

## Ballot Images for Secure Elections: Emails and Q+A

---

### Email to Candidates and Campaign Committees

Dear Campaign Data Manager:

Please encourage election officials to preserve electronic ballot images during and after the election. Election machines can store ballot images while scanning and tallying the votes, and officials can preserve them.

Election errors do happen, turning wins into losses. Vendors who program election machines are subject to errors (and tampering), like other big companies. Ballot images are the easiest way to detect and fix errors.

Images can be studied more easily than paper ballots, without disturbing the paper ballots, and even if any harm comes to stored paper ballots, by fire, quake, flood, break-in, or broken seals or locks.

Scanners from two election vendors, *ES&S* and *Hart*, save ballot images if officials select "All Processed Images" during setup. *Dominion* and *Clear Ballot* usually save images (VoteWell dot net/answers.pdf).

Please encourage election officials to save all ballot images, and store all memory devices without erasing them.

Name, Town

---

### Email to Election Officials

Dear Election Champions:

Thank you to the entire election staff for working to bring us elections we can trust. I appreciate how hard it is both to ensure fairness and to prove fairness afterwards. The President worries about rigging, his officials warn about China, Iran and Russia, and Democrats warn about Russia. Vendors who program election machines are subject to infiltration and errors, like other big companies.

My experience at the polls has been...

Please save the ballot images which election machines make while they scan ballots, if you don't already. If you do, thank you. The machines tally from these images, so if there are doubts about an election, the images show whether there were scanning errors or tallying errors.

Ballot images are powerful evidence to answer challenges from any losing candidate. Images can be studied more easily than paper ballots, without disturbing the paper ballots, and even if any harm comes to stored paper ballots, by fire, quake, flood, break-in, or broken seals or locks.

Scanners from two election vendors, *ES&S* and *Hart*, save ballot images if officials select "All Processed Images" during setup, while *Dominion* and *Clear Ballot* usually save images (VoteWell dot net/answers.pdf).

If you need to justify the small cost of storing these images, the Justice Department says that "all documents and records that may be relevant to the detection or prosecution of federal civil rights or election crimes must be maintained" for 22 months (p.78, *Federal Prosecution of Election Offenses*, DOJ 2017). Images tell us which part of the machines erred, if at all, and therefore what may be causing problems.

Election staff deserve thanks from everyone for keeping these election records, the ballot images, to protect us from challenges.

Name, Town

---

## Q+A: Asking Officials to Preserve Ballot Images

10/20/20 [VoteWell.net/answers.pdf](https://www.vote-well.net/answers.pdf)

**What will this accomplish?** Ballot images are the cheapest, fastest way to start checking and correcting results if official tallies look suspicious. Public concern can encourage election officials to continue or start preserving ballot images. Images show errors and drive hackers to other fields where people are not watching as much.

**Which candidates should I send the first email to?** All the ones you support, local and national. Also include office holders who aren't running for reelection this fall. The more they hear from voters, the more they will act. [ballotpedia.org/Sample\\_Ballot\\_Lookup](https://ballotpedia.org/Sample_Ballot_Lookup) **Share with all your friends.**

**Which election officials should I send the second email to?** Personalize it with your own concerns and sincere thanks for good local experiences you've had with voting. ("Poll workers are cheerful/helpful/funny... Lines were short/quick/social... Information is clear...") Improve any wording you can. Include your name and city, though not address or phone, since the email could become public under your state's open records law. Send to:

