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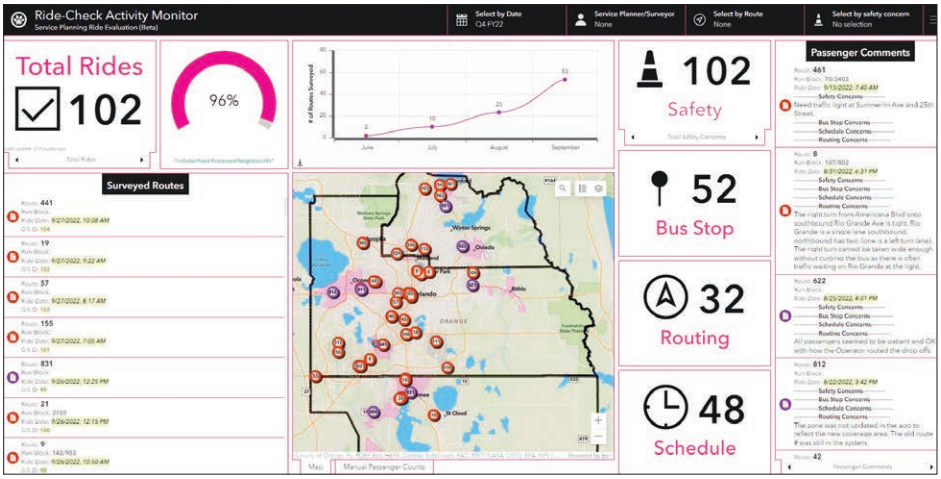
Summer 2024

# LYNX Maximizes the Use of GIS to Support Business Operations

The use of geographic information system (GIS) technology is becoming more widespread at LYNX, largely through the dedicated efforts of a small team as they look to employ it in just about any way they can.

The GIS staff actively seeks out new areas to apply GIS technology within their agency. Also, when dealing with specific information requests, the team attempts to craft their responses for the widest possible range of users. These responses are a product of necessity, as the small size of the team requires them to be strategic in their support of the wider agency. Their results have been impressive and extend across the organization.




↑ Real-time analytics capabilities from ArcGIS® GeoEvent™ provide management with a holistic view of fleet operations.

## Service Definition and Funding Support

LYNX—the public-facing branding of the Central Florida Regional Transportation Authority—provides 68 fixed-route bus services to the greater Orlando, Florida, area in Orange, Seminole, and Osceola counties, as well as limited services to Polk County. Annual ridership in 2022 was 17,187,900, or about 55,200 per weekday as of the fourth quarter of 2022.

One of the first key areas of GIS support is paratransit and on-demand mobility service, which complements the agency's fixed-route operations and enhances overall service to the public. A part of that support entails helping to establish eligibility for the organization's grants department, which is responsible for ensuring reimbursement and funding streams.

LYNX operates two non-fixed transportation services: Access LYNX is a shared-ride door-to-door transportation service for eligible individuals who are not able to use the regular fixed-route bus service due to a disability or limitation. NeighborLink is an on-demand flex service for more sparsely populated areas.

Both operate on a zonal basis and GIS is used to determine the best fit for customers, as well as their eligibility for funding/service support. Francis Franco, GIS supervisor for LYNX, shares that there is an ongoing effort to validate and consolidate zones and to take a more strategic look at where pickup/drop-off points are. Guided by a board of elected officials who identify the areas of greatest

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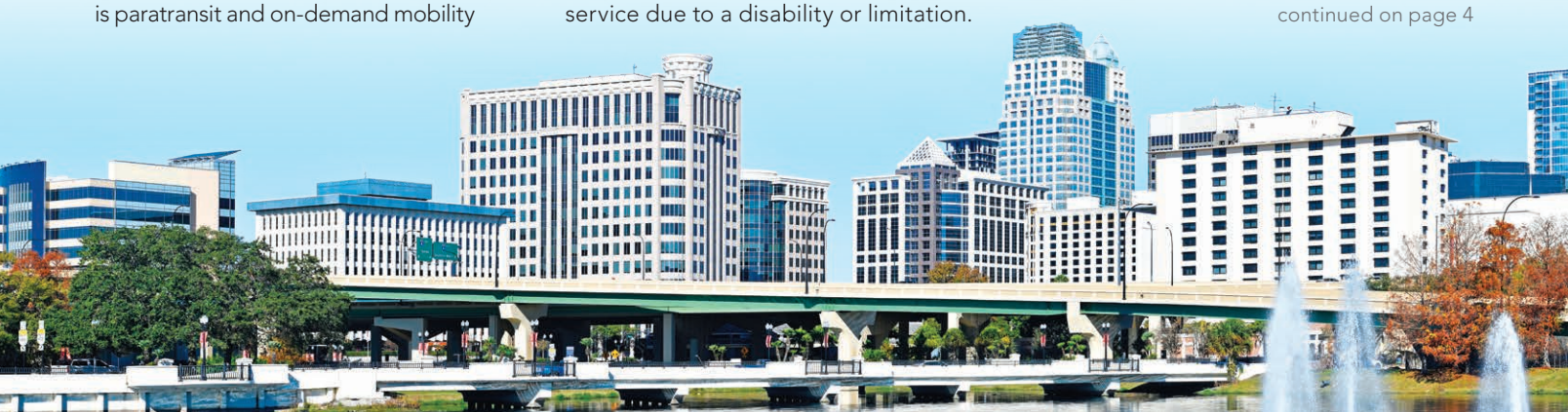

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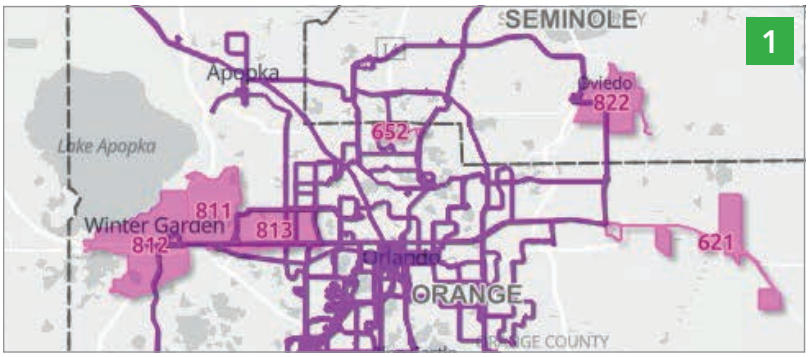






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## LYNX Maximizes the Use of GIS to Support Business continued from cover

need, the team uses GIS to discover how changes to services and zone boundaries can be made, and what impacts those changes would have.

"A central consideration for their services," he continues, "is accessibility within the zones, particularly the commercial and food gaps within zones, and accessibility between transportation services and recreational and employment centers." Using apps, dashboards, and maps available through ArcGIS® Online, staff at LYNX can analyze the demographic data within the zones, as well as the origins and destinations of the various trips to understand how zones might be modified.

A second major area of support for GIS is the preparation of specific grant and other funding proposals, as well as the Title VI equity analysis required by the Federal Transit Administration (FTA). LYNX has made a concerted effort to analyze the mobility needs of specific disadvantaged communities with the goal of attracting additional funds targeted at these residents. All the analyses and visualization associated with these efforts are carried out in-house by the GIS staff.

Closely related to these analyses is the GIS support of basic fixed-route service planning within the agency. Much of the organization's ridership is workforce-based and decidedly seasonal, with a large portion supporting the main local leisure attractions, such as the Universal Studios and Disney theme parks/resorts. LYNX also has a super-stop, which services a number of different malls.

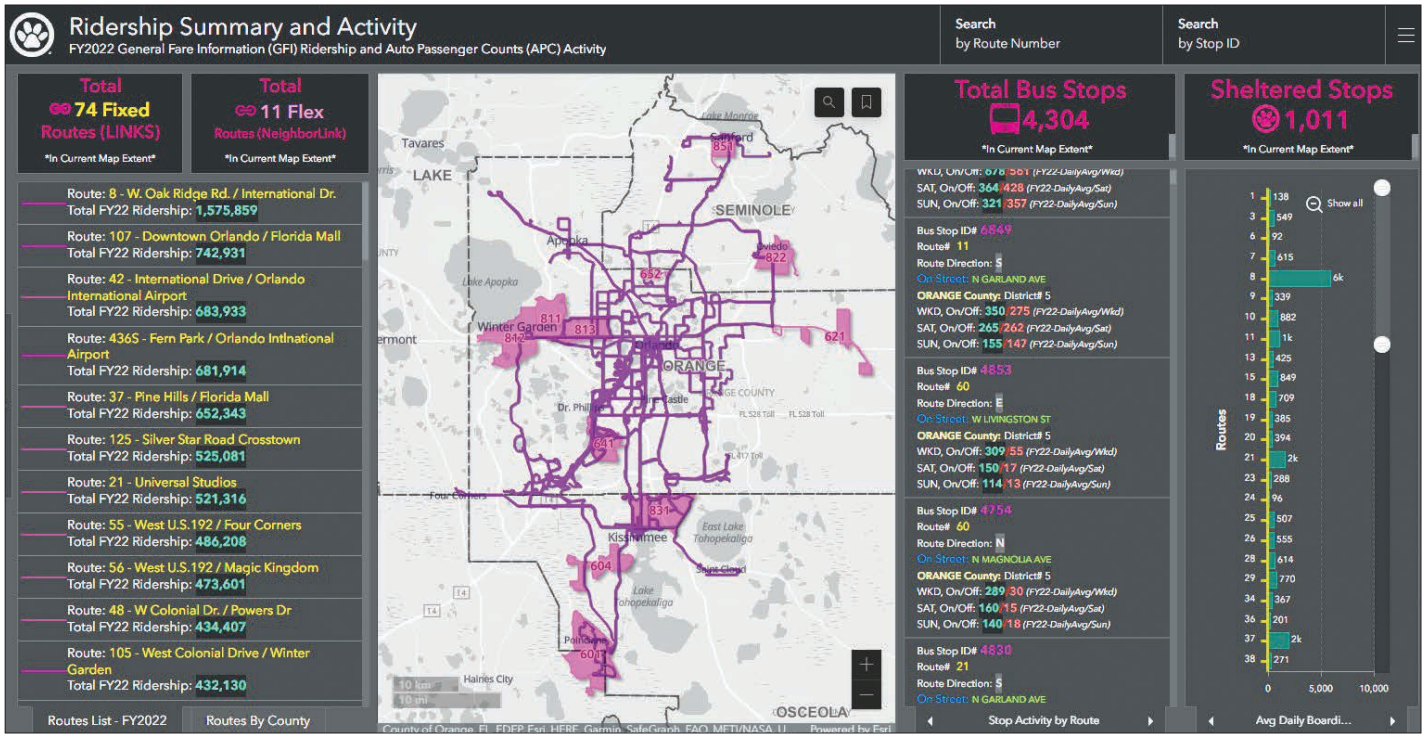
LYNX conducts four major service changes a year, and the process of monitoring the effects of changes begins as soon as they are implemented. A mobile data collection application, ArcGIS Survey123, and LYNX's own apps bring together operator and passenger information, enabling executives to monitor activities via an internal operations dashboard. On-vehicle automated passenger counting is a separate system, but its data is consolidated through ArcGIS Dashboards.

