EXPLORATION **IMPLEMENTATION** OPERATION

Core Team

Rachel Clone, Manager, Data Analytics & Support Unit, Michigan BOE

Nicholas Daum, Analyst, Program Development Division, Michigan BOE

Sarah McMillan, Analyst, Data Analytics & Support Unit, Michigan BOE

Stuart Talsma, Analyst, Program Development Division, Michigan BOE

Dave Tarrant, Analyst, Program Development Division, Michigan BOE

Sarah Whitt, Pilot Project Mentor & Systems and Data Specialist, Electronic Registration Information Center (ERIC)

Tim Lauxmann, GeoData Manager, Center for Shared Solutions (CSS), Michigan Department of Technology, Management, and Budget

John Clark, GIS Solutions Architect, Center for Shared Solutions (CSS), Michigan Department of Technology, Management, and Budget

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 helps inform the Best Practices. Learn more on **elections.nsgic.org.**

PROJECT BACKGROUND

The Bureau of Elections (BOE) staff update addresses, including district information, daily using a tabular system. In 2018, we modernized the Qualified Voter File (QVF) voter registration system to a web-based application. It was built as a tabular system but included the flexibility to accommodate a spatial environment as we anticipated making changes to integrate spatial data and processes.

Considering the new QVF and the need to streamline and modernize the street index portion of the system, BOE staff agreed that now is the time to incorporate spatial data and processes into the QVF. As a proof of concept, the BOE piloted a data exchange and comparison of QVF voter addresses with authoritative, county-provided addresses in 2019. With guidance from the Michigan Center for Shared Solutions (CSS), we evaluated the quality of geocoded address points and district data in QVF compared to Ottawa County GIS Department's data. Building on the success of the Ottawa County pilot, we joined the NSGIC Geo-Enabled Elections project pilot program in 2020 and geocoded 97% of over 3 million unique addresses from the QVF as part of our pilot project.

The BOE has partnered with CSS utilizing the Michigan Geographic Framework (MGF) as the cornerstone of the QVF Spatial Project. As a product, MGF serves as a digital base map for state government agencies seeking GIS solutions for their business needs. As a program, it is a multi-departmental, multi-jurisdictional effort to pool resources to maintain accurate spatial data and consolidate efforts that were duplicated across agencies. The MGF will allow us to effectively work with regional, county, and local levels of government to collect spatial data for election administration purposes.

Stakeholders

Michigan Department of State
Bureau of Elections
Center for Shared Solutions
People and voters of Michigan
People and voters of the United States

Champions

Jonathan Brater, Director, Michigan Bureau of Elections
Mark Holmes, Geospatial Services Manager, Center for Shared Solutions (CSS), Michigan Department of Technology, Management and Budget

Pilot Project Goals and Key Outcomes

Our list of initial, specific project goals can be found here. We made some progress on the following goals.

Begin advocating for spatial data sharing between counties and MGF by highlighting the benefits to elections with county officials. We had several meetings with CSS outreach specialists to discuss ways in which the BOE could deliver information about geo-enabled elections to communities outside of elections.

The BOE along with our partners from Michigan Department of Technology, Management and Budget developed a Spatial County Commissioner District Reapportionment tool for county clerks to create and approve their final boundary plans. This was our first public foray into geo-enabled elections. With a narrow scope, it was an excellent way to introduce clerks to spatial processes and functionality. The tool was very well received. We are excited to capitalize upon this success and continue to broaden our efforts to further geo-enable elections.

Determine the resources needed to resolve imperfect and no-match addresses and to validate district geography associated with those locations. NSGIC Fellow, Emily Ruetz, assisted with a second attempt at geocoding the more than 3,000 addresses from the Qualified Voter File which were not successfully geocoded in our first attempt. All but one address that was initially unable to geocode with SAP software was resolved using Esri's ArcGIS World Geocoder.

We can speculate several reasons why the World Geocoder succeeded where SAP failed to geocode these addresses, but this exercise showed that we can efficiently achieve location values, even at geocode accuracy, which is a huge step towards performing point-in-polygon district assignments.

Establish strategy for equating QVF addresses and their geocoded points to address locations from an authoritative source, where available. BOE shared the Ottawa County file with the QVF software development team for their review to develop use cases for writing business requirements.

Barriers

We have discussed options for how addresses and geography (districts) can be managed, and our preference is for the data to be maintained on the MGF for the BOE to draw on as necessary, but to get to this point there is still work that needs to be done by CSS on the MGF.

For one, a parcel layer is ideal for our purposes but there is currently no such layer available. However, three-quarters of the counties in Michigan are enrolled in the MGF to share such data. Additionally, there have been technical difficulties preventing 1Spatial, the MGF vendor, from successfully designing and implementing required business rules governing geographic updates to MGF.

Lessons Learned and Key Takeaways

Using two different tools to geocode addresses was a huge improvement and saved us a lot of time, rather than manually reviewing addresses to locate them. Some of the addresses that failed to geocode using SAP were in fact valid addresses; geocoding a second time proved to be efficient and successful. With that being said, we know there are other "non-real" addresses that could be located, and work remains to validate those addresses and correlate them to a more accurate point instead of the road centerline.

