incorporate place names, landmarks, and cultural references that are meaningful to local communities.
 - Invite community members to contribute feedback on data, context, and design.
- **Design for trust and action.** Contemplate who has the power to use the data—and who does not.
 - Prioritize clarity over complexity, especially when visualizing sensitive issues.
 - Design for strengths, not just deficits or disparities.
 - Share your methodology transparently to build credibility and support interpretation.

By consistently applying these three principles, GIS professionals can ensure that data not only informs but also includes, affirms, and empowers. Diversifying the lens through which data is viewed creates space for innovation that a single perspective alone could never unlock. What's lost without translation is more than language—it's the opportunity to build trust, spark civic engagement, innovate how data is collected and visualized, and reflect the lived experiences of the communities represented. What's lost is the chance to widen the circle of inclusion.

This is a call to every GIS professional to democratize mapping not only through data accuracy but also through design choices that make mapping products visually inclusive, linguistically accessible, and grounded in the voices and realities of the people they represent.

About the Author

Patricia Flores White is a geospatial analyst for the City of New Braunfels, Texas, where she uses GIS to build impactful tools supporting inclusive, accessible, and data-driven decision-making. For more information about translating infographics, email White at twhite@newbraunfels.gov.



How to Lead with GIS

By Alex Harper, Central Arkansas Water



In today's data-driven world, GIS has evolved from a back-office mapping tool into a core strategic platform. GIS no longer simply supports decision-making—it also propels it. Yet GIS is still often overlooked in leadership discussions and executive strategy sessions. This needs to change.

As someone who has worked in GIS leadership and collaborated with technical teams and executive stakeholders, I have come to believe that GIS is not just a system—it's a leadership advantage. Organizations that embed GIS into leadership frameworks see clearer trends, stronger collaboration, and better business outcomes, while also offering greater support for their communities. As for those that don't, they risk leaving powerful insight untapped.

This is a call to action for GIS professionals to lead boldly. It is also a call for leaders who don't regularly use GIS to recognize the power of location intelligence to drive decision-making.

A Missed Opportunity

In many organizations, GIS is viewed more as a niche technology that creates visually appealing maps rather than a key tool that drives efficiency and productivity. Leadership teams at these organizations may not fully understand the capabilities of GIS or how to align geospatial technology with their strategic objectives.

This isn't always the fault of organizational leaders. Sometimes, GIS leaders fail to showcase the rich capabilities of geospatial technology.

To address these challenges, leaders across an organization need to adopt a geospatial mindset—one that wholly embraces spatial thinking. GIS provides a lens through which to access that mindset. It enables leaders to see trends and patterns, anticipate change, allocate resources more effectively, and engage with stakeholders meaningfully.

But this won't just happen naturally. GIS-based leadership must be nurtured, practiced, and aligned with an organization's vision and mission. Here's how to do that.

Five Principles of GIS Leadership

Before leaders can transform how GIS is used in their organizations, they must understand what makes leadership effective. The following five core leadership principles become more powerful when connected to a GIS strategy:

- **Visionary thinking:** See what GIS can do beyond making pretty maps. Consider using it for modeling, forecasting, and gaining deeper insight.
- **Emotional intelligence:** Build relationships with stakeholders who may not speak the language of GIS but are still impacted by it.
- **Clear communication:** Arguably the most important leadership skill, it involves translating complex spatial data into compelling, actionable narratives.

- **Adaptability:** Confidently navigate the rapid evolution of geospatial technology, from cloud-based GIS to AI.
- **Collaboration:** Lead not only within the GIS team but also across departments, organizations, and governments.

Skills Worth Honing

To lead effectively with GIS, GIS professionals must pair technical expertise with a broad range of leadership and management skills. In addition to having a firm grasp on the latest technology, GIS leaders must be excellent project managers, communicators, and strategic thinkers.

