

# NASS IDEAS Award Application - 2021

## State of Iowa



**State Office:** Iowa Secretary of State Paul D. Pate

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**Title of Program:** Shielding the Vote: Using Technology to Boost Voter Confidence

**Project lead:** Wes Hicok, Election Training Specialist

**Description of the program:** Improving voter confidence is a top priority for election officials across the country. In fact, it is a bigger priority now than perhaps any time in recent memory. The Iowa Secretary of State's Office partnered with Protect Democracy to launch secure web applications that can accomplish that goal. VoteShield & BallotShield not only protect the security of elections, but they can also provide reassurance and documentation that election officials at the county and state level can utilize to inform the public about steps they are taking to maintain ballot integrity. Using technology and transparency, we can boost voter confidence across the nation.

**Subject area of nomination:** Elections

## **EXECUTIVE SUMMARY**

### **HISTORY**

Every state considers itself a target for foreign adversaries and bad actors whose possible goal is manipulating voter data. We know attempts were made in the 2016 elections. It is vital for states to take all the necessary steps possible to ensure the sanctity of the vote. The Iowa Secretary of State's Office worked with a non-profit organization to develop new tools that help ensure the vote is protected.

Iowa Secretary of State Paul Pate's partnership with Protect Democracy spawned the creation and launch of VoteShield and BallotShield. These innovative new tools and the way they're used at the state and local level set a model for monitoring and protecting election data.

VoteShield is a secure web application that tracks changes to Iowa's voter rolls and detects and flags anomalies. BallotShield is very similar to VoteShield in that it takes regular snapshots of absentee ballot transmission and receipt information and puts it in digestible report format for election officials. Iowa was the first state in the country to utilize both VoteShield and BallotShield.

The Iowa Secretary of State's Office began utilizing VoteShield prior to the 2018 elections. An updated version was unveiled to Iowa county auditors in November 2019. The system is now available in 17 states.

VoteShield is a tool for local election officials to monitor their county's voter data. It tracks changes to Iowa's voter rolls, and it detects and flags anomalies. County auditors know their counties best, so if an anomaly is detected, they can investigate themselves. By providing this tool that monitors these changes, we can better ensure the integrity of Iowa's voter data and elections.

Most of Iowa's voter registration data is publicly available, so the VoteShield team was able to onboard without requiring any proprietary or sensitive data. VoteShield is a secure web application, therefore the state does not need to manage any infrastructure or install any local software. Because VoteShield was created and funded in partnership with non-profit Protect Democracy, so our state and counties did not incur any costs.

We also partnered with Professor Timothy Hagle at the University of Iowa to ensure an outside voter registration expert was validating what we were seeing. Since before the 2018 general election, the Iowa Secretary of State's Office has received weekly reports from Professor Hagle on his analysis of this data. The Secretary of State's staff, Professor Hagle, and VoteShield regularly discuss the data, trends, and how to improve the reporting. VoteShield is a valuable tool that can help protect against hostile attempts to manipulate voter data, while also helping to reduce human error.

Following the successful launch of VoteShield, the Secretary of State's Office worked with Protect Democracy on BallotShield ahead of the 2020 general election. We implemented the same technology that was previously applied to voter registration files to Iowa's absentee ballot files.

Last year, election officials processed an unprecedented number of absentee ballots in Iowa and across the nation. Due to lingering doubts about the security of voting by mail, generating tools that provide extra monitoring of the process, and sharing that information with the public, helps bolster security and voter confidence. It can also detect potential problems with mail delivery.

BallotShield detects trends such as the average time from absentee requests being entered to ballots being transmitted, the average time between ballots being sent to and returned by voters within each county, and the percentage of ballots being returned by mail.

These items comparing counties ballot return rates can alert election officials to potential issues with a county's processes or with mail flow in certain regions that can be addressed with the U.S. Postal Service.

Additional items that assist with tracking include addresses receiving large number of absentee ballots. This scenario is to be expected at a congregate living address but would be a red flag if an individual residential address. The system can also detect numbers of voided ballots or changes made to address information of existing ballots to isolate unexpected changes.

## **SIGNIFICANCE**

Voter confidence in our nation is at an all-time low, [according to a Gallup poll released in October 2020](#). U.S. citizens have doubts about the accuracy of the results of the two most recent presidential elections. Some question whether there are enough cybersecurity protections in place. Others have doubts about the use of mail for absentee ballots.

Without confidence in our electoral process, we risk losing the most important fabric of our constitutional republic: the trust of the citizens in the basic American principal that we are a free and fair country. As election officials, it is our duty to ensure elections are protected and let our voters know the sanctity of their vote is upheld. This initiative, **‘Shielding the Vote: Using Technology to Boost Voter Confidence’**, can help us guarantee our *“government of the people, by the people, for the people, shall not perish from the Earth.”*

VoteShield protects and monitors voter registration. BallotShield does the same for absentee voting. Together, they create a versatile and robust fortress that can repel attacks on a county or state’s election system.

**Prof. Tim Hagle, University of Iowa:** *“VoteShield is an extremely valuable set of tools for state officials in charge of voter rolls as well as those interested in voter registration analysis. The analytic tools available helps to guarantee the accuracy and security of voter registration processes. In addition to displaying various data (e.g., registrations, removals, inactivations, address changes) in simple graphic form via timelines, the data can also be broken down into a variety of demographic characteristics including by party, age, and sex. Anomaly detection scores highlight data that shows unusual changes in a variety of categories at the county level. This helps to spot potential problems that deserve closer examination. Problems in the maintenance and accuracy of voter rolls can range from simple errors at the local level to external cyberattacks. With increased attention being paid to election integrity VoteShield provides tools to quickly identify potential problems.”*

**Quinn Raymond, project lead at VoteShield:** *“Our partnership with Secretary Pate is a model of how technologists and election administrators can work together to secure our elections and give the public greater confidence in their elections. Secretary Pate understands that ensuring all eligible citizens the right to vote means navigating a complex environment, including threats from sophisticated malicious actors. We’re excited that our system has provided him an important tool to secure the voter rolls against those evolving threats.”*

## **IMPACT/RESULTS**

By outlining and embracing a clear set of common values at the start, it became much easier for the Iowa Secretary of State’s Office to partner and establish trust with an outside organization:



All qualified voters are entitled to participate in free & fair elections.



