Smarter States Equal Smarter Communities

Leading Transformation through Geospatial Infrastructure

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NATIONAL GOVERNORS ASSOCIATION

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Introduction

All across the nation, government and community leaders are working to improve the lives of their residents. This means doing everything from growing their economies to improving the quality of life for their citizens to shoring up a community's resiliency.

But achieving the full potential of this vision can often be challenging for state and local governments. Data needed to make smart decisions and deploy these efforts often resides in silos or is only being addressed within one department, and not all stakeholders share the same vision for how to achieve their missions.

Today, it is time for states to demonstrate leadership so citizens across an entire state have the chance to benefit from new technology and innovative ideas. As the connecting force to get other jurisdictions on board and give help to areas where needed, states also have the ability to bring together best practices that different cities and counties test out, and deploy them statewide. Finally, states have the freedom to pioneer and pilot new technology or projects that can then be implemented across all areas with lessons learned for all involved.

It is time for states to become smart states, or states that make data-driven decisions, maintain constant awareness and stay connected by using technology and pioneering innovation. The National Governors Association (NGA) is ramping up its efforts to help states in this effort. Five states – Colorado, Nevada, New Jersey, North Dakota and Virginia – make up the first cohort in this new effort, dubbed the **Smarter States, Smarter Communities** initiative.

The initiative will initially focus on opportunities in energy, transportation, public safety and emergency management, where states are already making strides. Part of the initiative includes a learning lab to also address fundamental components to smarter states initiatives, such as governance, stakeholder engagement and telecommunications policy in both rural and urban regions.

In support of this initiative, Esri, a leader in geographic information systems (GIS), has joined with NGA in a unique public-private partnership to get states to the next level of being truly "smart." Esri and NGA have been longtime partners, helping government serve its citizens and recognize that location is a major component when it comes to making any agency or locale "smart."

In the following pages, we'll explore how GIS is an acknowledged, foundational technology that supports making states smarter, and learn how the NGA's new initiative, coupled with Esri's expertise and technology, will make use of GIS to bring states to the next level.

The Science of Where in Smart States

Today, making data-driven decisions that improve quality of life is essential in government, and even more so as states work to create smart communities and solutions. With the right process, people and technology, any state can become smarter.

Effective states will use GIS by applying a hub approach that connects people with the information and technology to drive improved quality of life, innovation and better choices. GIS is a foundational platform and a unifying thread that can pull lots of disparate datasets together. GIS can create information from data, enable more insight and innovation, and bring in different perspectives. States can take this opportunity to become a facilitator and leader in this arena and encourage more collaboration among cities, counties and state agencies to work better together. This collaboration can bring about standards and statewide initiatives, prioritize issues and promote best practice models, tools and more.

Smart states understand that smart is a journey, not a destination, and with GIS technology they can solve current challenges, rethink "business as usual" mindsets and reimagine a community based on technological advances that support infrastructure needs, humans in crisis, climate change and whatever else the future may bring.

Map: *Predominant Industry by County*

The Role of States in Bringing it All Together

States are taking advantage of the Science of Where and the foundational element that is GIS to truly become "smart states." States are creating a cohesive strategy across disciplines to deliver smart states that impact communities at the local level. For example, in emergency management, states are using GIS to coordinate resources, improve collaboration and increase civic engagement during a disaster that requires multi-jurisdictional response. In departments of transportation, states are keeping citizens moving safely and efficiently by monitoring sensors and making adjustments to traffic flows, responding to road closures and managing inclement weather events.

By learning from the examples of smart states in action, NGA has developed best practices that can help states with governance and stakeholder engagement, and building guidelines to be used across each state.

To become a smart state, state government leaders must focus on these core elements:

Leadership and vision

State governments must demonstrate leadership in matters and policies that affect all of its citizens. States must champion the dialogue on statewide interests in areas such as energy, natural resource management, emergency management and broadband so that local governments can benefit. State documentation of procedures and findings, recommendation on data standards and the provision of operational dashboards for facilitation and communication can act as a unifying strategy when local and state governments need to come together.