A constant part of service planning involves looking at transit use at the station and stop level and determining whether to upgrade existing facilities to super-stations or add new stops close to existing ones. A current challenge associated with this analysis is the shortage of operators and how that restricts service levels. While this is a national issue and not unique to LYNX, it has led to some necessary changes, including an increase in the number of express routes to Orlando International Airport. Yet, elsewhere, there are times when services simply cannot be provided.

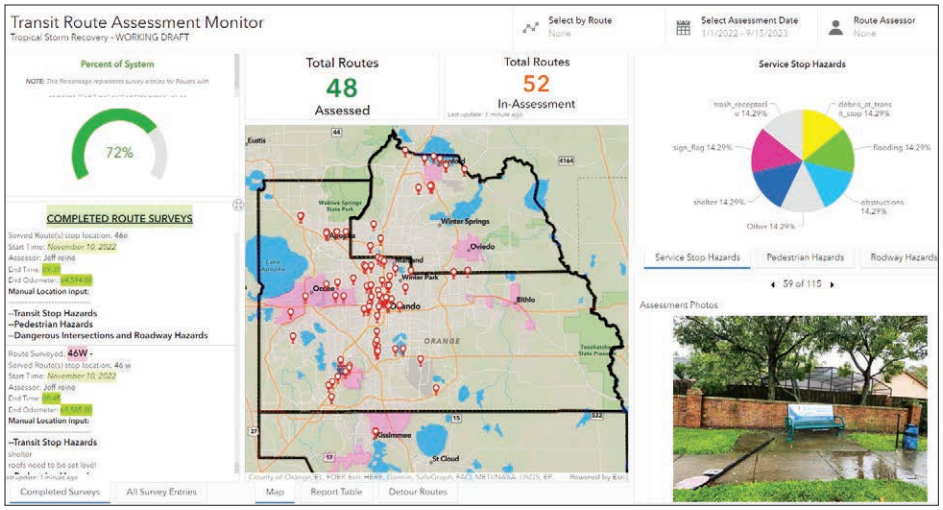
The solutions have been to engage robustly with local communities to keep them informed of what is happening—including LYNX currently hiring—and close cooperation with other transportation users and providers to ensure that disruption is kept to a minimum.

### Improved Asset Information

With changes in organizational leadership, and with increased requirements from FTA, there is a greater focus on asset management and how GIS can support the agency's larger asset management efforts. An example is monitoring garbage collection at bus stops and how to set clearance events. Additionally, bus shelter inspections and maintenance activities are coordinated




↑ General Fare Information Ridership and Auto Passenger Counts (APC) Activity.




↑ Survey 123 forms on risk and safety feed a real-time risk management dashboard.

through GIS. This works in parallel with Survey123 to capture and document activities, and on-site operatives are prompted through the app to indicate whether they are responding to a work order or taking auxiliary/ad hoc action. Survey123 also supports incident response and management in the case of accidents and bus stop damage.

As LYNX's asset management practices mature, GIS will become an integral part of most major workflows, but in the interim, the logic embedded within Survey123 is also being used to promote LYNX's office recycling and procurement programs. Although these are nonspatial applications, Franco says that this has the benefit of promoting the use of—and wider familiarity with—GIS technology.

## Risk Management

Closely associated with asset management is the concept of risk and safety management—currently required of all major transit systems within the US. At present, LYNX supports risk management using Survey123. Incidents and violations are all geocoded, including requests for information on particular addresses or locations. All of this information is then uploaded and displayed on an operations dashboard.

Additionally, Survey123 is utilized during storms and extreme weather, including hurricanes. Franco notes that this is a significant step forward from trying to record events on a wet paper map and is "all about using the platform to the maximum."

## Next Stages

LYNX is working towards using ArcGIS Experience Builder for application development. This is in line with the increasing number of more specific requests—a bespoke dashboard can be created, rather than visitors clicking on maps and searching for specific elements—and it continues the use of ArcGIS Insights℠.

"The initial dashboard we developed for the funding partners was a hit, so we developed more," says Franco. "ArcGIS Insights has been great for visualization in support of project management, and it seems popular, especially when dealing with ad hoc requests."

As the organization runs a very small GIS team—it currently consists of Franco and one other person—the ambition, even when building a dashboard to serve a specific request, is to have it serve as many additional potential users as possible.

For example, should an urban zone/fare-related request be received from the grants team, the GIS team might look to add route information as well. The initial internal customer may not, in the first instance, be asking about routes, but the information is there in ArcGIS Insights should it be wanted or needed subsequently—whether by the individual(s) who made the initial request, or someone else.

"We could just respond to requests with a table of trips, but instead we put everything into Insights and share a link. The users can then see everything—where people are going, which zip codes and urban zone boundaries are getting the most trips, what fares are going to a particular urban zone, and so on. They can then produce tables and graphs if they want or need to, and generally maneuver the information at their own pace. It's just a little bit more self-serve in terms of the initial requests."

## Bringing in Real Time

To support performance monitoring and automatic vehicle location, a next step is to acquire ArcGIS GeoEvent and its real-time analytics capabilities. That would result in LYNX having an enterprise environment, asset management, and fleet monitoring all in the GIS system.

Real-time vehicle tracking would augment, for instance, LYNX's already impressive Customer Service dashboard. Although at first sight it's very simple, it contains a large amount of data in pop-up form. The dashboard includes information on accessibility (absence of obstructions to wheelchairs, connections to sidewalks) and other amenities at bus stops (shelter, bike racks)—all common questions that people want answered ahead of travel. There is also a situational awareness component in the form of a direct link to Street View and a transit "leaderboard" which gives details of links to and from each stop. For both operator and customer, GeoEvent would add real-time bus movements between stops.

Again, multi-use is to the fore: The data filters available within a dashboard oriented towards customers can also be used, for instance, by LYNX's maintenance team when looking for a vendor for cleaning services at stops.

To explore more transit and GIS resources, please visit go.esri.com/TransitSLG.

# St. Johns County Leverages ArcGIS Solutions to Manage Capital Improvement Projects

By Stephanie Kurtz and Brooke Skladany,
St. Johns County Public Works Department

The St. Johns County Public Works Department aims to maintain, preserve, and protect the county's infrastructure resources. With the county's population increasing by over 44 percent in 10 years, achieving and exceeding our goal requires constant innovation of solutions, many of which involve using ArcGIS Enterprise as the foundational software system. This article will illustrate how the department leverages ArcGIS as a platform to manage infrastructure development effectively and maintain a high standard of living for county residents.

## An Enterprise Approach to Asset Management

St. Johns County is in northeast Florida, bordered by the Atlantic Ocean and the St. Johns River. Highlights of the county include the historical tourist destination of St. Augustine; extensive suburban, beachfront, and agricultural areas; and a highly rated public school system. The population, estimated at 306,000 people, increased by 44 percent between 2010 and 2020 and is projected to grow further. Because of the variety of landscapes and significant population increase, finding a way to manage capital improvement projects efficiently is a priority for the St. Johns County Public Works Department. The department maintains over 1,153 miles of roadway, 611 miles of sidewalks, and 266.3 miles of drainage pipes. With an increasing population, developing and maintaining assets requires constant innovation of solutions, many of which involve using ArcGIS Enterprise.

> We wanted to incorporate the power of GIS into our engineering division's CIP process and procedures. We were confident that having a spatial reference for [staff's] projects would significantly increase the efficiency of their project tracking tasks and open it up for other system integrations.

**Greg Caldwell**
Public Works Director

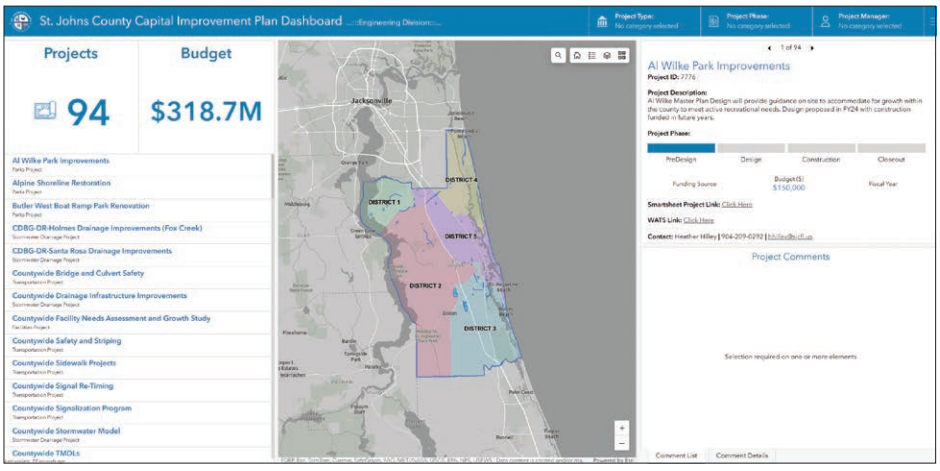
## Asset Maintenance Enhancements through Digital Transformation

St. Johns County's capital improvement program (CIP) focuses on maintaining capital assets and completing minor and major capital improvements. The program encompasses improvement plans to drainage, parks, facilities, and transportation. Previously, a legacy application was used to track project details and current status, while a monthly PDF report was manually generated and shared among stakeholders. The inherent flaws of this system included static information and a lack of spatial reference for projects. The department wanted to address these issues by enhancing the workflow process. The goal was to provide a solution allowing project managers to update information and facilitate communication with other staff members.

