GIS in Elections

BEST PRACTICES for GEO-ENABLING ELECTIONS

DETAILED GUIDANCE

NSGIC
GEO-ENABLED ELECTIONS

WHY GIS in ELECTIONS?

Does America's electoral system know where each voter resides? By and large, yes. But not nearly well enough to correctly place every voter in the right voting district and avoid election errors.

When voters are given the wrong ballot, results are contested. Controversy, legal battles, and even costly do-overs, follow.

With a presidential election on the horizon, and a redistricting process following shortly on its heels, there has never been a more important time to be able to correctly place voters in the right voting district.

NSGIC'S GEO-ENABLED ELECTIONS PROJECT

Using GIS in elections increases election accuracy and efficiency.

Many states already use GIS for other matters, including emergency response systems, infrastructure management, and zoning. Often, they have geographic information officers (GIOs) on staff. However, few states across our nation have fully geo-enabled their elections.

NSGIC partnered with states and subject matter experts to develop five best practices for implementing GIS in elections, a summary of which is presented here.

Using geographic information systems (GIS) to "pin" the location of each voter residence on a map makes sense in the same way that we use our smartphones to navigate to an unfamiliar location: it enhances accuracy and creates efficiencies. The risk of election errors is reduced, data becomes easier to quality control, and voters can more easily verify that they have been included in the right district or districts.

When we integrate GIS in elections, we strengthen our electoral system by increasing its accuracy and reliability. Ultimately, we increase voters' confidence that their voices are being heard.

NSGIC

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

BEST PRACTICES
for IMPLEMENTING GIS IN ELECTIONS

For all the rewards from making the transition, implementing GIS into elections management requires a sound plan, effort, and resolve.

Technically, realizing the inherent visualization and analytical advantages of GIS involves replacing non-spatial 'address file' systems with election precinct and voter location data in a GIS format. In practice, this will require some additional investment and technology.

It will require a lasting commitment from election leaders and staff training.

And, it may require collaboration across agencies, changes to policy, and possibly supporting statutory changes.

Following is a set of best practices to guide a GIS transformation, drawn from the insights, experiences, and counsel from ten states who participated in NSGIC's Geo-Enabled Elections project 2017-2019.

"Leveraging GIS in our electoral system increases accuracy and efficiency in elections. It ensures every voter has a chance to vote in the right electoral contests. It also makes election management systems easier to update as our physical environment changes through new development, or after the redrawing of boundaries, as occurs through redistricting."

Molly Schar, NSGIC Executive Director

LEARN MORE

Find additional information at
elections.nsgic.org

RIGHT BALLOT TO RIGHT VOTER

CONVENE A TEAM OF SPECIALISTS

1 SUMMARY

Geo-enabling elections requires collaboration at a high level between leaders in elections, information technology and database administration, and geospatial information technology. Working together under the leadership of an engaged project champion, officials, and key staff should address critical elements of geo-enabling the elections process: project goals, requirements, timelines, budget, and governance. Including the GIS coordinator or coordination office responsible for coordinating GIS resources and implementation from the outset is highly recommended.

DETAILS

Leaders must identify key stakeholders — officials with an interest or concern in election transparency, accuracy, and the use of technology to improve election systems. Once the key stakeholders are identified, exploration and kick-off meetings must be held to answer crucial questions:

- Why are we making this change?;
- What are the opportunities for saving time and money?;
- How will the new path improve the quality of the situation and process?

Building consensus within the stakeholder group is essential. This group should craft a unified message to move the work forward, identifying an appropriate timeline for proper implementation.

Geo-enabled elections require champions that can promote the desired change from both an elections and a GIS perspective. Successful champions should plan to undertake the following responsibilities:

- Ensure the ultimate success of the project;
- Identify and implement the project's strategic objectives;
- Invite essential leaders and expertise to the project;
- Set expectations for committee work and include partners needed for that work; and
- Create a policy and technical committee and designate chairs for both, as well as a lead staffer to support each.

The policy committee should include the secretary of state; chairs of relevant legislative standing committees (government operations or the equivalent) or designated members; chairs of the redistricting committee (if active); the state elections director; and major political party designees.