Data sharing

In the past, data exchange was challenged by politics, lack of understanding of the value of how data collected in one department could benefit another and the simple fact that the technology was not there to facilitate sharing. Advancements in open data, analytics, sensors and the applications of data have moved the needle to foster a more open exchange. States are demonstrating the value of data sharing through data hubs, initiatives with civic engagement tie-ins and crowdsourcing. Data collected for one project now feeds interdepartmental needs while providing new capabilities to local governments through renewed insights. GIS provides the framework for connecting data to support improved service levels.

Data governance

As the volume of data increases through open exchange and real-time data feeds, states offer leadership in acknowledging authoritative sources and protocols for use. States must provide the documentation of the use of data as information products, protect sensitive information and develop models to increase data literacy at all levels of government. This state governance should remain prevalent in all activities that impact statewide networks and citizens, especially when the outcomes of the use data, or lack thereof, cause the public to look to their governor for leadership.

Enabled platforms

States must demonstrate the support and development of enabled platforms to improve the successful uptake of smart technology approaches across their territory. States can lead by example by establishing strong cloud computing platforms, extending broadband to rural areas and using software platforms such as GIS. Those types of efforts offer opportunities for all levels of government to participate in becoming a smarter state regardless of size and resources.

Key technologies

Smart states will use and extend foundational technologies that raise their state's economic and social competitiveness. This includes the use of mobile technologies for both citizens and government agencies, the establishment of sensor networks, the extension of smart infrastructure such as cloud and IoT and the implementation of tools to improve the building of communities in city and county governments.

National Governors Association
Smarter States, Smarter Communities Initiative

The National Governors Association Center for Best Practices (NGA Center) launched its Smarter States, Smarter Communities initiative with a vision of helping governors develop statewide programs that build on and expand local successes under a "smart for all" vision.

The initiative starts with a two-year effort to educate, accelerate and replicate smart efforts across the country. NGA plans to initially focus on opportunities where states are already making strides, including energy, transportation and public safety and emergency response.

Esri has joined NGA as a strategic partner and advisor in this initiative because of the critical capabilities of GIS in making a smart state.

NGA's first phase will work on a range of real-world use cases, such as enhancing state smart grid capabilities that can improve system resiliency and enable use of new connected technologies for buildings, streets and industry; improving communications networks that enable autonomous vehicles; and using big data and predictive analytics to reduce recidivism.

To learn more about what NGA and its smarter states program will do in the coming months, head to **nga.org/bestpractices/divisions/eet/**

The states included in the first cohort of the effort are Colorado, North Dakota, Nevada, Virginia and New Jersey. A second cohort will be launched in summer 2019.

Sue Gander, Director of the Environment, Energy & Transportation Division at the NGA Center, offered an example of how some smart states are working with GIS to better connect their states and improve quality of life.

"Several smart states are working on really cool efforts to use data and analytics in their smart and connected transportation work," Gander said. "They are working with Esri on real-time dashboards that include asset conditions and situational awareness – helping them with weather conditions, traffic crashes, snowplow efforts and more."

The NGA Center will assemble lessons learned into roadmaps that will help all states accelerate their efforts. The roadmaps, to be released in spring 2019, will offer a step-by-step guide with examples drawn from across the country.

Esri and the NGA Partnership

The NGA effort is also working to help states figure out how they can take advantage of GIS technology and data to move their efforts along. As part of the 2017-2018 NGA Chair's Initiative for Gov. Brian Sandoval, Ahead of the Curve: Innovation Governors, a precursor to the Smarter States project, NGA put together several Esri Story Maps to illustrate the tales of specific technologies in transportation and energy and the impact they could have on states. And again with the NGA's 2018-2019 Chair's Initiative, which focuses on Good Jobs for All Americans: Mapping the Trends, they created another story map to outline workforce development trends and needs.