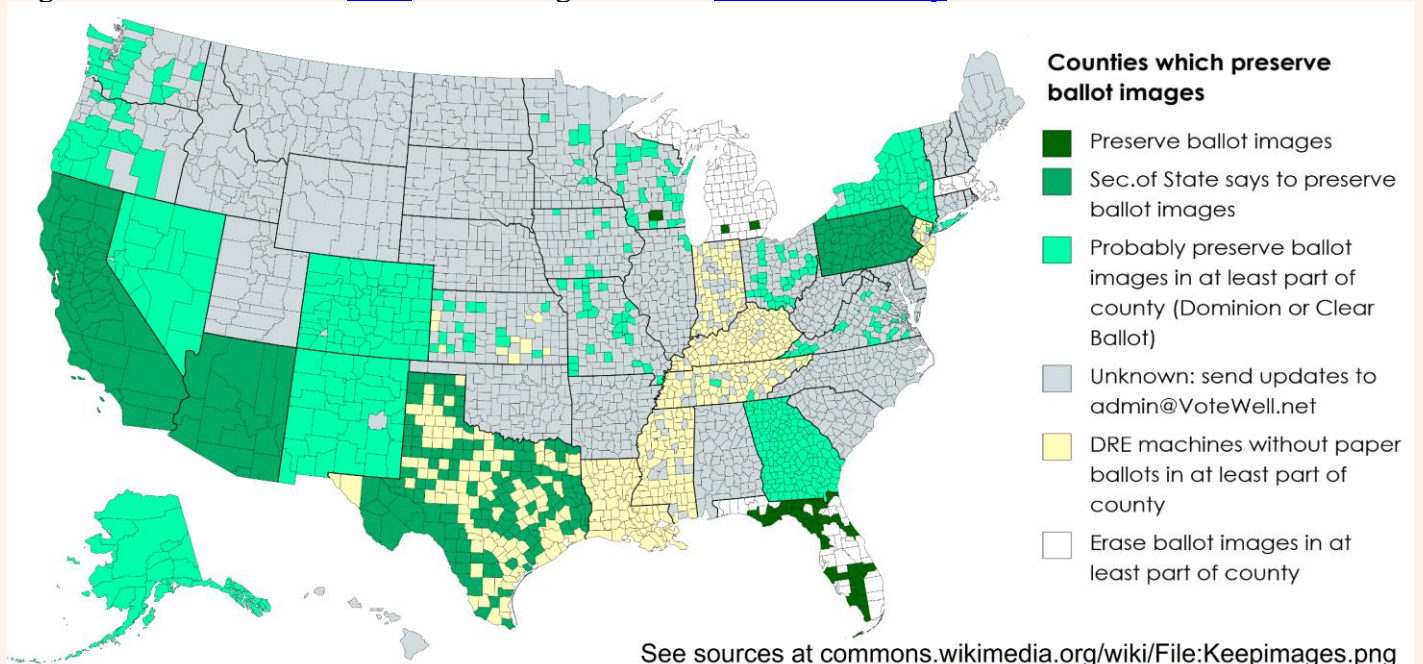
- A. Your **local** election official ([usvotefoundation.org /vote/eoddomestic.htm](https://usvotefoundation.org/vote/eoddomestic.htm) )
- B. Election officials in **biggest jurisdictions** in your state, to ensure more accurate state results
- C. Your **state** election official ([usa.gov/election-office](https://usa.gov/election-office) )

**What subject should be on the emails?** Personalize it! They're really busy these months. They may not read your email unless the subject line is friendly enough to make them look forward to reading it.

**Can I send it to a newspaper too?** YES! Every letter to the editor needs to be unique, under 300-350 words, and really as short as possible. The first email has 140 words; the second has 280 words.

- Personalize it the same way as above.
- Omit the paragraphs naming the four election vendors and the Justice Department. Too much detail.
- Omit or personalize everything else.
- Keep the ideas of thanking election staff and preserving ballot images.
- Add your address and phone number. Papers print your name and city. They phone to verify you sent it.
- Find paper's address online or use this [tool](#) from an environmental community (doesn't work in Firefox).

**Which offices already preserve ballot images?** Tell us at [admin@votewell.net](mailto:admin@votewell.net). Gray areas on the map show where we don't know. Please thank officials who save images, so they know we care, and so they keep the images safe. As far back as [2008](#), ballot images enabled [Humboldt County](#) to find 197 lost ballots.



**Which offices release images to the public?** See map at right.

**How much storage space will ballot images need?** Less than a cubic foot per 1,000 election machines (~1½ cubic inches per memory device). One gigabyte holds 1,500-4,000 Dominion images (based on table at end of this document) or 10,000-30,000 ES&S images (based on Dane County WI images).

**How can ballot images be counted?** By [hand](#) (e.g. on Zoom, which [works](#) for paper ballots too), or software from [Citizens Oversight Audit Engine](#) (or programmers can adapt [TEVS](#) or [Free+Fair](#)). Map shows where public can get and count ballot images. Elsewhere officials can count them.

**How do we know images are accurate?** Officials can check a good sample to see if images match paper ballots and address any problems. Official audits of paper ballots help, but are not enough, since no state audits all contests on enough paper ballots. Only [half the states audit](#) at all. Paper ballots are expensive and sensitive to count.