Because GIS projects are often complex and stretch across multiple departments, they require a high level of coordination. Leaders must understand that projects have life cycles, scopes, budgets, timelines, and risks that need to be mitigated. Project management frameworks such as Agile, Waterfall, Scrum, and Kanban provide structure and predictability to otherwise ambiguous initiatives.

Soft skills, though sometimes undervalued, form the foundation of effective leadership—and are discussed in nearly every leadership book and training session. Remember those five principles of GIS leadership? Here are some practical ways to use soft leadership skills to elevate GIS from a support role to a key driver of enterprise innovation and insight.

- **Set a vision:** Articulate how GIS fits into the organization's long-term goals. Then help others see that vision.
- **Read the room:** Use emotional intelligence to navigate interpersonal dynamics and employ authentic empathy to boost team morale—especially when everyone is under pressure.
- **Communicate with clarity:** Whether speaking with mobile crews or executives, use simple and clear language to translate technical insight into actionable strategies. In most cases, stakeholders have varying levels of technical knowledge.
- **Embrace change:** Technology, data, and organizational priorities change fast, so be ready to adapt quickly and lead others through rough patches.
- **Build bridges:** Create strong partnerships across departments, organizations, and sectors to align goals and amplify the impact of GIS.

Leading Forward with GIS

GIS naturally drives innovation. It thrives at the intersection of data, visualization, and decision-making. Thus, true GIS leadership moves organizations forward not just by delivering on projects but also by shaping the future.

GIS leaders need to be willing to drive change, challenge outdated processes, and introduce new workflows. They should encourage experimentation and empower GIS team members and other employees within the larger organization to push the limits

of the software and their thinking. Leaders should bring GIS into conversations about digital transformation. They should also help others understand how geospatial data connects to their own priorities, whether those revolve around improving customer service or developing climate resilience.

The days of GIS being a niche tool are over. It is now a business driver that bolsters strategic leadership, operational excellence, and enterprise-wide insight.

A Call to Action

To the GIS professionals: Step up. Don't wait for permission to demonstrate the value of GIS. Speak the language of leadership. Align your work with your organization's broader business goals. Showcase how spatial data drives business decisions. And invest in yourself by building your leadership skills alongside your technical expertise.

To the non-GIS professionals: Be curious. Invest time and effort in understanding GIS and what it can do. Start by asking questions about how location-based insight can improve your decision-making. Invite GIS teams to the strategic planning table. Be a champion of integration. GIS is more than a department—it's a way of thinking!

The future of GIS is brighter than ever if leaders at all levels embrace its potential. That means developing leaders who understand people, platforms, policy, and positions. Organizations that integrate GIS into every level of decision-making are the future. And the leaders of tomorrow will be those who can see spatially, think strategically, and act decisively.

To learn more about leading with GIS, consider attending the GIS Leadership Academy, hosted by the Geospatial Professional Network (GPN). Find out more at thegpn.org/GLA.

About the Author

Alex Harper is the senior information services manager at Central Arkansas Water, where he also leads the Pulaski Area Geographic Information System (PAgis), an independent government agency that acquires, maintains, and distributes GIS data for Pulaski County, Arkansas. With more than 18 years of experience in GIS, IT infrastructure, and data strategy, Harper has led award-winning teams recognized at both state and national levels for their innovative, community-focused work. He has been honored as a Geospatial World Rising Star, one of *Wastewater Digest's* Young Pros, and one of *xyHt's* Young GIS Professionals to Watch.

Custom e-Learning Clears the Way for Mine Action

Hidden dangers lurk beneath the surface in dozens of countries worldwide, where human conflict has left behind a deadly legacy of land mines, cluster munitions, and improvised explosive devices. The Geneva International Centre for Humanitarian Demining (GICHD) is at the forefront of efforts to mitigate these threats, providing critical advisory services and support to affected nations. At the heart of its operations lies modern enterprise GIS technology, which has transformed mine action work around the globe.

