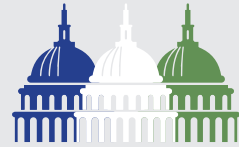




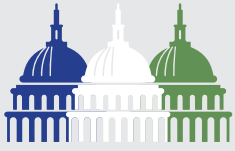
Photo by Barth Bailey on Unsplash



2022

State Election Director Report





Right Ballot to Right Voter

In 2018, the NSGIC *State Election Director's Report* stated: "The time has never been better for geo-enabled elections - a concept grounded in the integration of geographic information systems (GIS) technology with election data management systems." The mission of geo-enabling elections is about getting the right ballot to the right voter. In 2022, this mission remains as relevant and important as four years ago.

By using GIS, election officials can ensure candidates meet district residency requirements and that voters are assigned to the right voting district, receive the right ballot, and vote in the right electoral contests. Geo-enabling election systems also saves time and helps officials avoid location errors for both candidates and voters. Fewer errors reported after an election increases voter confidence which, in turn, makes voters feel their voices are being heard in every election.

Geo-enabling election data and processes are a substantial undertaking. Partnerships are key. From its inception, the Geo-Enabled Elections project has been laser-focused on building a strong relationship between election directors (EDs) and geographic information officers (GIOs). Collaboratively, these leaders must identify solutions that yield efficiencies, streamline legacy and broken processes, examine additional connections, and bring new faces and experts to the table. By promoting strong dialogue and engagement between GIOs and EDs, everyone wins. Election officials gain a data, technology, and geospatial advocate, and EDs bring a basket full of data - boundaries, addresses, and other data that, when added to a geographic information system, improve our democracy. Geo-enabling elections in turn expands the mapping that GIOs manage and make generally accessible. Mapping election information (voter locations, election district boundaries) enhances transparency, accuracy, and visibility that everyone desires, helping to eliminate distrust by making it easier to view and review election data.

Four years ago, geo-enabled elections were a relatively new idea. Only a handful of states consistently and procedurally used GIS technology for election administration, and about the same were considering using GIS in their election work.



Now, in 2022, 86% of all US States and Territories know about this work and have participated to some degree in this project. A third of US States and Territories participated in case studies or in the pilot program. The pilot program enabled participants to roll up their sleeves and implement the best practices for GIS integration in elections at their own pace. GIS technology support for elections must not languish; GIS technology is tried and true, politically neutral, and will provide election officials with a tool that will help them accomplish their job more efficiently and effectively.

And now, four years later, through informal interviews and survey completions, NSGIC listens to state EDs and shares the state of their practice and aspirations for improvement.

“

Few elements are more fundamental in our constitutional republic than elections and the votes that enable them. As stewards of those ideals, it is our civic duty to participate and also to do our parts to ensure those elections remain well administered. In many states, the Geo-Enabled Elections project has opened the door to unlock the tremendous potential that GIS and geospatial tools can have and are having in accomplishing those goals.

Although the project itself is coming to a close, NSGIC will strive to build upon its successes and the knowledge gained from it and continue to deepen our understanding of the elections space.

- Jonathan Duran, NSGIC president and deputy to the state geographic information officer of Arkansas

”

TOOLS and RESOURCES on
elections.NSGIC.org



The National States Geographic Information Council (NSGIC) is a state-led organization for developing, exchanging, and endorsing geospatial technology and policy best practices. Its Geo-Enabled Elections project, 2017-2022, focused specifically on the use of geospatial information in elections.

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Table of Contents

Themes and Key Takeaways 1

- General 1
 - Voter Address Management 2
 - Precinct Boundary and
Other Data Management 3
 - Transitioning to GIS 4
-

Project Mission and Accomplishments 5

The Survey 7

- Mission 7
 - Interviews/Survey Responses 7
 - Participants 7
 - Methodology 8
 - Complications 9
-

The Data 10

- General 10
 - Voter Address Management 12
 - Precinct Boundary and
Other Data Management 16
 - Transitioning to GIS 19
-

Learnings 20

- Introduction 20
 - Project Findings 21
 - Voices from State Election Directors 22
-

Next Steps 23



Themes and Key Takeaways

Questions for the survey and interviews were divided into four sections: general, voter address management, precinct boundary and other data management, and transitioning to GIS. As a result of rigorous data analysis and compilation, we identified several powerful themes and key takeaways.

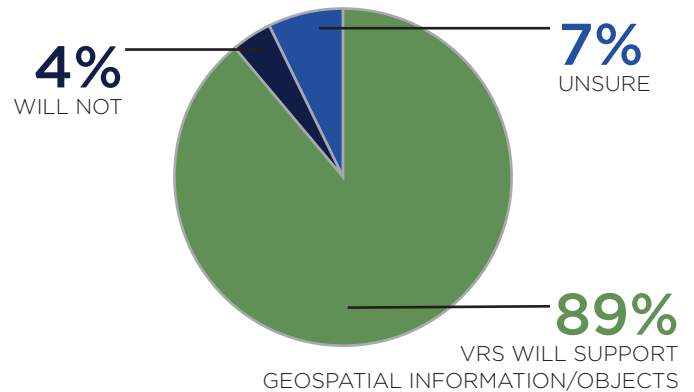
■ GENERAL

1 An increasing number of states are integrating GIS into their voter registration system (VRS) or using geospatial technology a la carte to visualize and analyze their voter data. A major uncovered theme sees nearly 90% of states sharing that their VRS will support geospatial information/objects within the next five years. Additionally, several states mentioned that their VRS vendors will improve current GIS solutions or add GIS support if it is currently absent from the application. Finally, and perhaps most inspiring, concerns over budget and commitment to geo-enabling elections seem to have waned, being replaced by a solid understanding that GIS has many benefits (accuracy, transparency, visualization, and more), and state EDs must devise a plan for integration now, especially after this redistricting cycle.

2 In 2022, a 3% increase in improved communication channels was seen between GIS professionals and EDs at both the state and local levels. In states and territories with large expanses of rural land, EDs expressed frustration with the ongoing struggle of a lack of GIS expertise and resources (software, training, funding, etc.) at the local level. EDs also have a lack of GIS knowledge and software expertise on their teams, and this lack of GIS capacity seems to be moving in the wrong direction since 2018. A variety of reasons, including shoring up brick and mortar security and cybersecurity practices, may account for this decline. Additional surveys, interviews, and research may uncover more definitive answers.

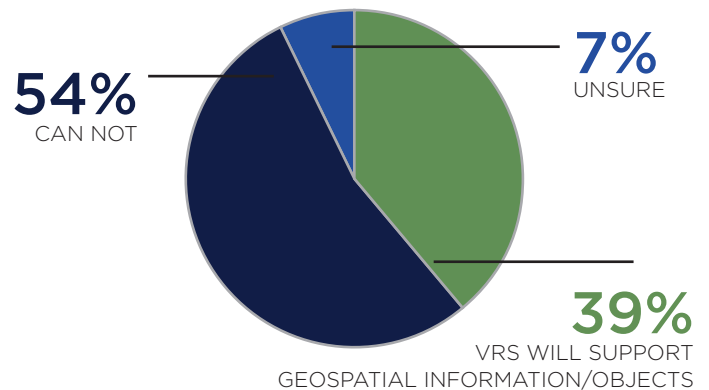
VRS/GIS INTEGRATION BY 2027

TOTAL STATES: 28



VRS/GIS INTEGRATION IN 2022

TOTAL STATES: 28



These are certain opportunities for GIOs and EDs to coalesce and express a need for GIS expertise in a multitude of state and local government positions, including elections, and connect to identify and uncover partnership possibilities and resources (including funding and staff) for these communities.

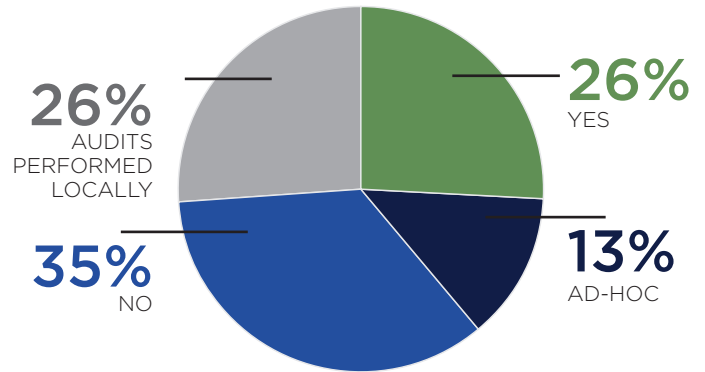
VOTER ADDRESS MANAGEMENT

1 Despite a growing number of states using or considering using addresses mapped as points, the majority of EDs say they continue to use street address range files for managing and locating voters and candidates. We know there are efficiencies and accuracies to be gained by using address points. With redistricting, legislatures map voting districts. Many election offices then take these shapefiles, take a step backward, and create new or update existing street address range files manually. To fully embrace geo-enabling elections, we must keep the spatial data and use GIS tools. Additionally, states must implement a single-point address data system and verify these voter address points against a master address repository or another authoritative list of addresses. Access to address data from e911 or Next Generation 911 (NG9-1-1) for election officials is imperative as it allows for comparison, validation, and verification of the voter file to an authoritative list of addresses used for emergency management. When coverage exists for a specific state or county, the National Address Database (NAD) is also an exceptional choice for obtaining addresses to use in verifying voter files. EDs can also access their statewide address points dataset by reaching out to the GIO or equivalent in their state.

