After-Action Report

Hand Count Audit of 4248 Ballots from April 2026 Republican State Assembly

May 16th, 2026

What did we expect to happen?

Settle Controversy

The overall purpose of the May 16th 2026 hand count audit (recount) was to settle controversy from the April 11th Colorado Republican Party State Assembly. There were two areas of controversy. The first area of controversy was lack of control in credentialing, which resulted in an untrustworthy figure for credentialed delegates. The teller team at assembly had to report more votes than voters, which appeared to be a failure of the teller team, but instead reflected poor information from earlier in the process. Because of this controversy, the teller team at assembly hand counted the ballots (not the votes) after the machine count, and came up with a final figure of 2183 ballots.

This controversy was not possible to fully settle, because once legitimate ballots are mixed with ballots cast by illegitimate voters, it is not possible to know which are which. However, the list of signatures on which delegates signed in was never counted at assembly, so as a separate effort from the recount, two volunteers counted the number of signatures on the sheets. This list of signatures was not authoritative, since it was known that some credentialed delegates never signed the list, and some people who were not credentialed delegates did sign it. However, this check, of whether the signature list showed more people present than the number of votes, added a bit more information about what did and didn't go wrong at the assembly.

The second area of controversy was that electronic machines were used for counting the votes (tabulating) at assembly. Since the functioning of the machines is not open to the public, including the candidate watchers, using machines to count resulted in a non-transparent count of a contentious governor race. Delegates at the assembly voted overwhelmingly to audit the machine count with a transparent hand count at a later date, which was May 16th, 2026.

Speed Test of Rocky Mountain Method

Another purpose of the hand count audit was a time test. The previous best test of the method was in 2024, when the same state assembly had counted very simple ballots where voters voted for one

of three choices[1]. That effort involved about 2000 ballots, or 6000 choices, counted (batched, tallied, and aggregated) in 45 minutes with 144 volunteers and 24 tally teams.[2] The tallying itself was completed within 15 minutes[3], meaning that across entire set of talliers about 2 ballots were tabulated per second, and each team tabulated about one ballot every 10 seconds. Together, the tally teams tabulated about 7 choices per second (0.15 seconds per choice), with an average tally team tabulating about 0.25 choices per second (4 seconds per choice.) This time includes marking the vote, totaling the votes in the batch, and cross-checking the totals.

Tally time is an important measurement because it is the bottleneck of the process, requiring the most man-hours, so though adding more tally teams can speed up tallying to be at least as fast as batching and aggregating, it takes a lot of people to do it that fast. The per-choice statistic is probably the best measure of speed, since some ballots are far more complex than others, and the 2024 assembly ballot was extremely simple.

In the 2026 recount, the pace of any particular tally team was expected to be similar to the 2024 count, but it wasn't clear ahead of time which factors would most affect the speed. Overall speed was less important in this situation than at the assembly (with thousands waiting on the results), so there was no need for so many people.

The 2026 plan was for 70 volunteers, 10 batching stations, 10 tally stations, and 5 aggregation stations. Factors expected to affect the speed were:

- 0.5 the number of overall hand counters
- 0.4 times the number of tally teams
- 2.25 times as many ballots
- 6 times as many choices on one ballot (but only one vote allowed)
- 6 times as many choices on the other ballot (but one vote allowed in each of four races)

Other purposes of the May 16th re-count included:

- Teach the method to new hand count volunteers.
- Watch for best practices in large-scale counting to use in the future.
- Understand what training hand counters need for chain-of-custody documentation.
- Test methods for handling complexities such as write-in votes.
- Demonstrate the hand count process for officials, media hosts, influencers, candidates.

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[1] "Choice" here is defined as each item on a ballot, which can be marked or not marked, as compared to the voter's specific decision to mark or not mark the item. For instance, a yes/no question has two choices, each of which the voter may choose to mark or not mark.

[2] See white paper "Colorado State Assembly Teller/Hand Count Report 2024" at https://restorerealcolorado.com/wp-content/uploads/2025/08/Colorado-Hand-Count-Whitepaper.pdf

[3] As reported by one of the hand count team from 2024.

What actually happened?