The GICHD's mission is to develop and professionalize solutions that help reduce risks from explosive ordnance. As an Esri Nonprofit Program member, the GICHD relies on ArcGIS technology to use and manage critical data and help mobile personnel, researchers, and others make evidence-based decisions.

"Because mine action is a geographic problem, the most important priority for us is determining the location of the explosive ordnance," said program manager Noor Zangana, who leads the Information Management division's Capacity Strengthening program.

The GICHD's Information Management System for Mine Action (IMSMA Core) is an ArcGIS Enterprise system that facilitates data collection, storage, analysis, and reporting that complies with the Anti-Personnel Landmines Convention and other global treaties. Zangana oversees a training program for IMSMA Core and ArcGIS apps. Each year, hundreds of people around the world use ArcGIS to collect data and support demining activities, so training for IMSMA Core and other GIS technology must be scalable and accessible to diverse audiences.

"Every country we support has different needs and approaches to dealing with explosive ordnance," Zangana shared. "They have experts and people new to the humanitarian action world."



↑ Capacity Strengthening program manager Noor Zangana summarizes key learnings in a custom e-Learning course.

The Capacity Strengthening program offers in-person IMSMA Core training at the GICHD's headquarters in Geneva, Switzerland, and in various countries. For many individuals, however, obtaining travel visas and funding to attend these events is challenging. Women, in particular, may face hurdles.

"In some affected countries that we support, it's difficult for women to travel, even if they have financial support from their government. We are trying very hard to support all types of people, all types of countries, all levels of knowledge," said Zangana.

To deliver training that's accessible anywhere, and to anyone who needs it, Zangana partnered with Esri's Training Services team to develop custom e-Learning courses.

Fit-for-Purpose Training

The GICHD's Information Management division works with up to 10 information management professionals in each supported country to provide an IMSMA Core portal provisioned with ArcGIS user types, data, and apps.

"We customize the portal and tools for each country based on their needs and to be fit for their purpose," Zangana said.

Zangana firmly believes that training should be tailored to the needs of those who will be managing and using an IMSMA Core portal. When Esri training consultant Andrew Sandifer informed her that Esri could create and deliver custom training, Zangana saw value in developing e-Learning tailored to IMSMA Core and mine action workflows.

"Through the e-Learning modality, we have capacity to support all people who need training," she said.

Zangana's team and Esri's custom training team worked together to create courses that introduce foundational IMSMA Core and GIS concepts, explain how GIS apps support mine action, and provide practical experience with the ArcGIS tools used to

collect, visualize, analyze, and share data that supports explosive ordnance planning and removal operations.

Each course includes conceptual content, interactive activities, and step-by-step exercises using sample training data. Some courses feature videos from the GICHD's Information Management staff. Quizzes are included to measure and reinforce knowledge.

Expanding Accessibility

Zangana's strong focus on supporting each country's unique training needs extends to language. The GICHD's custom e-Learning courses were written in British English, which is widely spoken in the organization's supported countries. But in 2024, Zangana noticed an increase in requests for support from French-speaking countries.

"A lot of French speakers are suffering from mines. The needs of those countries made us consider linguistic accessibility, and we wanted to have a plan to support them," she said. "We care about all the people from the countries we support who are taking training. They have input because we want to make sure that we

include everybody based on the objective of the training that we are building."

Upon learning that Esri could publish e-Learning in French, Zangana commissioned French-language versions of courses covering data collection with ArcGIS Survey123 and data visualization using web maps and dashboards.

The GICHD translated the British English text into French and returned it to the Esri team. The team placed the French text into the instructional content sections and course interface elements to deliver a custom training experience designed especially for learners in francophone countries.

The Next Phase: Supporting Field Operations

More than 2,000 people have taken the GICHD's e-Learning courses, and the educational content has been well received.

"They are so excited and really interested to learn about IMSMA. They are asking us to develop more topics," Zangana said.