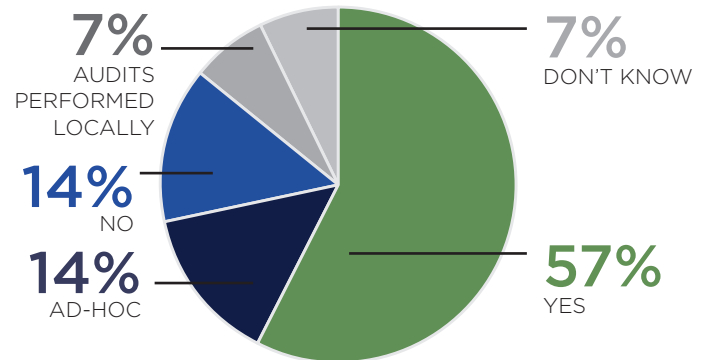
2 A majority of EDs interviewed, 57%, reported routinely auditing voter address agreement with election geography assignments. The audit methods performed are variable, but all seek to ensure that voters are assigned to the right precinct or district, enabling them to receive the correct ballot. In 2018, NSGIC released *Raising Election Accuracy and Efficiency with GIS*. In this document, NSGIC presented five best practices for integrating GIS in elections. A spatial data audit, defined as verifying voter or candidate locations using geanalytics (e.g., does the candidate or voter fall within the correct district), is the preferred method for auditing voter address agreement with election geography because it uses GIS. Systematic spatial data audits should be a part of any election office's to-do list and executed routinely.

ROUTINE AUDITS OF VOTER ADDRESSES AND ELECTION GEOGRAPHY

2018 | TOTAL STATES: 23



2022 | TOTAL STATES: 28



3 Thinking again about address points, it is encouraging to report that now more than ever, EDs have access to geocodes or address points for all addresses in their jurisdictions (2018 - 18%; 2022 - 29%). However, despite this positive data point, what is troubling is roughly the same percentage of EDs shared they do not know if they have access to this data.

In these cases, it's important that EDs reach out to state GIOs. State GIOs are typically well-positioned to assist EDs with obtaining the address data they need. If address data are not available, GIOs are always seeking to build partnerships in support of obtaining needed data.

PRECINCT BOUNDARY AND OTHER DATA MANAGEMENT

1 The availability, management, and ownership of key election datasets vary from state to state and throughout the nation. By and large, local governments determine and manage the datasets, with most EDs having access to use the locally delineated boundaries; however, about 7% of respondents manage the datasets themselves.

Boundaries do change. Increasingly, states are notified of jurisdictional boundary changes as it relates to their work. When boundaries change, data file and version management can be problematic for all levels of government.

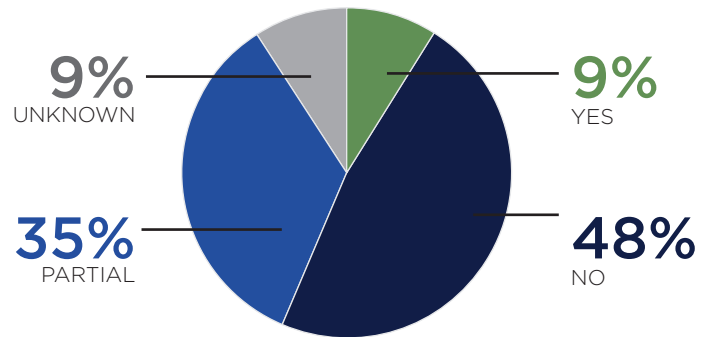
To alleviate this issue, data users should have access to and share the same data, be able to scrutinize the data collaboratively, and have transparent processes for ensuring that the data are correct. Building partnerships and pooling money to build data for everyone's benefit is key. With local governments at the helm managing and maintaining key election geography, states must ensure these government offices have a sufficient level of GIS expertise and access to resources (software, training, funding, etc.) to complete the work that their state requires.

2 As mentioned earlier, it is a Geo-Enabled Elections project best practice for EDs to conduct spatial data audits consistently and regularly. In the previous section, *Voter Address Management*, an increase was identified for EDs routinely auditing voter address agreement with election geography assignments; however, audit methods were not specifically spatial.

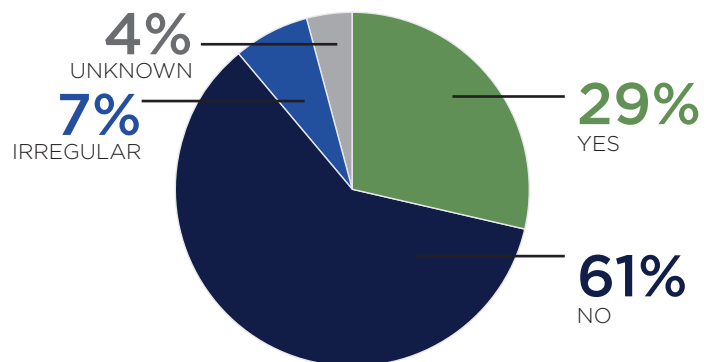
We do see movement in the right direction regarding spatial data audits too. A spatial data audit verifies voter or candidate locations using GIS tools (2018 - 9% and 2022 - 36%). However, a large number of states continue to do spatial data audits irregularly or have some spatial data but not all data needed for the spatial data audit. Spatial data audits, like risk-limiting audits, need to be procedural, consistent, and frequent. Ideally, spatial data audits should be defined in

SPATIAL AUDITS 2018 VS. 2022

2018 | TOTAL STATES: 23



2022 | TOTAL STATES: 28



state statute, standardized at the local level, with the effort coordinated and led by the state ED to facilitate statewide reporting and analysis. Accurate alignment of the various districts with each other, as well as with address points, will be a critical function of professionals in GIS and elections in every state and county.

A large number of states continue to do spatial data audits irregularly or have some spatial data but not all data needed for the spatial data audit.

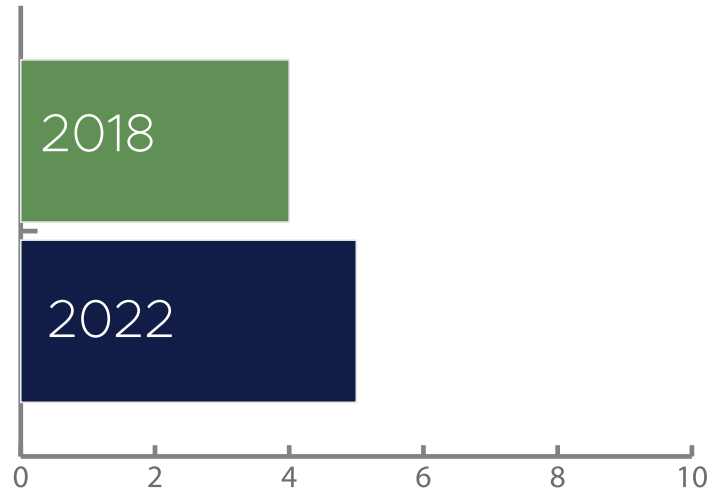
■ TRANSITIONING TO GIS

1 During the interviews, EDs were asked, “Where is your state election office currently with geo-enabled elections?” Geo-enabled elections was defined for each ED as the integration of GIS with election data management systems. On the scale of one to ten, ten is full GIS integration, and one is no GIS integration. In 2022, states averaged five on the geo-enabled elections scale. This is up one point from the 2018 *Election Director Report*.