Unrealized Benefits

We are not surprised that working on our pilot project has improved common understanding among the BOE and CSS staff of the nature of the data and our business needs, while rooting out sticking points that will need to be addressed before implementing a spatial system for elections. We are thrilled to share that the efforts under the pilot project have helped to assemble key agencies and decision-makers from Department of Technology, Management, and Budget, United States Postal Service, and the U.S. Census Bureau, elevating the profile of the entire project.

Next Steps

The BOE is working on creating a formal project with the QVF development team to better allocate resources. This will involve creating a master address file with unique IDs for address records and tying them to geographic locations.

Created: November 2021

EXPLORATION **IMPLEMENTATION** OPERATION

Core Team

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Blaine Hackett, Portfolio Manager, MnGeo

Kasey Rankl, Student GIS Specialist, MnGeo

Elorm Agbolosoo, GIS Specialist, MnGeo

Wesley Wilcox, Supervisor of Elections (Mentor), Marion County, Florida

Stakeholders

County and local election officials
Office of Secretary of State
Voting public
Media
Political campaigns
Civic democracy non-profits
Academia

Champions

Dan Ross, GIO for Minnesota and Chief Business and Technical Officer (CBTO), MnGeo
David Maeda, Elections Director, Office of the Secretary of State (OSS)

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PROJECT BACKGROUND

Minnesota has participated in three pilot projects with the Geo-Enabled Elections project: the first in 2019, the second in 2020, and a third in 2021. This participation has allowed the elections and GIS parts of state government (Secretary of State and Geospatial Information Office (MnGeo), respectively) to build a working relationship where there previously was not one. In addition, it has opened new avenues to improve election administration, such as voter precinct auditing and geocoding polling places.

In 2021, Minnesota returned to the work done in 2019 on voter precinct auditing to refine that process and make it a tool that Minnesota can use to validate data accuracy in the Statewide Voter Registration System (SVRS) database.

Pilot Project Goals and Key Outcomes

Approximately 1.6 million addresses were shared with MnGeo for geocoding. Using MnGeo's geocoder, about 600,000 were geocoded to highly accurate address points, and 995,000 to parcels or centerlines. Other addresses were sent through the Esri geocoder, and 721 remained unmatched.

The location of geocoded addresses was used to identify the address' precinct using the GIS precinct dataset maintained by OSS. This precinct was compared with the precinct given to the address in SVRS. For 3,638 addresses, the precincts from the different sources were not the same. These were further summarized to 1,654 records that shared the same street name and address range ID, indicating they were grouped together. Of these, 153 records had more than ten registered voters in the group. OSS has focused on doing analysis of these records to determine the issue, if any. Possible issues include geocoding accuracy, GIS boundary anomalies, or SVRS precinct coding.

Here is our list of specific project goals.

- **Standardize the geocoding process.**
- **Create a process for identifying potential mismatches.**
- **Create a process for feeding back mismatches to agencies for correction.**
- **Develop a more targeted process for the future.**

Barriers

One of the barriers for the project was the need to set up a service agreement between the Office of the Secretary of State and MnGeo. We were able to set up the agreement during the pilot project. Not all addresses geocoded easily for us, most notably were those in Red Lake Reservation and some college dormitories within the state. Not all street names are entered into the database the same way, so this caused some issues as well.

We still have a relatively large number of possible mismatches to manually review, and this is certainly time consuming.

Lessons Learned and Key Takeaways

We have identified our lessons learned and key takeaways for this project as follows:

- Good documentation from our 2019 pilot project made the geocoding process relatively easy.
- Removing units and house number suffix values from addresses exported by OSS simplified geocoding.
- Extracting unique addresses and including voter counts for each address helped reduce the number of records and simplified analysis.
- Including address range ID (from SVRS) for each address ended up being a good way to group addresses and help with review in SVRS.
- It is important to identify where GIS precinct boundaries are misaligned.

Unrealized Benefits

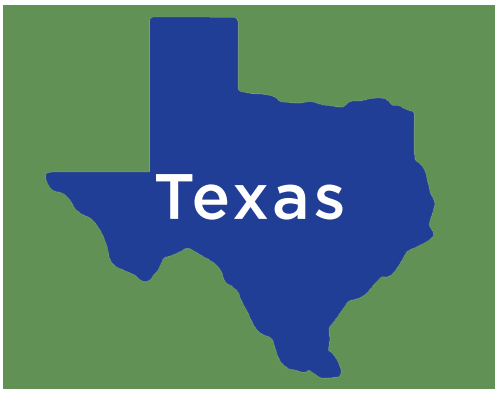
An unrealized benefit to the project is that we should be able to do similar analysis for school district boundaries. Currently, Minnesota Department of Education is in middle of a process of updating GIS data, so we will wait until that is completed.