Access the storymaps at the following links:

- **Ahead of the Curve: Innovation Governors State Innovations in Transportation and Energy Technologies**
- **Ahead of the Curve: Innovation Governors Innovations in Transportation**
- **Ahead of the Curve: Innovation Governors Innovations in the Connected Energy Sector**

How GIS Creates the Foundation for States to Become Smart

The smart movement challenges governments to adopt a more forward-thinking approach to building communities. The NGA's Smart States Initiative urges leaders to embrace a high-tech makeover in which governments are better connected to infrastructure, data and citizens, enabling a shift from a static to a more iterative and responsive governing body. Smart states pose questions to themselves and to local governments as to how they can improve effectiveness and efficiency while creating more livable communities. This movement encourages intelligent planning and engineering design that ensures resiliency from setbacks and is sustainable. And there is a call to question the balance of social equity in government services and public engagement.

A study of successful smart strategies demonstrates that smart is part of a strategy to improve service and create more livable and resilient communities. At the core of every successful strategy is a geospatial infrastructure fueled by GIS data and analysis, resulting in a shift from individual technology applications to a comprehensive Smart Community Information System.

*This GIS-centric system encompasses four technology pillars to achieve success:*

Planning and Engineering

States are faced with new opportunities to shape our communities. Today, planning and engineering disciplines must balance the needs of people, infrastructure and the environment. GIS allows governments to balance the built and natural environments, adjust to shifting demographics and lifestyles, and account for changes to the climate and the economy. Smart prompts a community to learn and adapt through real-time data and deliver intelligent design of infrastructure, ultimately supporting urban mobility, resiliency and sustainability.

Operational Efficiency

Smart states are those that deliver unparalleled service to their constituents. Balancing your resources and applying them to the best locations that benefit the most people helps improve citizen satisfaction. GIS collects information in real time and feeds it back into performance dashboards for real impact. More efficient workflows come from being able to collect information at the source, dispatching staff to where they are most needed and maximizing materials and resources to improve response times while reducing costs.
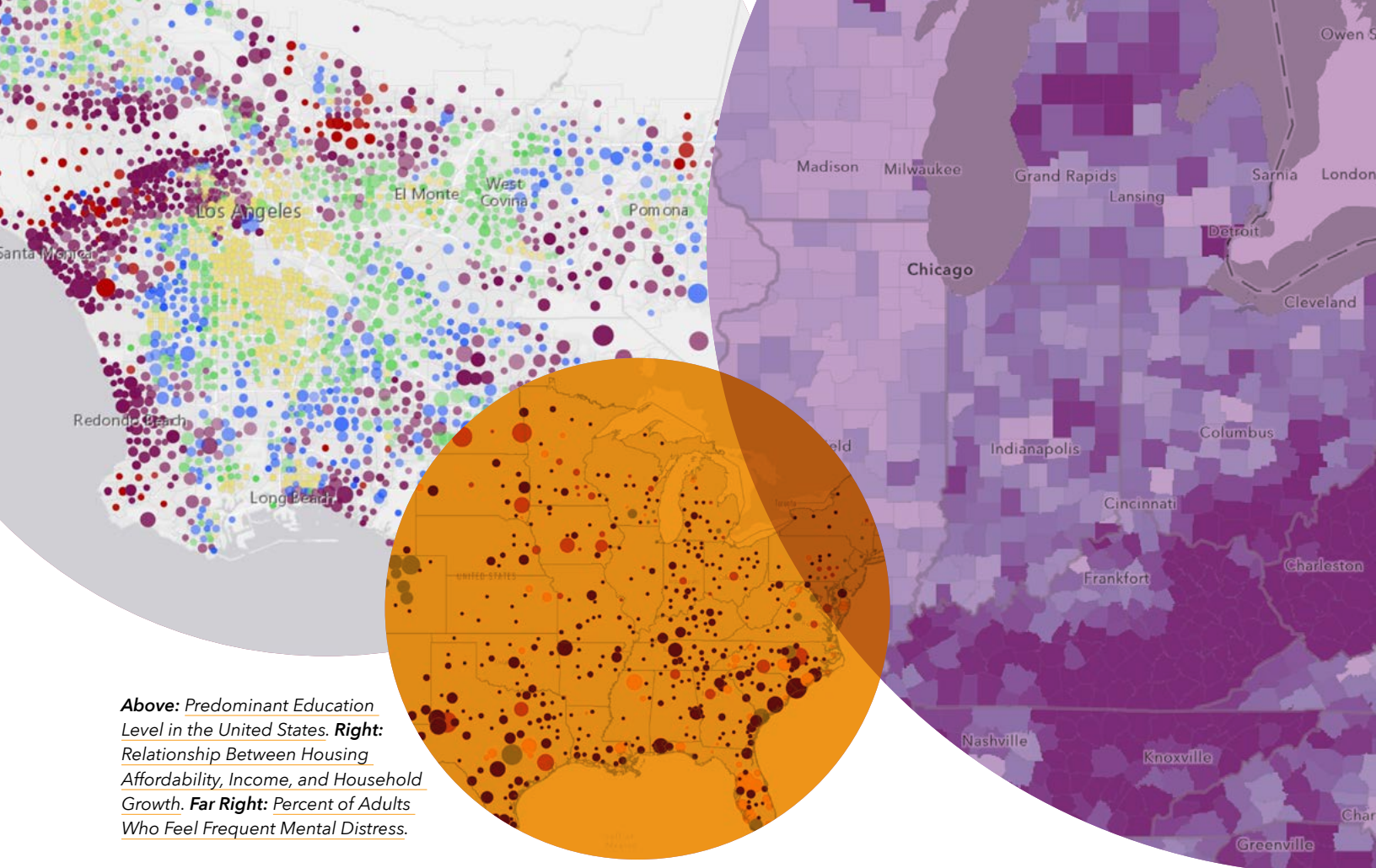
Above: *Predominant Education Level in the United States.* **Right:** *Relationship Between Housing Affordability, Income, and Household Growth.* **Far Right:** *Percent of Adults Who Feel Frequent Mental Distress.*