Geo-enabling elections data and processes is a substantial undertaking, and to observe an increase of one numeric step, four to five, from 2018 to 2022 is respectable, especially in light of the numerous challenges facing EDs in our country. The main takeaway from this section is there are approximately three states who serve as leaders when it comes to full GIS integration in elections. Additionally, for the ten states that participated in some capacity in the project and responded to this survey, we see substantial gains in their GIS knowledge, technical capabilities, and gained efficiencies in elections administration because they are using GIS. In situations where a GIO or equivalent is brought in as a thought leader for an elections project, the outcome typically solidifies the partnership, and the benefits of utilizing GIS in elections are realized. Hopefully, this trend continues, and partnerships are prioritized and developed.

2 One hundred percent of those surveyed understand the positive impact GIS can have in elections, especially having just completed redistricting upon the conclusion of the decennial census. Focusing on using GIS in elections administration helps bring data accuracy, integrity, and transparency to the process, while also providing election officials with solutions that streamline processes while saving time, energy, and money. It is critical for election officials to find these efficiencies as their attention is spread so thin and needed in so many other priority areas, including cybersecurity and staff security and safety. EDs are aware that maps are and always will be a key component to managing and participating in elections, and they are embracing

PERCEIVED LEVEL OF GEO-ENABLED ELECTIONS 2018 VS 2022



GIS technology. There is a thirst within the state election offices to try new things, to identify and learn new processes and practices that make them more efficient, and to be innovative as they strive to improve election data management operations.

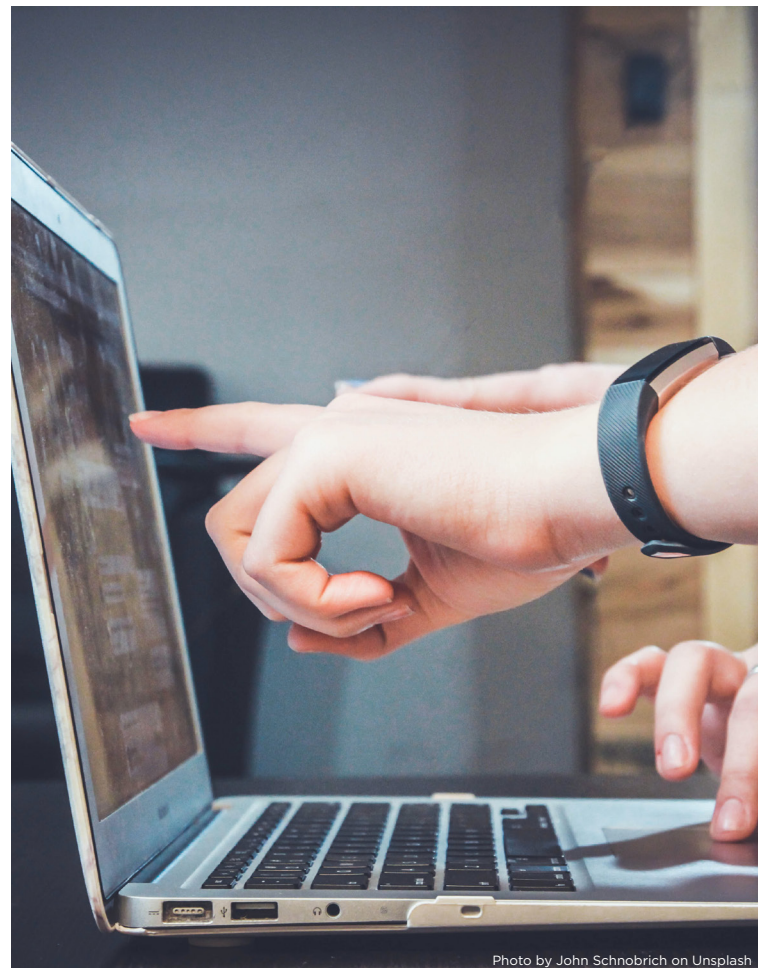


Photo by John Schnobrich on Unsplash



Project Mission and Accomplishments

The location of voters, candidates, and election district boundaries are fundamental to our democracy.

For decades, election offices have relied on lists of addresses for voters and paper maps on the wall of election districts. Checking that voters are in the correct district has largely been a manual process.

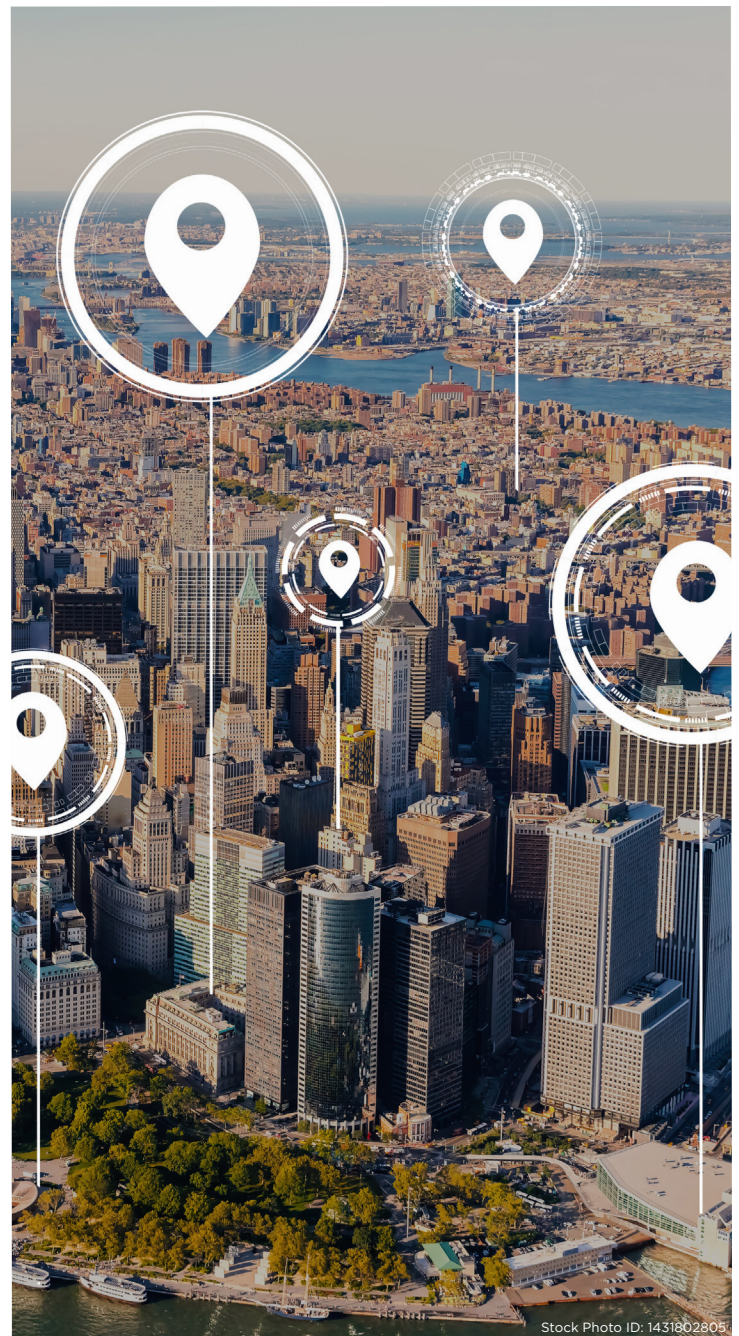
Modern GIS mapping tools now make it possible to map voter locations and election districts; validating new district assignments or whether or not voters are in the correct district can now take minutes for a large jurisdiction instead of days or weeks. The Geo-Enabled Elections project was created in 2017 to facilitate the adoption of GIS tools in elections to strengthen the accuracy and reliability of America's electoral system thus increasing voters' confidence that their votes are correctly counted in each election.

At the outset of the project, GIS technology, in most cases, was relatively new to state elections administration. This was a little surprising, given that most states have GIOs within state government and were already using GIS for other matters such as transportation planning, emergency response, and public lands management.

The project's goal is to assist states and other election authorities in implementing GIS technology in elections. Using GIS helps ensure that voters are placed in the right voting district, receive the right ballot, and vote in the right electoral contests. Instead of relying on cumbersome lists of voter addresses and written descriptions of voting districts, GIS technology enables election officials to view voters as points on a map and voting district boundaries as areas on a map containing those points. By mapping both voter locations and election district boundaries, election officials can use GIS tools

more efficiently and transparently to verify that voters have, in fact, been placed into the right voting district. GIS tools also make it much easier to conduct quality control audits.

Getting started and advancing the work can be challenging. NSGIC created a website (elections.NSGIC.org) where anyone can access resources to learn about, share, and grow in this work of geo-enabling elections.



Stock Photo ID: 1431802805



RESOURCES

Development of resources is a focus, and we strive to help EDs navigate the relationships, processes, and funding needed to do this work. Access best practices, advocacy and learning tools, RFPs, case studies and pilot studies, and more on elections.NSGIC.org.