The ideal voter file should be both complete but also accurate.



Election administrators are working in good faith towards these goals.

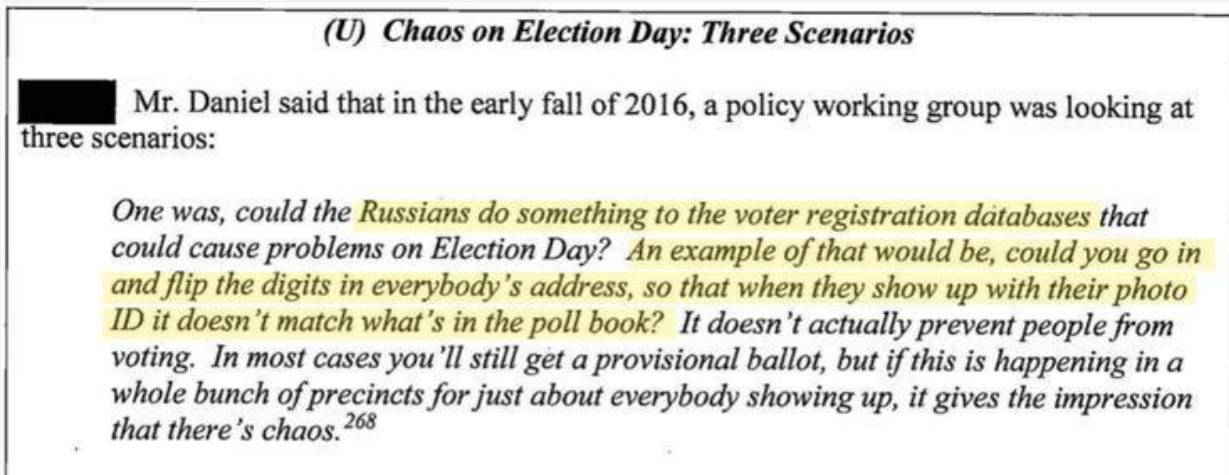


Public confidence in our electoral system is critical to our democracy.

Experts agree that voter registration databases are a target for foreign adversaries:

- Scalable (millions of records)
- Online 24/7
- Attacks are cheap
- Difficult to impose consequences

The primary purpose of an attack may simply be to introduce doubt into the minds of voters and undermine faith in our electoral system. That scenario was outlined in the U.S. Senate Intelligence Committee's Report on 2016 election interference:



Of course, depending on the scale, such an attack could also have a material outcome on the election. And while we saw these attacks originate from Russia in 2016, there are plenty of other actors in the world with the resources and motivation to attempt to disrupt U.S. elections in the future. Election Day chaos could be created if registered voters' profiles were changed maliciously, causing precinct election officials to mistakenly think they were addressing unregistered voters or voters at the wrong polling place.

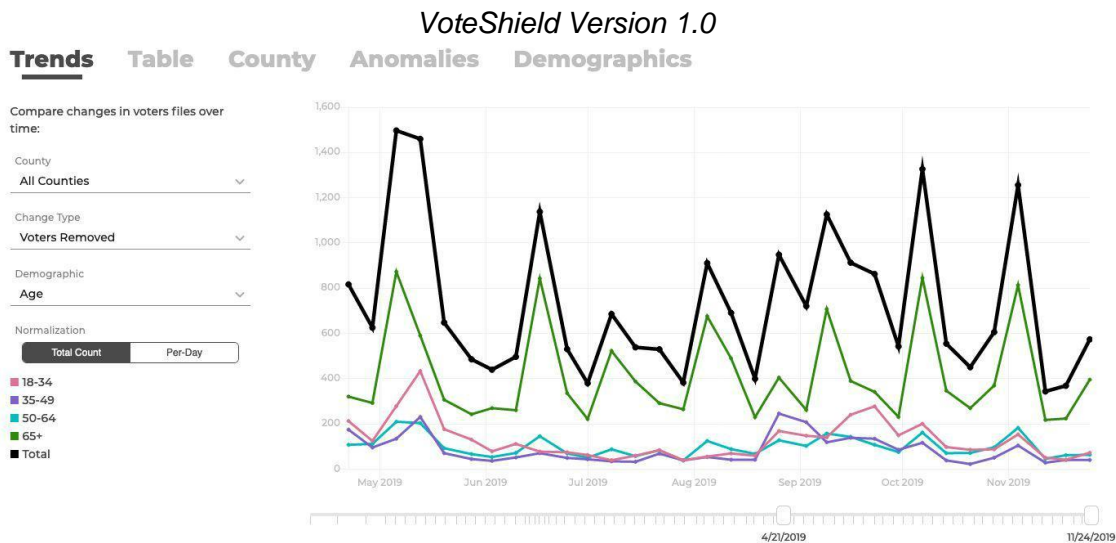
Another key problem VoteShield can discover and help solve is human error. A real-life example of how our partnership works with VoteShield and Professor Hagle is an incident that happened two months before our city-school election in 2019. A report showed an anomaly in one Iowa county's number of inactivated voters. We contacted that county's elections staff to ask about their high numbers. During our discussion, they realized that they incorrectly inactivated voters because of returned post cards from a mailing. The county auditor was able to reinstate more than 100 registered voters after receiving our phone call.

Since 2016, Iowa has implemented numerous security upgrades and processes to ensure we can "identify, protect, detect, respond, and recover" to/from such threats. Adopting VoteShield fits into a much broader set of security efforts.

Specifically, VoteShield:

- Tracks changes to voter records over time
- Visualizes these changes
- Uses machine learning and statistics to flag anomalies
- Compares demographics of altered records to rest of electorate

We beta tested version 1.0 of the software in the run-up to the 2018 midterm elections:



In addition to validating the security of our voter rolls, the tool is also useful for quickly spotting administrative errors that might otherwise incur legal or public perception issues.

### VoteShield Version 2.0

In 2019, VoteShield's development team responded to in-depth and ongoing feedback from our office, as well as several county auditors, to ensure version 2.0 could better meet our specific needs. In November of that year, we rolled out version 2.0 to all county auditors at no cost to the state or counties. They used this updated version to monitor their voter rolls throughout 2020 and continue to do so.

New features:

- Built through collaboration with the Secretary of State's Office and counties
- Cross-county timeline comparisons
- Four new anomaly detection methods
- New analysis panel for analyzing voter registration changes

\*VoteShield graphics related to Version 2.0 are available in the Supporting Materials.