The technical committee should include the elections director; lead state elections IT support staff; county election officers (clerks); county IT staff members from urban, midsize, and rural counties; the state GIO or GIS office manager; other relevant functional leads such as a representative from the DMV, 9-1-1, and the state tax commission; and appropriate private sector experts.

These committees are important, and each will bring a set of expertise and knowledge to the table to advance the strategy of the entire team.

POLICY CONSIDERATIONS

A funding strategy should be agreed upon including a detailed project budget and timeline.

The policy committee should also focus on drafting supporting legislation or administrative rules that promote:

- Data access, consistency, and flexible but useful data content guidelines;
- Data maintenance and an updating schedule or improvement plan;
- Access to technical support and assistance; and
- Core election dataset sharing and improvement (address points, voting unit boundaries, and other contextual data aiding in the development and improvement of the core election datasets like imagery, roads, addresses, and other boundaries).

Third, the policy committee should carefully evaluate potential legislation to best position and support a geo-enabled elections implementation, considering the following priorities:

1. Developing legislation to codify the creation and updating of digital voting unit boundaries including language on how and when boundaries are shared into the statewide dataset. The following should also be considered:

   a. Who is responsible for data submission, intake, and aggregation?

   b. How will the data be made accessible to others?

   c. Who is responsible for the maintenance and administration of the data archive or history?

2. Identifying or creating a state address database and/or a geocoding service. The following should also be considered:

   a. What is the frequency of updating the address database?

   b. Who will design/procure and administer the geocoding service?

   c. How should these items be acquired, locally sourced, or commercially purchased? Ensure that time is given to research the best options for your state.

3. Identifying how and when to report civic boundary changes. Civic boundary changes include the creation of new municipalities, annexations, de-annexations, and the dissolution of municipalities, as well as changes in district boundaries such as school districts. In addition to identifying how and when to report, it is important to determine who collects, certifies, and publishes this data in the agreed-upon GIS format.

4. Creating an official repository for geographic information data where the data is either created by the state agencies themselves or is reported by the local government up to state agencies. Understanding that transparency and data sharing is essential especially when the data needs for elections are so similar to that used by emergency management, the US Postal Service, and the assessor's office, special consideration should be given to the possibility of statutory or regulatory requirements for sharing geospatial data assets across all state agencies and entities.

TECHNICAL CONSIDERATIONS

The technical considerations will be focused on the specifics of the platform, software, and data, and the proper implementation of these pieces to fit the needs of the state and project.

The committee will lead the effort to develop and recommend an implementation plan, a software assessment, a schedule for upgrades and enhancements, and also a transition plan. States should be flexible in their implementation goals, certainly aiming for an all-at-once implementation, but also realizing a phased implementation with pilot areas may be the best way to move forward.

The implementation plan will identify address data sources and data quality goals, the process for determining the location of addresses, a schedule to ensure the proper precision of voting unit boundaries and their updates, techniques for keeping history of address records, tools to implement address standardization, and the determination of assigned coordinates for an address that includes recording the method of assignment.

State implementations may differ dramatically from one another. These processes include how to allow, track, and review manual assignment of geographic coordinates or how to ensure that all voters with the same address get assigned the same coordinates. States should leverage other states' experiences.

Each state's project team composition may also be different. In Utah, the Lieutenant Governor's office, the Automated Geographic Reference Center (AGRC), the Department of Technology Services, and county elections and GIS staff were instrumental in the effort. Justin Lee, State Election Director of Utah, shared in the Utah case study how essential it is for groups like this to be able to work together. Likewise, in Washington, undertaking the Elections Modernization Project required assembling an exploratory group comprised of IT professionals, election administrators, and county auditors, and according to Washington Election Director Lori Augino, collaborating with the State of Washington's Geospatial Program Office was essential.

COLLECT & SUSTAIN A STATEWIDE VOTING UNIT GIS LAYER

2 SUMMARY

To geo-enable elections, a GIS layer depicting voting unit boundaries is needed, and this must include both precinct tabulation areas, as well as the minor ballot area boundary divisions (also known as 'splits' and 'subs'). A sustainable approach for updating this data — congruent with all elections-related deadlines and events, is essential.

