

Coalition for Good Governance

Georgia's 127,000 Missing Votes— Disproportionate Vote Loss in African American Neighborhoods

February 8, 2019

This report summarizes preliminary findings based on our team's analysis of the November 2018 precinct election reports and demographic election data. We have engaged election statistics experts, voting systems scientists, and election data analytics experts to review the precinct level data related to the 127,000+ missing votes on the electronic voting machines. While we cannot speculate on the root cause of the disproportionate loss of votes in heavily African American neighborhood precincts, something is very wrong and it is disturbing. This report should motivate Georgia voters and civic leaders to take action to demand answers and a fair and transparent election system. Georgia's election officials must stop concealing the source of the problem and stop fighting the public's efforts to understand how the votes were counted in this election.

Executive Summary—Key Points in This Report

- Approximately 127,000 fewer votes were recorded in the 2018 Lt. Governor's contest than experts estimate should have been cast.
- Statistical analyses and experts' reports expose a dramatically increased number of missing votes (undervotes or drop-off in votes compared to the top-of-the-ballot contest) for the Lt. Governor's contest in primarily African American neighborhood precincts.
- Voting machine defects and misprogramming are the likely culprits responsible for the significant number of missing votes. Some voters reported touchscreen machines that did not properly display the Lt. Governor's contest, and others reported machine screen malfunction and "vote flipping" when they attempted to vote.
- The extreme drop-off in votes in the Lt. Governor's contest when compared to the Governor's contest is significantly out of line with historic patterns and does not appear in any other 2018 statewide contest, including those contests that were much further "down ballot" than the Lt. Governor's race. The drop-off indicates that 63,718 fewer votes were

recorded for Lt. Governor than for the Commissioner of Agriculture, the statewide contest with the second-lowest participation rate.

- The extreme pattern of missing Lt. Governor's contest votes only occurred in votes cast on touch-screen machines. The larger-than-average number of undervotes did not occur in votes cast on paper ballots. Mail-in ballot voters voted down the ballot in typical historical voting patterns.
- There is no meaningful correlation between new voters and the Lt. Governor undervote, debunking officials' excuse that newly registered voters were confused about the need to vote separately for Governor and Lt. Governor.
- Forensic examinations of the machine programming must be promptly undertaken to obtain answers, locate the source of the errors, and, if appropriate, hold officials accountable.
- Electronic voting systems must be immediately abandoned and paper ballots adopted so that no future elections are conducted on Georgia's unauditible machines.
- Governor Kemp, Secretary Raffensperger, and legislative leaders must abandon their plan to adopt a new ballot-marking-device electronic voting system that, like the current system, is unauditible and vulnerable to problems of the type experienced in November's election.

There are many more questions to be asked and potential irregularities to be explored. Further analysis is required to know potential misprogramming impacts on other races.

We encourage you to read the full report and to support our ongoing efforts to determine the cause of the undervote irregularity as well as its impact on the African American voting community. Voters should call on their bi-partisan county election boards to conduct independent local investigations to determine the cause of the potential disenfranchisement in their counties.

Purpose of This Report

We at [Coalition for Good Governance](#) believe it is imperative that Georgia voters, U.S. Congress, Georgia lawmakers, election officials, and the press be provided with essential information concerning the manner in which the electronic voting system failed in the 2018 mid-terms. The systemic failures must be understood and their causes broadly communicated to protect the nation's future elections. Although we are in the early stages of dissecting Georgia's November 2018 systemic failures, it is important that voters and civic leaders have access to credible information so that they can demand fundamental improvements in Georgia's system in an informed manner.

Logical explanations for the 127,000+ missing votes¹ in Georgia's November 6, 2018, Lieutenant Governor's contest continue to elude political scientists, statisticians, and voting system experts.