The first challenge was to provide a mechanism for project managers to update data quickly and intuitively with minimal reliance on geographic information system (GIS) staff. The second challenge was to make basic project information dynamic and readily accessible to other staff members without contacting project managers directly.

## A Shift toward Spatial Insight

The county's public works GIS/IT team saw opportunities to incorporate spatial




↑ The dashboard provided a clear view of the active CIP projects within the city and served as a mechanism to stay within the allocated budget.

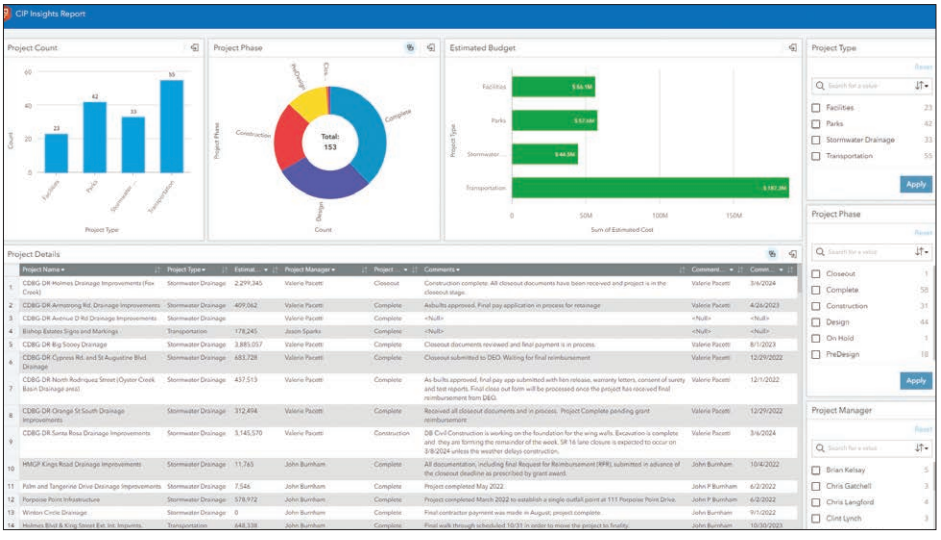

↑ The CIP Geo Hub is useful for direct staff and upper-level management to view how the county manages provided funds.

information through interactive, dynamic dashboards with key performance indicators and links to other project tracking tools. ArcGIS Solutions provided the basis for a more efficient CIP workflow process. The Capital Improvement Project Plans web app was implemented so that staff could edit basic project information. Project managers can comment on the current status and attach pictures and files. The Capital Improvement Plan dashboard was implemented to showcase projects dynamically and engage upper-level management.

Instead of depending on constant communication from project managers, the county administrator's team can review the dashboard to see the locations, basic information, and recent comments about project status. The updates are immediately available to anyone with view permissions. The dashboard facilitates a transparent and efficient exchange of information and is heavily used by county staff daily. The public works GIS/IT team also incorporated an insights report to provide additional project tracking and analysis resources.

The applications for each division of public works became too numerous to organize via links, bookmarks, and emails. Considering the CIP tools offered, it was clear the department needed a way to manage all the applications easily and in a user-friendly way. The chosen solution would leverage the power of ArcGIS Hub. The CIP Geo Hub was created, providing internal users direct access to applications, statistics, and key performance indicators.

After developing the Capital Improvement Plan dashboard for organizational use, county leadership requested a similar setup for public use. The objective of the publicly available dashboard is to increase government transparency and provide a platform to inform residents of local projects. The public dashboard is a copy of the internal Capital Improvement Plan dashboard; it wincludes infographics and dynamic statistics; and, like the dashboard for internal use it, utilizes filters, project identifications, and mapping navigations to create an interactive user experience.




↑ The CIP Insights Report enables the team to plan, analyze data, and create something manageable to read from a complex dataset.

**"This solution significantly improved our CIP project tracking procedures. I use the [CIP] dashboard daily to get the most updated status of all our projects. The dashboard helps document progress on each project and provides real-time information, making all our meetings more efficient."**

**Duane Kent, PE**
St. Johns County Engineer

## Real-Time Updates and Plans for the Future

The successful implementation of ArcGIS Solutions has drastically increased the efficiency of managing capital improvement projects in St. Johns County compared to the previous workflow. The solution has empowered project managers to take ownership of the data and perform basic editing instead of needing to rely on GIS staff. The combination of web apps, dashboards, and the hub site allows project managers to easily update project information and communicate with upper management. Using the internal dashboard has helped facilitate monthly CIP meetings, reducing the time required from several hours to an hour or less. Data that was once static and potentially outdated is now dynamic and accessible, providing real-time updates as changes are made. Increased transparency for the public is another benefit of this solution. Plans for further improvements include action items for each project and automated updates to track project expenditures.

For more public works success stories, please go to go.esri.com/SJCPW.

# Massachusetts Bolsters Resilience with Accessible Climate Data and Tools

By Sunny Fleming, Environment and Natural Resources Industry Specialist at Esri

Farmers in mostly rural western Massachusetts know the cost of extreme weather. The past year has pitted them against a deep freeze in February, late frost in May, and torrential rainfall and flooding in July and again in September. Although climate change is a global threat, for these farmers, the effects hit hardest close to home.

Nearly 26,000 Massachusetts residents rely on agriculture for their livelihoods, and with 94 percent of the state's farms being small or family-owned operations, the impact of these events has been environmentally, socially, and economically disruptive. For example, Natural Roots, a horse-powered vegetable farm in Conway, serves 500 farm-share customers who have been told not to expect winter shares due to flooded fields.

While larger coastal cities such as Boston have been proactive in their climate action, many Massachusetts farming communities like Conway often lack the staff or resources to keep pace. The Commonwealth of Massachusetts's Executive Office of Energy and Environmental Affairs (EEA) works to bridge this gap. The EEA improves resilience to climate impacts and helps communities adapt to climate change via accessible data, user-friendly analytical tools built with geographic information system (GIS) technology, and grants to fund mitigation and adaptation measures. Building climate resilience means finding solutions to protect people, places like rural farms, and crop yields from extreme weather events.

The EEA launched the ResilientMass Maps and Data Center to inform actions. Users can create and share maps showing climate change risks, forecasts, and adaptation strategies for their localities.

"The ResilientMass website is a one-stop shop for climate resilience," said Margot Mansfield, assistant climate scientist and coastal hazards specialist for the EEA. "We've been building tools and bringing in up-to-date data to help municipalities."

## New Tools, New Funding, New Priorities

As a national leader in the fight against climate change, Massachusetts continues to modernize its resilience efforts.

"The climate crisis is one of our greatest challenges, but there is enormous opportunity in our response," said Governor Maura Healey, who signed an executive order creating the cabinet-level position of climate chief on her first day in office, January 5, 2023.

The governor also announced an expansion of the EEA's Municipal Vulnerability Preparedness (MVP) grant program—MVP 2.0.

Under MVP 2.0, the state will invest another $100 million in climate resilience efforts. EEA leadership has initially selected 29 towns and one tribe to participate in the FY23–25 pilot round of the expanded MVP planning process.

The new pilot program addresses gaps in the first iteration of vulnerability preparedness. It allows communities to revisit and expand on previous resilience efforts, moving from planning to implementation. MVP 2.0 places a stronger emphasis on creating social resilience through an equitable and inclusive process. Municipalities, particularly rural or vulnerable populations, can use visualization tools and the latest data to guide decision-making with an equity lens.

Governor Healey and other state officials urge robust community engagement throughout the MVP 2.0 process. Grassroots organizers and city leadership will be involved at every step to ensure that local needs are being met.

"For MVP, the projects are often formulated by the town," said Marissa Robertson, the deputy director of the

MVP program. "Recent extreme weather events are bringing to light what should be a priority, like a dam that is at risk of collapsing from one major rain event."

Earlier this year, the Healey-Driscoll administration announced the creation of a new role within the Executive Office of Housing and Economic Development—director of rural affairs. This position will advocate for rural equity and agriculture and small business interests in western Massachusetts, complementing the EEA's efforts to support underresourced areas.

## Fair and Actionable Response

Program managers and other experts within the EEA evaluate eligibility for MVP action grants based on factors such as location, climate vulnerability, and environmental justice populations (identified by demographic criteria). This lends greater weight to projects that would benefit underserved communities.

The Federal Emergency Management Agency (FEMA) has a new requirement to instill equity as a foundation for emergency management. Both state and local mitigation plans required by FEMA must include analysis of who will benefit. In fact, FEMA has made equity its first goal, noting that underserved communities often suffer unjustly from disasters. As a result, disasters worsen inequities already present in society.

For towns lacking the expertise or resources to examine equity, MVP staff developed a web tool called Guides for Equitable and Actionable Response (GEAR).

"People can use GEAR to pick a community factor, such as housing or infrastructure, and visualize how it interacts with a climate hazard such as heat or flooding," Robertson said. "We're trying to make everyone as competitive as possible to get as much funding as possible to implement resilience projects."

GEAR makes it easy for users to take advantage of advanced mapping tools without always needing to hire outside consultants. This ensures that projects stay rooted in local needs and inspire community engagement, Robertson added.

Promoting community awareness and engagement around climate risk has been a point of emphasis for the White House. The Climate Mapping for Resilience and Adaptation (CMRA) tool lets users explore real-time maps showing climate-related hazards, learn more about climate risks and adaptation, and find federal funding for resilience projects. GEAR takes this one step further, giving communities in Massachusetts an acute view of local climate priorities.