A simple data content specifications document should be developed and adopted in coordination with election offices, including spatial data validation rules and processes to ensure data integrity.

It is recommended that the development of an application programming interface (API) should be considered for both single and bulk point-in-polygon GIS query capabilities. The API-based spatial query will enable automated determination and validation of voter assignments to voting units.

Finally, for transparency, an interactive web map should be created for stakeholders and the public to view the most current voting unit data.

DETAILS

After the census redistricting period, the subsequent redistricting process, at state and local government levels, is the most important component in determining GIS statewide voting unit boundaries. Each state will have its own process for how redistricting is determined, but once that process is complete, the public entity that has statutory authority to create and modify voting unit boundaries (usually the county-level legislative branch — commission or council) should also be the steward of the GIS voting unit boundary files. Ideally, that data can be provided to the state repository in a GIS form, but it may need to be converted or created from non-GIS sources like paper maps or digital PDFs.

At a minimum, statewide voting unit boundaries must incorporate all boundary lines from state-level election districts (congress, state legislatures, state school board, etc.).

Ideally, they also incorporate boundary lines from significant local government election districts (county commission, city council, major local service districts, etc.) as well. Additional minor boundaries, such as water, library, sewer, or cemetery districts may also be incorporated into voting unit boundaries for cases where the representation for these entities is elected as part of the general election. However, these minor divisions may necessitate the splitting of precinct boundaries into smaller voting unit boundaries known as splits or sub-precincts.

Ultimately, the smallest possible ballot area geographies should be assigned a unique identifier that creates a one-to-one match with voting unit identifiers used elsewhere in the election management system. If possible, this unique identifier should have some implied meaning, like a city name or abbreviation combined with a numeric voting unit number within the specified area.

These unique identifiers should include commonly consumed identifiers (i.e. FIPS Codes) and could incorporate the Open Civic Data Division Identifiers (OCD-IDs). OCD-IDs are a common identifier of geopolitical divisions that are used by a variety of civic and technology entities. OCD-IDs do not describe the geographic boundary but provide a common syntax for representing the names of geographic boundaries in a nested hierarchy.

For example, the OCD-ID for State Senate District 4 in Missouri is (sldu refers to the upper house of the state legislature):

ocd-division/country:us/state:mo/sldu:4

And precinct 121 in Miami-Dade County, FL would have the OCD-ID:

ocd-division/country:us/state:fl/county:miami-dade/precinct:121

States may additionally choose to maintain unique district identifiers for internal use but could translate these into OCD-IDs or other longer formats for ease of use when published for the public user.

POLICY CONSIDERATIONS

For this best practice, the policy committee should evaluate and consider supporting legislation related to the following.

First, identify how the state receives statewide voting unit boundary data. The committee will need to determine a way to consolidate it into a statewide GIS data layer.

Second, determine how the state handles updates to voting unit boundaries between election cycles. Does your state allow changes to precinct data between census periods?

Third, the committee should also evaluate how the completeness of the voting units will be evaluated. Is there existing legislation to support this mission? ? If this process is not made explicit in the statute, what government entity should perform this function?

TECHNICAL CONSIDERATIONS

The technical committee should consider the following regarding this best practice.

First, develop guidance on the appropriate use of precinct splitting within the voting unit boundary layer, and determine how to derive sub and split level data from the precinct data. How is the data formatted to accommodate local government boundaries — especially smaller, more obscure entities that elect their officers? What quality control rules will be employed? Are there corrections that can be made at the state elections office level? How will feedback on the quality of voting unit boundaries be provided back to the local government office/staff from which it was received?

Secondly, the data needs to be complete. What processes are required to ensure this? When evaluating the data, is it okay to have islands or must the entire state be covered by voting unit areas? How should overlaps and gaps be handled? Finally, ensure you have statewide unique identifiers for the smallest possible voting units. Are there any exceptional cases that you need to consider when designing your unique identification system?

IMPLEMENT A STATEWIDE GEOCODING STRATEGY

3 SUMMARY

An overall geocoding strategy is needed to specify a consistent, cost-effective method for assigning geographic coordinates to each residential address using state, local, and/or commercial GIS reference data.