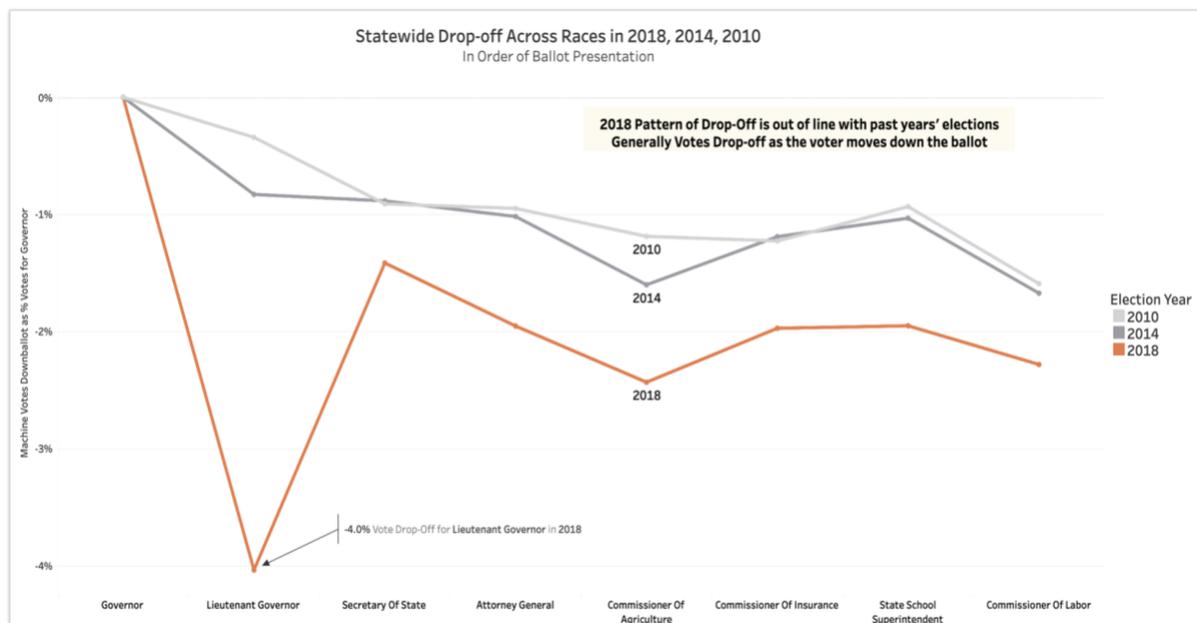
¹ The 127,000 is calculated as follows: The drop-off in votes for Lt. Governor, compared to votes for Governor, has averaged 0.8% over the four elections prior to the 2018 elections. Had there been an average 0.8% drop-off in this election, rather than the 4.0% drop-off actually experienced, there would have been over 127,000 more votes cast for Lt. Governor.

Early indications based on public election records show that many of the missing votes (“undervotes”) occurred at highly unusual rates when voters used touchscreen voting machines, especially in African American neighborhoods. In most precincts having White majorities and in mail-in paper ballot voting, however, only a typical amount of undervotes is seen.

The Missing Votes

There are approximately 169,000 voters whose ballots did not record a vote (creating “undervotes”) for either the Republican or the Democratic candidate for the Lt. Governor contest. Only 2,233 of the approximately 236,000 mail-in ballot voters failed to vote in the Lt. Governor’s race, meaning that for auditable paper mail ballots, less than a 1% drop-off occurred. Some “drop-off” from the number of votes cast in the top race is typical as voters move down the ballot, but an undervote rate of 4% for Lieutenant Governor is an extreme anomaly, especially because it happens extensively on ballots cast on the voting machines, but not on the paper ballots. There were only 66,301 voters who did not successfully record votes for Secretary of State, the next “down ballot” contest after the Lt. Governor’s contest. For votes cast on the electronic machines, all other 9 statewide contests reported significantly more votes than those tallied for Lt. Governor, which is the second most powerful position in state government, and unlikely to be purposely skipped (undervoted) by voters, as demonstrated by the less than 1% drop-off rate on paper ballots. Even the race for lesser known Commissioner of Agriculture tallied 63,178 more votes than those reported for Lt. Governor.

Georgia’s prior gubernatorial elections do not show significant drop-offs for the Lt. Governors’ races, nor for other down-ballot statewide races.



Votes Are Missing from Voting Machines, Not from Mail-In Paper Ballots

As noted above, only 2,233 mail-in ballot voters who voted for Governor failed to vote for Lt. Governor, approximately 1% of mail-in ballot voters. Those vote tallies can be verified because the paper ballots can be examined. However, votes reported from the electronic voting machines cannot be audited to determine how many votes the voters actually cast in the Lt. Governor election. An independent forensic examination of the voting machines and programming will be required to detect the problem that caused the missing votes. (See Bernhard memo, Exhibit A).

There is no reasonable explanation for voters who used voting machines to have different undervote patterns than voters who voted on paper ballots. Experts have rendered opinions that the undervote patterns observed in the November election are consistent with electronic voting system hardware malfunction or software defects.²