Next Steps

We have identified our next steps for the pilot project to be the following:

- Document processes so that OSS can continue to do similar voter precinct auditing in the future.
- The OSS will complete its review of possible mismatches and communicate those to counties for correction if necessary.
- The OSS will correct misaligned boundaries in GIS precinct dataset. If boundaries are municipal boundaries, also contact Minnesota Department of Transportation (MN/DOT) who maintains the state municipal boundary dataset.

Created: November 2021



Core Team

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Felicia Retiz, Deputy Geographic Information Officer, Texas Water Development Board

Gayla Mullins, Strategic Mapping Program Manager, Texas Water Development Board

Lauren Kirk, Geospatial Data Coordinator, Texas Water Development Board

Chelsea Sidenblad, Senior GIS Analyst, Texas Water Development Board

Jennifer Kirby, GIS Work Lead, Texas Water Development Board

John Dziurlaj, Senior Solutions Architect (Mentor), The Turnout

Stakeholders

Kendall County Elections Department
Kendall County GIS Department

Champions

Staci Decker, Elections Administrator, Kendall County Elections Department
Mike Howle, Geographic Information Specialist, Kendall County, Texas

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PROJECT BACKGROUND

The Texas Natural Resources Information System (TNRIS) and Kendall County have been working together since May 2021 to explore a partnership for implementing GIS into existing elections processes. Kendall County's Election Department had provided a list of registered voters in a CSV format, in addition to GIS layers, including address points, streets, and voting precincts.

TNRIS's goal is to utilize the GIS components and voter registration list to analyze a voter's address along with the appropriate assigning of districts and splits for elections. The aim of this pilot is to provide a framework for recommended data standardizations that would be required for a geo-enabled process to validate the integrity of elections in Texas.

Pilot Project Goals and Key Outcomes

Our goals for the project can be found here.

Establish a relationship with the Secretary of State to collaborate on a geo-enabled elections pilot project.

Collect applicable datasets from the pilot county – Kendall County, Texas.

Obtain clarification of voter registration information collection and schema.

Provide recommendations for data standardization for implementation of the work statewide.

Below you can review the methods and key outcomes from our pilot project.

• We geocoded the voter registration list provided by Kendall County Elections Department. The first approach was the most successful but still contained errors due to incomplete data for each voter record (90 records), and several geocoded addresses mapped to incorrect locations (approx. 800 records).

• We utilized existing address point data for Kendall County, Texas, and used a table join to match full addresses in the attribute table to the full address field in the voter registration list. The second approach yielded no results due to lacking fields (zip code, city, state) in the address point layer. A spatial join with the Census zip code layer was attempted in order to add the needed zip code field for the table join. However, this was unsuccessful since multiple cities/towns can reside in the same zip code and current shapefiles for Census unincorporated communities do not exist.

• We created centroids from existing Kendall County Parcel data and assigned a situs address field to the points for a similar table join to the voter registration list. Centroids could not be created due to topology errors in the Kendall County Parcel dataset. It was beyond the scope of the project to correct topology errors.

Barriers

We did have some barriers to completing our work. You can review our barriers below. We experienced:

• A lack of communication between the Secretary of State and delay/lack of communication with the Kendall County Elections Department to answer any questions raised during data exploration.

• Inconsistencies and incompleteness of multiple datasets used in the three approaches.

• Difficulties in obtaining supplemental voter registration information for comparison to provide recommendations for standardization.

• Concern regarding the pilot project. Due to the political climate in Texas surrounding elections, the pilot was not well advertised, caused some concern from the executive level, and collaboration with other local or state entities was stifled.

Lessons Learned and Key Takeaways

We did have some lessons learned during our pilot project.

Implementing a successful geo-enabled elections process will be a major challenge for the State of Texas.

Generally, Texas counties are not required to implement data creation standards/rules as no statewide mandate exists for minimum requirements on data to be collected. Because of this issue, a considerable amount of time would be required to ensure each county has the necessary voter registration information, land parcel information, and address point information with little to no errors in topology and no duplication of records. Land parcel and address point information are used to validate voter registration addresses that were missing or not locatable on a map.

We used the best data we could find to validate the voter registration list. We cannot speak to exactly what factors and data are needed to make a geo-enabled elections validation process work, as we were unable to get supplemental voter registration data to make an informed comparison.

Due to a lack of response from the Secretary of State's office and from other counties that were contacted for reference, Texas was unable to successfully utilize a voter address list against a voting precinct boundary to validate its location.

Next Steps

Internally, we would like to determine whether the state of Texas is ready for geo-enabled elections. We would also consider making a recommendation to the Secretary of State to encourage a data collection standard to facilitate a more accurate voter registration list.

Externally, we would like to discuss our findings with the NSGIC Geo-Enabled Elections project team.