BallotShield was deployed in Iowa ahead of the 2020 general election. More than 1 million Iowans voted absentee, shattering the state record by a significant margin. The application allowed us to detect an anomaly in Guthrie County, a rural county on the western side of Iowa. BallotShield alerted us that the average number of days to return an absentee ballot in Guthrie County was 17 days, significantly longer than the rest of the state. This led to our office connecting with the U.S. Postal Service and the county auditor to see if there was an unusual delay in mail from Guthrie County. We wanted to ensure local voters were able to have their ballots processed.

\*VoteShield graphics specifically related to the Guthrie County situation are available in the Supporting Materials.

It turned out there was no delay, it was simply an input error from the auditor's office. However, this level of sophisticated detection showed BallotShield is a valuable tool that lets us know election mail is being delivered in a timely fashion, ensuring every eligible voter's ballot will count.

BallotShield can also detect absentee ballot request anomalies, such as several requests coming from one residence. This is normal in the case of college dorms, assisted living facilities, or homeless shelters. However, when numerous requests are being made from one address that is not a congregate setting, BallotShield detects such an anomaly and alerts the election official of a potentially suspicious situation. This innovative web application helps ensure voter fraud is not taking place on absentee ballot requests.

- **Innovation**

This project is innovative in two ways:

- It leverages newer technologies, such as machine-learning, coupled with public data to monitor the integrity of our elections.
- It engages productively with an outside non-profit towards a common set of goals.

- **Sustainability**

- VoteShield and BallotShield are funded exclusively through a 501c3 non-profit.
- Plans are for Iowa to continue utilizing these programs for the foreseeable future, and developers are currently planning beyond 2021 to ensure a sustainable model that remains focused on its mission.

- **Cost-effectiveness**

- There are no costs to the state or local election administrators.
- VoteShield/BallotShield pays the standard subscription fee for access to our voter data.

- **Replicability**

- VoteShield is currently available in 17 states, with three more states set to implement it by the end of 2021.
- BallotShield has expanded to five states with another one currently in the works.

- **Creating positive results**

- Having confidence in the integrity of our voter data and absentee ballots is mission critical.
- Being able to communicate that confidence to our voters is equally important.

# SUPPORTING MATERIALS

## Media coverage of VoteShield

Government Technology: [Nonprofit's free app flags suspicious changes to voter rolls](#)

Waukon Standard: [Iowa's First-in-the-Nation partnership with VoteShield helps protect integrity of elections](#)

River Cities Reader: [Iowa's First-in-the-Nation partnership with VoteShield helps protect integrity of elections](#)

University of Iowa: [Prof. Tim Hagle assisting Iowa Secretary of State with VoteShield partnership](#)

Freethink Media: [Keeping Democracy Safe in the 2020 election](#)

Cedar Rapids Gazette: [Election commissioners: Working together to protect Iowans' votes](#)

Quad City Times: [Column: 'We've got this'](#)

Governing: [Cybersecurity and Democracy collide: Locking down elections](#)

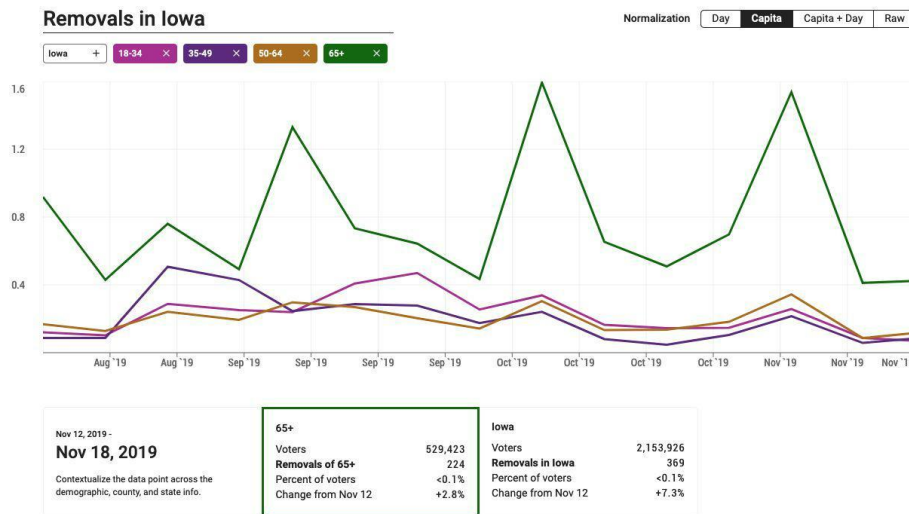
Center for Tech and Civic Life: [30 ways election officials boost voter confidence and trust](#)

Mason City Globe Gazette: [Commentary: Working together to protect your vote](#)






North Scott Press: [Working together to protect your vote](#)

Iowa Public Radio: [Moritz running for re-election](#)

### Timeline View



## Anomaly View

Average Index <sup>^</sup>	Snapshot	Change Type	Location	Voters Affected	% Affected (Total voters)	Change from Previous Snapshot	Trends
9.8   	Nov 4, 2019 - Nov 12, 2019	Address Changes	[REDACTED]	101	0.5% 19,471	7,200%	
9.74   	Nov 4, 2019 - Nov 12, 2019	Address Changes	[REDACTED]	129	0.6% 22,381	n/a	
9.72   	Oct 7, 2019 - Oct 14, 2019	Registrations	[REDACTED]	86	0.7% 11,636	1,333.3%	

## Analysis View


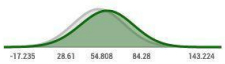

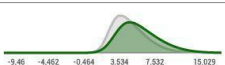

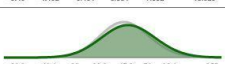




Oct 28, 2019 - Nov 4, 2019

### Analysis of 1,256 Removals in Iowa

This group of Removals contains 0.1% of voters in Iowa.

#### Most Highly Correlated Variables

Click on any of these variables to further analyze them.