Statewide Problem with Disparate Impact on African American Neighborhoods

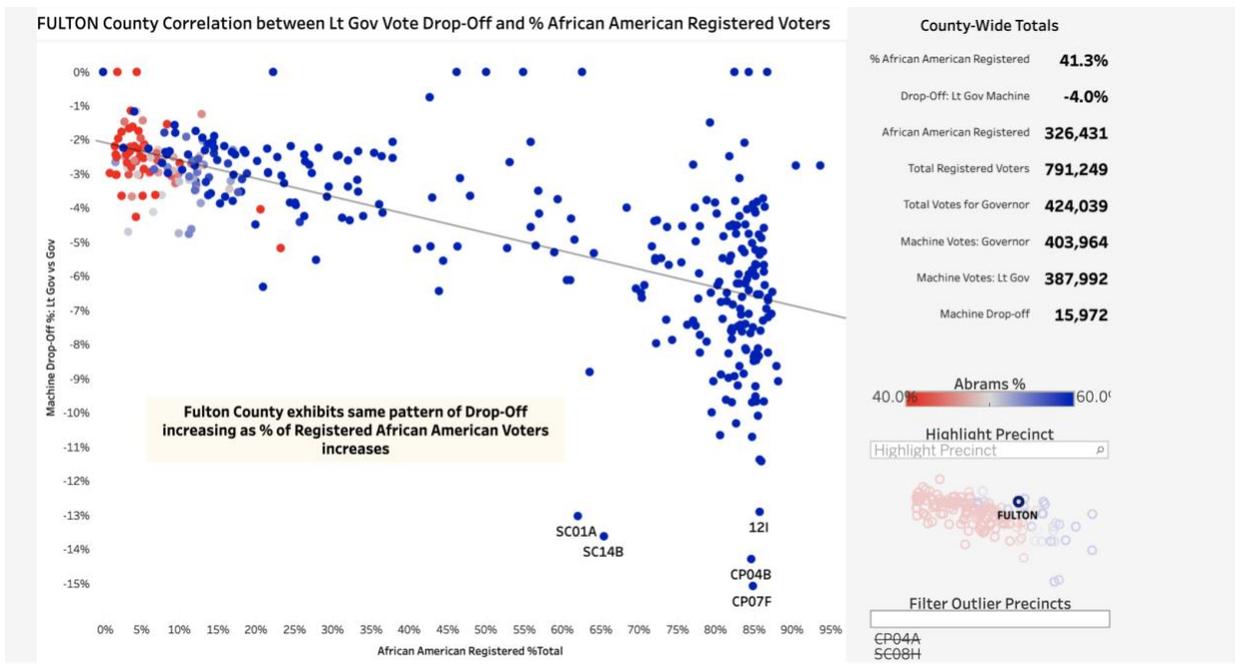
The extreme undervote issue occurred at statistically significant levels in 101 of Georgia's 159 counties.³ However, the undervotes on voting machines are concentrated in precincts where African American voters make up the majority of the precincts' registered voters. The rates of touchscreen machine-reported undervotes in such precincts in the Lt. Governor contest are far greater than the undervote rates in non-African American neighborhoods regardless of whether those neighborhoods lean Democratic or Republican. The undervote problem did not happen at the same exaggerated levels in many primarily White neighborhoods that overwhelmingly voted for Stacey Abrams and other Democrats, rebutting the argument that the difference can be explained by party-driven voter behavior.

The graph below shows the concentration of drop-off of votes from the Governor's contest to the Lt. Governor's contest in Fulton County precincts. As the percentage of African American registered voters increase in precinct demographics, the rates of machine undervotes climb dramatically. Blue dots represent Democratic Party-leaning precincts and red dots are Republican-leaning precincts. The link below provides the interactive version that permits exploring the detailed data by precinct. The interactive graphs can be found at <https://tabsoft.co/2GuVcj2>.⁴

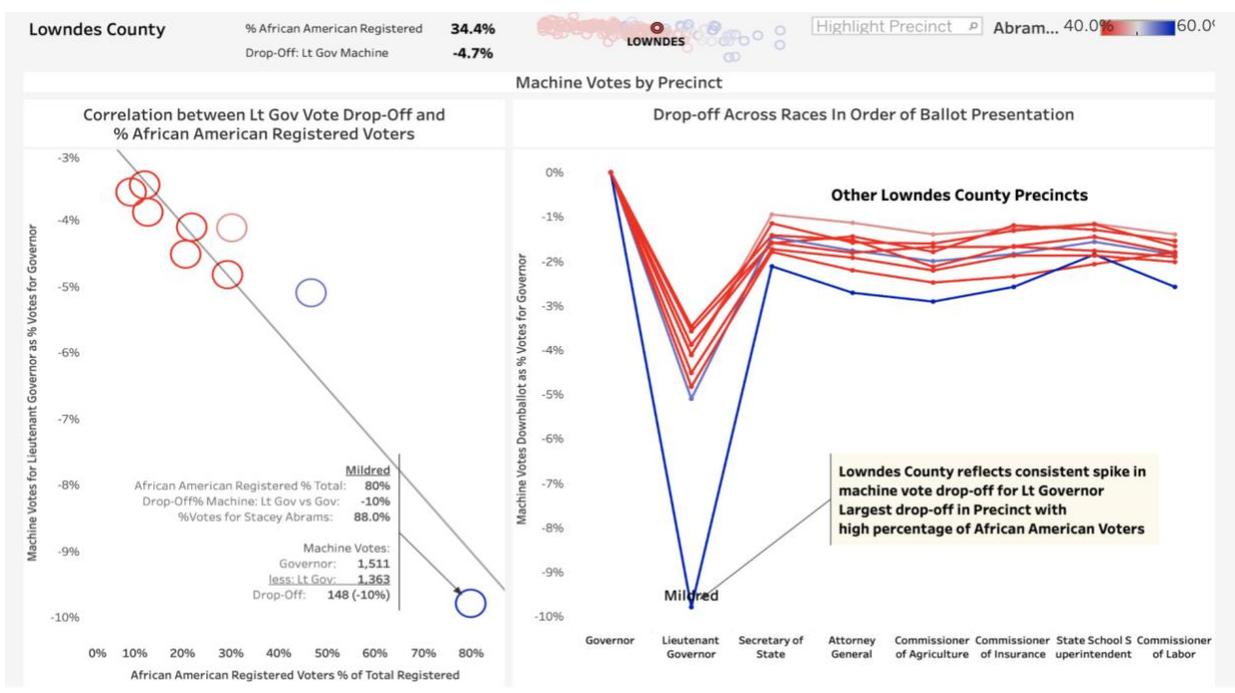
² See Stark and Brill expert opinions. <https://coalitionforgoodgovernance.sharefile.com/d-s9b25d5afafd4d66b>