REPORTS

Significant research, surveying, interviewing, and reporting culminated in the development of **three reports baselining geo-enabled elections**, as well as identifying the who's who in GIS in elections in the United States.

Access NSGIC State Representative Report (2018), NSGIC State Election Director Report (2018), NSGIC Election Director Survey (2021) on elections.NSGIC.org.



EVENTS

Numerous webinars and GeoSummits have been held for the election and GIS communities. Access recordings and summaries for these events at elections.NSGIC.org. The 2022 *Elections GeoSummit* will be held virtually on Thursday, December 8.

Since it started, the Geo-Enabled Elections project has contributed significantly to changing the national conversation. There is now a much greater understanding of the concept of geo-enabled elections. Stakeholders in counties, states, agencies, the private sector, and academia are pulling together to increase the use of GIS in elections nationwide.

NSGIC created and facilitated that process, and according to NSGIC president Jonathan Duran, deputy to the state geographic information officer of Arkansas, "Although the project itself is coming to a close, sunsetting in 2022, NSGIC will strive to build upon its successes and the knowledge gained from it and continue to deepen our understanding of the elections space." The future of geo-enabling elections is bright.



Perhaps the most satisfying element of being involved with this project is watching how quickly election officials recognize the benefits from enhancing their voting systems with GIS integration.

The path to bring map-based technology to elections management is now more straightforward, the desire is there, and it's now becoming a matter of making the time and connections to get this work done.

- Bert Granberg, director of analytics,
Wasatch Front Regional Council





The Survey

MISSION

Since the project's inception in 2017, NSGIC has worked to grow the use of GIS in elections nationwide. The mission of this report is to provide documented evidence and share the degree to which states have progressed since 2018; the last time state EDs were surveyed on this topic. The report includes information on state advances in voter address management and auditing, ED's access to technology and systems capable of using GIS location information, collaboration with state GIOs, and so much more.



Since the project's inception in 2017, NSGIC has worked to grow the use of GIS in elections nationwide.

INTERVIEWS/SURVEY RESPONSES

State EDs were interviewed or responded to a project survey between March and May of 2022. The focus of these interviews and surveys was to determine a state's current level of GIS integration with election data management systems.

NSGIC established a baseline in the 2018 *Election Director Report*. The baseline information was vital in developing a set of best practices for successfully integrating GIS into election systems. Now, using the data collected, compiled, and analyzed in the spring of 2022, the project team can compare data points to 2018 and evaluate state progress and project impact.

PARTICIPANTS

All 50 states, American Samoa, the Commonwealth of the Northern Mariana Islands, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands are represented by a state official whose primary responsibility is the administration of elections within the state. These individuals were the target of the Geo-Enabled Elections project interviews and survey, and the data collected provides the substance for this report.

NSGIC gratefully acknowledges the state and territory EDs who responded to the team's request for interviews and survey responses. Without their responses to emails and the subsequent phone interviews or survey completions, this report would not be possible.

■ METHODOLOGY

On March 25, 2022, the Geo-Enabled Elections project began an outreach campaign to connect with the state and territory EDs. EDs received an email requesting a thirty-minute interview or the completion of a survey between late March and the end of May. For either option, a series of questions would be asked focusing on the state's current use of GIS in election data management.

For those that chose to interview, EDs were encouraged to invite all necessary personnel to the interview. All EDs were notified that their responses would remain anonymous, and findings communicated in the report would maintain anonymity.

With there never being a true downtime in elections management, the project team appreciated the time and energy shared by the EDs. To maximize participation and data for the project, the project team emailed EDs who did not respond to initial requests a total of four separate times. Nearly 50% of all EDs responded, with 43% of respondents participating in an interview and 57% of respondents choosing the survey. In 2018, nearly 42% of EDs responded. The project team believes that the increased percentage of respondents illustrates the growing relationship between EDs and GIOs, the most important component of the Geo-Enabled Elections project.

Interview For those EDs choosing an interview, once the project manager confirmed participation, a thirty-minute interview was scheduled. Interview durations fluctuated, with many concluding in the thirty-minute allocated time slot; however, a handful of interviews exceeded the thirty-minute duration. Whenever an interview exceeded the scheduled thirty minutes, the EDs and necessary personnel stayed on the call to finish the interview. This behavior was quite different from that seen in 2018 and indicated to the project team respect and prioritization of the Geo-Enabled Elections project and a desire within state election teams to fully share the requested information.

During the interview, the interviewer asked the ED, and occasionally their staff or other personnel, a series of 26 questions in the following categories: general, address management, precinct boundary and other data management, and transitioning to GIS. If an ED requested the questions ahead of time, questions were provided in PDF form.

The interviewer was also the transcriber. Detailed notes were recorded during the interview capturing the information and stories shared. The interviewer reviewed and consolidated the notes following each interview.

To ensure accuracy, if, during the drafting of the report, additional questions for the ED surfaced, the project manager sent over the information and questions to the ED for answering and reviewing. The project team felt this was essential to ensure all information shared in the report was correct. The majority of EDs reviewed and answered the outstanding questions providing additional information and updates.

Survey For those EDs who chose to complete the survey, once the project manager confirmed participation, the survey link was sent via email. The survey contained the same questions as those asked during interviews. To ensure the flow of questioning, the project team implemented skip logic and branching. This intelligent survey strategy was used to let respondents skip one or more questions and jump to a different question when appropriate.

The branch logic is executed based on the ED's response to an earlier question. Using this feature allowed the survey creator control over the survey flow and relevant question display. No project team follow-up was necessary to ensure accuracy for the 16 survey responses.

■ COMPLICATIONS

The complications of participating in this report in 2022 were very different from 2018.

Relationships In 2018, NSGIC was a new player in the elections space. NSGIC brought a lot of GIS experience to the conversation, but EDs were not typically familiar with the organization or its membership and purpose. It is possible that, in 2018, a greater number of EDs would have participated if a closer relationship had existed between NSGIC, its members, and each ED.

Now, in 2022, through a lot of hard work, NSGIC has established itself as the authority on elections and GIS. The project team received input from an additional eight percentage points of EDs for this report. And as one ED reported during the interview, “I trust Jamie and NSGIC; they are good.”

Capacity A lot has happened in elections since 2018. Election offices have experienced the following and so much more:

- **COVID-19 pandemic**
- **Threats (cyber, physical, verbal, and everything in between) to our country’s election infrastructure and officials**
- **The spread of Mis-dis-malinformation**
- **An increasing skeptical public**
- **Diminishing elections trust**
- **Political polarism**
- **Budget issues**
- **Staffing shortages**

The project team attributes a lack of response from several election offices to staffing capacity and changes in leadership. Since the 2018 report, 52% of all states and territories have seen a change in election leadership. NSGIC believes most changes in leadership are primarily due to election cycles, retirements, and new positions and views the situation as an opportunity to continue building and nurturing relationships with

state election leads, encouraging the use of GIS technology in elections.

Competing Priorities Although the project team planned the survey collection period to coincide with the ‘off season’ for elections administration, there is never really a downtime for election officials. With elections, primaries, certifications, ballot creation, overseas voting deadlines, security threats, risk-limiting audits, and much more, election professionals face many demands for their time. Even before the pandemic, they were doing more with less. In 2022, they are under more pressure than ever. The stress of competing priorities and where to focus time and energy for the largest benefit likely impacted the response rate for this report.

Since the 2018 report, 52% of all states and territories have seen a change in election leadership.



The Data

In 2018, four years ago, the *NSGIC Election Director Report* began with these words, “the time has never been better for geo-enabled elections - a concept grounded in the integration of GIS technology with election data management systems to ensure each voter received the correct ballot.” In 2022, the same is true, the time has never been better to get the right ballot to the right voter, the mission of the Geo-Enabled Elections project since its inception.

NSGIC is the member organization supporting the work of state GIOs and equivalents. Currently, nearly every state (96% in 2022) has representation with NSGIC; however, no US Territories are represented within NSGIC.