**Does the law already require saving images?** That depends on prosecutors and judges, who are also very busy.

**Where is the book which the email mentions?** *Federal Prosecution of Election Offenses* is at [justice.gov/criminal/file/1029066/download](https://justice.gov/criminal/file/1029066/download)

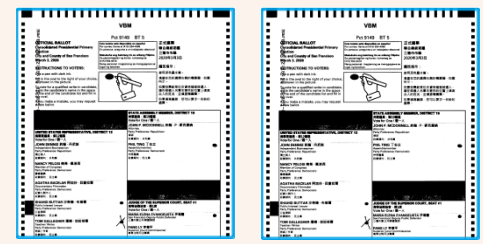
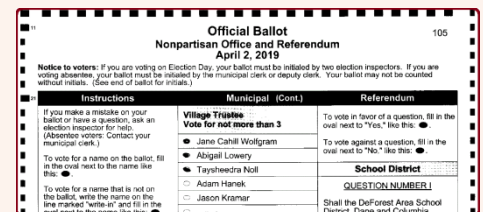
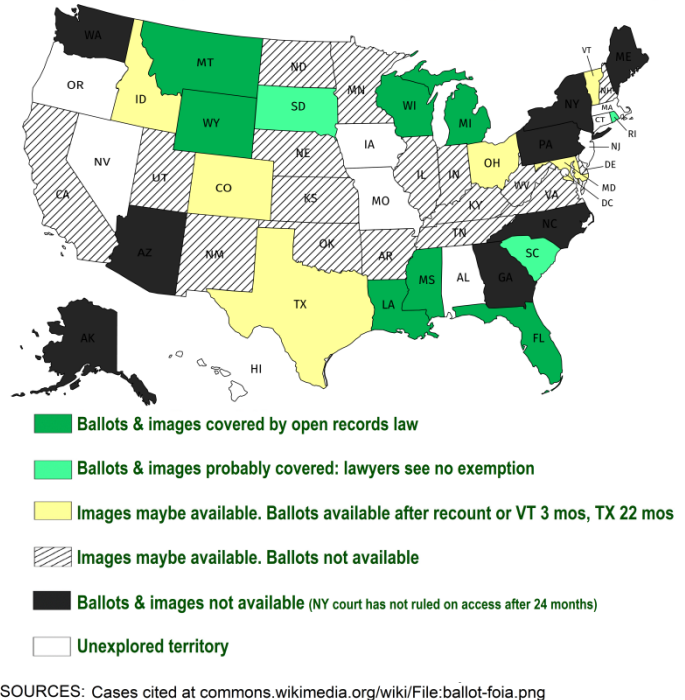
**What errors have happened?** Brennan Center compiled a list: [brennancenter.org/sites/default/files/2019-08/Report\\_Voting\\_Machine\\_Failures\\_Database-Solution.pdf](https://brennancenter.org/sites/default/files/2019-08/Report_Voting_Machine_Failures_Database-Solution.pdf) . Here are recent examples:

- [2020 Baltimore](#): printed ballot misaligned with scanner, so popular incumbent got implausibly few votes.
- [2019 Northampton County, PA](#): software under-counted 99% on one candidate, who won in hand-count.
- [2018 New York City](#): multi-feeds in scanner hid all but first in each clump.
- [2016 Maryland](#): 1,972 ballots left out of one system, paper folds and black lines from scanner flaws misinterpreted as overvotes, check or X missed, multifeds, candidates omitted from some ballots.
- [2014 Stoughton, WI](#): referendum votes ignored, since scanner programmed for wrong spot on ballot.
- [2010 New York](#): 50,000-60,000 votes lost when machines miscommunicated with voters on overvotes. Other votes were lost when scanner [overheated](#).

**What do ballot images look like?** They look like ballots. Download zip files:

- **Dane County WI** images: [elections.countyofdane.com/Election-Auditing](https://elections.countyofdane.com/Election-Auditing) (their ES&S system creates pdf files; here's an [example](#))
- **San Francisco** images are under "Final Report": [sfelections.sfgov.org/march-3-2020-election-results-detailed-reports](https://sfelections.sfgov.org/march-3-2020-election-results-detailed-reports) (their Dominion system creates tif files; if you can't read multi-page [tif](#) files, try [pdf](#))

Can ballots and images be released to public? (According to sources shown)



Where does **ES&S** (biggest election machine company), describe the ability to preserve all images? Page 20 (22 in pdf) of ES&S Electionware® Volume IV: User's Guide [drive.google.com/file/d/0B2TKmkSNAkCfc2NZOExmRGkxcHc/view](https://drive.google.com/file/d/0B2TKmkSNAkCfc2NZOExmRGkxcHc/view)

**Ballot Image Options** **ES&S**

Select the Ballot Image Options for this election. This option determines whether the ballot images are stored.