Whether using a public sector or commercial geocoding datasets, or a combination thereof, the approach to geocoding can be coordinated with other state-level and local entities to maximize the chance of potential partnerships that can greatly reduce costs while improving data quality.

The elections-specific portion of the geocoding strategy should also include a method for manually placing or assigning geographic coordinates for correcting geocoding results or establishing coordinates for an address for which an automated match was not found.

Where possible, automated processes for geocoding should be put in place using multiple geospatial data sources (e.g., street-range GIS data, address point GIS data, public and commercial geocoding APIs, etc.) to ensure the best possible validation of an address location.

A complete lineage, or, at a minimum, basic record-level metadata should be kept for address locations, describing how, when, and by whom geographic coordinates for each voter residence has been updated.

DETAILS

Geocoding is matching individual voter addresses to specific geographic point locations, expressed as geographic coordinates. Linking addresses to point locations enables the use of GIS tools for reviewing whether or not voters are, or might be, assigned to the wrong voting units, and thereby, the wrong election districts and ballot.

The geocoding process compares each address to a master GIS dataset of addresses that specifies their geographic locations. For geocoding to be useful, it must involve working with master address resources containing all, or at least a very high proportion of all addresses. This master address resource is typically one of two types.

Address Point GIS Layer
The first type is a comprehensive set of addresses. Address point geocoding is advantageous for its exacting specification of geographic coordinates, often on rooftops or at entryways. But, to be successful on its own, the inventory of addresses must be comprehensive.

While address point mapping is not currently available for many jurisdictions, that is changing rapidly. This is occurring because of the mapping needs of the Next Generation 9-1-1 emergency call routing systems. These new systems are being deployed all over the United States, typically at city, county, or regional levels and often include the development and maintenance of an address point GIS layer. Tax assessor offices are typically a good starting source for address locations because they track a site address for each parcel. Those addresses may be a good place to start in developing a master address database.

Road Centerline GIS Layer
The second type of master address resource consists of streets mapped as directional lines with complete address range information. Each street is broken up into street segments, or blocks, by cross streets, and each block is associated with a range of addresses. For example, River Street runs two blocks from Main Street to Jones Avenue and along the way crosses Adams Street. The block from Main Street to Adams Street contains addresses from 1 - 49 on one side of the street and 2 - 48 on the other side. Similarly, the block from Adams Street to Jones Avenue has addresses

from 51 - 99 on one side and 50 - 98 on the other. Geocoding 25 River Street will assign coordinates that are about half-way along the block between Main and Adams Streets, offset from the roadway on the appropriate side of the street. If addresses are evenly distributed along that block, then the mapped location of 25 River Street should be located appropriately. Road centerline geocoding is advantageous in that it can locate addresses within the range, even if it is not known that a specific address has been assigned within that range.

It may make sense to implement this best practice on a county-by-county basis. This is because each county:

- Will be a more manageable unit of work;
- May have a different master address resource available for geocoding;
- May have different quality of mapped election districts; and
- May have differing capabilities to support resolving both issues with voter addresses and with discrepancies in election district assignments.

A final element of this best practice is adding to each geocoded address how, when, and by whom geographic coordinates were updated; this is tracking the address location lineage. Once this information is captured, you can display the actual address. Additionally, you can display how it was geocoded, when it was geocoded, and by which agency or perhaps even which individual geocoded it.

Automated geocoding processes typically assign a confidence score to the geocoding result. It will be important to develop rules for follow-up review when a score is less than perfect (typically 100). A score will likely not have to be perfect for the geocode to yield a correct location. However, it is essential to ascertain the minimum score to have confidence in the location assigned by the geocoding process.

POLICY CONSIDERATIONS

The policy committee should consider the need for a legislative or regulatory directive mandating the geocoding of all voter physical addresses in order to determine voter to a voting unit assignment. Most states have a state-level GIS office and they may be able to assist with the geocoding and expertise needed for implementation.

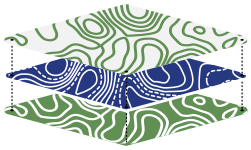
The policy committee should also consider formal coordination with the public safety agency or agencies involved in developing address data for the Next Generation 9-1-1 system. There is a strong overlap between the geocoding needs for validating voter addresses and election districts and the address data needs for a Next Generation 9-1-1 system.