To that end, she and her team are planning to add another custom e-Learning course. It will have a French-language version as well, since that's now considered a best practice at the GICHD. The primary audience for the course will be mobile operators, and the content will focus on using IMSMA Core and ArcGIS software and apps to conduct holistic mine action workflows.

"We're going beyond information management professionals to train operators in each country," Zangana shared. "Collecting mine data is very complex, and surveying a confirmed hazardous area is very expensive. Accurate data is so important because in the next stage, operators will do clearance," meaning they will remove the mines—many of them unexploded—from their hidden locations.

By providing customized enterprise GIS systems and training, the GICHD leads in helping countries take informed action to clear threats from past conflicts and raise hopes for a safer future.

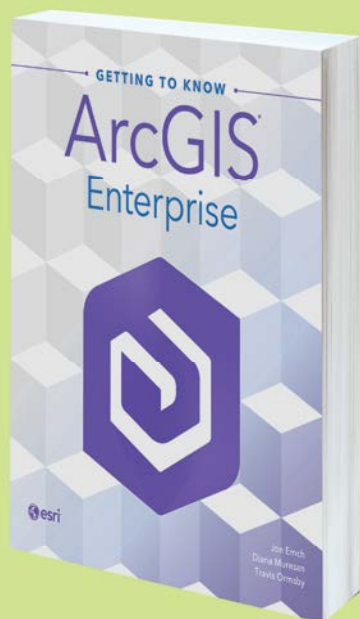
To learn more about the GICHD's programs, visit gichd.org. For more information on Esri's custom training program, email GIStraining@esri.com.



↑ Operators learn to use ArcGIS software through custom training that supports humanitarian demining efforts. (Image courtesy of the Geneva International Centre for Humanitarian Demining, or GICHD.)

→ Collecting accurate data on mines is important because in the next stage, operators work to remove them.

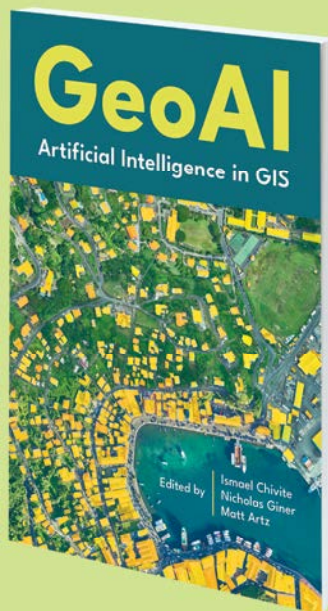




Getting to Know ArcGIS Enterprise

By Jon Emch, Diana Muresan, and Travis Ormsby

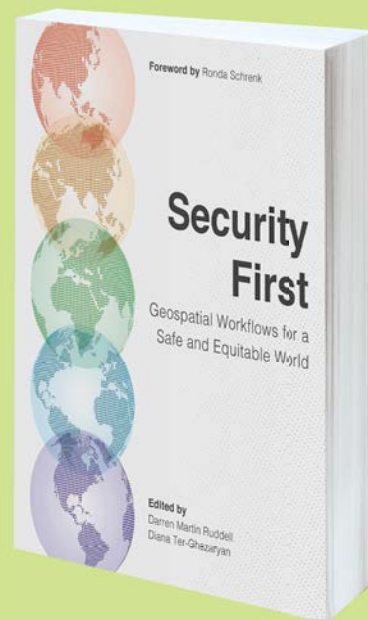
In today's increasingly demanding and rapidly changing business environment, understanding how to work with ArcGIS Enterprise is key to increasing collaboration and being resilient. *Getting to Know ArcGIS Enterprise*—the first book from Esri Press focused on ArcGIS Enterprise—covers the essential skills of planning, deploying, administering, using, and maintaining this foundational software system so users can securely organize and share their work on any device, anywhere, at any time. The book addresses the most common and vital workflows that ArcGIS Enterprise administrators need to comprehend and put into practice. November 2025, 300 pp. Ebook ISBN: 9781589487918, paperback ISBN: 9781589487932, and hardback ISBN: 9781589488557.