Setup

The re-count was held in a large meeting room at a church in Arapahoe County, with about 25 tables set up. Five tables were for batchers (2 batch teams of 2 per table), ten for talliers (1 tally team of 4 per table; a couple more tally tables were added late in the process), and several for aggregators (original setup was for 5 teams of 2, but later it became 2 teams of 4). Most of the hand counters were from Arapahoe but many came from other counties, especially the neighboring Douglas County. Many had previous experience hand counting, but many of those had not done it for so long they didn't remember the details until they started.

There were probably about 70 participants, but some people came and went, so there were about 60 at any one time. Batching teams were recycled into aggregation teams, and in a few cases, tally teams, when they were done batching. Runners were mostly inexperienced people who came at the last minute.

Batchers, talliers, aggregators, and floor managers were distinguished by different-colored vests. Supplies for each table were in labeled plastic gallon bags ("Batch A", "Agg D") which were easy to place on the appropriate table and then arrange. Each table had a stand identifying it so runners could easily keep track of where batches were going. Batches flowed from the batch tables at the south side of the room, to the tally tables in the middle, to boxes collecting batches for aggregation on the north side.

Overall Smooth Procedure with Some Complications

After the teams were present and assembled, they were instructed in the process, but many had to be re-instructed on almost everything for the first batch. After the first batch, however, the teams sped up and the group overall reached top speed very quickly. From that point on it was hard to tell experienced hand counters from the completely new volunteers – everyone caught on once the process started. New people seemed to have a very positive experience even though the overall process was longer than many had planned for.

There were hardly any questions after the first few batches, except when complications such as write-in votes came up. Each table had a separate sheet to record write-in votes, but there were few write-in votes and it wasn't clear whether those ballots should be separated from their batch to go with the write-in sheet. Since different tables handled it differently on the advice of different floor managers, there may have been an inaccuracy in the number of write-in votes. One of the aggregation teams was significantly delayed by trying to reconcile the write-in totals.

Another complication was undervotes; a few ballots had no vote at all on them, so the decision was made to write "U" beside that line on the tally sheet to show the line was intentionally blank.

For the first set of ballots, each ballot in a batch was numbered by the tally team watcher or caller, to keep ballots in order in case there was a question. For the second set of ballots, this job was given to the batchers, which hardly slowed the batching but sped up tallying noticeably.

Delays in Aggregation

The original plan was to have aggregation done by 5 teams of two, but that was later changed to 2 teams of 4, one of which did the super-aggregation of aggregation sheets. Two teams seemed sufficient, since with the simpler set of ballots, they often found themselves waiting on the next batch from the tally teams. The more complex ballots took a bit longer because there were more numbers to transcribe from the tally sheets. 25 batches were piled in a box with their aggregation sheets, then the next 25 on top. This worked, but could have been a mess if batches had slipped out of their place on the pile.

Callers and watchers at the aggregation tables had a long time to wait while the aggregators added up the numbers (tally teams have less of an issue here because the talliers are just counting marks, not adding) and had a tendency to walk away, which was not helpful if a question came up.

Aggregation probably took longer than it should have because of the write-in problem. Most of the participants left before the aggregation was finished, which was okay because the work of all but a handful of people was done when the last batch was tallied, but there was a bit of a problem finding people still available for the super-aggregation step. Keeping the aggregation team present and focused but not distracted may always be a problem; in a large-scale hand count, the aggregators have large numbers to add up and reconcile and this job is more difficult when everyone else is wandering around chatting and eating.

Some candidates, officials, and members of the public showed up, but not many, probably due to short notice. However, the event was captured on video and a slide show of pictures with explanations was posted online for election officials and others to learn from.

Where Results Matched and Didn't

The number of the first set of ballots (governor's race) from the May 16th re-count matched the number of ballots hand counted by the teller team at the state assembly: 2183. The second set (other races) was 2065 in the re-count versus 2064 as reported at assembly. The governor's race re-count showed respectively 1, 2, 3, 12, and 26 more votes for five of the candidates than reported at assembly (the higher vote total a candidate had, the higher the number of additional votes), plus 12 write-ins. The change in the number of write-ins could be due to the confusion in write-in procedure during the recount rather than an inaccuracy in the machines; however, that does not explain the other changes. Another possible explanation is the lack of official vote totals published after the assembly; since some numbers were mis-stated during the announced results and later corrected, it was not clear what the official total of all numbers was. However, the changes for the governor race don't seem to be random; all the changes add votes, and the number of votes added does not vary in a random way but adds more votes on to the already higher vote totals. The change in totals did not change the outcome significantly, but raised the question of how the machine tabulation missed these votes since the ballot total was confirmed to be the same.