³ See Stark affidavit ¶ 23 <https://coalitionforgoodgovernance.sharefile.com/d-s9b25d5afafd4d66b>

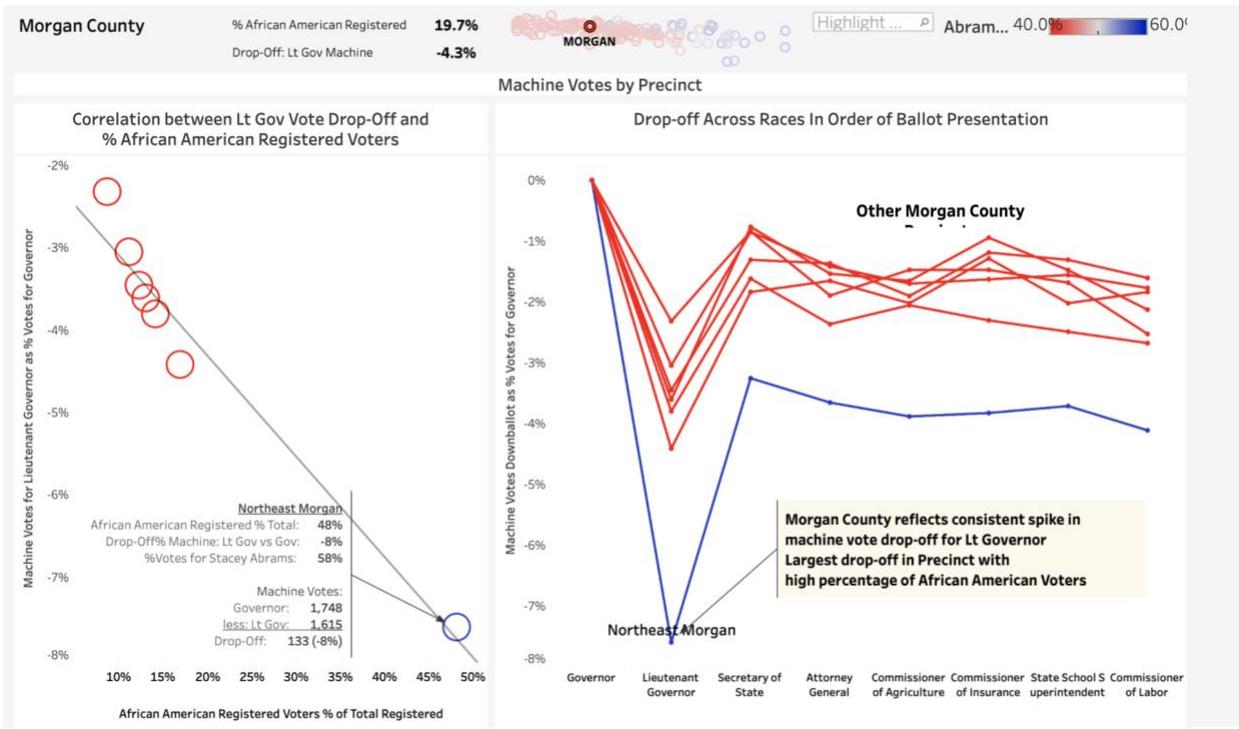
⁴ Interactive graphs and commentary courtesy of Melanie Manning, Empower Elections, <https://www.empowerboc.com/news-events-elections/>.



The strange irregular undervote occurred in over 100 counties in the state, both in “red” counties and “blue” counties. Lowndes County provides a typical example. The undervote in Mildred Precinct, the county’s precinct with the most registered African Americans, is far greater than in other precincts. Note that voters did not merely vote for Governor, lose interest in the rest of the election, and cast their ballots. They continued to vote in the down-ballot contests—a pattern seen statewide. The interactive link (<https://tabsoft.co/2GuVcj2>) will permit exploration of the Lowndes County details on the graph below.



Morgan County provides another picture of the machine-driven irregularity in reported Lt. Governor vote tallies. Morgan and several other counties' details, including precinct by precinct demographics, can be reviewed through the above interactive link.