Variable	Correlation	Comparison
Age	 Positive <b>0.301</b>	
Most Recent Electoral Participation	 Positive <b>0.073</b>	
Absentee Votes	 Positive <b>0.066</b>	
Party: No party affiliation	 Negative <b>-0.057</b>	
Party: Democrat	 Positive <b>0.051</b>	

#### Legend

Oct 28, 2019 - Nov 4, 2019

 1,256 Removals in Iowa

 Sample of all 2,149,454 voters in Iowa

#### Jump to comparison

Gender

Voter Status

Party

Age

Participation

Most Recent Electoral Participation

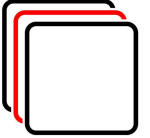
Absentee Votes

Average Election Size

Primary Vote: Democrat

Primary Vote: Republican

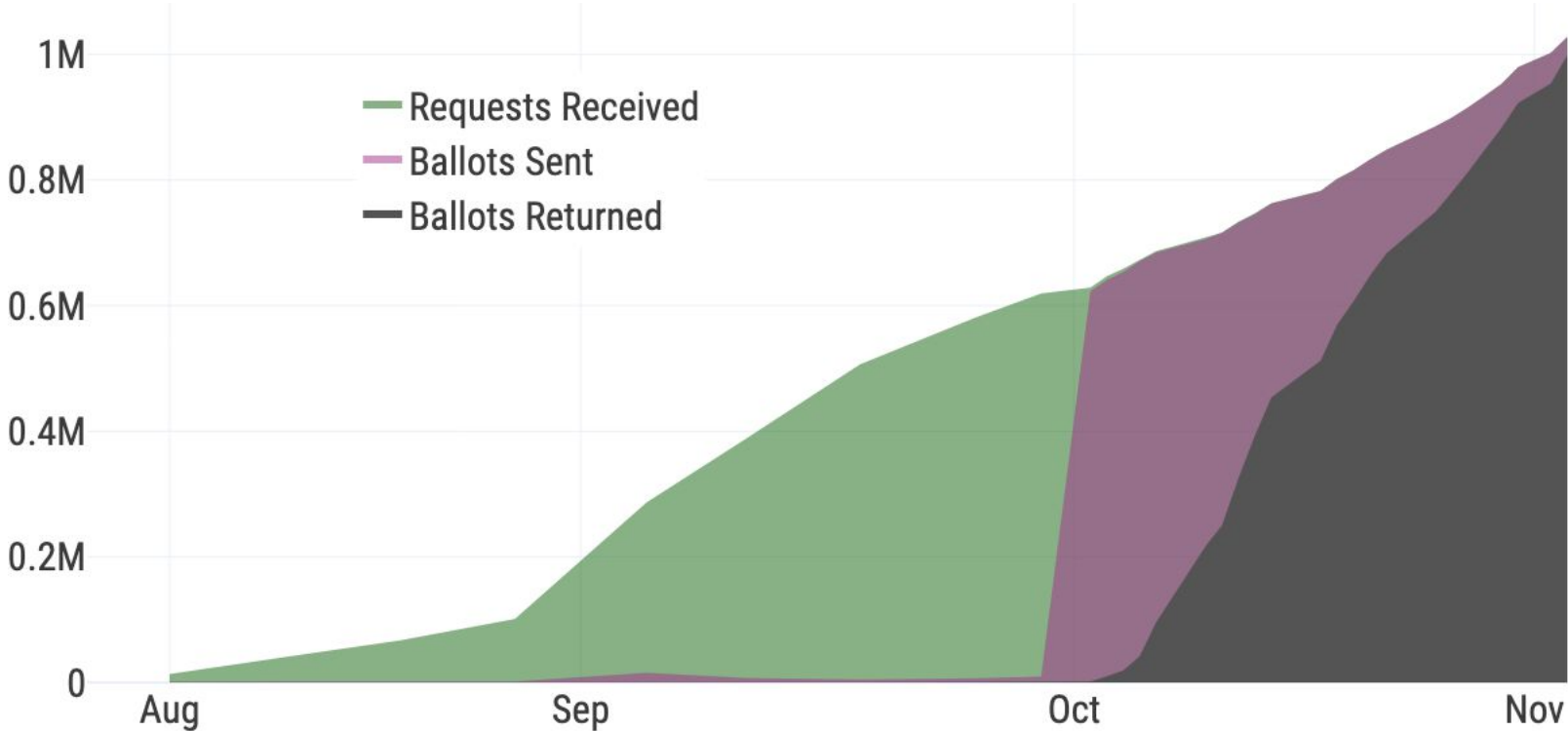




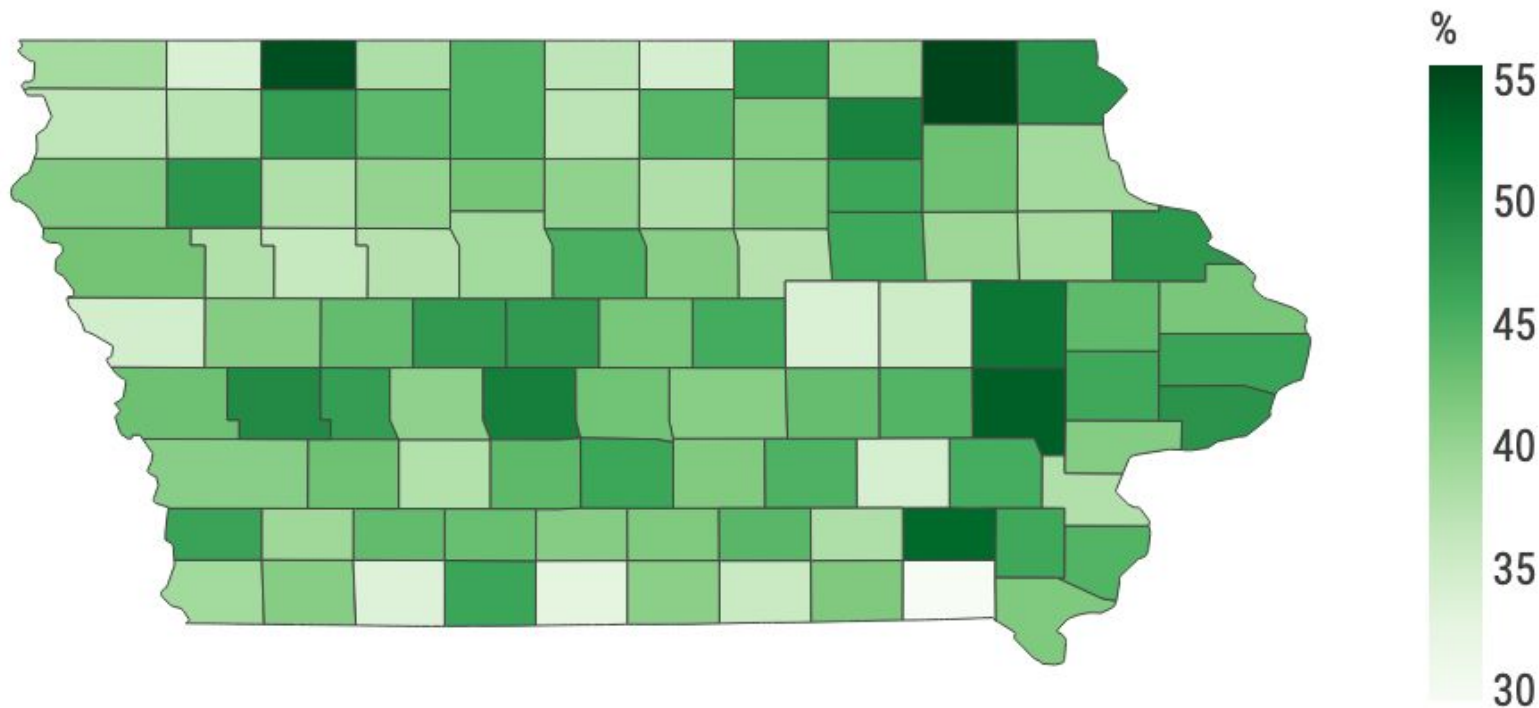
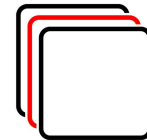
# BallotShield