Data-Driven Performance

Smart states push aside politics and preconceptions in favor of data and analytics to make decisions. High-performing organizations are using location as the standard analytical approach to achieve new insight. Increasingly, smart devices, the internet of things and cloud computing are feeding data on the locations of people, nature, vehicles and infrastructure. By geo-enabling data and enterprise systems, governments can bring about business intelligence, establish more efficient workflows, improve communication and tackle an issue in its entirety as opposed to its individual parts. GIS helps states drive down costs, reduce time to action and support decision-making and policy decisions that improves the overall quality of life, city by city and county by county.

Civic Inclusion

Governments and citizens rely on each other to meet the community's needs and shape its future. What occurs in a community is inherently geographically personal; everyone who lives in a place cares about that place. GIS provides an opportunity to evolve how state governments think about civic inclusion. It can help identify where people are speaking up and where are they not, what neighborhoods are at risk of falling behind and how a connected citizen can act as a sensor to help governments keep on the right course. Mapping and spatial analytics provide the ability to help state governments better understand their community makeup and help citizens understand why, in the context of where they live.

Case Studies

Coordinating Resources While Wildfires Rage Through California

Smart States Drive Collaboration

The challenge: Fires have been raging through parts of California in recent summers. At the fire season's height, over 13,000 firefighters, from cities and counties across the nation, were on the lines, battling 18 large wildfires across California. Those fires burned over 340,000 acres and damaged or destroyed over 1,800 structures. As the fires were put under control, the threats were still real – 15,000 homes continued to be threatened by these fires, and nearly 40,000 residents were under evacuations at that time.

For those who had been evacuated and were trying to return home, it was incredibly difficult to know the status of damage to their homes or next steps in terms of restoration. It was difficult to store and coordinate this information internally, as well.

The solution: The California Department of Forestry and Fire Protection (CAL FIRE) developed an interactive map to communicate the status of the homes and buildings across the state.