Created: November 2021

EXPLORATION **IMPLEMENTATION** OPERATION

Core Team

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Lelonie Oatway, Elections Administrator, Vermont Secretary of State's Office

John Adams, Director, Vermont Center for Geographic Information

David Fox, Senior Geographer, Vermont Center for Geographic Information

Gary Bilotta, GIS Director Recorder's Office (Mentor), Maricopa County, Arizona

Stakeholders

Regional planning commissions
Vermont town election officials
Vermont voters

Champions

Jim Condos, Vermont Secretary of State
Kristin McClure, Vermont Chief Data Officer

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PROJECT BACKGROUND

Vermont has an active state-level GIS coordinating group: The Vermont Center for Geographic Information (VCGI). We have a high-quality point-based addressing system as part of the E911 program. To date, we have not integrated this address data with the voter rolls maintained by the Secretary of State's office. Vermont's municipal boundaries – which form the majority of voting districts - are more problematic. Historically, few have ever been surveyed, and field evidence of the boundaries is often absent or contradictory.

Pilot Project Goals and Key Outcomes

Our goals for the project can be found here. We made significant progress on our goals.

Improve coordination between the Secretary of State's Office and VCGI. Members of the core team met throughout the process over Microsoft Teams - giving VCGI insight into the current election and voter registration processes and helping the Secretary of State's Office understand ways to leverage geospatial data and technology to improve the accuracy of the statewide voter checklist and thereby strengthen election security. The regular interaction helped build relationships and has benefited both organizations beyond just elections.

Geocode and validate addresses for the statewide voter registration checklist. We were able to achieve over 90% location matching with a first pass of the data without any cleaning or modifications. Using guidance from Maricopa County, Arizona, we classified the unmatched addresses into different categories and found that an additional 6% could be matched by addressing some basic formatting issues and accounting for some idiosyncratic practices by certain municipalities. The unmatched addresses were provided to the clerks and grouped by type of issue to assist with the verification process. Any verified or unverified geocoded address that raised questions regarding whether or not they were in the appropriate district was flagged as a high priority.

Identify voting districts and document process. A review of voting district and ward assignments was completed. The existing process of creating sub-municipal districts, which only exist in a handful of municipalities, currently lacks standards and a formalized process. The group identified this as an issue that could be addressed to help avoid the potential for future boundary-related election issues.

Better position Vermont for redistricting. Clerks are in the process of improving their voter checklists with the lists of unmatched addresses and the Elections Office is exploring ways to integrate geocoding/e911 data in the existing election management software system. VCGI will continue to perform a semi-annual audit of new addresses.

Develop a web map to assist SOS with address validation. We added this goal early in the process when realizing that an existing process used by the Elections Office relied on the use of a book of printed maps. A web map for addressing look-up was created and provided to SOS staff for review and included additional layers, such as parcels, which has helped make their lives easier.

Barriers

VCGI's primary staff member assigned to this project left to take on a new opportunity in the middle of the project, limiting the amount of staff time available to work on achieving our goals. One key barrier identified was the informality of the process for adopting local districts.

Lessons Learned and Key Takeaways

We should have done this sooner. GIS data and technology are extremely well suited to help ensure our elections are accurate and efficient. It did not take very much work to geocode the vast majority of addresses in the voter checklist and confirm their validity and that they are located in the appropriate district. In a day and age when emotions around election security are notably high, it is certainly helpful to have additional checks in place to affirm the integrity of our democracy. Our battle-tested team mentor from Maricopa County, Arizona, helped us clearly see just how valuable a geo-enabled election really is.

Unrealized Benefits

We have not yet pulled together communication material to highlight this effort and engage our municipal partners to help them understand the benefits of geo-enabled elections.

The Vermont state legislature passed a law earlier this year that made permanent the practice of mailing a ballot to all active registered voters for each General Election. The identification and correction of address errors in the statewide voter checklist will assist in ensuring that ballots are sent to and received by the voters they are intended for.

Reducing the number of undeliverable ballots based on address errors will help build confidence in the integrity and security of the ballot mailing process. Building and maintaining that confidence is a critical goal given the current climate of distrust in election administration.

Next Steps

Our next steps include:

• Engaging local stakeholders to help them become proponents of geo-enabled elections.

• Investigating potential changes to policies/ state law to help ensure accurate administrative boundaries.

• Setting up a semi-automated regular audit of the voter registration checklist.

• Exploring the potential for integrating e911 data into the existing election management system software.

Created: November 2021

EXPLORATION IMPLEMENTATION **OPERATION**

Core Team

Rebecca Turner, Clerk and Registrar of Voters, Calaveras County, California

Doug Polzoni, GIS Coordinator, Calaveras County, California

Robin Glanville, Assistant County Clerk and Registrar of Voters, Calaveras County, California

Chuck Skaggs, GIS Coordinator (Mentor), Riverside County, California

Sharilynn Domain, GIS Specialist (Mentor), Lee County, Florida

Stakeholders

California Secretary of State
California State Election Director
Calaveras County, California voters
California voters
Calaveras County, California Elections
Calaveras County, California GIS Department

Champions

Rebecca Turner, Clerk and Registrar of Voters, Calaveras County, California
Doug Polzoni, GIS Coordinator, Calaveras County, California
Robin Glanville, Assistant County Clerk and Registrar of Voters, Calaveras County, California
Kelsea Stefanick, Deputy Registrar of Voters, Calaveras County, California
Beth Cole, Deputy Registrar of Voters, Calaveras County, California

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PROJECT BACKGROUND

When preparing for redistricting in 2010, the Elections Office realized that without a tool that could clearly identify the current voter addresses within the voting jurisdictions, ensuring voters were in the correct jurisdictions after boundary changes would be incredibly difficult.