TECHNICAL CONSIDERATIONS

Getting started with this best practice is a matter of acquiring:

- The best available master address resources (road centerline and/or address point GIS layers);
- GIS software or APIs that enable sophisticated geocoding results; and
- Expertise in how to prepare and use the geocoding services.

You may find that your state GIS coordination office can provide assistance with the above items. It may be constructive to start by conducting a pilot and geocoding voter addresses from one county or smaller area and then evaluating their locations versus an election district that is associated with only some of the addresses being geocoded. Please see the Geo-Enabled Elections Minnesota pilot project summary for details.



ASSEMBLE BEST AVAILABLE CONTEXTUAL GIS LAYERS

4 SUMMARY

In order to geo-enable elections, relevant, accurate, verified, and accessible supporting GIS data layers are needed. While precincts, districts, and voter address points are required to ensure proper precincting and districting of voters, these contextual GIS layers are also paramount to locating voter residences and maintaining accurate voting unit boundaries.

The recommended contextual GIS layers that should be accessible within a geo-enabled elections system include boundaries for cities, towns, school districts, and service districts, but also reference materials such as aerial photography, base maps, zip codes, and even tax parcels. Identifying the desired contextual GIS data layers and the expected refresh schedule for each is important.

DETAILS

There are many other contextual map layers that can be useful in developing and refining maps of election districts. These map layers fall into two main categories:

1) Local district data that does not fit within the existing precinct boundaries and may be needed to complete the smallest possible ballot areas. These would include school districts, service districts, park districts, and other boundaries that don't fit neatly within census blocks or precinct lines.

2) 2) Data that are beneficial for helping to compare and audit district boundaries and address data. These would include layers like aerial photography, street centerlines, property parcels, and zip code boundaries.

Each of these map layers is defined and described in more detail below. As geography often changes over time, it is important that election offices have a process for updating maps from other sources.

POLICY CONSIDERATIONS

Contextual layers are useful for all of the reasons provided above, and there are a few questions that can help determine what is needed.

First, are any of these contextual layers required in specific states where precinct data is not sufficient? School districts and other special districts may be needed to get a complete picture of where voting unit boundaries must also fall in order to properly manage voter ballots.

Second, are there existing sources for each of these contextual layers? To avoid duplicative data development or procurement, the safest starting assumption is that there are existing sources that can be found through coordinated outreach to the state GIS office or other GIS interested state agencies such as the tax commission, transportation department, 911/public safety office, environmental quality, health department, etc.

Finally, is there a known update process and schedule for the contextual data layers? It is important to be working with the most up-to-date data.

TECHNICAL CONSIDERATIONS

When looking at contextual data, it is important to identify what these datasets contain and how they can help improve both voting unit boundaries and address quality. As stated above, it may also be necessary to use these datasets as an aid to creating the smallest ballot areas.

The first main grouping of data is existing boundaries. These map layers include boundaries for cities, towns, counties, school districts, and service districts. The mapping of these districts shows the legally defined extent of these jurisdictions and as a result, can help to both create the smallest ballot areas and audit existing precinct data.

An important consideration is reviewing these district boundaries regularly and understanding their update schedule. For example, municipalities adjacent to unincorporated areas often expand by annexing unincorporated land, particularly as it is developed. Other district boundaries, for example, school or sanitation districts, do not change on a set schedule but rather will change as school enrollment changes or as development occurs. Ideally, an election office can work with local jurisdictions to have them provide notification of changes in district boundaries on a regular schedule in a GIS file format.

The second group of data is mostly used for comparison and audit purposes. Property parcels show boundaries of ownership and can be useful in places where address points do not exist or where boundary lines are not accurate enough. Parcels can be used to derive address points or show specific, local boundary line discrepancies. Parcels may also be coded by assessors with the taxing entities that levy taxes upon each property. As taxation and representation through elections should be closely linked, parcels may offer a useful starting or checkpoint for voting unit boundaries. In rapidly developing areas, election offices should strive for obtaining more regular updates. In areas developing more slowly, these updates may not be possible or needed.