"GIS gives us an overall count of the number of structures that are within the perimeter that were impacted, how many of those were damaged and destroyed, how many of them were not damaged, so we can give accurate reporting as well as analyze that data to try and figure out why all these fires are so large and damaging," said Deputy Chief Steven Hawks of CAL FIRE's Wildland Fire Prevention Engineering Program.

Even now with the fires contained, CAL FIRE continues to use GIS to help recovery efforts and reporting. Firefighters can post updates in real time, and residents can look up the status of properties just by entering an address. Data generated by the app is relayed to the local counties and cities to inform their recovery and response strategies.

"We know we're never going to prevent all the fires, or even prevent every structure from catching fire, but if we can at least lessen the impacts, it would be definitely worthwhile," said Hawks. "That's what GIS helps us do."
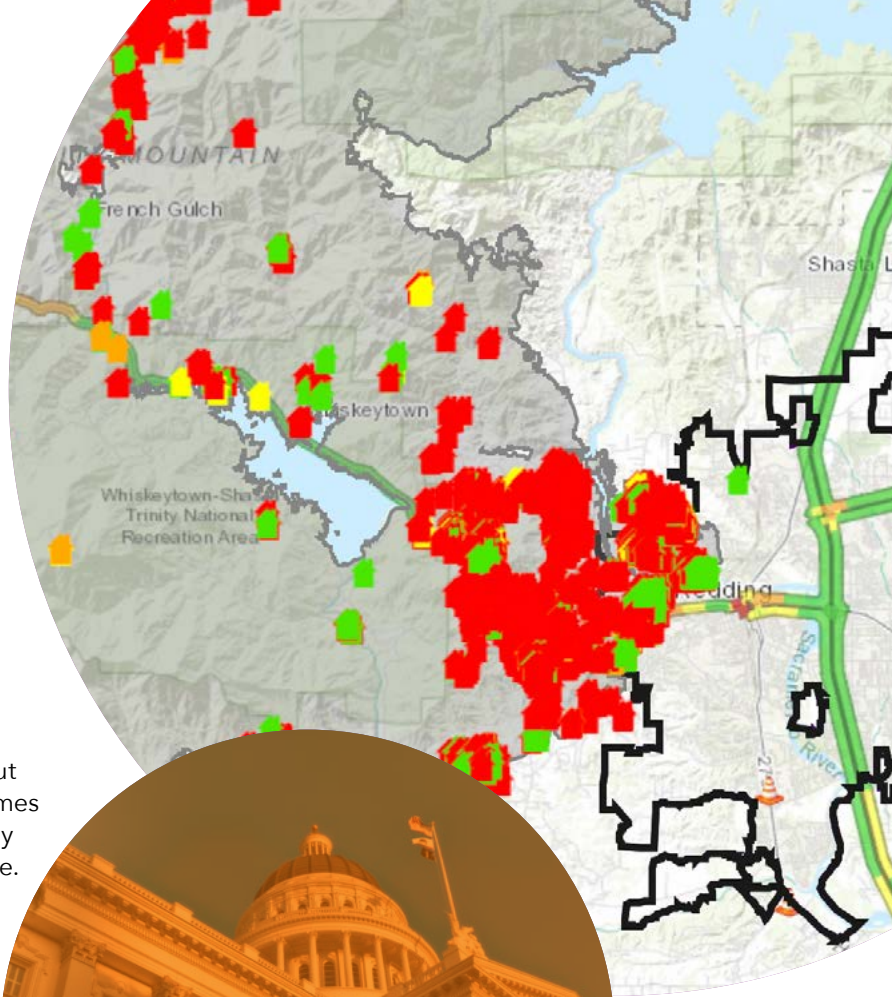
Map: Structure status after wildfire

*"We know we're never going to prevent all the fires, or even prevent every structure from catching fire, but if we can at least lessen the impacts, it would be definitely worthwhile. **That's what GIS helps us do.**"*