Before utilizing a GIS tool, the elections staff referenced the Board of Equalization Tax Rate Area Code Chart to determine voter precinct and ballot types. The County Elections Office and County GIS Office collaborated to create the elections parcel layer. The election parcel layer is a mapping tool that integrates the county parcel map with the election precinct and portion map to ensure accuracy when precincting voters. This allows elections staff to look up an address in the map and identify the voters' tax rate area, assessor's parcel number, precinct, and portion. This data is then entered and visually verified by a staff member in the Election Management System Street Guide.

Although this is a significant improvement from where the Elections Office was in 2010, it would be ideal to have an auditing tool to ensure voters are placed in the correct precinct and portion and verify ballot types after consolidating precincts for an election.

Pilot Project Goals and Key Outcomes

Our goal for the project can be found here. We made significant progress on this goal.

Ensure each voter is accurately placed in the correct precinct.

• We hoped to integrate GIS with the voter registration database (VRD) to allow the voter data to be imported into the GIS.

• We hoped to develop an automated daily quality control workflow to validate voter addresses to the correct precincts.

Barriers

We have experienced a few barriers during the project. We identified two barriers below:

• Establishing the connection between Election Information Management System (EIMS) and ArcGIS was challenging. It was also challenging to ensure daily data updates.

• Allocating hours to the address clean-up to ensure the election management system and the GIS layer matched.

Lessons Learned and Key Takeaways

We made significant progress on our goal. We pulled the election data from the election management system and created a map within ArcMap. The map includes three sets of data:

• Addresses that match 100%.

• Addresses that tie or are a close match but not a 100%.

• Unmatched addresses – there is no match.

For the purposes of this project, we have completed our pilot project work by creating a connection between the EIMS data and the ArcMap data. Staff is now in the process of reviewing and cleaning up the tie data and unmatched addresses. This process is approximately two-thirds complete, and we expect to be finished with the work by the end of November 2021.

Unrealized Benefits

An unrealized benefit of the project was when we realized we could use the link between EIMS and GIS to proof ballot types for future elections.

Next Steps

Our next step is to clean up the addresses that do not match the GIS layer.

Created: November 2021

EXPLORATION IMPLEMENTATION OPERATION

Core Team

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Merced County, California

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Marina Garza-Ortega, Elections Technical Analyst,
Merced County, California

Matt Eimers, GIS Supervisor (Mentor),
Orange County, California

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PROJECT BACKGROUND

Merced County, California, Registrar of Voters Department started using GIS software in 2010 to ensure a more accurate redistricting process. Once we completed redistricting, the department continued to use GIS to precinct, reapportion, and implement districts dividing into sub-districts. In 2014, the department collaborated with the Merced County GIS Department to create a single address point layer to help ensure the accuracy of pinpointing voters. In 2015, the department used GIS to reapportion the entire county to ensure that significant district lines were not crossed. In addition, GIS was used to do an overall review to ensure voters were in the proper precincts. Our next step was to gradually transition to single addresses within the voter management software Election Information Management System (EIMS), but that was put on hold due to the upcoming Presidential Election of 2016. We now plan to learn and transition to single-point addresses with the voter management software EIMS. The goal is to transition to single-point addresses in 2023.

Stakeholders

Merced County Registrar of Voters/Elections Office
Merced County Information Systems Department
Merced County voters

Champions

Gene Barrera, GIS Manager, Merced County, California
Shawnesti Machado, Supervising Election Specialist, Merced County, California
Marina Garza-Ortega, Elections Technical Analyst, Merced County, California
Matt Eimers, GIS Supervisor (Mentor), Orange County, California

Pilot Project Goals and Key Outcomes

Our goals for the project can be found here. We made significant progress on our goals.

Standardize voter data and GIS data between EIMS and the GIS software (Esri ArcMap). We have a had demonstration with our mentor on the communication tools utilized to transfer data between EIMS and our GIS software (Esri) on May 12, 2021, and June 1, 2021.

Learn and plan to transition to single point addresses with EIMS. We met with two developers from DFM Associates on May 18, 2021. We have the information needed to start the planning for 2023 implementation.

Develop a plan to complete the address point layer in the GIS software (Esri ArcMap) with assistance from DATAMARK system and Next Generation 9-1-1 data. DATAMARK VEP is currently operational and is delivering address and road centerline data to our CAD dispatching system as well as Community and Economic Development's TRAKiT building permit management system. We will still work on a plan to implement this data in the address point layer in GIS for election use.