An overview of absentee voting in the Iowa 2020 general election

# BallotShield 2020: Iowa Absentee Voting Overview



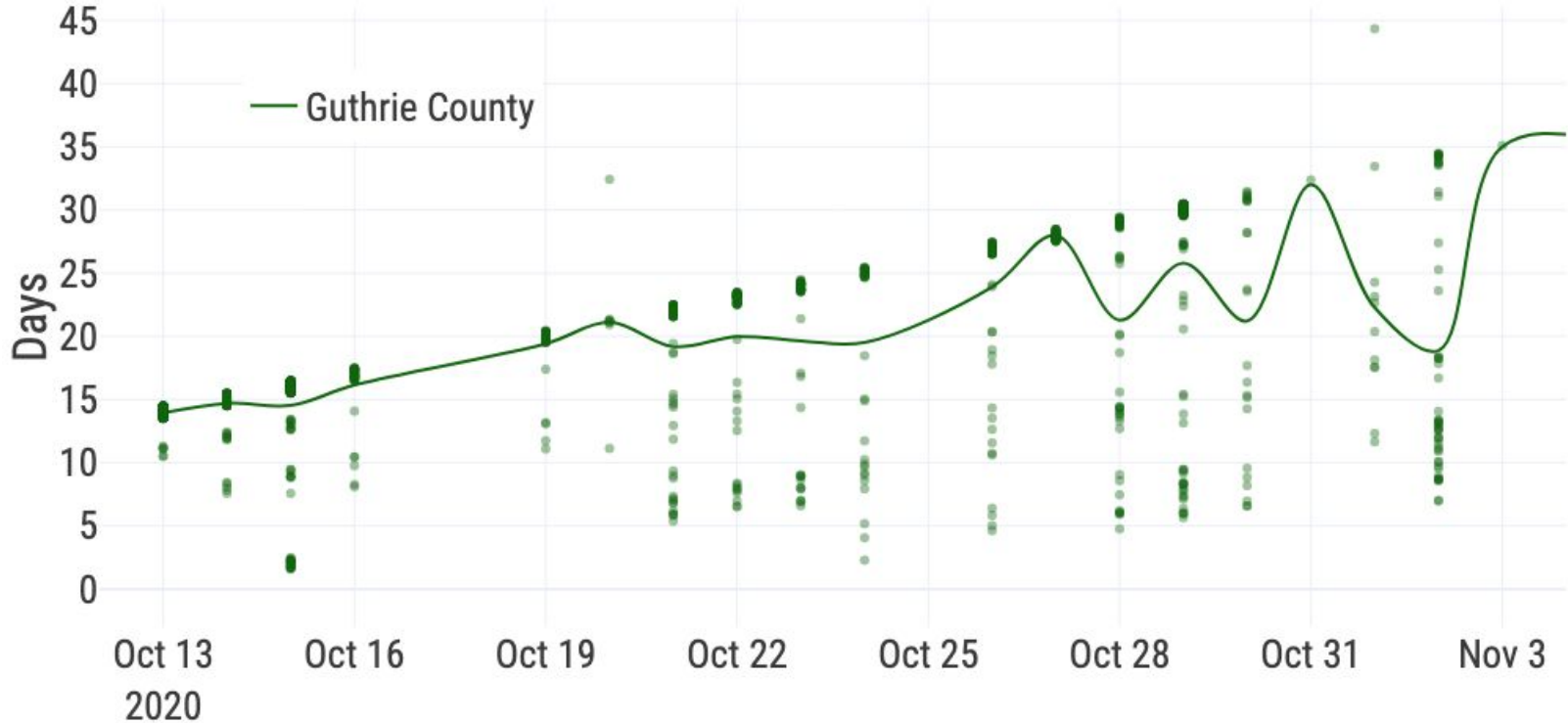
# Absentee Ballots Cast as a Percent of Registered Voters