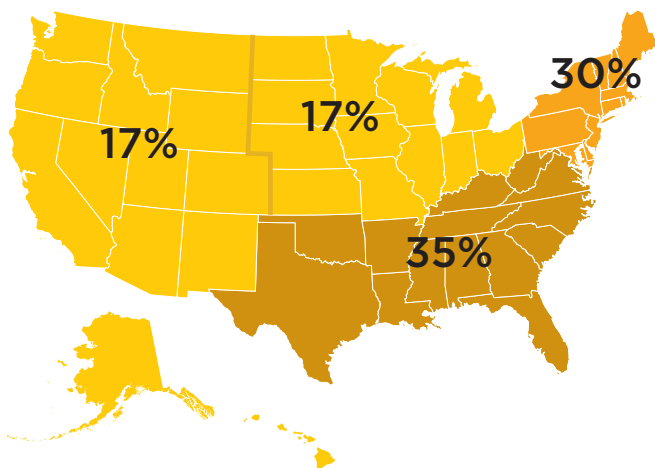
GENERAL

Twenty-eight out of 56 total states and territories responded to the survey. This is up eight percentage points as 23 EDs responded in 2018. Of the 28 EDs that responded, 46% participated in 2018, and 54% did not. Regionally, using the National Association of State Election Directors (NASED) regional divisions, participation in the *State Election Director Report* is illustrated by the figures below.

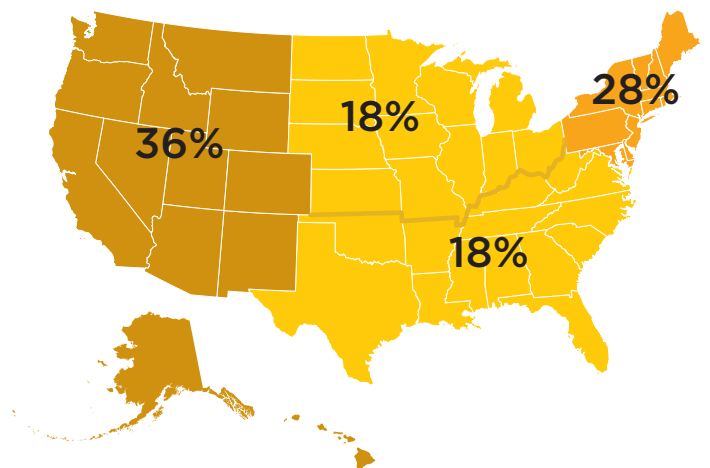
Considering all states and territories, not just those responding to this report, 34% of state and territory election offices participated in the pilot program or as a case study. Broadening project participation to include those activities above, as well as responding to reports and surveys, that percentage jumps to 86%. There is a clear interest in using GIS technology in elections, and one important key to making that happen is developing and nurturing the relationship between the GIO and ED.

86% of US States and Territories participated in some form in the Geo-Enabled Elections project.

2018



2022



NASED's regions include the following territories: Northeast - Puerto Rico and Virgin Islands; West - American Samoa, Guam, and Commonwealth of the Northern Mariana Islands.

Voter Registration Systems Fourteen out of 23 states (61%) reported using a VRS that was developed by and is currently maintained by a vendor in 2018.

In 2022, this number increased to 18 of 28 or 64%. The remaining ten states use systems that were either developed in-house or started as vendor-developed solutions but are now being maintained in-house. In both survey years, states responded that there is little interest in moving away from existing systems.

As in 2018 (96%), most states (89%) maintain their VRS database at the central state level. In five years' time, that number is anticipated to increase to 93%, with only a couple of states unsure of their plans. Centralized VRSs are maintained at the state level, with local governments providing the data entry. This is described as a 'hub and spoke' model.

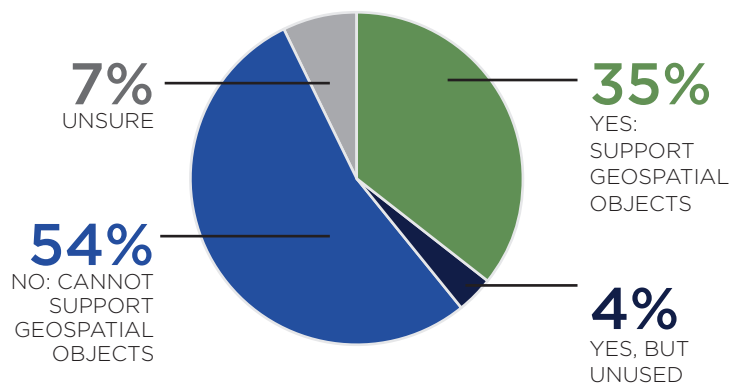


Support for Geospatial Objects VRSs must support geospatial data. As one state explained, "We must be able to pass data back and forth and interface consistently and accurately between the GIS and VRS." As another election official shared, "We should not be moving data extracts between the GIS and the elections management system. The two systems should be integrated."

In 2018, few VRSs supported geospatial data types. For those few that did, the data were either unused or underused at the time. In 2022, 10 of 28 EDs, or 39%, shared that their systems can use geospatial information, although not all report actively using it. While this is a significant increase from 2018, the ongoing work will be to ensure these EDs use the geospatial capabilities.

GEOSPATIAL OBJECT USE 2022

TOTAL STATES: 28



As in 2018, in 2022, there is overwhelming agreement amongst survey respondents (89%) that VRSs need to support geospatial data in the next five years. Vendors are increasingly providing support for geospatial information. This was evident from participants at the December 2021 *Elections GeoSummit*. The 2022 interviews and survey responses indicate that those states with VRSs developed in-house are also interested in adding geospatial tools. With resources from the Geo-Enabled Elections project, such as sample RFPs that include information on integrating GIS solutions into elections and model statutory language intended to serve as a starting point for updating state legislation, there is no better time to move forward.

Communication Most state EDs expressed they have a good relationship with their state and local GIS specialists, including their state GIO or equivalent. Numbers were up three percentage points from 2018 (2018 - 83% 19/23, 2022 - 86% 24/28). Several states reported that although they have a connection with their local GIS contacts, some rural counties do not have GIS staff or resources. Most states also stated they have the capability to manage GIS files or have good connections with state and local GIS specialists who can.

One state ED had this to say, “Just by having conversations and establishing a relationship with a GIO, a lot of states could make headway.” Developing this relationship and keeping the lines of communication open is vital to advancing geo-enabled elections in states.

GIS Capacity As in 2018, the majority of states have access to state, county, or local GIS expertise or specialists to boost their capabilities in using GIS technology; however, the number of state election offices having GIS professional expertise remains low. As in 2018, the state leaders in this space have figured it out and have permanent GIS employees on staff to do the work of geo-enabling elections.

Read the Geo-Enabled Elections project **case studies** to learn firsthand how states have been successful in integrating GIS into elections.

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■ VOTER ADDRESS MANAGEMENT

Addresses are vital for elections. Elections management in the United States is decentralized. Local governments are responsible for creating and maintaining voter registration information, including voter addresses. In 2022, 93% of states responding reported that they maintain a state-level VRS that is updated by local government election officials.

How often do you receive address updates?

With this question, EDs were asked if they receive address updates. Interviewers were not looking for answers about the voter file but rather if the ED was notified of newly created addresses, such as a new subdivision with 20 new addresses.

The project team learned that most states do not update their voter file address information with new addresses until a voter is attached to the new address. The voter file does not typically contain address data with no voter. However, several EDs reported that local governments and cities do update their street range files to include the new addresses. And some EDs do request this information via a petition.

However, EDs did stress the importance of timely address data maintenance and how it impacts accurately geocoding the voter file when performing spatial data audits. Spatial data audits are a best practice for geo-enabling elections and are instrumental in validating that candidates and voters fall within the correct district and precinct. This prioritization by EDs makes a strong case for the National Address Database (NAD) and collaboration between elections and emergency management (NG9-1-1 and e911) to ensure current address data is freely accessible and available to all.

The **National Address Database** is an initiative within the United States Department of Transportation that is made possible through the commitment of the USDOT and partners from all levels of government.

These groups recognize the need for a National Address Database that is freely accessible to all.

How often do you update your registered voter address data, and how do you receive the updates?

Responses in 2022 are quite different from those in 2018 for this set of questions. In 2018, fourteen states, or 61%, reported daily updates of registered voters or their addresses. In the remaining states, EDs were evenly split between updating as needed or not providing the information.

In 2022, fourteen states, or 50%, reported real-time updates of registered voters or their addresses. Remaining EDs shared they update registered voters or their addresses less frequently. This is a significantly improved focus on address maintenance and shows EDs understand better that addresses are a priority, and that they must be diligent in keeping them current in their voter file.



What address standardization system do you currently use?

In 2022, as in 2018, there seems to be confusion between address validation and address standardization.

Address validation, also known as address verification, confirms addresses are valid by comparing them against a reliable, authoritative database (like the one used for an NG9-1-1 system).