Aerial imagery and other general base map data (street centerlines, surface water boundaries, and landmarks) can also be useful for positioning addresses and correcting poor boundary lines. Aerial imagery is extremely helpful as viewers familiar with an area can recognize landscape details such as a highway, lake, or a local school. In more rural areas, it may be the only option when trying to position an address point on top of residential structures. Having current aerial imagery can be very useful but can also be expensive unless your state has a program to refresh imagery on a regular schedule. Contacting counties about access to their imagery or basemaps is a possible solution; otherwise, using national sources such as National Map, Open Street Map, Esri, or Google may be sufficient for the accuracy that is needed.

Finally, having access to zip code data can be especially helpful for address validation and locating. However, zip codes and other USPS data is designed to support mail delivery and are not always helpful in locating specific residential addresses, especially in areas in which only rural route or post office mail delivery is offered. State GIS offices may be able to provide access to up-to-date maps, but there are also commercial sources from which this mapping data can be licensed for a subscription fee.

DEFINE & IMPLEMENT DATA VALIDATION PROCESSES

5 SUMMARY

An analysis of the information provided in interviews of state elections directors highlights the need for additional work to create spatial auditing processes for precinct assignments. This will continue to be a need in a geo-enabled elections system and the spatial audit focus should include the voting unit GIS data, geocoding resources, and voting unit assignment results.

Validating the elections data using geoanalytics (e.g. whether the candidate or voter residence is located within the appropriate district) and cross-checking geocoding results against multiple sources, will provide greater confidence in the elections system to administrators and the public. Validation processes should include operational data quality controls, periodic full review and reporting, change logging, metadata documentation, and periodic archiving.

DETAILS

Systematic audits of the GIS data not only provide greater accountability to voters, they also serve as a mechanism to detect errors in voting unit assignments while providing feedback to election officials and other stakeholders for process improvement. Incorrect voting unit assignments occur for a variety of reasons including boundary map errors, non-standard addresses provided by voters, new and other addresses unknown to the elections system or workers, and of course clerical errors.

Non-GIS election systems rely on street address range files to manage the relationship between addresses and election districts. When errors occur in these systems, they can long go undetected unless the election administrators have an intimate knowledge of all the streets and election district, and have a penchant and patience for painstaking detailed data reviews.

A GIS-enabled elections system automates the voting unit assignment limited potential error to three cases: non-standardized addresses, the address location sources from geocoding or from manual placement, or the voting unit GIS boundary layer. While the first case would cause problems to any elections system, the second and third cases pertain to the GIS reference data and GIS provides advantages for data review and correction. These advantages are significant because GIS provides powerful map-based visualizations and validation processes. Automated voter residence geocoding can employ multiple GIS address reference datasets including commercial sources (e.g. Google Maps API) and the street and address point datasets kept current for use by 9-1-1 emergency communications centers.

If an elections administrator chooses to manually assign a geographic location (geographic coordinates) for a voter address, the election district assigned to the address can be checked against the election district map using GIS tools. Periodically GIS software can identify mismatches between the district assignment on the voter record versus the district where the address location is manually placed or located through automated geocoding.

In this process, addresses can be classified into three confidence categories: discrepancy likely, discrepancy unlikely, or possible discrepancy. Likely discrepancies should be reviewed immediately. Those in the “possible” category should periodically be reviewed by county or other staff with local knowledge. In both cases, the review should be map-based, and resolution notes should be logged for each record inspected. Wisconsin provides a good example of this type of review. Their process assigns four categories of address types (good, warning, exception and invalid) based on a confidence level in the accuracy of the address. Ideally the address location falls on the rooftop of the addressed

building, however, address locations that fall decidedly within the address parcel may also be acceptable. The "invalid" address type is not a high enough confidence to place in a district, so it marked as unassigned triggering clerks to make a manual assignment.

In Wisconsin, voting unit boundary data is received every six months by law from every county. Data is standardized by the legislative staff to a uniform set of data fields. Quality checks are done at the elections office to make sure no discernable gaps or overlaps exist and to make sure that new municipal annexations are reflected and conform to the law.

POLICY CONSIDERATIONS

The policy committee should consider a legislative directive that requires state and local election offices to verify the correct district assignment of voter addresses. For geo-enabled election systems, verification should be based on assigning geographic coordinates to a voter address, or geocoding, and reviewing the coordinate location against the election district(s) in which the coordinate location falls.