Steven Hawks, *Deputy Chief of CAL FIRE's Wildland Fire Prevention Engineering Program*
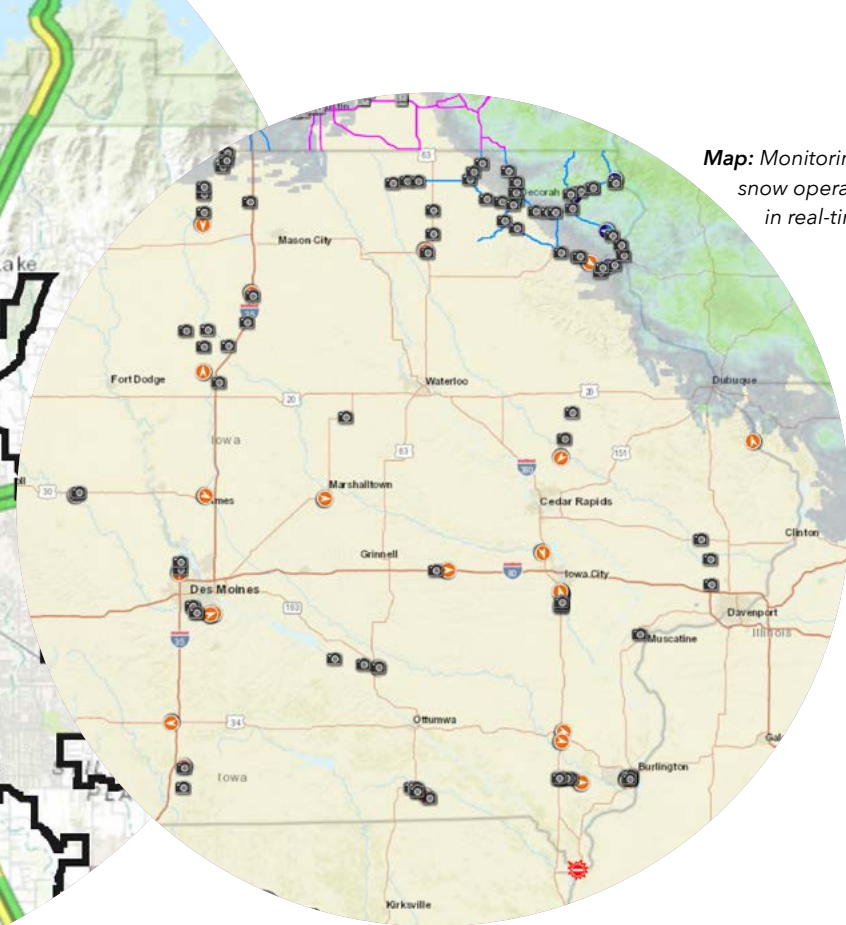
Map: *Monitoring of snow operations in real-time*

Iowa Uses Real-Time Data to Improve Snowplow Information

Smart States Drive Good Government

The challenge: The Iowa Department of Transportation (DOT) deploys about 900 snowplows each winter to plow 9,479 centerline miles of road and 25,215 lane miles of roadway. The Iowa DOT is continuously seeking ways to improve winter operations and provide information to the traveling public. In particular, during notoriously harsh winters, the Iowa DOT wanted a way to provide citizens with real-time weather and road information, and to create a database of consistent information.

The solution: To gather this information, the Iowa DOT used its existing communications infrastructure and the snowplows deployed on a regular basis in the winter. The information collected from the snowplow cameras is available for internal and public use. The public can access the information through the agency's GIS-enabled Track A Plow app, which provides snowplow locations, as well as up-to-date Plow Cam photos.

Colorado Informs Citizens About Road Conditions Across the State

Smart States Drive Data-Driven Performance

The challenge: Colorado's Department of Transportation (CDOT) found it needed to manage increasingly complex transportation systems under continually constrained conditions and limited revenues. Its responsibilities across a dynamic state are vast. It must maintain, repair and plow over 23,000 total lane miles of highway, maintain 3,447 bridges and oversee 28 billion miles of vehicle travel annually.