Develop and plan for auditing data quality to ensure ballot accuracy. We have had a demonstration with our mentor on June 22, 2021, on auditing data quality to ensure ballot accuracy.

Barriers

We did have some barriers to completing our work. It was challenging to schedule times for our team to meet on a regular basis. The Elections Department had two special elections - one on August 31, 2021, and one on November 2, 2021. This was in addition to a statewide gubernatorial recall election that was held on September 14, 2021.

Lessons Learned and Key Takeaways

We did have some lessons learned during our pilot project. Our mentor was Matt Eimers, the GIS Supervisor for the Orange County, California Registrar of Voters. Matt was particularly instrumental in helping us obtain knowledge on how our two major systems (EIMS and Esri GIS software) can work together and integrate with one another. Our mentor showed us various tools within both software systems to utilize before, during, and after elections. We have also learned about auditing data quality to ensure ballot accuracy.

Unrealized Benefits

We are ready to transition to single-point addresses in 2023 because of this effort.

Next Steps

Our next step is to start the written documentation and plan for our implementation of single-point addresses in 2023, and we hope to be included in additional pilots supported by NSGIC.

Created: November 2021

EXPLORATION | IMPLEMENTATION | **OPERATION**

Core Team

Cathy Darling Allen, Registrar of Voters (ROV), Shasta County, California

Dave Powers, IT GIS Manager, Shasta County, California

Joanna Francescut, Assistant ROV, Shasta County, California

Sarah Murrietta, Supervising Analyst, Shasta County, California

Marcus Harner, IT GIS Analyst, Shasta County, California

Gary Bilotta, GIS Director Recorder's Office (Mentor), Maricopa County, Arizona

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PROJECT BACKGROUND

Shasta County, California, is in far northern California, approximately equidistant from both Sacramento and the Oregon border with 111,000 registered voters.

Shasta County has developed a decentralized geographic information system (GIS) effort over the past 15 years that partners with the three incorporated cities within the county: the cities of Redding, Anderson, and Shasta Lake. The local GIS effort is led by the GIS Division staff within the Information Technology Department and supported within the Elections Department by staff trained in a variety of GIS software.

Shasta County participated in the project in 2020 with great enthusiasm. Shasta will continue to use this project as an opportunity to enhance the integrity and efficiency of election administration using GIS to significantly expand the practices, data accuracy, and relationships currently in place. To the extent possible, this will include annual processes of address verification and updates between Shasta County departments and the three incorporated cities. It will also include attribute and spatial verification of voter addresses, precinct layer verification and updates as needed, and confirmation that the voter's geocoded and manually assigned precincts match.

In 2021, Shasta County, CA, is thrilled to be joined by the new states and California counties who will participate in the project.

Stakeholders

Paul Hellman, Director of Resource Management, Shasta County, California
Leslie Morgan, Assessor Recorder, Shasta County, California
John Ducket, City Manager, City of Shasta Lake, California
Barry Tippin, City Manager, City of Redding, California
Jeff Kiser, City Manager, City of Anderson, California
Shasta County voters and California voters

Champions

Cathy Darling Allen, Registrar of Voters (ROV), Shasta County, California
Matthew Pontes, CEO, Shasta County, California
Tom Schreiber, CIO, Shasta County, California
Neal Kelley, Registrar of Voters, Orange County, California
Jana Lean, Director of Elections, State of California Office of the Secretary of State

Pilot Project Goals and Key Outcomes

Our list of specific project goals can be found below.

Geocode new voters from the 2020 election and finish quality control of outliers from the 2020 pilot.

Develop geospatial voter registration workflows for assigning voter precinct and portions. Create an application to handle the geocoding of voters at time of registration processing.

Develop annual quality control workflows for spatial and analytical audits. Continue documentation development and ongoing maintenance of the geocoded voter data.

Apply learned best practices to the 2021 state and local redistricting processes.

Barriers

The largest barrier to completing this project to our collective satisfaction was finding enough time for Election Department staff to dedicate to the project. It was difficult to make this project a priority with all the elections, recalls, and redistricting projects requiring effort at the same time.

Generally, in California we expect to have elections in even years. In our county, we have not had an "off year" with an election since 2015. The year 2020 saw the highest turnout. This combined with never-before seen levels of voter skepticism naturally contributed to the delay in getting some key goals of this project completed, especially in 2021.

Lessons Learned and Key Takeaways

The first time that a spatial review process has been undertaken for the Shasta County voter file was during the Geo-Enabled Elections pilot project in 2020. This review showed that there is measurable value when spatially assigned attributes, such as the voter's assigned precinct, are verified using spatial analysis.

Making this happen required collaboration between the Elections Department, the IT-GIS staff, and staff from other county departments. An address locator built in-house was used; it included verified address points, local road centerline address ranges, and county assessment record addresses for consistent assignment of the geographical location for each voter address.

The need for accurate precinct and portions areas, updated for each change in local Tax Rate Assessment (TRA) boundaries, is significantly dependent on the accuracy and accessibility of supporting GIS data layers. For this project, an updated TRA table was spatially joined to the county parcel layer, which was then used to update critical GIS layers like school, water, and other municipal boundaries. These updated layers, along with refreshed data from other sources, were then used to validate and adjust election precinct and portion layers as needed.