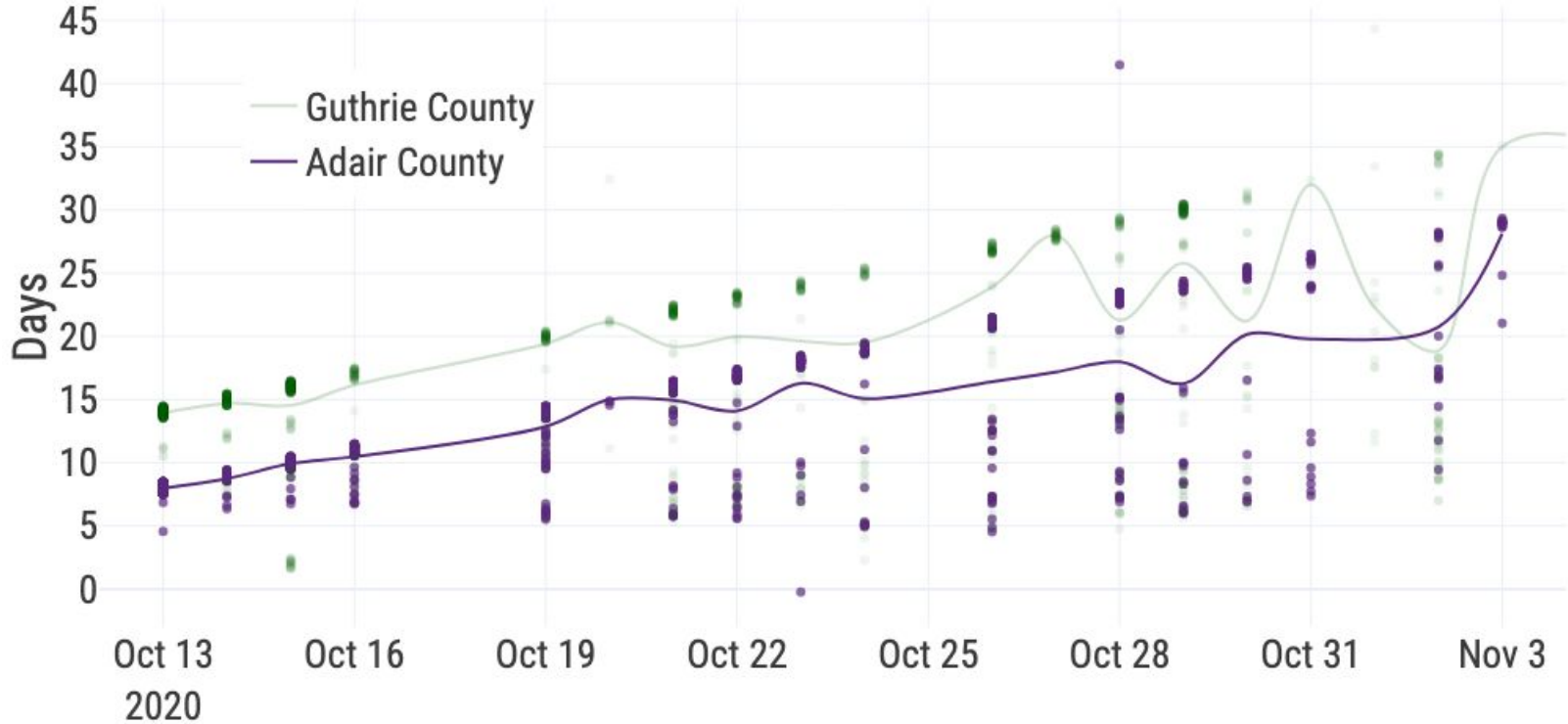




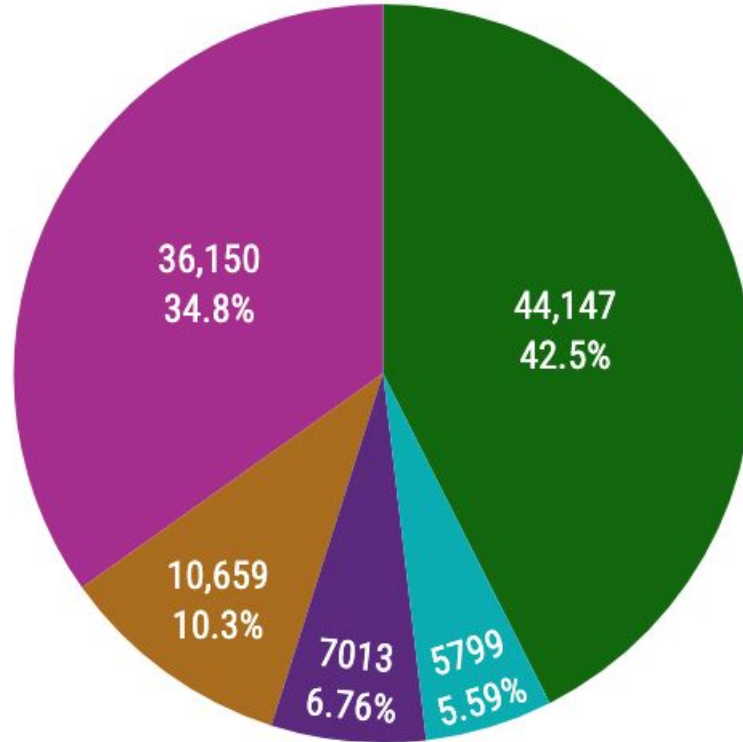
# A Closer Look at Guthrie County Return Times