States and local election officials should work with their state GIS offices to ensure the best available data (most current, correct scale) are used in the audit process.

Lastly, the policy committee should establish expectations for what will be audited and the timeframe for the audit, when it begins, and when results must be reported and acted upon. Boundary assignment audits should be performed routinely. At a minimum, they should occur prior to each election with a reasonable window of time to resolve any discrepancies.

TECHNICAL CONSIDERATIONS

The technical committee should consider the following items for this best practice. The items have been categorized into three groups: administration, addresses, and precincts.

Administration

- Who is responsible for performing the internal audit?
- Is a separate external review also desired? If so, what entity and type of entity will be used and how will the data be protected?

Addresses

- Are addresses of record (voter provided) correctly standardized? A standardization algorithm should be identified and consistently employed. Data owners should determine a schedule to follow where the standardization algorithm is run and compared to previous results, ideally, during the intake process for new and updated voter addresses.
- Are any addresses not assigned valid geographic coordinates (not findable)? If so, unfindable addresses should be researched, and the geocoding score should be evaluated. How should voter records with ambiguous addresses or locations be handled?
- A periodic, full re-geocode and review should be completed for all low-scoring and manual placements. Review the results carefully for possible and needed updates to assigned address location coordinates.
- Periodically, random samples of addresses and their locations should be performed. Separate analyses should sample all addresses and addresses with a lower locational confidence score. The locations of the sampled addresses should be reviewed manually.

Precincts

- Are all state elected office district boundaries (congress, state, house, a board of education, etc.) and other relevant boundaries (county) covered by the boundary lines of voting units?
- Are all areas in the state covered by a voting unit layer (no gaps)?
- Are any areas covered by more than one voting unit (no overlaps)?
- Do all voting units have a voting unit identifier that is unique statewide?
- Are all voting unit boundary data periodically reviewed by local officials?
- Is the polygon geometry checked periodically for island polygons or multipart polygons? Or are these types of polygons allowed?
- Is there a periodic review of candidate addresses relative to the districts in which they file to run for office (where their residency is required)?

GEO-ENABLED ELECTIONS 2019-2021

NSGIC will complete the Geo-Enabled Elections project, phase two, to coincide with the nationwide redistricting expected to follow the 2020 Census.

GIS technology is particularly helpful for reducing the risk of errors when voters are re-allocated to new districts following a redrawing of district boundaries. Also, the period leading into, and immediately following redistricting, is a beneficial window to increase the use of GIS in an elections system. As a result, many states can be expected to increase their use of GIS in elections during this time.

The goal of the Geo-Enabled Elections project, phase two, is to raise awareness and help prepare states to adopt GIS in elections. The project is currently selecting pilot states to participate in phase two; any state interested in participating may contact the project via the website elections.nsgic.org.

Visit the website today and sign up to be notified about latest developments.