The counties' electoral processes were improved by using the capabilities of the GIS to geocode or provide geographical coordinates corresponding to the physical location of each voter residence and create a VoterFilePoints layer that shows the voter's address location along with reviewing existing boundary files. These processes were improved by not only enhancing accuracy, but by providing additional visual resources that enable opportunities to provide enhanced public information, education, and outreach.

In 2021, the California special statewide election to recall the Governor substantially slowed the work on GIS generally. While census data was also delayed in its release in 2021, redistricting is still very much an ongoing mandated task that will benefit from the work that was accomplished through this project. Shasta County GIS staff are committed to assisting the Elections Department in continuing the project through completion. For example, we are aware of the file version control issue on several fronts, and as a mitigation, GIS staff have volunteered to assist the Elections Department in developing and implementing process documentation that will shore up staff training and practice.

Unrealized Benefits

There has been an ongoing address assessment and verification project within the county department that assigns addresses and other county departments that use physical address information to provide services, assess values, and collect revenue. This election-focused project brought additional visibility to—and highlighted the value in—completing the address assessment project.

This project also highlighted the need for ongoing collaboration between departments to assure that common spatial data being used is accurate, current, and sourced from one understood and documented location. At the beginning of the project, it was discovered that there were multiple common data layers that were sourced from two different locations and versions.

The project has emphasized the importance and urgency of replacing the current file-based voter information system with a spatial system for election data verification and analysis – one that contains spatial voter locations and boundaries.

The IT GIS Division has helped the Elections Department with GIS-based projects, analysis, visual products, and interactive online mapping for internal and public use, without understanding the election workflow and data processes. This project gave both groups the opportunity to learn new processes and techniques, as well as become familiar with each other's workflow and data needs.

The project also highlighted the benefits of interdepartmental use of the same enterprise GIS software (in this case ArcGIS Pro) for data management, analysis, and geographical product utilization. Some of the benefits provided were greater consistency and accuracy from improved system-wide management, more efficient use and sharing of data, reduced redundancy of data across the system, better use of departmental GIS resources, and reduced maintenance and support costs.

From the Elections Department perspective, this project provided a framework and accountability that was missing from a previously friendly, encouraging, and helpful relationship with GIS staff. We also want to take this opportunity to thank Gary Bilotta, GIS Director at the Maricopa County, Arizona, Recorder's Office for being our mentor.

This project highlighted the importance of clearly defined workflows and consistent oversight and review as new data are incorporated. As mentioned above, changes in staff and lack of clearly defined processes resulted in poor beginning quality data. Continued review and ongoing attention from all parties have brought us to the end of this project at a great spot to continue to expand these principles.

Next Steps

Shasta County will continue to work on this project, with or without continued ongoing support by NSGIC – although we'd greatly prefer to work with them. Our unrealized intention for 2021 was to accomplish the following goals:

• Develop spatial based policies, workflows, and auditing processes that will facilitate the automated determination and validation of voter precinct assignments.

• Incorporate a periodic quality review process to validate the accuracy of the precinct and portion layers, incorporating several of the workflows used during this project.

• Expand the use of online public maps, applications, and other spatial tools to assist, inform, provide transparency, and raise public and voter awareness and confidence.

• Audit the incumbent data file against the newly validated layers to ensure accuracy in Election Department records.

We consider these goals to still be aspirational, although we suspect they will be accomplished by mid-2022 because of redistricting and the ongoing election cycle in 2022.

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Core Team

Donna Johnston, Registrar of Voters, Sutter County, California

Jarvis Jones, GIS Analyst, Sutter County, California

Matthew Eimers, GIS Supervisor (Mentor), Orange County, California

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 helps inform the Best Practices. Learn more on **elections.nsgic.org.**

PROJECT BACKGROUND

Sutter County Elections Department staff use GIS data in several processes, including address verification and precinct planning. Despite the use of GIS, there was always a separation between GIS "maps" and Election Information Management System (EIMS) "elections" data. For this Geo-Enabled Elections project, we wanted to explore the possibility of more directly comparing available GIS and elections data to see what improvements could be made to both datasets.

In the past, GIS address data was never accurate or complete enough to use as a source for elections. The development of Next Generation 9-1-1 (NG9-1-1) address data left us with a dataset that was theoretically good enough to use in a GIS audit.

Stakeholders

Sutter County, California Board of Supervisors
Donna Johnston, Registrar of Voters, Sutter County, California
Jarvis Jones, GIS Analyst, Sutter County, California

Champions

Donna Johnston, Registrar of Voters, Sutter County, California
Jarvis Jones, GIS Analyst, Sutter County, California

Pilot Project Goals and Key Outcomes

Our goals for the project can be found here. We made significant progress on our goals.