"There's a heavy equity focus within the tool, which is something that a lot of towns and cities have struggled with," Robertson said. If a user wanted to look at heat and health data, for example, GEAR provides guided explorations on how to use community maps and data layers to support equitable decision-making. "You might find out your town has three senior centers in a known hot spot. That's a very vulnerable group living in an area of extreme heat. GEAR is designed to get you thinking about who's vulnerable and what climate vulnerabilities they are exposed to."

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↓ Governor Healey visited this washed out road and railroad crossing in Leominster after catastrophic flooding in July 2023. (Photo courtesy of Governor Healey's office by Joshua Qualls, director of photography.)

# Harris Central Appraisal District Integrates Parcel Fabric into Yearly Workflows

Harris Central Appraisal District (HCAD) of Harris County, Texas, is regularly responsible for over 1.8 million property valuations. In one of the largest US counties and the largest county in all of Texas, HCAD serves over 500 taxing jurisdictions and assesses properties of over 4.7 million residents and other types of properties with a total market value of approximately $895 billion. With so many properties needing to be managed and assessed, HCAD needed a process that was accurate, secure, and easy to incorporate into existing workflows.

HCAD used geographic information system (GIS) technology to evolve to the next level of efficient parcel management. The agency's work now serves as a foundation for assessment and collaboration with and among taxing jurisdictions across Harris County.

## Valuing What Matters Most

HCAD had been working to modernize its workflows for almost nine years, but it needed to keep up with technology changes and develop a system that was easy to use and update, and would save time.

HCAD also valued community engagement, so it was important that the technology would allow the agency to be transparent with the residents. The agency wanted technology that would provide accurate representations of its properties and valuations and allow easy access to the platform that would display all this information.

## Migrating to Better Things

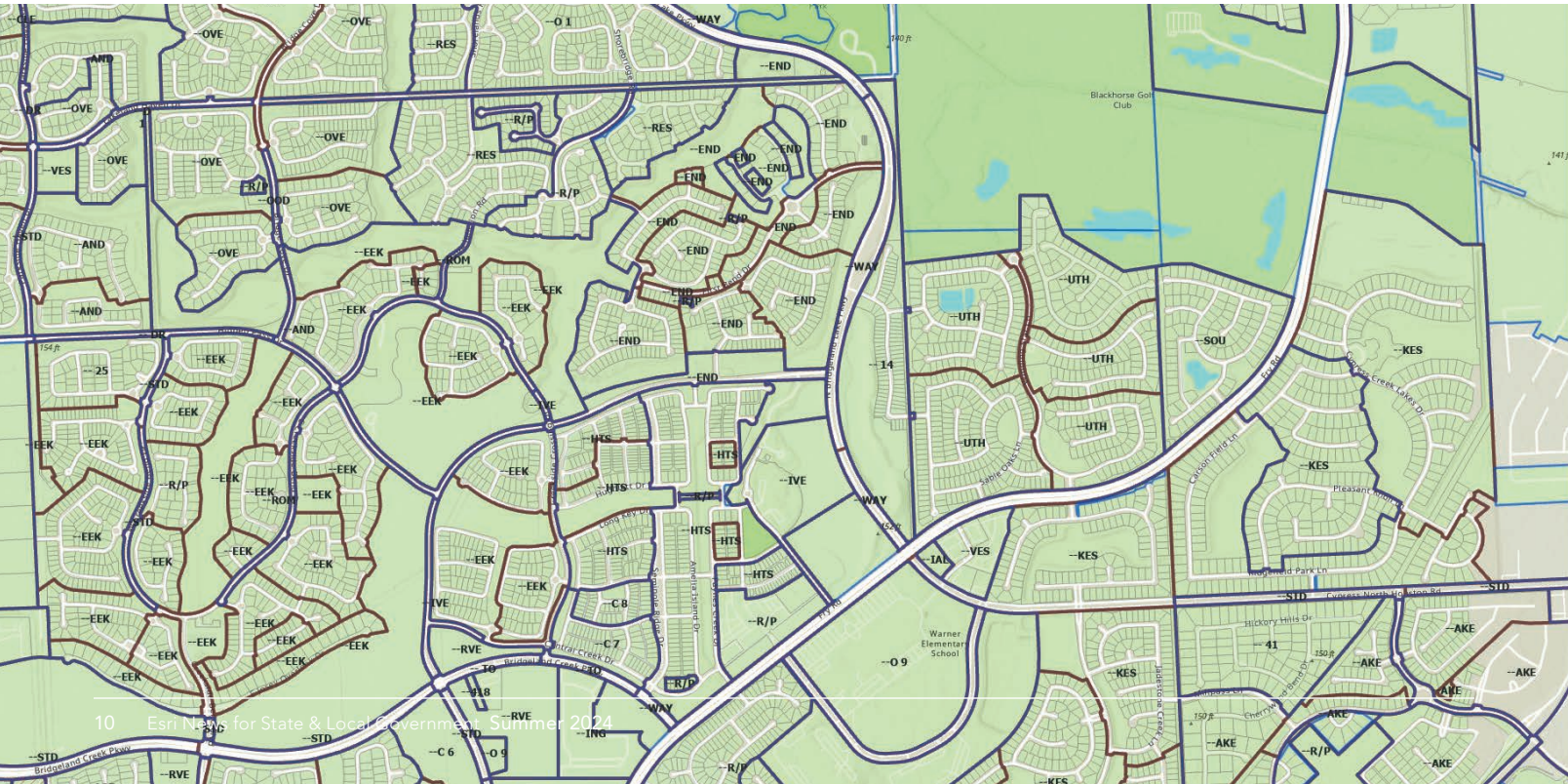
Starting the movement away from outdated technologies, HCAD turned to Esri partner Sidwell to support the agency with migrating its data to parcel fabric. The initial ArcMap™ parcel fabric conversion was a multiphase migration spanning 18 months. A significant amount of time was dedicated to converting the data to ArcGIS Parcel Fabric and adding it back to the production database to support the ongoing appraisal process.

HCAD migrated to Parcel Fabric with assistance from the land records team at Esri. The conversion took over 30 hours to complete. Through Esri training, HCAD staff learned to work in ArcGIS Pro and how to update data. They also participated in Esri's holistic testing for data migration to Parcel Fabric.

"Esri gave us all the tools we needed to be successful upfront. With that, our staff was set up to succeed when the conversion happened," said Joshua Dye, GIS analyst for HCAD. "Regardless of the number of iterations we had to go through, we wouldn't change a thing on how we went about things. The reward and benefits far outweigh the length of time or challenges."

ArcGIS products have helped HCAD meet its organizational goals by helping it gain authoritative data, improve data accuracy, and increase public transparency.

↓ The county's parcel fabric integration allowed the county to continue its transparency with residents.




↑ ArcGIS Pro has made it easier for the county to visualize and manage all parcel information.

## Results, Impact, Future Plans

Successfully integrating Parcel Fabric technology into its workflows, HCAD has managed approximately 150K parcel changes of various types annually. Due to fluctuations in property value, HCAD has seen appeals increase by 9 percent, from 452K in 2021 to 494K the next year, and continues to go up annually. In some ways, the increase in appeals is correlated to the HCAD website getting 20–30K hits per month, and at least a couple of thousand hits during slow seasons, since its new parcel maps launched.

Once the parcel fabric integration was completed and secured in its GIS, HCAD staff was very pleased with the new addition to managing parcels. The public response has also provided generally positive feedback on HCAD's basemap migrations. Other jurisdictions are now interested in HCAD's efforts based on what they have done with the parcel fabric and the refreshed look of its vector map.

The tools and features in ArcGIS Pro have made it easier to address data issues. HCAD can fix data errors more efficiently now, from taking days to now completing them in an afternoon. ArcGIS Pro is substantially easier to learn than previous iterations of technologies used in the past.

"The best outcome from using GIS is the amount of time saved," Dye said.

To further streamline its public engagement, HCAD is addressing any issues the public has with accessing the data and continuing to improve the process for property owners. HCAD's current plan is to be a complete ArcGIS Pro shop, replacing desktop legacy systems. "ArcGIS Pro and ArcGIS Parcel Fabric provide new tools to take on new requests as they originate from appraisal staff, jurisdictions, and the public. Staying on top of updates is important to avoid errors and maximize our investment in Parcel Fabric," Dye said.

HCAD also plans to share its vector maps with other jurisdictions, given the positive feedback received from those jurisdictions. This allows other jurisdictions to download HCAD's datasets for their work. HCAD is on its way to increased collaboration with other jurisdictions and setting an example in the appraisal industry.

"It's important for an appraisal district to have accurate property records. GIS helped us accomplish this. We can update our data more frequently and get accurate information to more people sooner," said Dye.

To learn more solutions for parcel management, please visit go.esri.com/ParcelSLG.

# Optimize the Health and Performance of Your Enterprise GIS with ArcGIS Monitor

ArcGIS Enterprise enables state and local governments to deploy an enterprise geographic information system (GIS) within their own infrastructure. However, administrating and maintaining such a system can sometimes be challenging as the enterprise GIS capabilities scale and grow over time or if the organization does not have dedicated IT personnel.

ArcGIS Monitor is an ArcGIS Enterprise extension that helps administrators get the most from their enterprise GIS and IT investment. Monitor collects metrics focused on both ArcGIS Enterprise components (e.g., ArcGIS Enterprise portals, GIS servers, web services, and geodatabases) and the underlying infrastructure. It provides a comprehensive overview of enterprise GIS health, performance, and usage, helping organizations go from reactive to proactive.