elections.nsgic.org

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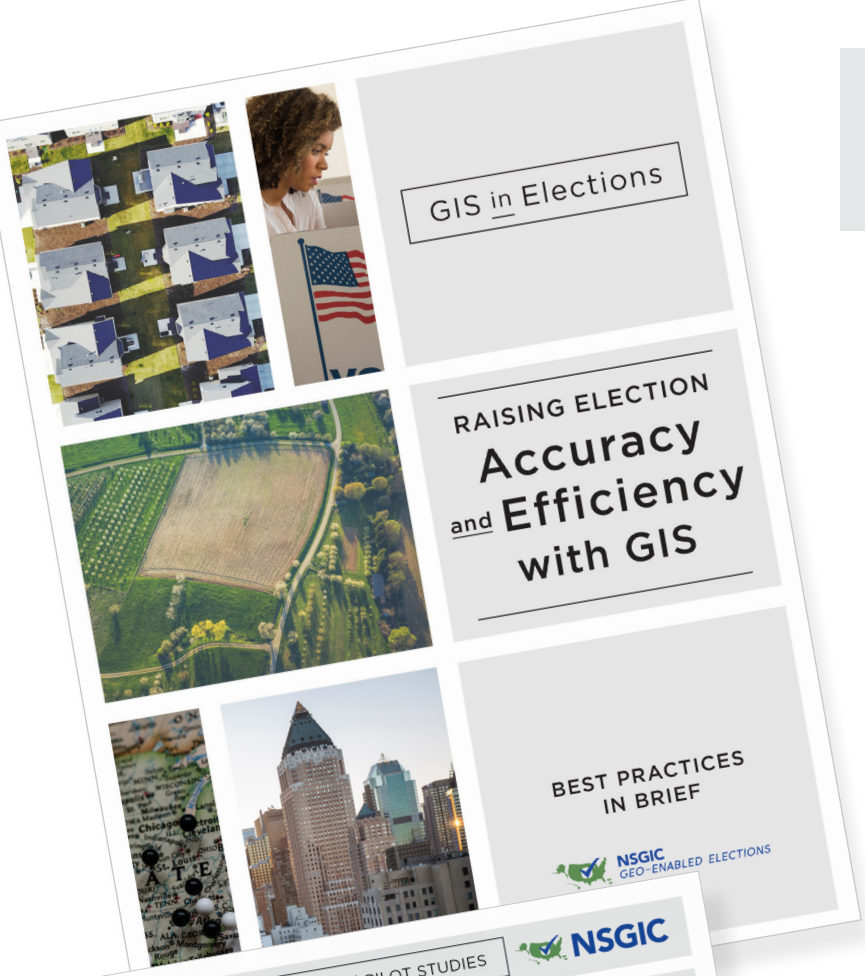

GEO-ENABLED ELECTIONS | PILOT STUDIES

NSGIC

Kentucky

NSGIC's Geo-Enabled Elections Project
NSGIC partnered with states and subject matter experts to develop Best Practices for integrating GIS in electoral systems.
This pilot study helped inform those Best Practices.
Learn more on **elections.nsgic.org.**

STATE PROJECT BACKGROUND

The Commonwealth sees the NSGIC Geo-Enabled Elections project as an opportunity to enhance the integrity and efficiency of elections. Additionally, there are identified business processes within State Government that could benefit greatly if voting precinct data was accurate, current, and readily accessible. Kentucky hopes to establish an ongoing relationship between the GIS community and the agencies that are involved in the election process and subsequently, build upon that relationship with an aim of geo-enabling the election process. It is felt that if appropriate best practices are embraced the citizens in Kentucky will have more faith in the election process and taxpayer savings could be realized.

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Jennifer Morrell
Former Election Official now Consultant

Veronica Degraffenreid
Director of Elections State Board of Elections North Carolina

Stakeholders

Kentucky State Board of Elections (SBE)
Kentucky Legislative Research Commission (LRC)
Department for Local Government (DLG)
Kentucky Office of Homeland Security (KOHS)
Kentucky League of Cities (KLC)
Kentucky Association of Counties (KACo)
County Boards of Election (CBEs)
Secretary of State (SOS)
Kentucky 911 Services Board
Kentucky Department of Education (KDE)
Department of Revenue - Property Valuation (DOR-PVA)
Kentucky State Police (KSP)
Alcoholic Beverage Control (ABC)

Champions

Charles Grindle, Chief Information Office, Commonwealth of Kentucky
John Holiday, Executive Director, Kentucky Office of Homeland Security
Rob Guckenberger, Executive Director, Office of IT Architecture Governance, Commonwealth Office of Technology

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TAKE ACTION

READY TO GET STARTED ON IMPLEMENTING GIS IN ELECTIONS?

Find more guidance, resources, and insights on our website.
elections.nsgic.org/action

- **Raising Election Accuracy and Efficiency with GIS**
- **Learnings from Pilot Studies**
  KY, PA, NE, MN, WV
- **Learnings from Case Studies**
  HI, NC, UT, WA, WI
- **The state of GIS implementation in elections across the nation**
- **Five questions to get the conversation started between GIOs and election directors**

During 2019-2021, NSGIC will complete the Geo-Enabled Elections project, phase two, to coincide with the nationwide redistricting that follows the 2020 Census.

Learn more on the website, and sign up to stay up to date on findings.

RIGHT BALLOT TO RIGHT VOTER

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The Geo-Enabled Elections project
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