Election data analytics expert Chris Brill of TargetSmart explains the concerning racial impact results in his report attached as Exhibit B. His earlier report on the missing votes overall is included the document referenced in footnote 2 (pages 120–124).

Touchscreen Voting Machines Are the Likely Vote Stealers

Experts have long warned of the dangers of electronic voting that cannot be relied on for accuracy or audited or recounted when problems like “missing votes” arise. Georgia’s system is exceptionally vulnerable to attack, manipulation, and human error in programming. First, the design of Georgia’s Diebold touchscreen voting system is so fundamentally flawed that the National Academies of Sciences recommended immediately abandoning all such systems before the 2018 mid-terms,⁵ which echoed the recommendations of most federal agencies and multiple Congressional committees. Further, Georgia’s unacceptable system’s problems are exacerbated by the fact that the system was compromised by its exposure to extreme cybersecurity risks in 2016 and 2017, and the impacts were

⁵ <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=25120>

never mitigated, meaning that residual malware may reside in the system, including 27,000 voting machines and thousands of additional vulnerable components. Georgia state and county officials--including every county's bi-partisan election board--conducted this election on a system that they, and everyone else, knew was compromised.

In our *Curling v. Kemp* case in federal court in the Northern District of Georgia, Judge Amy Totenberg ruled: "Plaintiffs in this case have presented sufficient evidence so far that their votes cast by DRE may be altered, diluted, or effectively not counted on the same terms as someone using another voting method—or that there is a serious risk of this under the circumstances."⁶ Yet, Governor Brian Kemp, then Secretary of State, and every county election board, insisted on using those compromised and flawed machines to conduct the November election, despite having the capability to use paper ballots and optical scanners already owned and certified.

The type of misprogramming or defect exhibited virtually statewide in the Lt. Governor's contest can be caused in the central programming of the 27,000 machines that takes place in the Secretary of State's office. The superficial testing of the machines conducted by local election officials has little chance of detecting such irregularities in programming.

Lt. Governor's Contest Missing on Some Touchscreen Ballots

During the election, various organizations' voter hotline complaints recorded numerous reports of the Lt. Governor's contest being missing from the appropriate screens. We have interviewed and received sworn affidavits from several voters who experienced this defect. Widespread reports of "vote flipping" and difficulty in recording a vote in the Lt. Governor's contest were prevalent. It is premature to estimate the likely multiple causes of the massive undervote, as forensic review of the electronic records will be required to detect the cause and determine the full impact.

Although the Lt. Governor's contest tallies show significant undervotes, a converse spike of unexpectedly high numbers of votes were recorded in state legislative contests in many counties (State House of Representatives and State Senate). Inexplicably, many such contests, generally the 12th and 13th contests down ballot, received more votes than statewide contests and the U.S. Congressional contests.⁷ Whether these unusually high numbers of votes are actually a reflection of voters' enthusiasm for these down-ballot state legislative contests over voters' interest in higher-office contests will remain unknown until the electronic records can be inspected by experts to determine whether the voting machine ballot screens may have been miscoded.

⁶ <https://coalitionforgoodgovernance.sharefile.com/d-s0f38f64d507438a8>

⁷ Brill report, p.122 <https://coalitionforgoodgovernance.sharefile.com/d-s9b25d5afafd4d66b>

State Officials' Response

Despite the vulnerability of the system and the extremely anomalous voting results, neither the Secretary of State nor the Georgia counties have performed any forensic examination of the machines or memory cards. Interim Secretary of State Robyn Crittenden refused to order a recount that Lt. Governor candidate Sarah Riggs Amico requested, and refused to conduct a meaningful investigation to determine the cause of these less-than-credible purported election results, but instead claimed that the voting system was accurate and secure.⁸

The State Board of Elections, charged with investigating election problems and ensuring uniform voting standards and procedures across the state, has shown no interest in this problem of missing votes and the likelihood of machine misprogramming.

Many Questions Remain Unanswered

Although experts have addressed the statistical likelihood that voting machines' defective programming caused the missing vote irregularities [Exhibits A and B], most questions are unanswered, and officials must be held to account. Answers must be discerned and brought forward to voters, Congress, state lawmakers, and the press.

--Were other races and ethnic groups also subjected to disparate treatment in ballot issuance and vote counting, as the African American community appears to have been?

--Was the Lt. Governor's contest the only contest severely impacted?

--Was this irregularity experienced in every county to some extent or did some counties operate voting machines that escaped the programming flaw or defect?

--Why did officials take no action when told that the Lt. Governor's contest did not appear on some touchscreen ballots? When did officials first learn of this malfunction?

--Did routine machine testing detect the problem that caused the missing votes?