Address Standardization is a process that changes addresses to adhere to a standard like the one used by the United States Postal Service (USPS). An example of an address standardization is that all components of an address are capitalized and spelled out in full. Thus, "St." is stored as "STREET." Similarly, all street types are standardized to a fully spelled out version. Thus, "CIR," "CIRC," "CIRCL," "CIRCLE," and "CRCL" are all stored as "CIRCLE." Given that some addresses may have as many as seven component parts (for example, 1500 E Main St North Extension #1), this process quickly becomes complex. Address standardization is not a process typically accommodated by existing election systems.

EDs were asked what address standard they used for standardization. In 2018, nine states used USPS, and in 2022, 12 states used USPS. The remainder of states in 2018 used vendor-specific systems (13%), in-house resources (17%), and 22% were not standardizing at all, or the tool was unknown.

Now in 2022, 21% use vendor-specific systems, 21% use a state resource, and 14% reported the tool being used is unknown. In 2022, address standardization in six states is built into their vendor-specific VRSs; the scope of that standardization is unknown.

As noted in the 2018 State Representatives Baseline Survey Report, the focus of the US Postal Service's (USPS) Address Standard is mail delivery; it is not a general purpose standard for civic addresses. The two closely related national civic address location standards are the Federal Geographic Data Committee (FGDC) Address Standard and the Civic Local Data Exchange Format (CLDXF).

It's important to understand that elections management requires identifying where the address is located to ensure correct precinct and election district assignments. Additionally, election offices must be sure addresses are correctly standardized so they can mail voter registration information or vote by mail ballots. USPS address standardization is designed for mail delivery, and civic address standards are used for address location representation; there are subtle but important differences that can impact address standardization.

Both address standardization and validation are extremely important and vital to geo-enabling elections. A properly standardized address is the first step in finding and removing duplicate addresses from a database. Then address validation verifies that the address exists.

Do you have access to a master address repository or another authoritative list of addresses compiled within your jurisdiction?

During the December 2021 *Elections GeoSummit*, an attendee commented as follows: "During the address panel discussion, we heard from GIS professionals representing the local, state, and federal government, and unanimously they expressed how accurate and complete address data are critical to election integrity. It was clear that collaboration and communication are key among the various stakeholders when building and maintaining these datasets. I left this session re-energized and ready to work with the key players in our state to ensure that address data are being sourced at the appropriate level and that we are working together toward the unified goal where this data can be used not only in elections systems but also across the wider scope of government."

It is clear that election and GIS professionals are in agreement on this point - access to a master address repository or other authoritative list of addresses assists in the process of geocoding voter files and verifying the existence of addresses.

People use geocoding every day and may not even know what it is. Geocoding is the process of taking a physical address with a number, street, state, and zip code and transforming it into an accurate point on a map; it is critical to modernizing election systems.

With a slight increase from 2018, 39% of EDs have a master address repository or other authoritative list of addresses for their state. There is still work to be done to inform and educate EDs and election officials about the work being done on developing master address databases by GIOs for NG9-1-1 and by the USDOT for the **National Address Database**. Where these authoritative address lists exist, they are a resource for EDs.



Photo by on Geo Jango on Unsplash

Do you audit voter addresses to district assignments for accuracy? If so, how?

Between 2018 and 2022, there was a significant improvement in election offices performing voter precinct and district assignment auditing. In this question, EDs were asked if they audit voter addresses to district assignments for accuracy. The audit did not have to be a spatial audit to answer this question affirmatively.

The Geo-Enabled Elections project, from its inception, has encouraged EDs to audit voter and candidate district and precinct assignments for accuracy. One of the best practices of geo-enabled elections is performing spatial data audits.

In 2018, only 26% of EDs reported they performed an audit, with 13% more performing audits in an ad-hoc fashion. Now, in 2022, 57% of EDs reported performing audits, with an additional 14% performing audits in an ad-hoc fashion. In 2018, 35% did not audit at all, and 26% of EDs shared that auditing happens at the local level. Also notable, in 2022, 14% do not audit, 7% do not know, and 7% audit at the local level.

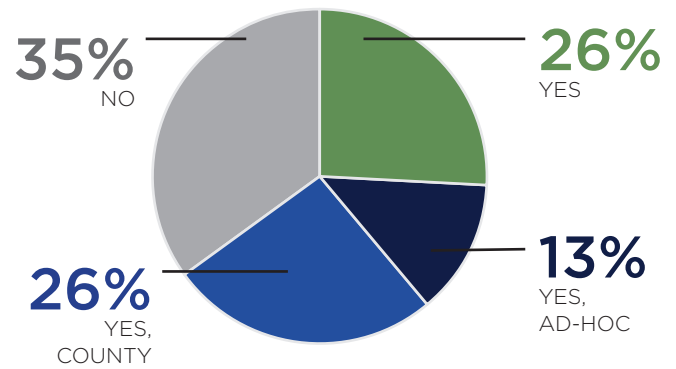
State EDs need to promote auditing, ideally spatial data audits. Ensuring that it happens consistently and routinely as part of the election data management process is key to making sure voters receive the right ballot for every election.

Do you have access to geocodes/address points (like an e911 file) from a governmental source for all addresses in your jurisdiction?

Progress has also been made regarding access to geocodes for address points. In 2018, 18% of EDs reported having access to geocodes/address points from a governmental source for all addresses in their jurisdiction. In 2022, this number has increased to 29%, with two states specifically identifying NG-911 systems as the source.

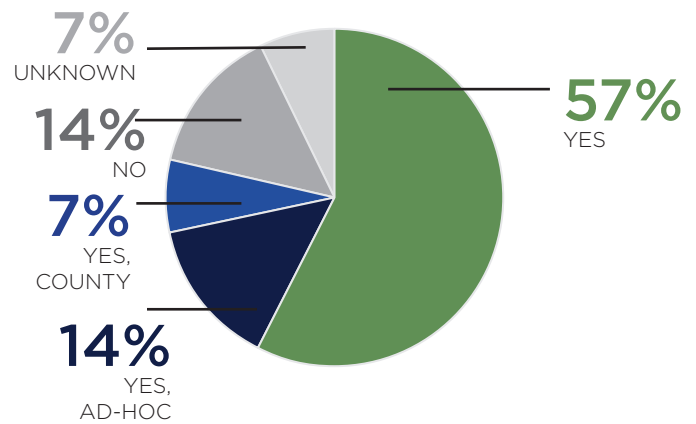
PERFORMED AUDITS 2018

TOTAL STATES: 23



PERFORMED AUDITS 2022

TOTAL STATES: 28



■ PRECINCT BOUNDARY AND OTHER DATA MANAGEMENT

The availability and management of current key election datasets continue to vary throughout the nation. It is evident from the ED responses that local governments (e.g., counties, cities, or other local entities) often play an integral role in data management, notification, and workflows.

In 2018, NSGIC produced the *State Representatives Baseline Survey Report*. This was the first ever election survey and report engaging state GIOs in coordination with election entities to obtain information. Of those GIOs that responded, only about half reported maintaining a statewide GIS layer of voting precincts. This is changing with the work of states themselves, nonprofits, and academia.

Summaries of the responses provided by the EDs for precinct and other related election datasets follow.

If a jurisdictional boundary changes, how are you notified?

As in 2018, in 2022, the majority of EDs responded that local governments continue to manage notifications of jurisdictional boundary changes. Fourteen of 28 responses, 50% of EDs, indicated counties or local governments notify state election offices of the changes. Three EDs responded that the Secretary of State's office notifies them of changes, with only one ED responding they are involved in the notification process for jurisdictional boundary changes.

Again, the data infer that the majority of the jurisdictional boundaries are owned or managed by local government, and operations such as boundary alterations or notifications are a direct function of the entity managing the data.

Other responses were not as telling. One state shared they have no unincorporated areas, so municipal boundaries only change if there has been a mapping error, and another shared they

are not notified. Additionally, one state shared their state planning agency is responsible for notifications regarding jurisdictional boundary changes.

When can local election officials update precinct boundaries?

Responses in 2022 indicate a change in the timeframe during which election officials can update precinct boundaries. In 2022, 43% of EDs reported updating precinct boundaries as needed. Responses received in 2018 indicated that 70% of EDs updated precinct boundaries during a specified period or regular cycle. In 2022, only 18% of EDs reported updating precinct boundaries during a regular cycle, with about the same updating purely during a redistricting or decennial census event. The management and running of elections can be quite different from state to state, with states having different rules and laws. The project team attributes the difference in the data between 2018 and 2022 to this fact.

How do you now incorporate a jurisdictional boundary change into your elections administration tasks?