The solution: CDOT leveraged Esri's ArcGIS platform to elevate the organization's digital transformation by using location intelligence to manage critical assets and analyze real-time data. They now use this data to feed organizational and public decision-making, and to have a public view into highway, traffic and other transportation information, at their Online Transportation Information System (OTIS). OTIS shows information and maps on everything from CDOT budget and performance to bike, pedestrian and traffic data across the state.

Conclusion

States are already demonstrating how they can drive smart state initiatives. We see this in emergency management, transportation, energy, natural resources, public safety, public health and more. Their governance is connecting state departments, cities, counties and regional governments in matters that concern entire states and their citizens. There are functions that must be driven by state government. Keeping state objectives in mind, and identifying the areas that can benefit from technology, states can lead a digital transformation and improve the state's workflows, processes, environment and technical direction. GIS is foundational to supporting the smart strategy that states are leading. Esri's Smart Community Information System supports planning and engineering that adapts to change, improves operational efficiency, capitalizes on data-driven performance to realize real-time awareness and response, and achieves civic inclusion through engagement and attention on social equity.

*Explore best practices and find inspiration to draw from by visiting **go.esri.com/smart-states***
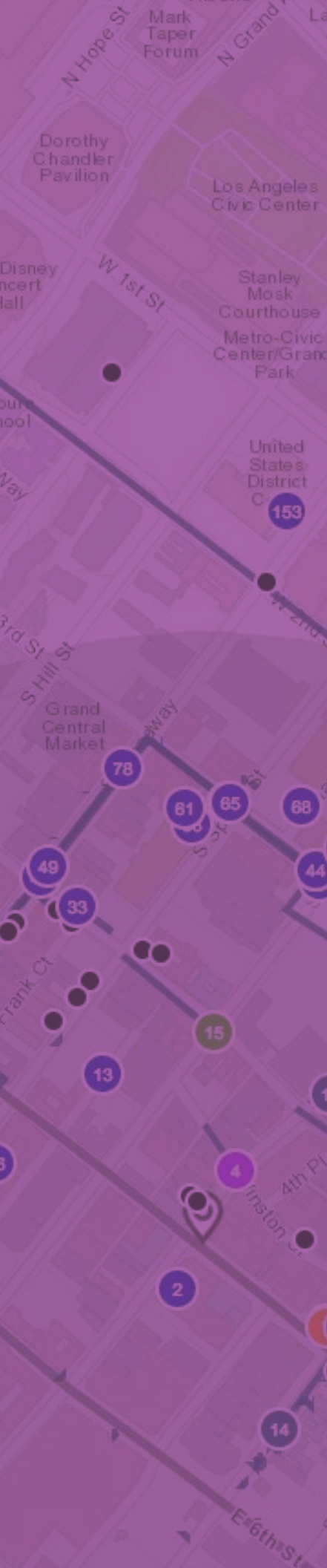
About Esri

When Esri was founded in 1969, we realized even then that geographic information system (GIS) technology could make a difference in society. Working with others who shared this passion, we were encouraged by the vast possibilities of GIS. Today our confidence in GIS is built on the belief that geography matters - it connects our many cultures and societies and influences our way of life. GIS leverage geographic insight to ensure better communication and collaboration.

Explore our website to discover how our customers have obtained the geographic advantage by using Esri software to address social, economic, business, and environmental concerns at local, regional, national, and global scales. We hope you will be inspired to join the Esri community in using GIS to create a better world

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About NGA

Founded in 1908, the National Governors Association is the voice of the nation's governors and one of the most respected public policy organizations in the country. The association's members are the governors of the 55 states, territories and commonwealths. Members come to the association from across the political spectrum, but NGA itself is boldly nonpartisan. Because of that, governors can share best practices, speak with an informed voice on national policy and develop innovative solutions that improve citizens' lives through state government and support the principles of federalism.

www.nga.org

About GovLoop

GovLoop's mission is to inspire public sector professionals by serving as the knowledge network for government. GovLoop connects more than 300,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to the public sector.

For more information about this report, please reach out to info@govloop.com.