GeoAI: Artificial Intelligence in GIS

By Ismael Chivite, Dr. Nicholas Giner, and Matt Artz

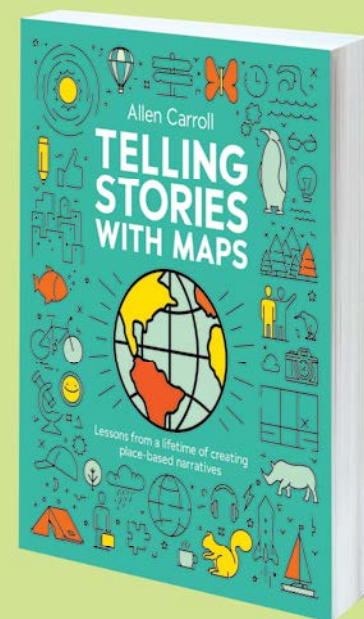
The emergence of AI-enhanced GIS has unveiled new opportunities to democratize the technology and automate complex spatial analyses, helping both new and experienced users—from city planners and policymakers to business professionals and research groups—make better decisions faster. *GeoAI: Artificial Intelligence in GIS* is a collection of real-world stories about how public, private, and nongovernmental organizations successfully use GeoAI to manage processes, workflows, policies, and communication. The book also includes a technology showcase that provides ideas, strategies, tools, and actions to get readers to jumpstart their own use of GeoAI. September 2025, 124 pp. Ebook ISBN: 9781589488458 and paperback ISBN: 9781589488441.



Security First: Geospatial Workflows for a Safe and Equitable World

By Dr. Darren Martin Ruddell and Dr. Diana Ter-Ghazaryan

To resolve the complex challenges humanity faces today, learning GIS has never been more critical for visualizing and interpreting data. *Security First: Geospatial Workflows for a Safe and Equitable World* guides readers through targeted exercises and examples to show how GIS can be used in the fields of human security and global intelligence. Each chapter outlines learning objectives, technical requirements, and prerequisite knowledge and includes a geospatial workflow, an analysis, and additional resources. All detailed exercises use ArcGIS software and downloadable data, helping readers establish and reinforce their technical skills. After each exercise, readers interpret their results and write an intelligence brief, fostering critical thinking about how to incorporate GIS into analytical work. October 2025, 428 pp. Ebook ISBN: 9781589487840 and paperback ISBN: 9781589487857.



Telling Stories with Maps: Lessons from a Lifetime of Creating Place-Based Narratives