## Key Benefits

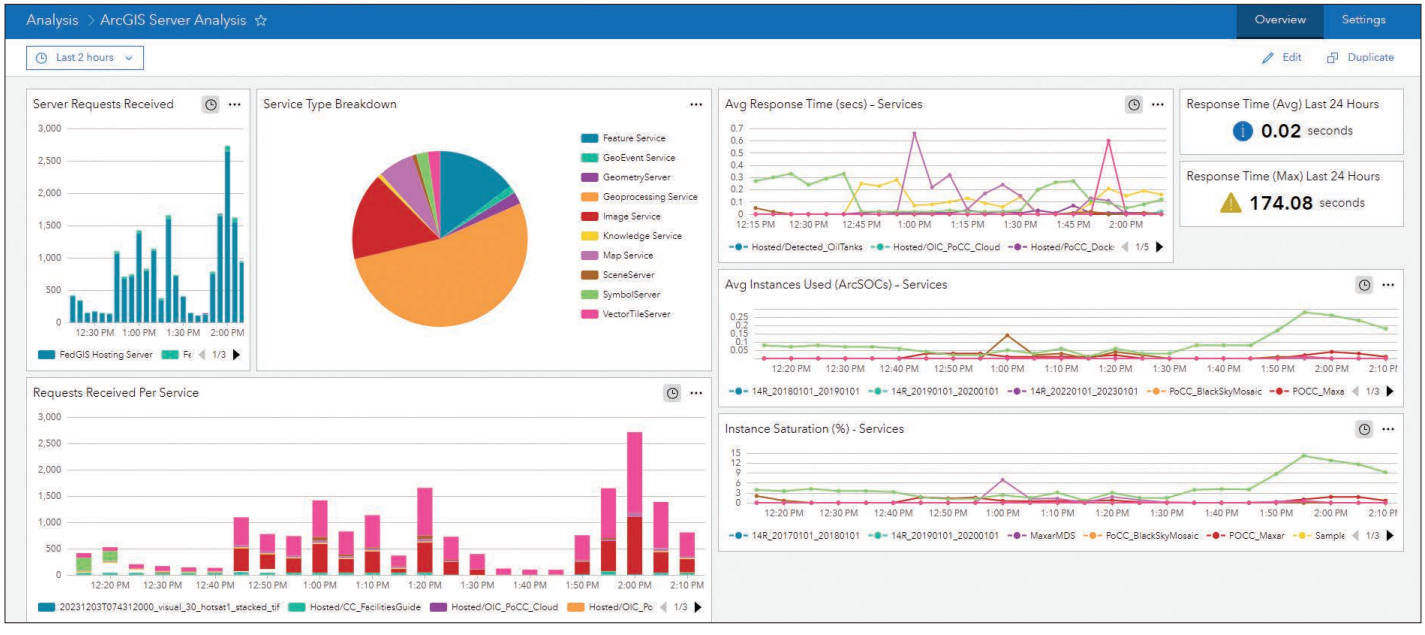
ArcGIS Monitor offers proactive monitoring as its primary advantage. Monitor collects real-time metrics, allowing administrators to identify and resolve potential issues before they escalate. Configurable alerts and notifications on enterprise GIS components facilitate prompt responses to system health concerns, mitigating the risk of downtime and operational disruptions.

For instance, administrators can set up an alert on a GIS server to trigger when its instance saturation percentage is high, indicating that more instances (i.e., system resources) are needed to handle the incoming service requests. When an alert is triggered, a notification email or webhook can be sent to an administrator or manager when components reach or exceed defined threshold values for system health. Ensuring that the enterprise GIS is working optimally can reduce and prevent system downtime, which helps save on operational costs.

By collecting metrics about enterprise GIS components and infrastructure, Monitor provides a holistic view of the entire system. Over several weeks or months, system activity trends and patterns can emerge that can guide administrators and managers with rightsizing the enterprise GIS. This information ensures enough system resources, such as computer processing units (CPU) and memory, are allocated to each component of the enterprise GIS and its infrastructure so that it will run efficiently.

For ArcGIS Enterprise deployments, identifying and isolating the causes of performance and system issues can sometimes be challenging. However, ArcGIS Monitor provides a solution by offering administrators and managers a single application to help troubleshoot these issues. It enables them to investigate common performance problems like high traffic volume and network bottlenecks, as well as check the availability of resources. Although Monitor does not automatically resolve these problems, it helps administrators and managers determine possible sources of the issue.

The metrics collected by ArcGIS Monitor are stored in an internal database, providing administrators and managers with an archive of enterprise GIS activity. This information is beneficial because it provides a history of




↑ Analysis view showing performance metrics of an ArcGIS Server site.

system activity, usage, and performance. This data can be examined to address questions related to trends and patterns of use:

- Which enterprise GIS components have the most activity?
- Which web services are the most active?
- Are web services more active during specific time periods?
- Are some web services mostly inactive? Should they be deprecated?

This data can be used for justifying additional system and IT resources and anticipating high-traffic events such as emergency weather response efforts or government elections. It also helps in planning for enterprise GIS growth and predicting system resource needs when new components and GIS capabilities are added.

> "ArcGIS Monitor has given me back [time every week for] monitoring our deployment as a whole, whether that's log files or making sure services are up. It allows me to be proactive rather than reactive, and then allows our platform to continue to accelerate faster and faster."

**Greg Jameson**
City of Grimes, Iowa

> "ArcGIS Monitor gives you the context of the entire GIS system. You're not just looking at CPU, RAM, and that's it. You're looking at it with the context of the whole system in mind."

**Joe Guzi**
Stark County, Ohio

## User Feedback

ArcGIS Monitor is a valuable tool for state and local governments seeking to maximize their enterprise GIS investments and ensure smooth operations. This product complements and strengthens enterprise GIS deployments by providing a holistic view of the entire system and infrastructure. It empowers GIS staff, regardless of their level of IT expertise, to better communicate with their organization's IT personnel, leveraging quantitative information about the enterprise GIS.

To learn more about ArcGIS Monitor, please go to go.esri.com/MonitorSLG.

## Massachusetts Bolsters Resilience with Accessible Climate Data and Tools

continued from page 9

### Enhancing Regional Resilience Town-by-Town

In addition to giving towns new tools, resources, and data to improve resilience, MVP 2.0 provides EEA staff with the chance to improve and expand their efforts.

"GEAR is a new tool, and we're hoping that towns will provide a lot of feedback," Robertson said. "We provided a how-to video, but we are considering offering trainings and one-on-one instruction for towns that need extra support."

Flooding has exposed vulnerabilities, particularly in western Massachusetts. Farmers have suffered devastating losses. "That social impact ripples out very quickly because people are losing their jobs," Robertson said. "They're losing money based on one rain event. I think that's really bringing the social resilience aspect to the forefront."

Ultimately, the EEA wants what is best for the commonwealth—and the common good. Since there are no county governments, cities in Massachusetts have more decision-making power. There is a strong sense of unity between state agencies and local leadership. And when communities unite across regions, actionable responses to climate change grow stronger.

"Resiliency isn't tied to one little neighborhood," Robertson said. "You become more resilient if you're able to do it as a region by adding capacity and leveraging shared resources."

As Robertson and her team continue to support the towns involved in the MVP 2.0 pilot project, extreme events provide a nearly constant reminder of the impact the team has already made.

"Towards the beginning of summer, we had some heavy rain, and one of our towns, Deerfield, contacted us to say that [its] MVP culvert project held up great in the storm," Robertson said. The town had been identified as an area vulnerable to flooding during the initial MVP planning process. Funding from MVP action grants in fiscal years 2021 and 2022 allowed the town to replace two priority culverts that helped avoid flooding.

"It's been long enough since these projects have been implemented, we're starting to get feedback," Robertson said. "It's validating to hear projects are working."

To learn more about how GIS drives successful climate action and resilience, visit go.esri.com/ClimateSLG.

↑ The new culvert on Mill Village Road in Deerfield improves water flow and public safety. (Photo courtesy of Massachusetts EEA)

# Four Ways to Incorporate Equity Across Industries

## Esri's Strategic Equity Plan

We have recently seen an increased desire to utilize data and mapping tools for community transparency and engagement. Although this is not a new concept, the recent pandemic and advocacy for racial justice have pushed organizations in all sectors to optimize their use of data to enhance equity and social justice. We are increasingly seeing the need for GIS professionals to collaborate with equity practitioners. So to meet this need, Esri has recently expanded its equity resources and developed a GIS-based strategic equity plan all organizations can follow. Please review the new resources below.

**Webinar Series: Build Your Strategic Equity Plan with GIS**—A successful equity strategic plan depends on having the right data, choosing the appropriate solutions, and empowering people. Learn from subject matter experts and chief equity officers who have successfully implemented a location-based equity strategic plan in this five-part webinar series.

Register Today
**go.esri.com/EquityWebinar**

**Blog Series: Equity across Industries**—Enhancing equity and social justice requires an organization to apply an equity lens to all department workflows. Through this blog series, Esri subject matter experts outline GIS tools and solutions that enhance health equity, transportation access, and more.

Read the Series
**go.esri.com/BlogSeries**

**Chief Equity Officer Network–** In order to operationalize equity initiatives, it is important that equity officers and professionals use data and GIS technology to justify resource allocation and new program implementations. The chief equity officer network connects equity professionals to GIS staff and solutions, providing them with the tools to operationalize their work.

Join the Network
**go.esri.com/JoinNetwork**

**Website: Mapping Equity Across Industries–**Every government, nonprofit, and business can advance equitable outcomes with a GIS-based strategic equity plan. Please visit our Mapping Equity across Industries website, where we outline the strategic equity plan and offer a variety of resources to assist you in advancing equity in your community.

Visit the Website
**go.esri.com/EquityWebsite**

GIS allows you to collaborate with community members, policymakers, and business leaders; establish benchmarks and priorities; and effectively distribute resources, staff, and services where they're most needed to advance equity. The resources listed above have been developed with your plans in mind, and we hope you take advantage of them.

# Mapping the Way for Homeless Point-in-Time Counts

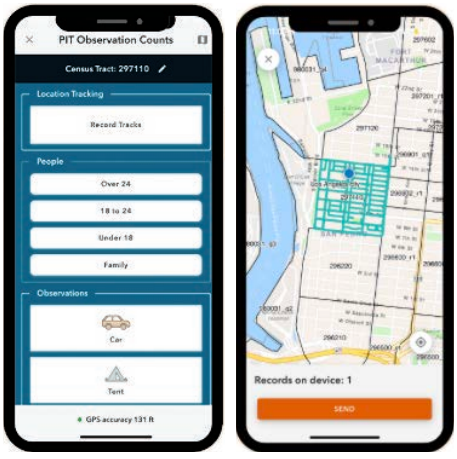
Homelessness is a complex issue that affects communities worldwide. Conducting accurate and comprehensive point-in-time (PIT) counts is crucial for understanding the scale of homelessness and developing effective strategies to address it. By applying Esri's expertise in data collection, analysis, mapping, visualization, and planning, we aim to help organizations streamline their annual PIT counts and make informed, data-driven decisions.