# A Closer Look at Guthrie County Return Times



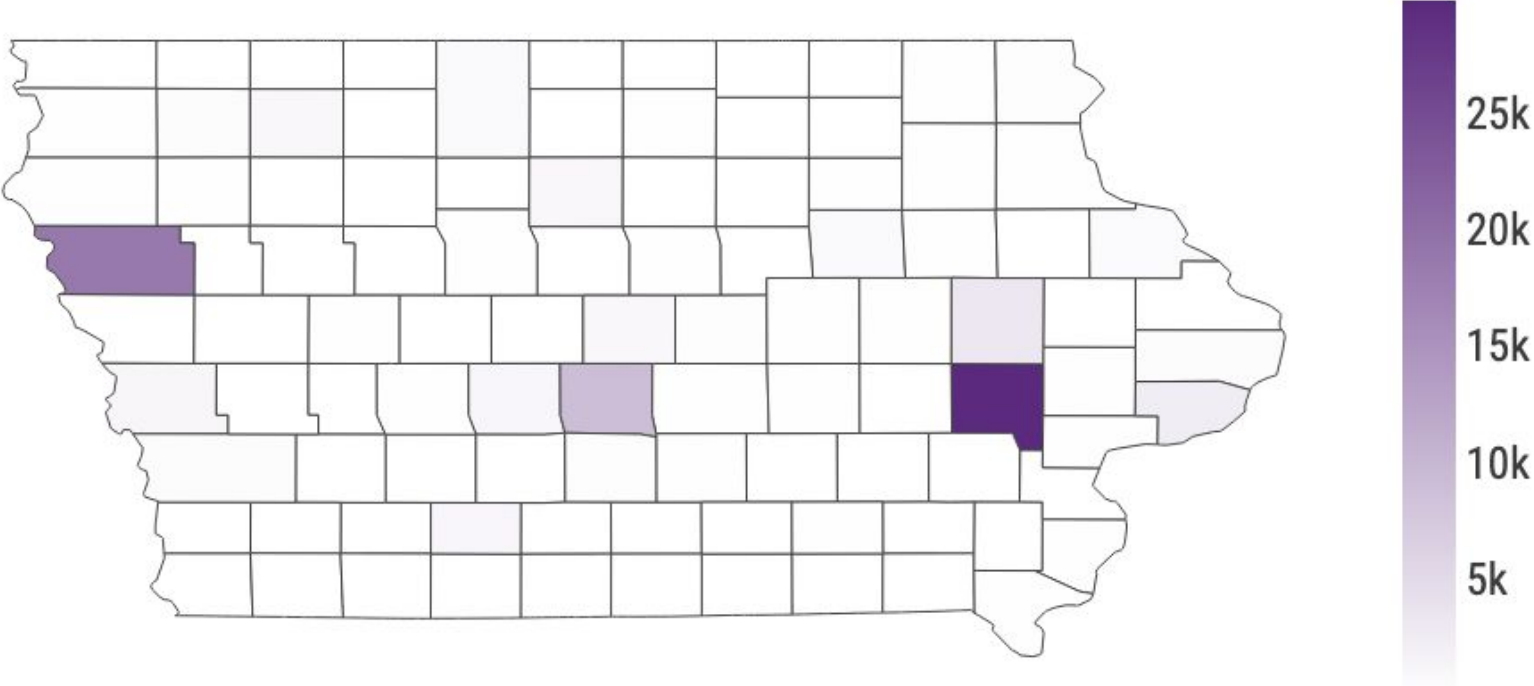
# Absentee Ballot Record Modifications



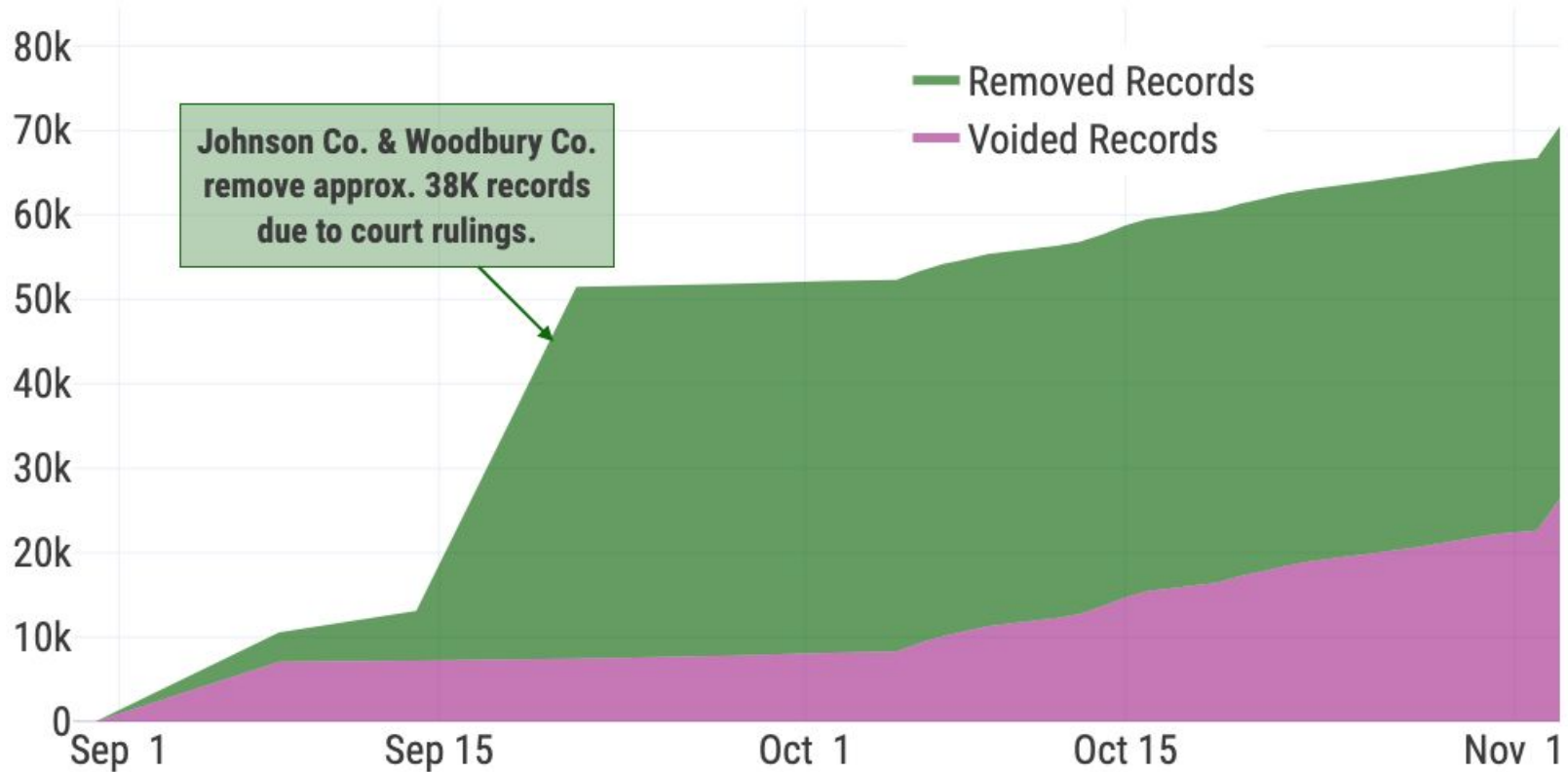
- Removed Records
- Voided Records
- Address Changes
- Name Changes
- Party Changes