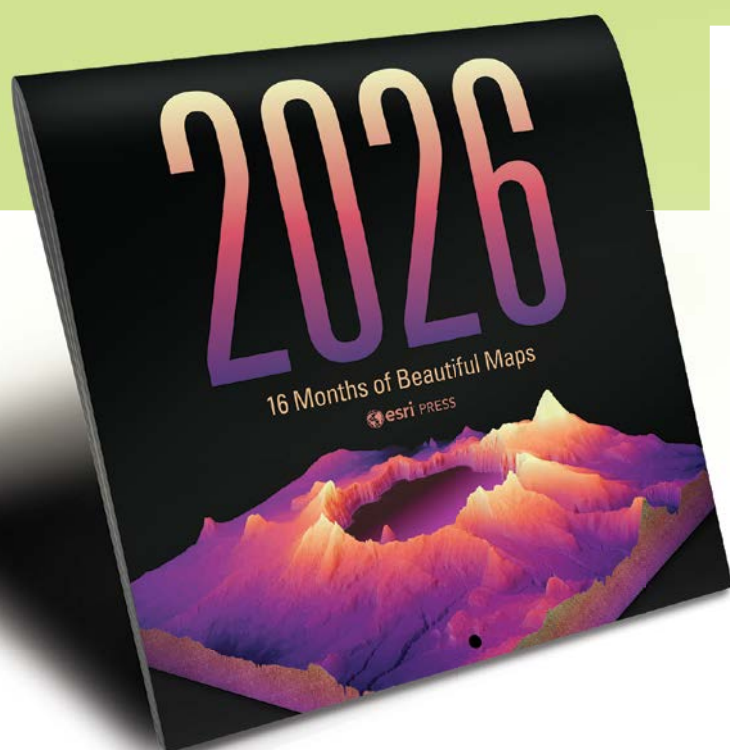
By Allen Carroll

While humans have used maps for centuries—from scraping patterns in the sand to charting every place on Earth—the digital age has revolutionized how maps are created, distributed, and consumed. The internet forged enormous opportunities for storytelling, enabling maps to interact with other multimedia elements, including photos, videos, audio, and text, to tell countless tales about the world. In *Telling Stories with Maps: Lessons from a Lifetime of Creating Place-Based Narratives*, author Allen Carroll draws on his 27 years of experience working for both the National Geographic Society and Esri to reveal how maps tell stories and enrich narratives by providing context. The book, which features a foreword by Lonely Planet cofounder and renowned travel writer Tony Wheeler, contains rich illustrations, with examples ranging from traditional maps to the latest digital visualizations. Readers will be inspired to produce place-based narratives that engage and inform their audiences. June 2025, 244 pp. Ebook ISBN: 9781589487956 and paperback ISBN: 9781589487970.

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By Esri

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Training and Certification Offerings

Training

Prepare Everyone to Extract Insight

GIS users and organizations are rapidly adopting advanced analytics. To ensure users have a solid, skills-based foundation in this, they can take advantage of the following two new courses:

- **Spatial Analysis Essentials for ArcGIS**—This class is for anyone seeking an introduction to spatial analysis concepts and workflows. Using ArcGIS Pro tools, attendees explore data; tackle a variety of common, real-world analysis projects; and discover automation options to quickly produce reliable information from data. See course details and sign up at go.esri.com/analysis-course.
- **Graph Analytics Using ArcGIS Knowledge**—This course is ideal for GIS analysts, all-source analysts, intelligence analysts, researchers, data scientists, and others who analyze data stored in multiple formats to find answers to complex questions. Learn more and register at go.esri.com/graph-analytics.

Empower Your Organization with Enterprise GIS

The unprecedented pace of technological change and continually shifting workplace paradigms are creating challenges for individuals and organizations at every level. The good news is that GIS offers valuable tools to help manage change.

When skilled professionals wield data visualization and analysis tools, they can reveal what is changing where, how changes affect operations, and when opportunities for innovation arise. With this insight, leaders gain the clarity and confidence they need to make sound decisions while navigating disruption.

Broad access to GIS data and tools is the key to maximizing these benefits. To support buy-in for expanding geospatial capabilities, the following interactive, one-day workshops are available to GIS managers, program leaders, project teams, and others who want to grow their organizations' geospatial competencies:

- Communicating and Collaborating for ArcGIS Success
- Building Organizational Agility and Enabling Change in a Geospatial World
- Creating Organizational and Geospatial Resiliency

To explore workshop details, visit go.esri.com/change-management-2025.

Take Steps Now to Simplify Next Year's Projects

Boost workforce capabilities while minimizing administrative overhead with the Esri Training Pass. With just one purchase, organizations can secure training days and redeem them throughout the year to ensure that their teams are consistently equipped for success. Get started at go.esri.com/trpass2025.

Level Up with Live Training Seminars

To help members of the GIS community stay current with technology advancements, Esri hosts frequent, no-cost live training seminars. Over one hour, experts share updates about and demonstrate popular ArcGIS products and topics. Attendees can ask questions and join their GIS peers in the lively chat.