**Planning a safe and efficient PIT count requires modern GIS approaches.**

- **Planning for a PIT count is inherently geographic.**
  During the planning process, it is common to divide the geographic area to be covered into sections. Some organizations plan for achieving complete coverage and others plan for covering known hot spots where people experiencing homelessness may typically be found. This geographic information is crucial for determining the areas that need to be covered during the count and for organizing volunteers and resources effectively.
- **GIS enhances the safety of PIT counts.**
  Safety is also a major concern during PIT counts in both rural and urban areas. In rural areas, safety issues may arise due to the remote locations of encampments, such as having a lack of communication or being far from police stations. In urban areas, abandoned buildings can pose structural risks or be used for illegal activities. It is helpful to visually represent known unsafe locations on a map, such as freeways, abandoned buildings, waterways, and wooded or forested areas. Known unsafe locations like these should be handled by specially trained individuals.

**Volunteer recruitment, coordination, and training are key to PIT count success.**

- **Prepare, because PIT counts require more than an app for digital data collection and a dashboard for visualization.**
  Most PIT counts require volunteer recruitment, training, and coordination efforts. Volunteers contribute to the overall capacity of the count, allowing for greater coverage of geographic areas. Additionally, communities view the event as an opportunity to educate the public about homelessness and foster collaboration among people from diverse backgrounds. These volunteers are recruited from various sources and are typically provided with training.
- **Engage and coordinate potential volunteers.**
  ArcGIS Hub can be used to create dedicated websites to engage with potential volunteers. Organizations can provide information about the homeless count initiative, the importance of volunteers, and the specific roles and responsibilities they will have. GIS tools also provide features for volunteer registration, communication, collaboration, and reporting.




↑ Mobile apps for homeless point-in-time counts.

**Organizations require different solutions based on the type of count they are conducting.**

The US Department of Housing and Urban Development (HUD) recommends two main data collection methodologies for homeless PIT counts: street counts and demographic interviews.

- **Street Count: This methodology involves counting individuals experiencing homelessness who are found on the streets, in parks, or at other public spaces.**
  Using ArcGIS QuickCapture for the 2024 Greater Los Angeles Homeless

Count, volunteers were able to easily and rapidly collect counts of individuals as well as dwellings such as tents and makeshift shelters with just a tap of a large button. Additionally, volunteers could review and validate the captured data before it was submitted, ensuring accuracy and consistency.

- **Demographic Interviews: This methodology involves face-to-face interviews with individuals experiencing homelessness to gather more detailed information about their circumstances.** ArcGIS Survey123 allows for the customized design of surveys tailored to organizations' specific data collection needs, adhering to HUD requirements for demographic PIT counts.

**Location intelligence improves data accuracy and quality assurance.**

- HUD encourages the use of technology to ease the survey administration burden of the PIT count, because capturing data electronically in real time improves its quality due to a decrease in entry errors common with paper-based PIT counts.
- By leveraging location sharing of volunteers, the lead organization can confidently validate that that area has been covered by a volunteer, providing quality assurance.

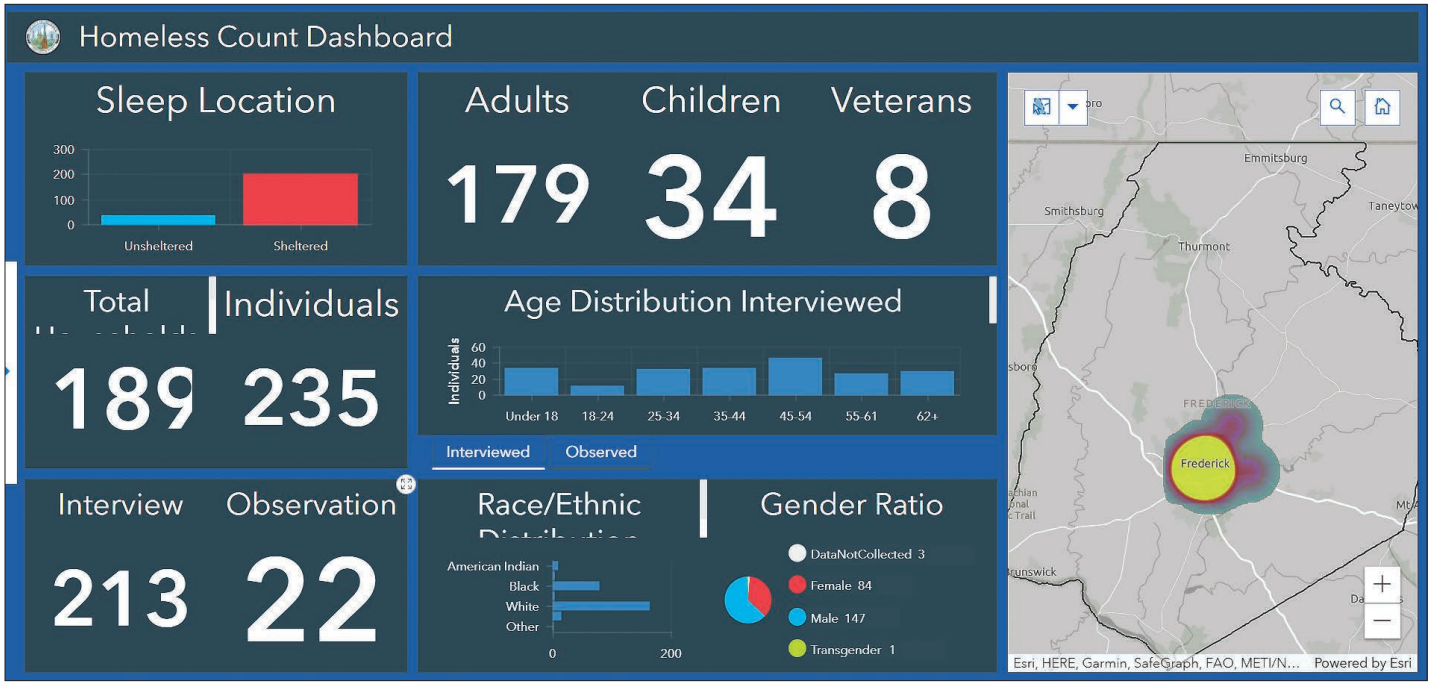
**Organizations can go above and beyond HUD requirements.**

By leveraging GIS technology, organizations can go beyond the basic requirements of PIT counts and gain a deeper understanding of homelessness in their communities. This understanding can inform evidence-based decision-making, facilitate collaboration among stakeholders, and ultimately contribute to more effective housing solutions and support for the homeless population.

- **Transparency:** By utilizing GIS technology, organizations can enhance transparency in their PIT counts. They can provide access to the collected data, methodologies, and results to the public, stakeholders, and policymakers. This transparency helps build trust, encourages collaboration, and fosters a better understanding of the homeless population and the challenges it faces.
- **Community Demographic Insight:** GIS enables organizations to analyze and visualize the collected data in a spatial context. By examining demographic patterns and characteristics of the homeless population, organizations can gain deeper insight into the specific needs and challenges of different communities. This insight can inform targeted interventions and resource allocation to address homelessness effectively.
- **Identification of Trends:** GIS technology allows organizations to identify trends and patterns in the data collected during PIT counts. By analyzing the data over time, organizations can identify changes in the homeless population, such as shifts in demographics, geographic distribution, or specific subpopulations. This information helps organizations adapt their strategies, allocate resources efficiently, and measure the impact of their interventions.
- **Housing Solutions:** GIS can play a crucial role in identifying potential housing solutions for individuals and families experiencing homelessness. By mapping available resources, such as affordable housing options, shelters, and support services, organizations can identify gaps and opportunities for improving access to housing. GIS can also help assess the suitability of different locations for housing initiatives, considering factors such as proximity to services, transportation, and employment opportunities.

To enhance your homeless PIT count, please visit go.esri.com/CrisisResponse.

↓ ArcGIS Dashboard provides a centralized view of the crisis.