6. From the **Save to Results Media** drop-down menu, select how you want the ES&S DS850 to handle ballot images.

- Select **None** if you want the ES&S DS850 not to save any ballot images.
- Select **All Processed Images** if you want the ES&S DS850 to save all processed ballot images.
- Select **Processed Write-in Images Only** if you want the ES&S DS850 to only save processed write-in ballot images.

Where does **Hart** (third biggest election machine company) describe the ability to preserve all images? [hartintercivic.com/wp-content/uploads/VerityScan.pdf](http://hartintercivic.com/wp-content/uploads/VerityScan.pdf)

**Election Managers** **Hart**

**Ensures reliable audits of voter intent and enables fast recounts**

You can configure Verity Scan to digitally capture full images of scanned ballots.

Does **Dominion** (second biggest election machine company) preserve all images? Manuals and [flow charts](#) imply it usually does. Testimony ([page 299](#)) says it's optional in some states. Michigan precinct scanners have this option, shown at right. [michigan.gov/documents/sos/071B7700117\\_Dominion\\_Exhibit\\_2\\_to\\_Sch\\_A\\_Tech\\_Req\\_555357\\_7.pdf](http://michigan.gov/documents/sos/071B7700117_Dominion_Exhibit_2_to_Sch_A_Tech_Req_555357_7.pdf) page 2

ImageCas Central	ImageCas Precinct Dominion
<b>Canon DR-G1130</b> 11" - 80/min, 4800/hr 14" - 64/min, 3840/hr 17" - 53/min, 3180/hr 20" - 45/min, 2700/hr	<b>With ballot image capture enabled:</b> 11" - 6/min, 360/hr 14" - 4.5/min, 280/hr 17" - 3.5/min, 230/hr 20" - 3.3/min, 198/hr
<b>Canon DR-M160II</b> 11" - 60/min, 3600/hr 14" - 47/min, 2820/hr 17" - 38/min, 2280/hr 20" - 33/min, 1980/hr	<b>With ballot image capture disabled:</b> 11" - 7.5/min, 450/hr 14" - 6/min, 360/hr 17" - 5/min, 300/hr 20" - 4/min, 240/hr

Does saving ballot images slow down scanning? By 3-5 seconds per ballot at polling places (table at right). Probably

not at central scanner, which only needs about a second per ballot, with or without saving images.

Will ballot images fit on storage devices? Dominion says 24,000-62,000 images fit on a 16GB card, depending on ballot size, as shown in table.

Ballot Size (Single-Sided)	Approx. Ballot Image Size (KB)	Memory Card Size <span style="float: right;"><b>Dominion</b></span>			
		2GB	4GB	8GB	16GB
8.5" x 11"	250	6000	14000	30000	62000
8.5" x 14"	277	5400	12600	27000	55800
8.5" x 17"	312	4800	11200	24000	49600
8.5" x 20"	334	4500	10500	22400	46400
8.5" x 22"	357	4200	9800	21000	43400
Ballot Size (Double-Sided)					
8.5" x 11"	357	4200	9800	21000	43400
8.5" x 14"	454	3300	7700	16500	34100
8.5" x 17"	499	3000	7000	15000	31100
8.5" x 20"	555	2700	6300	13500	27900
8.5" x 22"	624	2400	5600	12000	24800

[www.sos.state.co.us/pubs/elections/VotingSystems/systemsDocumentation/Dominion/2.02-DemocracySuite-SystemConfigurationOverview-4-19\\_redacted.pdf](http://www.sos.state.co.us/pubs/elections/VotingSystems/systemsDocumentation/Dominion/2.02-DemocracySuite-SystemConfigurationOverview-4-19_redacted.pdf) page 56

Table 4.3: ImageCast® Evolution Ballot Image Capacity for Various Ballot Sizes and Memory Card Sizes

As an example, on a memory card programmed for Miami-Dade election on an early voting unit that contains 749 precincts (with some splits), the election database with audio files and other required files consumes approximately 2.7GB of the memory card space. Alternatively, on a memory card programmed with for the same election with one (1) precinct, the election database, audio files and other required files only consumes 12MB of the memory card space. When determining memory card capacity, it is important to understand how much of the memory card space will be consumed with the election programming data and how much space remains for ballot image storage.