Evidence Is Being Altered and Destroyed

State and county officials are required by state law to preserve the electronic records intact so that they may be examined by forensic experts in litigation discovery. Instead of doing so, officials have been continually reprogramming the machines and memory cards, writing over and altering the important electronic election records that constitute evidence.⁹

⁸ <https://coalitionforgoodgovernance.sharefile.com/d-sd54c210b81e49d7b>

⁹ <https://whowhatwhy.org/2018/11/20/georgia-runoff-will-likely-contaminate-voting-machines-as-evidence/>

The Secretary of State's office has a record of destroying electronic election records and programming files.¹⁰ Therefore we are alert to the dangers of such destruction and are attempting to prevent further destruction of evidence.

Solutions Are Readily Available

Litigation is an expensive and slow-moving process for urgent public policy changes such as those needed here. Georgia voters should not have to seek court intervention to force Georgia officials to adopt a transparent and accountable balloting system, nor to answer questions as to what happened to their votes.

We call on Secretary Raffensperger to immediately decertify the touchscreen voting units and instead use the currently owned paper ballot optical scanning system (now used only to count mail ballots) in all future elections until a new voting system is fully implemented.

We call on the Georgia legislature to conduct thorough hearings to determine how this likely misprogramming occurred and the reasons for the disparate impact on African American neighborhoods. The legislature should immediately ban electronic voting in Georgia and require hand-marked paper ballots, counted by optical scanners and tested with statistically valid audits.¹¹

We call on Governor Kemp, Secretary Raffensperger, and the legislature to immediately abandon their consideration of the next generation of electronic voting machines (ballot marking devices) that cannot be audited or relied on for verifiable vote tallies.^{12,13}

Coalition's Ongoing Georgia Litigation and Advocacy

[Coalition for Good Governance](#) is a nonpartisan, nonprofit organization dedicated to secure and transparent elections.

The unexplained 127,000+ missing votes prompted Coalition for Good Governance and three Georgia voters to sue Georgia's Secretary of State, Fulton County, and Gwinnett County to challenge the conduct of the November election and specifically to overturn the Lt. Governor's election. The numerous and varied irregularities cast the Lt. Governor's election results in great doubt,¹⁴ triggering the necessity of a lawsuit (an "election contest") in state court to vindicate

¹⁰ <https://slate.com/technology/2017/10/georgia-destroyed-election-data-right-after-a-lawsuit-alleged-the-system-was-vulnerable.html>

¹¹ <https://coalitionforgoodgovernance.sharefile.com/d-sceab4c2b4af4035b>

¹² <https://coalitionforgoodgovernance.sharefile.com/d-s8ff65ce73424379a>

¹³ <https://www.ajc.com/news/opinion/opinion-making-election-systems-more-secure/cF2euQBCYUiraLjUZXXxCJK/>

¹⁴ <https://conta.cc/2DUBVXP>

Georgia's voters' rights to a fair election.¹⁵ Coalition for Good Governance also has a pending lawsuit in federal court against the state filed in 2017 to stop the use of electronic voting machines.¹⁶

The Coalition's resources and team are fully dedicated to addressing Georgia's flawed election system and advocating for a fully transparent and fair system of elections. Our small organization has made great progress in vindicating Georgian's constitutional rights to cast a ballot that will be counted, and counted fairly. Some of our work includes:

--In the run-up to the election, we organized a lawsuit against Gwinnett County Board of Elections, the State Election Board, and then--Secretary of State Kemp to halt the discriminatory policies that rejected thousands of legitimate ballots cast by eligible mail ballot voters. The Federal District Court for the Northern District of Atlanta ordered that the state count the majority of the wrongly rejected ballots.¹⁷ The case continues this year where discovery will uncover more of the facts and with that evidence in hand, we will seek a permanent ruling to assure that all absentee ballots from eligible voters are counted fairly.

--The 11th Circuit Court of Appeals just upheld Judge Totenberg's ruling on jurisdictional issues in our Curling v. Kemp case seeking to ban electronic voting machines.¹⁸ The case now begins the discovery phase where important information should be forthcoming to inform a trial later this year.

--We filed a lawsuit to overturn the flawed Lt. Governor's election. We were denied the opportunity to conduct discovery and denied our right to a jury trial.¹⁹ We are appealing to the Georgia Supreme Court.

--A year ago, our members were the first to warn of the dangers of the new proposed electronic voting system (ballot marking devices) being promoted by state officials for a new voting system. Through heroic activism and advocacy, a handful of individual members and other activists were able to use the Coalition's research and information to stave off 2018 passage of a "barcode balloting" system by the legislature. This year, dozens of experts, election integrity organizations, lawmakers, and hundreds of voters have joined in the opposition to the proposed new electronic voting system as they have become more aware of the risks of unaccountable balloting systems to a democratic society.

¹⁵ The Court denied plaintiffs access to discovery and election data and dismissed the case. We are appealing to the Georgia Supreme Court.