Answers to this question were quite varied, with 25% of EDs reporting counties managing and incorporating jurisdictional boundary changes into elections administration tasks, while just over 50% of EDs reporting procedurally how changes are incorporated - manual 46%, automated 4%, and by request 4%. Fourteen percent of EDs reported they did not know, and 7% reported not applicable.

In 2018, the majority of EDs reported that counties manage and incorporate jurisdictional boundary changes as part of their elections administration tasks.

Again, this indicates that the local government owns or stewards the jurisdictional boundary. In 2022 as in 2018, the update frequency and specific processes were typically not stated.

Are precinct and other boundaries changed between decennial censuses?

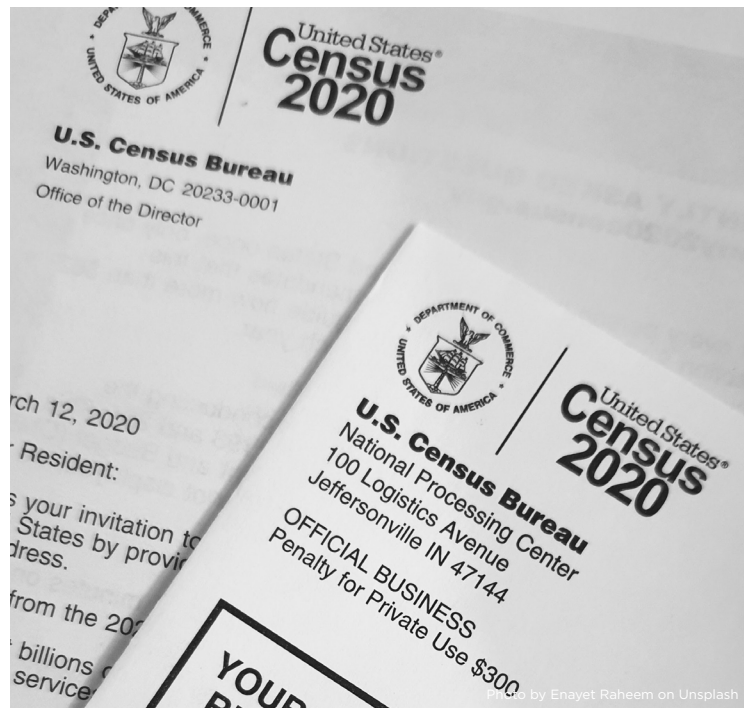
Boundaries change. As in 2018 (91%), 86% of EDs reported that boundaries do change between decennial censuses. In 2022, 11% reported boundaries do not change, and a single ED reported they did not know.

Recognizing that boundaries change and that maintaining boundaries can require significant work, it is a small leap to acknowledge that maintaining and creating spatial data at the county, state, and national scales are best accomplished with multi-level, multi-sector partnerships across interested public agencies. Subsequently, it is then easy to argue that the role of the GIO as a coordinator, connector, and advocate for state GIS data efforts across levels of government is instrumental in the election data management process.

How many different types of voting districts do you need to maintain to assign voters to the correct ballot? (i.e., school districts, municipal districts, county districts, state legislative districts, etc.)

Both in 2018 and 2022, there was much variation in the answers reported by EDs. In 2022, answers ranged from under ten to several thousand types of voting districts. This range was similarly extreme in 2018.

While it's clear that there is variability in the number of election districts that must be mapped, the project team believes this variability may also reflect a lack of understanding of the concept of geographic layers in a GIS. In the context of this report, a map layer depicts the mapping for a single type of election jurisdiction. Examples include state representative or senate districts, municipal sewer service areas (when these are managed by an elected body), regional school districts, or any other collection of like jurisdictional areas overseen by an elected body. There is work to be done to help election administrators of all levels understand the conceptual side of geographic information



systems and the terminology used when discussing GIS.

Do you have access to GIS maps and shapefiles for each of your voting districts from a government source?

Some progress has been made regarding access to GIS maps and GIS data files (e.g. shapefiles) for voting districts from a government source.

In 2018, 12 of 23 EDs reported having this information for each of the voting districts from a government source. In 2022, the number was similar.

However, there is much improvement in states reporting having some but not all of their voting districts mapped or in a GIS data format. In 2018, 17% of EDs reported having some but not all of their districts. In 2022, 36% of EDs reported having some of their districts mapped or spatial in the form of a shapefile. Nearly the same number of states answered no in 2018 and 2022.

Geo-enabled elections require election geography, including voting districts, precincts, voters, and candidates, to be in a GIS data format like a shapefile. Having election geography in a spatial format supports spatial data audits, a best practice of geo-enabling elections.

If you have access to precinct/voting district shapefiles and have access to geocodes/address points, have you checked their alignment with each other? (verifying that all address points are in the correct precinct)

In 2018, only two EDs, or 9%, reported checking the alignment of precincts and districts with voter address points. Thirty-five percent of states in 2018 reported performing a partial spatial audit.

In 2022, significant progress has been made in this area. Thirty-six percent of EDs reported checking the alignment of voter address points and precinct and district shapefiles.

current GIS data representing election precincts and districts. As reported earlier in the *State Representatives Baseline Survey Report*, only about half the states in 2018 had mapped their precincts and districts.

Most local governments have mapped their precinct boundaries. However, this does not always mean that the mapping is in a data format ready for use in a GIS. For those who have the data available in a GIS format, state election offices could promote it as a best practice and encourage local governments to perform spatial data audits.

Do your precinct boundaries and address points follow streets?

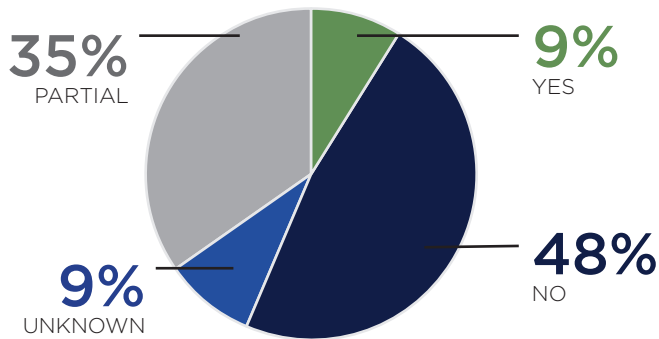
In 2022, two questions were added to understand the alignment of address points and precinct boundaries to streets.

One of the five best practices of geo-enabling elections is assembling the best available contextual layers for doing this important work. Establishing an election geography dataset can be a substantial undertaking. Certainly, precincts, districts, and voter and candidate address points are essential. However, one must not underestimate the importance of other GIS map layers, like streets, aerial imagery, and assessor parcel mapping, for providing context for mapping address locations and election district boundaries. Being able to see street lines, parcel boundaries, or man-made or natural geographic features can be useful in developing and refining maps of election districts.

To summarize, 39% reported that precincts and address points do follow streets. Twenty-nine percent of EDs reported that precincts and address points do not follow streets. A similar number of EDs, 32%, reported they did not know.

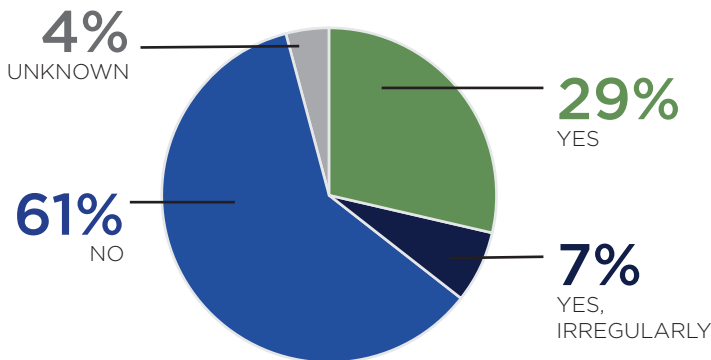
PERFORMED AUDITS 2018

TOTAL STATES: 23



PERFORMED AUDITS 2022

TOTAL STATES: 28



The most effective audit is one that uses GIS tools to conduct a spatial data audit - mapping candidate and voter addresses and checking that they reside in the district and precinct to which they have been assigned. This audit requires geocoding address locations, as well as

■ TRANSITIONING TO GIS

With benefits for redistricting and election data management processes while also saving election officials time and work effort, there is no better time to geo-enable elections. In 2018, EDs were asked, on a scale of one to ten, “Where is your state election office currently with geo-enabled elections? Ten is full GIS integration, and one is no GIS integration.” States averaged four on the scale of the geo-enabled elections. The response rate clearly indicated a need for the Geo-Enabled Elections project and the subsequent body of work that ensued.

