Elections in the United States are based on geography: Where you live determines which races you vote on and where you are authorized to vote. Candidates also care about maps: They must live in the district they seek to represent.

Because geography is mission-critical to our democracy, geographical information systems (GIS) can improve the accuracy of getting the right ballot to each voter, and therefore decrease the number of times incorrectly assigned voters land an election on the front page. In 2017, a Virginia state legislative race was declared a tie, and the winner’s name was picked from a bowl. This race was particularly important because it affected the balance of power in the Virginia House of Delegates. Had the Democrat won, the House would have been split 50/50 between Democrats and Republicans. Since the winner of the lottery was a Republican, the GOP narrowly held onto power in the House of Delegates. A later analysis of the race showed that election officials erred by placing more than two dozen voters in the wrong legislative district. That means those voters received the wrong ballot, which could have been enough votes to sway that very close race. But no one will ever know, because cast ballots cannot be traced back to the voter.

In close races, every aspect of election procedures will likely be scrutinized, including the assignment of voters. Errors can stem from data entry mistakes or from wall maps with hand-drawn precinct boundaries that are not precise enough to define cul-de-sacs and river curves. “Street files”—tables of street addresses with corresponding precinct and district assignments that are used in some jurisdictions—may not keep up with newly developed subdivisions.

Did You Know?
• Geographic information systems underpin Google maps and many other functions on our phones and laptops.
• NextGen 911 relies on GIS, and sometimes that same system can be shared with election officials.
• Some estimate that 10% to 12% of voters in the nation are assigned to the wrong precincts (which does not necessarily mean they receive the wrong ballots).
State Action

States already use GIS for redistricting. Now, states are beginning to deploy GIS for election administration as well. Examples:

- **North Carolina** uses “spatial audits” to compare their lists of voter addresses to geographic data. Now that they have used spatial audits for a few years, fewer than 1% of addresses cum district assignments are flagged for further review. Officials report that the only way to do quality control on voter registration files is to compare it to something else—a GIS system.

- **In Wisconsin**, all voters are assigned to districts based on the state’s GIS system. The system goes so far as to pinpoint not just the piece of property, but where the residence is situated on the land, with a “pin drop” over the house (not on the mailbox or the property generally).

- **In Utah**, GIS was already in use for redistricting after the 2010 census, as it is in most states. The Beehive State then expanded its GIS to work with counties to create and confirm their local maps and to integrate all that information into the statewide voter registration database.

- **Washington state** went live with VoteWA this year, a replacement for its street files and much more. The secretary of state’s office helped the smaller counties get up to speed with the bigger ones by visiting every county. Because it is a statewide project, when new district lines are drawn for redistricting, the system will make it immediately clear which district every voter is in. Similar to the approach in Wisconsin, this relieves the pressure on local jurisdictions to assign voters to many overlapping districts, such as congressional, legislative, municipal and school board districts.

What does it take for a state to integrate GIS into every part of the elections process, not just redistricting? Often, states need a policy directive (such as a new law) and funding to cover the change. Other options:

- A state could require that maps be submitted in GIS format. For example, Virginia recently enacted SB 1018/HB 2760, which requires the use of GIS to create maps for redistricting or making any changes to local election districts or precincts.

- The legislature can require data sharing. In 2017, Oregon created a state geographic information council and a geographic information officer responsible for all geographic information and geospatial framework data, including for elections.

- The state could collect all precinct changes a couple of times per year, or more, and expect to receive them in GIS formats. In Arkansas, the county clerk is required to submit written, printed and digital copies of the map and boundaries to the secretary of state and Arkansas Geographic Information Systems Office within 30 days of making any changes.

- States can perhaps improve two policy areas with one change: NextGen 911 experts, who are more likely to have funding for geocoding than election officials, may be able to share their information in order to benefit elections as well. Good things may come from collaboration.

- Legislators can encourage GIS for elections by using their bully pulpit or by providing funding. Geocoding every address is not hard once the system is in place, but the transition requires training and potentially software development.

Additional Resources

- National States Geographic Information Council (NSGIC), and its elections specialist, Jamie Chesser
- Geo-enabled Elections: Pilot Studies, NSGIC
- Best Practices for Geo-enabling Elections, NSGIC

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