¹⁶ <https://www.lawfareblog.com/federal-court-ruling-georgia-shows-judges-have-role-play-election-security>

¹⁷ <https://campaignlegal.org/cases-actions/martin-v-kemp>

¹⁸ <https://coalitionforgoodgovernance.sharefile.com/d-sc3b5674498644eb8>

¹⁹ <https://www.law.com/dailyreportonline/2019/01/18/judge-throws-out-contest-of-lieutenant-governors-election/>

Support the Coalition's Litigation Efforts

Coalition for Good Governance and our co-plaintiffs are well positioned to obtain answers through more in-depth expert research and discovery in the pending litigation. The significant cost of the litigation is funded entirely through donations to our small but effective nonprofit organization. All donations go directly to legal fees and expenses for our three pending election cases in Georgia. We are proud that Stacey Abrams's Fair Fight Action organization has been a generous donor to advance our efforts that benefits voters and Fair Fight's far-reaching voting rights lawsuit as well. Please joining them in supporting our essential efforts to vindicate voters' rights to secure and fair elections. The Coalition benefits from [crowd funding through its CrowdPac site](#).

Feel free to contact us for further information.

Marilyn Marks

Executive Director, [Coalition for Good Governance](#)

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Exhibit A

Memo to Coalition for Good Governance
Voting machine-related undervotes in Lt. Governor's race
February 5, 2019

In the 2018 general election last November in Georgia, there was an extraordinarily high undervote rate in the Lieutenant Governor's race. As I have previously discussed in affidavits and elsewhere, Georgia's DRE voting system is [highly susceptible](#) to widespread errors that would be very difficult to detect due to the lack of verifiable evidence generated by the election system and the centralized nature of its election infrastructure (which is unique to Georgia). These errors, whether due to accident or intention, very well could manifest by dropping votes for one or more candidates or contests. It is entirely plausible that the undervote rate in the Lieutenant Governor's race was caused by such errors.

The only way to investigate the cause of the anomalous undervote rate is to perform forensic examination of Georgia's election infrastructure, especially the database that was used to program the voting machines and the voting machines themselves. Such an examination would first review the database used to program the machines, then look at the internal memory of voting machines to determine if any unintended programming was resident on the machine. The examination would also review the machines' removable memory cards. As the machines produce no other evidence trail, examining the internal memory and other electronic records is the only way that might rule out incorrect programming, data corruption, or other sources of unexpected behavior. Given the concerns about the correlation between the undervote anomaly and precinct demographics, it is imperative that the electronic records be diligently preserved and promptly examined by independent voting system experts.

It is my understanding that the state has continued to reprogram the voting machines and memory cards used in November's election. Without sufficient preservation of the internal state of each voting machine in question, the chance of an analysis successfully ruling out sources of unintended behavior decreases with each additional use. Continuing to use the voting machines in question without taking steps to preserve their internal state would be akin to cleaning up a crime scene before the authorities could properly examine it. Therefore it is absolutely paramount that some measure to preserve the internal memory and memory cards of the voting machines be taken. Such preservation need not result in voting machines or memory cards being taken out of service. Full images of the internal memory of each machine can be made and stored in a secure way for examination by independent experts.

The undervote rate in Georgia's Lieutenant Governor's race was the highest undervote rate of any contest in the nation in 2018 without plausible explanation. Election data appears to refute the state's claim that the rate was caused by voter inexperience, voter error, or the qualities of one or both of the candidates in the contest. Something strange happened in this contest, and the state of Georgia seems wholly unconcerned with exploring why their voting system has potentially disenfranchised over 100,000 of its voters. Forensic investigation must be performed to reassure the citizens of Georgia that their votes are being counted correctly.

Barring plausible and proven alternative hypotheses coming to light, anything short of an independent forensic examination is gross negligence on the part of the state.

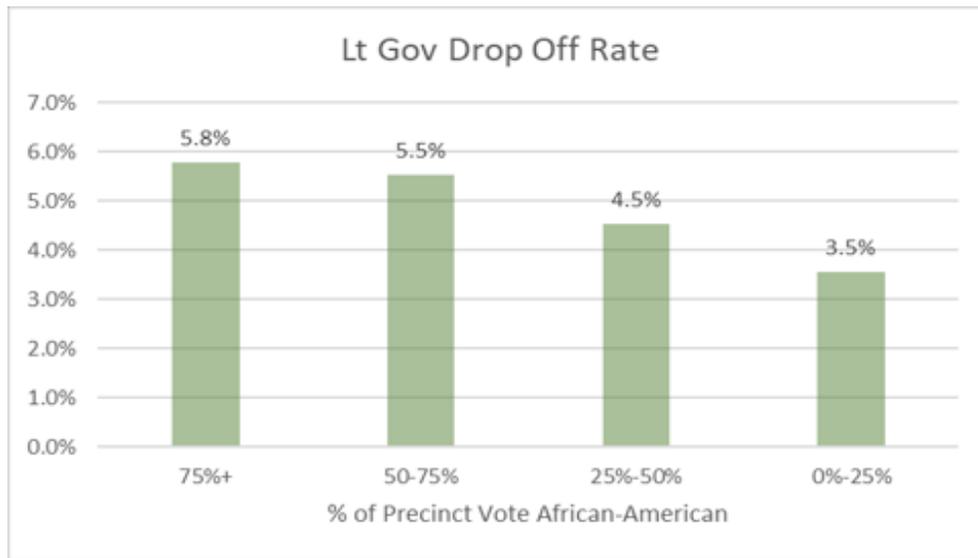
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To: Coalition for Good Governance
From: Christopher Brill
Date: February 5th 2019
Subject: Correlation between 2018 Lt. Governor Under voting patterns and precinct racial composition