In 2018, 100% of responding EDs were open to changing their election data management processes, as well as participating in the project. So, did all 23 offices that engaged in interviews participate in the project? Almost. Seventy percent of EDs that responded participated in some aspect of the project. The other 30%, while not participating in project activities like pilot projects or case studies, did respond to surveys and interviews, enabling NSGIC to evaluate and assess the state of GIS in elections in this country.

Now, in 2022, in the twilight of the Geo-Enabled Elections project, EDs can be proud. They took one giant step up that geo-enabled elections ladder - averaging five on the scale of one to ten. What this number may not boldly say but nonetheless makes abundantly clear is that over the last several years, the EDs participating in the project made substantial progress. This progress was in the form of relationships, knowing who to contact for help, creating GIS data, streamlining processes, implementing spatial data audits, and so much more.

EDs want to integrate GIS into their elections. They want to build a connection or continue to nurture their relationships with the state GIO. They are open to change and know they must innovate and adopt new processes that help them work more efficiently. Slowly but steadily, geo-enabling elections is finding its way into the DNA of those working in elections management.



Photo by Hans Isaacson on Unsplash



Learnings

■ INTRODUCTION

In October of 2022, the United States will celebrate the 20th anniversary of the Help America Vote Act (HAVA). Since its passage, HAVA has served as a “pillar of support for our nation’s electoral system – directing a bipartisan approach at the federal level to improving the accessibility and integrity of the electoral process, development of new minimum standards for voting systems, and supporting election officials who sustain the durability of our democratic process.”

- U.S. Election Assistance Commission

HAVA required and provided one-time funding for creating state-level voter databases, including addresses and precinct assignments. It laid a foundation for the data needed in elections, and states continue to build from that foundation when they geo-enable elections.

The HAVA funding to the states was key. Wendy Underhill, director of elections and redistricting at the National Conference of State Legislatures (NCSL), can attest that changes in government processes rarely happen overnight.



In 2000, only one state had online voter registration (OVR)—Arizona. It wasn’t called that then, and it was an outgrowth of other state government changes. In 2008, Washington state adopted OVR, looking for increased accuracy and efficiency. By 2022, 42 states plus D.C. have adopted OVR. It’s a great example of how ideas spread across the states. It makes sense; the American public has changed over the years. Citizens expect to be able to do business with the government online.

The parallel for geo-enabled elections is clear. Some states are pioneers; others are following, and the American public uses GIS every day. Both OVR and geo-enabled elections are technology advancements in elections, and neither has a partisan bent. With continued attention to geo-enabled elections, there is every reason to think it will spread.



- Wendy Underhill, director of elections and redistricting at the National Conference of State Legislatures (NCSL)

Project Findings

■ GIS & DEMOCRACY

State and local election officials have repeatedly shared that GIS is critical in elections administration. “We should have done this sooner.” This is often the reaction from state EDs participating in the project. GIS data and technology are extremely well suited to helping ensure elections are accurate and efficient. Project participants found it did not take very much work to geocode the vast majority of addresses in the voter list, confirming whether they were valid or not and whether or not they were in the appropriate district. In a day and age when emotions around elections are notably high, it is certainly helpful to have additional checks in place to affirm the integrity of this vital element in the democratic process.

■ DATA SHARING

Local governments manage key election geography (addresses, election districts). Successfully geo-enabling elections depends on local governments having access to sufficient GIS expertise. It’s also essential that the data they produce be shared. Data users at all levels of government should have access to key datasets, be able to scrutinize the data collaboratively - making it better, and have transparent processes for ensuring that the data are correct. Building partnerships and pooling money to build data for everyone’s benefit is a smart and effective use of government resources. State government leaders must broaden their awareness of opportunities for building data once and using it in multiple contexts. For example, Next Generation 9-1-1 emergency call routing systems are being developed all over the United States. These systems require a comprehensive address database and mapping of addresses as point locations in a GIS. The exact same information is required for geo-enabling elections. Effective coordination is good government, and coordination between the state elections office and the state geospatial coordination office, as well as up and down the chain of government, is critical.

■ PARTNERSHIP BUILDING

Elections are inherently spatial. The involvement of the state GIO is imperative in any implementation and integration of GIS technology in elections. Database design, technology acquisition, and data acquisition, as well as making connections or building relationships with state leaders in information and systems technology, are in the wheelhouse of all state GIOs. Leaders must break down the silos, build up the partnerships, and leverage the long history of geospatial data coordination that exists among these professionals.

■ TIME SAVINGS

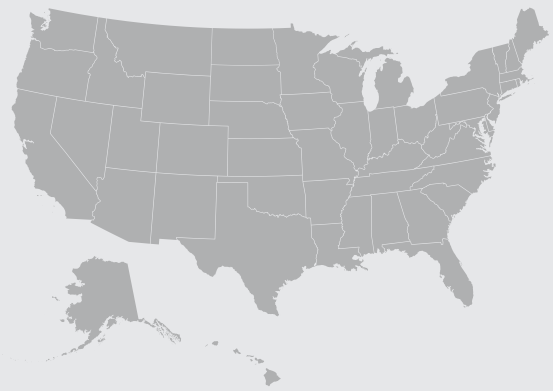
GIS integration in elections saves election officials time and work effort. Checking that voters are in the correct districts has largely been a manual process. Modern GIS mapping tools now make it possible to map voter locations and election districts; validating new district assignments or whether or not voters are in the correct district can now take minutes for a large jurisdiction instead of days or weeks. Additionally, and perhaps equally important, using GIS in elections administration better positions states for the decennial census and the redistricting process.

“We should have done this sooner.”
This is often the reaction from state EDs participating in the project.

“States are preparing and planning for single-point addresses, which means no more address ranges. As one state shared, street ranges are just not precise; with street ranges, you can include addresses that don’t exist. Just because a number is within the range does not mean that a house, and subsequently a voter, with that house number, exists. The number one reason, in our mind, for GIS, is a better voter file.”

“Determine the value within your state for geo-enabled elections. Share that value with key stakeholders and decision-makers. The value likely is monetary, which translates to FTE(s) in elections that have GIS knowledge and software skills, securing the use of the technology now and into the future.”

Voices From State Election Directors



“Until GIS is fully integrated within elections management systems, there will still be a knowledge curve and reliance on the expertise of a GIS professional to fully achieve the benefits of what geo-enabled elections can offer. It is a lot of work to manage two systems - GIS and VRS or elections management systems. Election offices need one system that they manage.”

“As a result of the relationship elections established with GIS, we were able to lean on their GIS expertise on the coattails of redistricting to build a data visualization and analysis application to assist clerks. Visualizing towns, cities, district lines, and individual address points, clerks could discern important information and input it into formats necessary for their work. While just another day at the office for the GIS team, it was life-saving and immensely critical for Elections.”

“In some states, the pandemic, the census, and redistricting created a perfect storm pushing counties and agencies to make epic decisions and commitments to just dive in head first. Because you know, why not? Were these states successful - you bet; some advanced their efforts at ten times the speed.”

“Just by having conversations and establishing a relationship with a GIO, a lot of states could make headway.”



Next Steps

■ THANK YOU

NSGIC would like to thank the Democracy Fund Voice for its generous underwriting of the Geo-Enabled Elections project since its inception in 2017; this support was pivotal for advancing this important body of work.

■ PARTNERSHIPS

Partnerships are key to advancing geo-enabled elections. Continue to nurture your relationship with your GIO. And if you have not connected with your state's GIO, do the following:

- **Determine who your state GIO is using this NSGIC tool.**
- **Learn about the GIO position and the scope of their responsibilities.**
- **Review 5 Questions Election Directors can ask their state GIO and get the conversation going.**

■ STAY CONNECTED

To continue the commitment to building upon the successes and knowledge gained from this project, NSGIC has developed a Geo-Enabled Elections working group. Get involved. Reach out to info@nsgic.org for more details or if you have questions regarding the project.

Stay connected with NSGIC. To learn more about NSGIC and its advocacy and geospatial advancement work, visit the **NSGIC website**. Make sure you know what is happening at NSGIC.



The National States Geographic Information Council

TOOLS and RESOURCES on
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Few elements are more fundamental in our constitutional republic than elections and the votes that enable them. As stewards of those ideals, it is our civic duty to participate and also to do our parts to ensure those elections remain well administered.

In many states, the Geo-Enabled Elections project has revealed the tremendous potential that GIS and geospatial tools have for making elections administration more efficient and transparent. Although the project itself is coming to a close, NSGIC will strive to build upon its successes and the knowledge gained from the Geo-Enabled Elections project and continue to deepen our understanding of the elections.



- Jonathan Duran, NSGIC president and deputy to the state geographic information officer of Arkansas