# Non-Profit Organization Empowers Students to Help Reduce Community Inequities

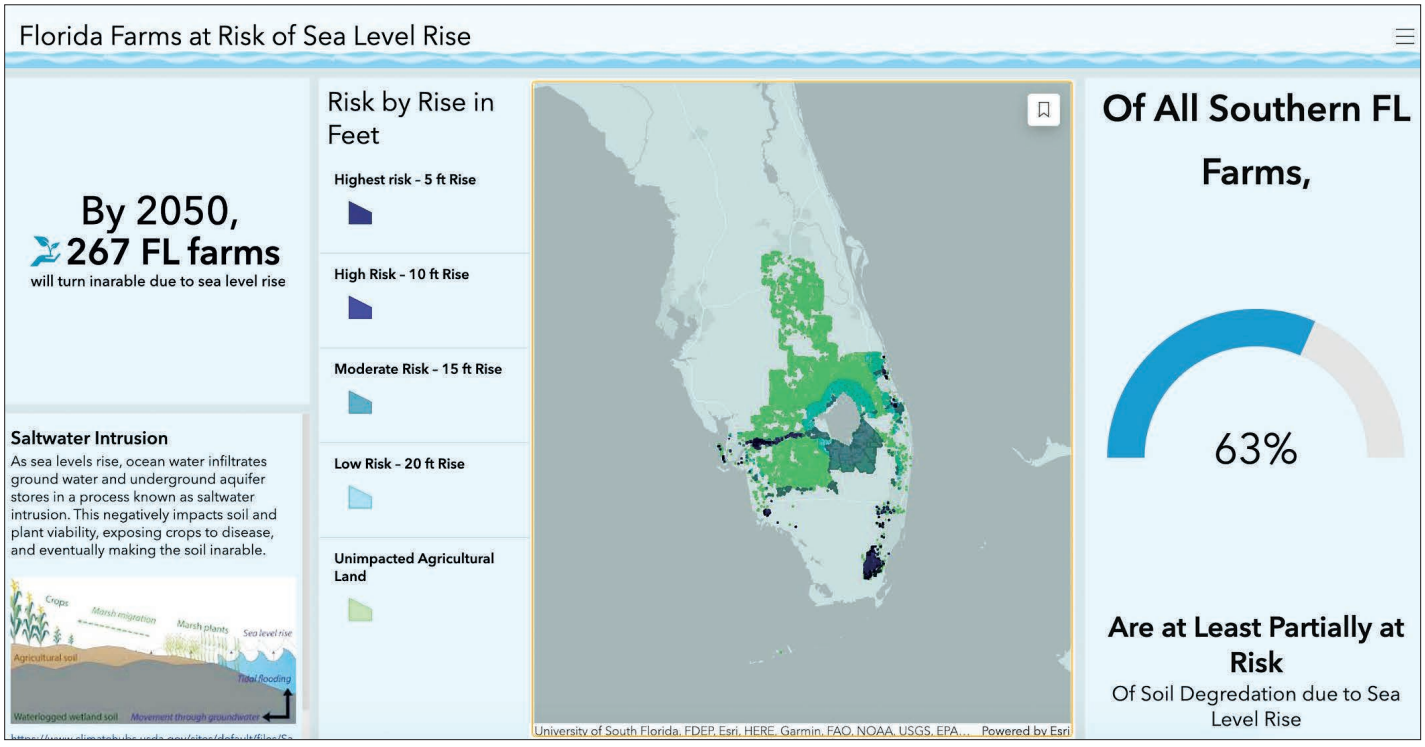
## Reducing Social and Environmental Disparities with Data

Providing K–12 students with equitable access to math and science learning is essential for young people to develop a proficiency in STEM (science, technology, engineering, and mathematics). Statistically, BIPOC (Black, Indigenous, people of color) students face barriers to excelling in math and science as early as kindergarten due to a variety of factors. A child's socioeconomic status, family support, a school's economic status, and other factors can influence how a student responds academically. The tech-justice nonprofit organization trubel&co was launched to provide opportunities for BIPOC students through the use of geospatial tools to expand STEM education and support the next generation of high school students. trubel&co integrates STEM education with civic innovation to create a pipeline of changemakers committed to improving their community using data analytics, responsible technology, and inclusive design. The organization's goal is to accelerate young innovators' drive to help address their communities' most complex challenges through STEM and design coursework, service learning, and professional development workshops. trubel&co's mission also prioritizes the technical fluency of each student by supplying student cohorts with guidance and geospatial resources.

### Student Innovation with GIS

trubel&co's team of mentors empowers students to design geospatial tools for social change to fix the problems they care about most. Students are paired with a peer and learn how to take a geographic approach to understanding issues like access to education in Black and brown communities, political reform in rural areas, health equity, food security, climate change, and other pressing challenges. Each student

↓ A dashboard with a map of southern Florida, showing that 63 percent of farms are partially at risk of sea level rise.



is introduced to geographic information system (GIS) technology with the goal of using qualitative and quantitative insights from the research they conduct.

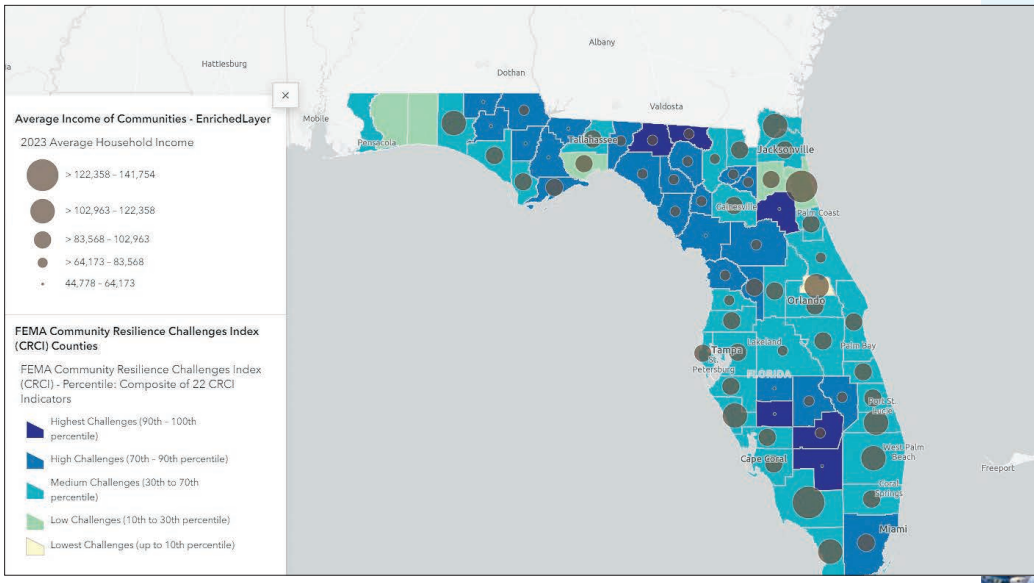
To begin analyzing the causes and conditions of community challenges, students use GIS to:

- Organize and clean collections of data.
- Create dashboards and web applications to visualize complex data.
- Perform critical data analysis that validates lived experiences.
- Brainstorm practical solutions to resolve the challenge they are researching.

"We push our students to think through experiences that they're approximate to," said Nick Okafor, founder and executive director of trubel&co. "We help them to think about what their relations are to different communities and how their perspective can be rooted in power. We really appreciate their insights as 16-year-olds to be able to think about challenges as a local citizen and how we can use that to really ground, not only their exploration of STEM education, but their journey into solutions and innovation."

## Nurturing Critical Thinking with a Geographic Approach

Each student is provided with eight weeks of instructional material that supports self-guided learning to develop problem-solving insights based on the geography of their communities. To ensure that students can thrive with interactive learning, trubel&co adapts the curriculum to meet the specific needs of each cohort. This is done by understanding the demographics and cultural elements of the students' communities to help them thrive. Through collaborative learning, each student creates a GIS application for a hypothetical client, such as an elected official or community decision-maker, to whom they would present their solution. For example, two students in the 2023 Southwest Florida cohort used ArcGIS Dashboards to create an interactive Florida Farms at Risk of Sea Level Rise Dashboard that evaluates land depletion across the US and analyzes overlaps with sea level rise in Southwest Florida. Their research highlighted that hundreds of farms were at risk in the region and could become nonarable causing devastating impacts to local agricultural communities. To address this, they advocated for sustainability and adaptation practices such as micro-irrigation or agroforestry.




↑ ArcGIS Online map of Florida's average income of communities and areas with the highest and lowest resilience according to FEMA's county index.

Inspired by lived experiences, another example of a local challenge students researched is the displacement of people because of climate change. Students identified this problem as a high-priority challenge and created an ArcGIS StoryMap℠ to address the following questions for including environmental scientists and climatologists, GIS specialists, data analysts, and community engagement specialists:

- What demographics are most affected by droughts?
- What are the effects of sea level rise on Florida residents?
- How can GIS mapping be used to show climate gentrification?

By analyzing the impacts of climate change through a geographic lens, the students found connections between redlining and gentrification for vulnerable and historically marginalized populations.

"I learned how to use GIS through the lens of both social impacts and business strategies," said Okafor. "And so, we strive to provide that to our students and hope communities see the potential of GIS to unlock innovation, unlock insights, and to be grounded in community learning."

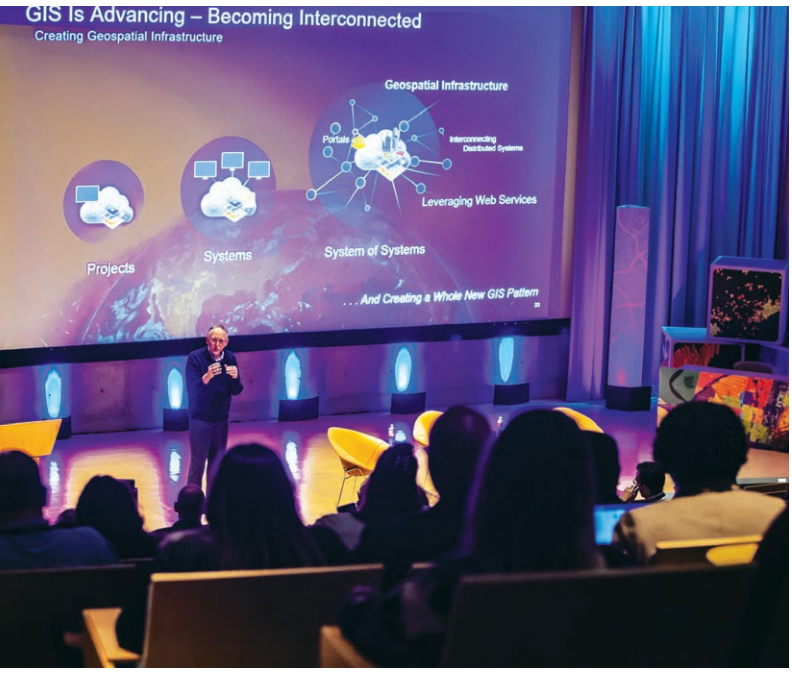
## Collaborating with Changemakers to Empower Students

Local educational institutions and education champions such as The Water School at Florida Gulf Coast University, Massachusetts Institute of Technology (MIT), and NewSchools Venture Fund help trubel&co expand its geographic influence. A long-term goal is to help students cultivate geospatial thinking across more communities each year. The opportunity for students to think spatially about community challenges has motivated them to develop a deep interest in using research and GIS skills to help the communities they call home. The GIS and STEM education trubel&co provides has begun to bridge the gap for marginalized communities and continues to help students contextualize what liberation means for their communities.