Compare NG 9-1-1 GIS address data with elections roll address data. Addresses from the elections voter roll were geocoded against NG9-1-1 data. The goal was to increase the match rate of the NG9-1-1 based geocoder when matching the elections voter roll addresses. At the recommendation of subject matter expert and mentor Matthew Eimers, we worked to improve the match rate against the address point layer. Address errors were identified in both the elections voter roll and the NG9-1-1 GIS data. Once corrected, we were able to achieve a 99.99% match rate of elections voter roll addresses with the NG9-1-1 based geocoder.

Audit district-based data associated with elections voter roll data. Once a geocoded address dataset was created, it was possible to compare the values for geographic areas in the voter roll with those boundaries in GIS. The attributes for voter precinct, incorporated city, Board of Supervisor district, and county boundary in the voter roll were compared to GIS boundaries. Mismatches were sent to Elections Department staff for review. 0.41% of voter roll records had a precinct number different from GIS. Elections Department staff is currently making the changes to the elections management database for any necessary corrections.

Stretch goal – revamp GIS-based "Find my Elected Official Web App." Matthew Eimers demonstrated an ArcGIS Online elections application template he utilized. We ran out of staff time to implement a Sutter County, California version; however, it is planned for the future.

Barriers

NG9-1-1 address data contained errors that made obtaining a high geocoding match rate difficult. The NG9-1-1 geocoder often fell back to centerline address matches, which we felt were not adequate for this project. To obtain a high address point match rate, errors were corrected (street name spellings, incorrect ZIP codes, etc.), missing point address data was added, and the format was tweaked (added a "base" address point for multi-unit properties).

Our original goal was to audit more districts than the four listed above, but we found the "sub-precinct" divisions of precincts in our voter roll made that too complicated to audit in this short period of time.

Lessons Learned and Key Takeaways

• GIS data provide a valuable accuracy check on voter roll information. For a GIS audit to be successful, GIS data must be accurate and complete.

• A GIS audit of voter roll data improves the GIS as much or more than it does the voter roll information. The inter-departmental use of the same address GIS datasets improves other departments' GIS-related workflows.

• Conferring with subject matter experts from other jurisdictions provides valuable input on best practices, as well as better workflows and methods to accomplish specific tasks.

Unrealized Benefits

This project was originally implemented to improve voter roll data by comparing it to GIS. While we were able to identify errors in the voter roll, many more errors were identified in the NG9-1-1 GIS address data. Since NG9-1-1 data is used countywide, errors that were corrected for the voter roll audit increase the accuracy of unrelated department operations, like 911 call routing.

Next Steps

• Revamping our voter information application with the new template used by Matthew Eimers in Orange County.

• Using GIS data to assist in accurately splitting our sub-precincts.

• Once sub-precincts are eliminated, auditing the remaining district boundary attributes in the voter roll.

Created: November 2021

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PROJECT BACKGROUND

Tulare County, California, has used this project as an opportunity to enhance the integrity and efficiency of election administration using geographic information systems (GIS) to significantly expand the practices, data accuracy, and relationships currently in place.

Core Team

Stephanie Hill, Systems and Procedures Analyst, Registrar of Voters Office, Tulare County, California

Victor Garcia, Elections Technical Analyst, Registrar of Voters Office, Tulare County, California

Stakeholders

Tulare County Registrar of Voters Office
Tulare County voters
Tulare County local districts

Champions

Stephanie Hill, Systems and Procedures Analyst, Registrar of Voters Office, Tulare County, California
Victor Garcia, Elections Technical Analyst, Registrar of Voters Office, Tulare County, California
Bob Irvine, IT Division Manager, Tulare County, California
Juan Witrago, IT Division Manager-Application Support Division (Mentor), Madera County, California

Pilot Project Goals and Key Outcomes

Our list of specific project goals can be found below.

Establish a primary point of contact within the Tulare County GIS Department.

Establish best practices for implementing district boundary changes/updates.

Below you can review the methods and key outcomes from our pilot project.

• We were able to establish a point of contact within our county GIS Department. Together, we have created a team of four to six staff members that will assist in our redistricting projects.

• We have also been working on implementing some new changes in how we process district boundary changes. We established a check and balance. Currently, we have one staff member implement the changes, and the other staff member does quality control to make sure all the new changes are implemented correctly. This process is working well thus far.

Barriers

We did have some barriers to completing our work. You can review our barriers below. We experienced:

• A special gubernatorial recall election during our pilot project. This election needed a lot of attention and pulled staff away from the project.

• Some staff changes within the county.

Lessons Learned and Key Takeaways

We did have some lessons learned during our pilot project. We know now after six months in the pilot project that we have a steep learning curve ahead of us. We also realized during the pilot project that communication and follow-through are vital for advancing the work.

Unrealized Benefits

By opening communication with multiple departments and staff members, many interesting and insightful ideas were brought to the table. Having folks from outside the elections "world" be a part of the project brought a fresh perspective.

Next Steps

We plan on continuing the project in hopes that it will be regularly evaluated to ensure we are using the most up-to-date tools and our practices are the most effective.

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