Research Summary

The following is an initial review of the precinct under vote for Lt Governor and how close it correlates to the African-American share of the vote in each precinct. *In short, when you look at the 2,634 or so statewide precincts, the undervote rate for Lt Governor does tend to increase as the electorate becomes more African American.* The first chart below shows drop-off % decreases as the overall share of African-American voters decreases:



To examine this further, a Pearson correlation¹ was run on multiple variables including race, candidate performance, % of the electorate aged over 50/under 50, share of the electorate that are new registrants and share of the electorate that were first time voters. We then analyzed, separately, election results based on the three vote methods: In Person Early, Absentee by Mail and Election Day.

¹ A Pearson correlation is a number between -1 and 1 that indicates the extent to which two variables are linearly related

In short, the variable African American vote share correlated highest against Lt.Gov undervote when examining the Election Day vote and In Person advance vote. The first chart shows each variable for ***In person early voters***:

Focused Analysis on Field Lt.Gov.Under.Vote

	Association Measure
X.AfAm_V	0.293418
X.POC_V	0.291189
X.White_V	-0.281162
LTGOVD	0.183531
GOVD	0.171286
X.Asian_V	-0.105412
X.NewReg	-0.091567
X.Over50	0.079741
X.Under50	-0.079686
X.Hispanic_V	0.027283
X.FirstTime	-0.023063
X.Native_V	-0.012758

And then here is the same correlation analysis looking at just votes cast on ***Election Day***

Focused Analysis on Field Lt.Gov.Under.Vote

	Association Measure
X.AfAm_V	0.4300602
X.POC_V	0.4272688
X.White_V	-0.4099519
GOVD	0.3741033
LTGOVD	0.3691079
X.Under50	-0.0919387
X.Over50	0.0918667
X.NewReg	-0.0905727
X.Asian_V	-0.0891530
X.FirstTime	0.0658877
X.Native_V	0.0378854
X.Hispanic_V	0.0067638

And then finally here is the same correlation analysis looking at mail-in ***absentee voting*** only:

Focused Analysis on Field Lt.Gov.Under.Vote

	Association Measure
X.AfAm_V	0.1081094
X.POC_V	0.1069198
X.White_V	-0.1007232
GOVD	0.0952649
LTGOVD	0.0756819
X.Over50	0.0383449
X.Under50	-0.0383177
X.Asian_V	-0.0160149
X.NewReg	-0.0141880
X.FirstTime	0.0124552
X.Native_V	-0.0115690
X.Hispanic_V	-0.0045337

Variable Definitions

Variable	Definition
X.AfAm_V	% Share of 2018 voters in a precinct who are African-American
X.POC_V	% Share of 2018 voters in a precinct who are persons of color, defined as African-American, Hispanic, Native American and Asian (per voter file)
X.White_V	% Share of 2018 voters in a precinct who are white (per voter file)
LTGOVD	% Share of the vote received by the Democratic candidate for Lt. Governor
GOVD	% Share of the vote received by the Democratic candidate for Governor
X.Asian_V	% Share of 2018 voters in a precinct who are Asian (per voter file)
X.NewReg	% Share of 2018 voters in a precinct who are newly registered as of January 1st 2018
X.Over50	% Share of 2018 voters in a precinct who are 50 years old or older
X.Under50	% Share of 2018 voters in a precinct who are under 50 years of age
X.Hispanic_V	% Share of 2018 voters in a precinct who are Hispanic (per voter file)
X.FirstTime	% Share of 2018 voters in a precinct who did not previously vote in a general election
X.Native_V	% Share of 2018 voters in a precinct who are Native American (per voter file)

Concluding notes

- 1) We created a variable 'x.FirstTime' to measure the share of an electorate in a precinct that were first time voters. The idea here was to test the idea that new voters were more likely to drop-off because of voter confusion. This variable does not seem to correlate much at all with a higher under vote pattern, at least in the data we have access to.
- 2) Second, African-American precinct share correlates highest with under vote for both in person absentee and election day voting. That correlation almost disappears when you look at votes cast by mail in absentee. Overall, this phenomenon occurred at a higher rate in precincts that are more African-American, but when we take into account vote method, it becomes difficult to conclude that this was simply a result of voter behavior.

- 3) The racial patterns seen here in the data, as well as the unusual rate of under voting that occurred for just this one office (Lt Gov), combined with the election security concerns expressed by experts, in our opinion, justifies a thorough review of the voting machine programming itself, to determine whether anomalous results may have been caused by mis-programming or some other machine error.