For anyone interested in leveraging ArcGIS maps and tools within Microsoft products, check out the December 4 seminar. Sign up—and explore other upcoming seminar topics—at esri.com/lts.

A Fun, Engaging Way to Learn New Skills

No-cost massive open online courses (MOOCs) are a compelling option for people to build their knowledge and practical GIS skills while exploring various technology topics. Each Esri course includes access to ArcGIS software, expert videos, guided exercises, and a certificate of completion. Head to go.esri.com/moocs-2026 to browse the 2026 MOOC schedule, or dive right in and experience this fun and engaging way to learn by enrolling in one of the following MOOCs:

- **The ArcGIS Imagery MOOC: Foundations and Frontiers**—This new course takes participants on a journey through the latest ways to use GIS and GeoAI to combine imagery, remote sensing, and geospatial data. Real-world scenarios provide context for how organizations can unlock the synergies between GIS and imagery. Register by November 5 to gain access to the course (which is open through December 3) at go.esri.com/imagery-mooc-2025.
- **Going Places with Spatial Analysis**—Opening in late January, this course is a popular way for students and new GIS users to learn the basics of spatial data and analysis techniques, as well as for experienced professionals to try out the latest ArcGIS Online tools. Register for the MOOC at go.esri.com/gpsa-mooc-2026.

Certification

Excel with Esri Technical Certifications

The following new ArcGIS Enterprise exams are available for GIS professionals and administrators to validate their in-demand technical skills:

- ArcGIS Enterprise Administration Professional 2025 (go.esri.com/eaep-2025)
- ArcGIS Enterprise Geodata Management Professional 2025 (go.esri.com/egmp-2025)
- ArcGIS Enterprise System Design Professional 2025 (go.esri.com/esdp-2025)

Anyone interested in certifying their experience should assess which exam is right for them and explore the exam information guides and preparation resources.

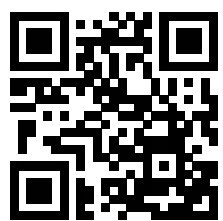
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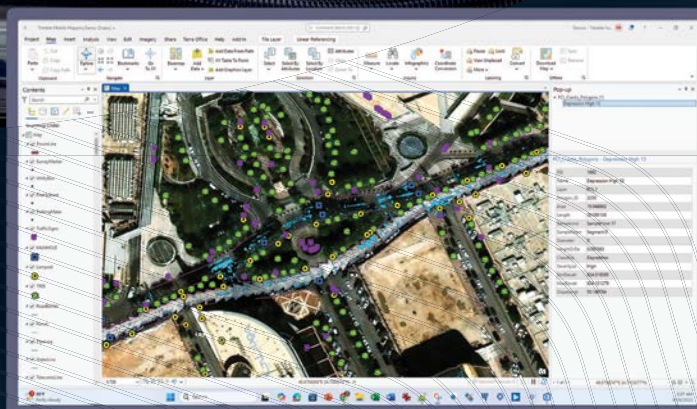
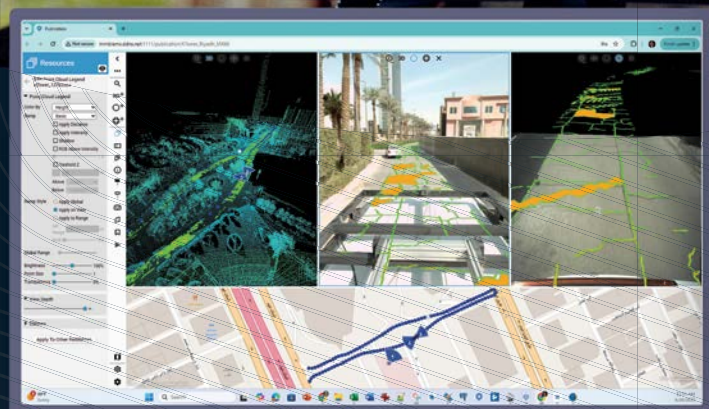
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