# 4 Key Insights

## from the 2024 Esri Public Sector CIO Summit

On March 20 and 21, 2024, Esri hosted the twelfth annual Esri Public Sector CIO Summit at Esri headquarters. Each year, CIOs, IT directors, CDOs, and CTOs in state, city, county, and regional government attend this summit to receive a brief on the latest GIS capabilities, emerging trends, and best practices so that they can better communicate and leverage the power of GIS technology. This year, four major topics emerged among this group of IT executives. This is an opportunity for GIS professionals to have a deeper conversation about the integration of GIS and IT framed around these four topics:




↑ Jack Dangermond kicks off the event, focusing on the role CIOs and IT leaders have in managing enterprise GIS solutions.

### 1 GIS Is an Enterprise System, and We Should Talk about It as Such

IT is shifting from project work to more organization-wide problem-solving, where each discipline is bringing its unique perspective to the table and using GIS as a common denominator. Homelessness, for example, is being addressed holistically by public works, planning, health, human services, law enforcement, and IT professionals. As more cross-discipline challenges emerge, enterprise GIS is ready to

↑ Jennifer Higgs, GIS Manager, Keith Durbin, CIO, and Colleen Herndon, ITS Assistant Director, receive the Enterprise Approach to GIS Award from Jack Dangermond on behalf of Metropolitan Government of Nashville & Davidson County, TN.

→ Martin Perez, Assistant CIO, Darryl Polk, CTO, and Jeff Van Wagenen Jr., CEO, receive the Innovations in GIS Award from Jack Dangermond on behalf of Riverside County, CA.

support an enterprise approach to solving problems. Keith Durbin, CIO of Information Technology Services (ITS), and Colleen Herndon, ITS assistant director from Metropolitan Government of Nashville & Davidson County, Tennessee, spoke about the power of building an enterprise GIS approach. Metro Nashville received the Enterprise Approach to GIS Award. Darryl Polk, CTO for Riverside County, California, shared how enterprise GIS helped execute county CEO Jeff Van Wagenen's vision for integrated digital service delivery for human services. Without GIS as a common denominator, a multiagency collaboration and program would not have been possible. Riverside County received the Innovations in GIS Award for this work.

## 2 A Culture of GIS Can Be Your Major Differentiator

The IT leaders who presented shared that GIS has moved from being just a technology into a way of thinking. A "GIS culture" (as the Metro Nashville presenters described their approach) forces an organization to question who can be included in the GIS strategy and who can benefit from GIS tools, enabling data-driven problem-solving. Herndon said it perfectly: "To truly grow our GIS program at enterprise scale, we know that it was going to be important to instill GIS skill sets across our departments." Laura Clark, CIO for State of Michigan, started her career in GIS and stated that "a lot of my foundational decision-making and data analytics and principles come out of that [experience]." GIS being viewed as a major system and decision-making tool is opening new doors and opportunities for GIS use and GIS professionals to support.

## 3 IT Leaders Who Team Up with GIS Professionals Have the Power to Improve the Lives of Residents

Having a culture of GIS and embracing GIS as a decision-making tool means organizations are applying GIS capabilities to new challenges and disciplines. IT leaders have an opportunity to use technology to impact social and civic challenges. Eric Fey, director of elections from Saint Louis County, Missouri, presented an unprecedented view into the role geography has in the elections process. Getting a voter to a polling place is difficult. Getting the right ballot to the right person based on multiple congressional, city, county, utility, school, or hospital districts is even more difficult. Both are location problems; both impact the way a resident may view government services and efficiency. Fey's use of GIS across his department is helping him and his staff support ballot tracking, volunteers, early voting, absentee ballot drop-off siting, improved communications, response to inquiries, and even assistance to visually impaired voters. Laurice Walker, chief equity officer, and Laura Sharp, equity data project manager from City of Tucson, Arizona, demonstrated how teamwork between a domain-specific expert and a data and GIS expert can drive change. Tucson's experience is just one example of how IT leaders can support cross-departmental issues such as broadband, substance misuse, homelessness, and transportation safety.

## 4 GeoAI - Quality AI Isn't Possible without Quality Data

You probably know the phrase "garbage in, garbage out" or, for the IT folks, "bad data in, bad data out." This phrase has never been more important than when it comes to artificial intelligence (AI). Greater attention needs to be paid on the quality of data to ensure quality AI models and outcomes. Chris Rodgers, county commissioner from Douglas County, Nebraska, and Rita Reynolds, CIO from the National Association of Counties (NACo)—both of whom are on NACo's AI Governance Committee—spoke about the importance of providing staff with quality imagery data to run an asset detection model. Douglas County was able to inventory 17,408 more Americans with Disabilities Act (ADA)-compliant curb ramps in 12 days with quality imagery data and an AI model.

To see what your IT executive witnessed, check out the event proceedings go.esri.com/2024-cio-recap.

→ Esri president and founder Jack Dangermond addresses the current state of GIS.

# Build Your Ultimate Experience at Esri User Conference

## Don't Miss Out on These State and Local Government Activities

## Monday, July 15

**8:30 AM–3:30 PM** Esri UC Plenary Session

Jack Dangermond, Esri president and founder, will set the stage for the Esri User Conference (Esri UC) in this opening session for all attendees. Throughout the day, conference attendees will see geographic information system (GIS) technology in action through presentations and demonstrations showcasing new products and capabilities, ArcGIS software updates and enhancements, and the inspiring work of the global GIS community.

**4:00 PM–6:00 PM** Map Gallery Reception

Explore an expansive collection of innovative maps and special exhibits created by our global user community. Grab some refreshments and join map authors discussing their work.

## Tuesday, July 16

**8:00 AM–6:00 PM** Map Gallery

**9:00 AM–6:00 PM** Expo Floor

Come to the State and Local Government area to talk to our subject matter experts to learn more about the following:

- Health and Human Services
- Environmental and Natural Resources Management
- Land Records and Cadastre
- Equity
- Transportation
- Nonprofit Programs
- Elections
- Public Works

**8:30 AM–5:00 PM** State and Local Government Technical Workshops and User Presentations

Led by Esri staff, technical sessions are workshops that focus on concepts, best practices, and how the Esri platform and technology work.

**11:30 AM–12:15 PM** Trends in Land Records and Property Assessment

**11:30 AM–12:30 PM** Special Interest Group Meetings

**1:00 PM–1:45 PM** The Geographic Approach to Protecting, Restoring, and Managing the Environment

**4:00 PM–4:45 PM** Understanding Your Role in Developing a Climate Action Plan

## Wednesday, July 17

**8:00 AM–6:00 PM** Map Gallery

**9:00 AM–6:00 PM** Expo Floor

**8:30 AM–5:00 PM** State and Local Government Technical Workshops and User Presentations

**10:00 AM–10:45 AM** Implementing the Geographic Approach to Planning and Community Development

**11:30 AM–12:15 PM** Public Works Agencies Rebuild, Rethink, and Reimagine Our Communities with GIS

**3:30 PM–5:30 PM** Esri Awards Ceremony

Each year, a select group of users from around the world is recognized for its work with GIS and receive the Special Achievement in GIS (SAG) Award. This group comprises organizations whose works have stood out from thousands of their peers. The awards ceremony is an opportunity for us to celebrate them for their work and contributions to GIS.

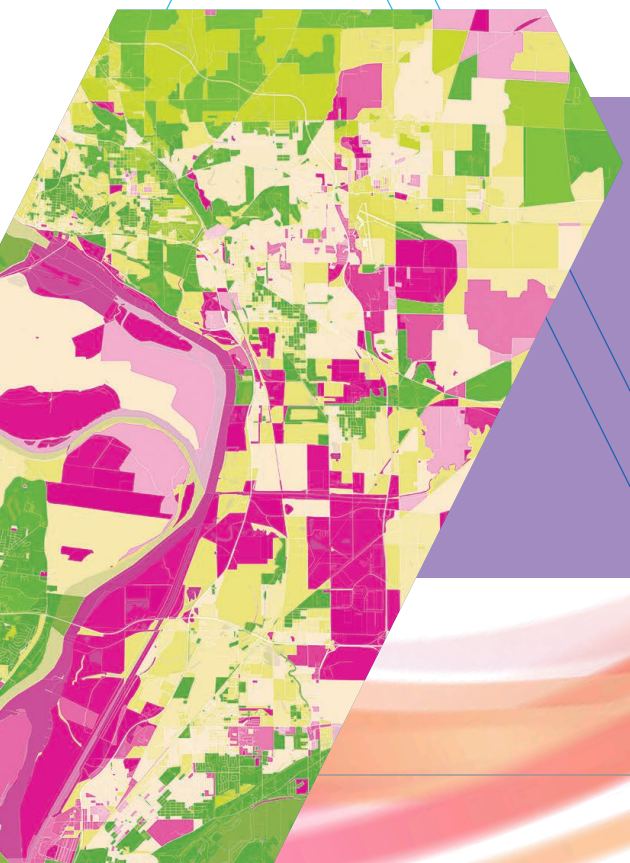
## Thursday, July 18

| | |
|---|---|
| 8:00 AM–5:00 PM | Map Gallery |
| 9:00 AM–6:00 PM | Expo Floor |
| 10:00 AM–10:45 AM | Embracing the Era Transportation with Real-Time Capabilities |
| 11:30 AM–12:15 PM | Build an Equity Strategy with GIS |
| 1:00 PM–1:45 PM | Health Trends in GIS: Charting New Frontiers |

## Friday, July 19

| | |
|---|---|
| 9:00 AM–10:00 AM | Technical Workshops |
| 10:30 AM–NOON | Closing Session |

To explore What's New in more detail, please visit **go.esri.com/SLGarea**



## What's New This Year?

Come by the State and Local Government Expo Area To:

- Ask an industry expert about the emerging themes challenges you face. Bring any and all questions to the Ask Me Anything area.
- Walk through technical steps on common workflows and receive guidance on how to further your GIS program. Stop by the How To area to learn more.
- Pick up educational guides in the Resource Center to continue your professional development.
- Be interviewed on-site so we can promote your work in Esri publications.

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# DEVELOP AN EQUITY STRATEGIC PLAN

## IN FOUR STEPS WITH GIS

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