# Removed and Voided Records by County



# Removed and Voiced Records Over Time



# Common Addresses Tool



Full Address	County	Number Of Ballots
<a href="#">1130 Carmel Dr Dubuque IA 52003</a>	Dubuque	122
<a href="#">3485 Windsor Ave Dubuque IA 52001</a>	Dubuque	84
<a href="#">1301 Summit St Marshalltown IA 50158</a>	Marshall	82
<a href="#">3390 Windsor Ave Dubuque IA 52001</a>	Dubuque	74
<a href="#">1215 30Th St Des Moines IA 50311</a>	Scott	67
<a href="#">2360 Carter Rd Dubuque IA 52001</a>	Dubuque	55
<a href="#">2421 Lutheran Dr Muscatine IA 52761</a>	Muscatine	54
<a href="#">518 W Locust St-Sau West Davenport IA 52803</a>	Jackson	53
<a href="#">1005 Lincoln Ave Dubuque IA 52001</a>	Dubuque	50
<a href="#">3340 Windsor Ave Dubuque IA 52001</a>	Dubuque	50
<a href="#">1410 W Dunkerton Rd Waterloo IA 50703</a>	Black Hawk	50
<a href="#">518 W Locust St-Sau East Davenport IA 52803</a>	Scott	49
<a href="#">105 Mccarren Dr Manchester IA 52057</a>	Delaware	45
<a href="#">708 S Jefferson Way Indianola IA 50125</a>	Warren	44
<a href="#">114 S 20Th-Eventide Denison IA 51442</a>	Crawford	43
<a href="#">405 N 15Th Ave Hiawatha IA 52233</a>	Linn	43
<a href="#">1450 Alta Vista St Dubuque IA 52001</a>	Bremer	42
<a href="#">1118 11Th St Dewitt IA 52742</a>	Clinton	40
<a href="#">2332 Liberty Dr Coralville IA 52241</a>	Johnson	40
<a href="#">302 2Nd St Ne Mason City IA 50401</a>	Cerro Gordo	40
<a href="#">2651 St Francis Dr Waterloo IA 50702</a>	Black Hawk	39
<a href="#">1050 4Th Ave Se Cedar Rapids IA 52403</a>	Linn	36

1130 Carmel Dr Dubuque IA 52003

1130 Carmel Dr  
Dubuque, IA 52003

Directions Save Nearby Send to your phone Share

Suggest an edit on 1130 Carmel Dr

Add a missing place

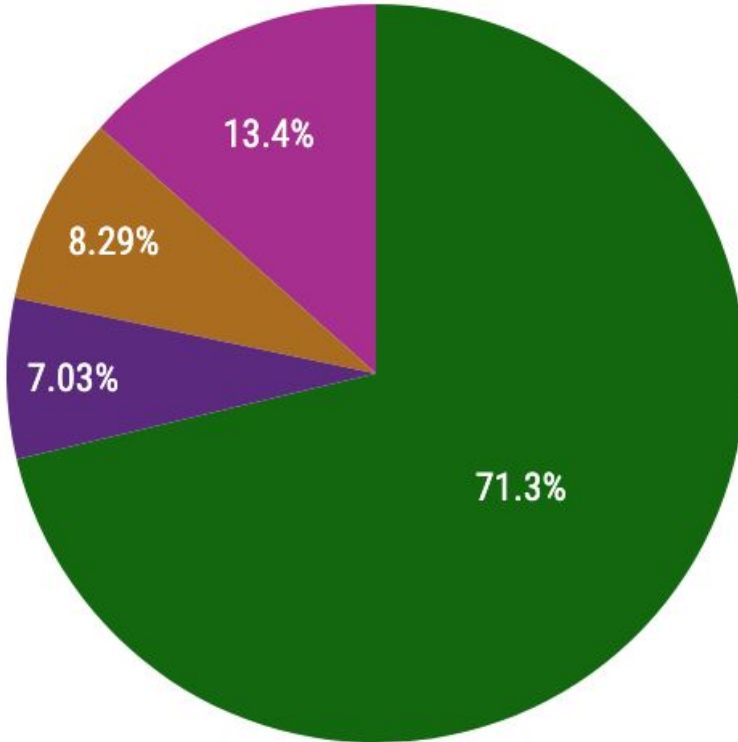
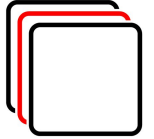
Add your business

Add a label

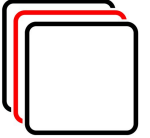
Photos

Sisters of Charity-BVM-MT

# Common Addresses Sources - More than 20 Ballots



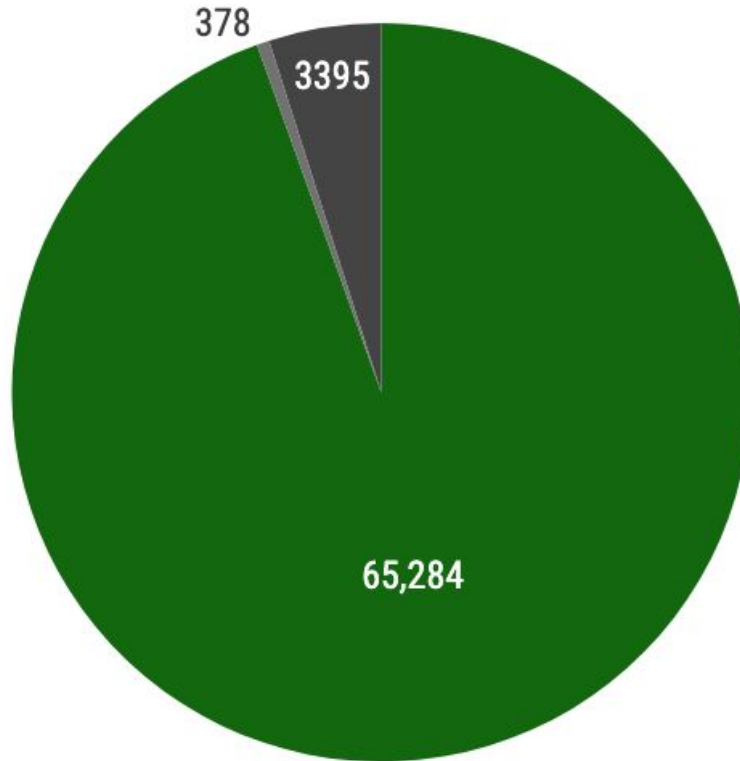
- Senior Living/Nursing Home
- Student Housing
- Religious Facility
- Residential Medical Facility



# VoteShield

An initial examination of post-election list maintenance in Iowa

# Categorizing Post-Election Removals



- NVRA Maintenance
- Active Voters
- Other



# NVRA List Maintenance by County: Percent of Voters