The tabulation of votes in the other races basically agreed with the machine count, with a few small discrepancies, mostly plus or minus one vote, and mostly in the write-in votes (which could be due

to the confusion in write-in procedure during the recount, rather than an inaccuracy with the machines.)

The number of signatures on the credentialing list came to 2303, far more than the credentialing report at the assembly. This result suggests there may not have been more votes than voters, but does not prove that everyone who received a ballot was a valid voter.

Statistics and Speed

The counting started at 10AM and the last of the aggregating finished just before 3PM. The first batch was counted and sent to tallying within about 5 minutes. Batching continued to take just a few minutes per batch, while the best tally teams after finding their rhythm were able to handle a batch in about 5 minutes. The batchers took about 30 minutes to batch each of the two sets of ballots.

The talliers finished the last batch about 3:45PM, so the total time for tallying was about 3 hours 40 minutes, including a short time between the sets of ballots. The total number of ballots was 4248 ballots batched, tallied, and aggregated within 300 minutes by approximately 60 volunteers which included 10 tally teams. The overall output of the entire group was about 14 ballots per minute, or about one ballot every 4 seconds. Together, the tally teams handled 19 ballots per minute, or about one ballot every 3 seconds. An average tally team handled 2 ballots per minute.

The total number of choices processed during this time was (2183 x 19) + (2065 x 18) = 78,647. The group overall processed 4 choices per second, with the tally teams together tabulating about 6 choices per second (0.16 seconds per choice) and each individual tally team on average tabulating 0.6 choices per second (1.6 seconds per choice.)

The speed of a ballot through tallying was a bit slower than for the 2024 hand count, but because these ballots had many more choices than the 2024 hand count, going by the number of choices per second, the 2026 talliers worked much faster. (These 10 tally teams together had almost the same choice per second output as 24 teams together did in 2024, and the average 2026 team more than doubled the 2024 speed!)

One way to look at this is that multiplying the number of choices by 6 only increased the time to process the ballot by a factor of 1.5. However, that result may be misleading because the first batch is always slower, but the first batch was a small percentage of all the batches handled in 2026, while in 2024 each team only handled about 3 batches. One thing that is clear is that top speed can be achieved quickly and maintained through the count.

What went well, what didn't, and why?

What Went Well

The group, made up of all levels of experience, came together quickly and worked smoothly for hours. New people picked up the procedure right away. The pre-labeled packages of supplies made setup and breakdown quick. Check-in lists and place cards pre-assigning people to their positions were not completely followed as some people showed up late or not at all, but they were a good starting point. Lanyards and colored vests made it easy to see who belonged where, both for direction and for identifying potential disruptors. Not all of the participants came prepared to stay for several hours, but they had good attitudes which seemed to be a result of understanding the big picture that they were participating in an important civic duty. Pizza ordered at lunchtime by one of the candidate observers was a big help in keeping people from becoming "hangry" and slowing down.

The team came up to top speed very quickly and appeared to maintain that speed for the rest of the tallying stage. Aggregation in general went quickly and might not have extended long beyond the tallying if it weren't for the confusion over write-ins.

Transparent overlays to associate each name on the ballot with a number worked well. Preparing the overlays in MS Excel did not work well because the page size changed slightly in printing. The simple and quick solution was to draw numbers and lines on a transparency laid over a ballot, then photocopy that transparency for every tally station.

Tables were far enough apart there were no noticeable problems with talliers overhearing numbers being called at another table.

What Didn't Go Well

Organizers did not know how long to tell people to be prepared for, so some were expecting only an hour or two. Data from this hand count will help with managing expectations in the future.

Aggregation, and to some extent tallying, was slowed by a floor manager not understanding the write-in procedure and giving advice that conflicted with the other floor manager. The different procedures caused numbers that didn't line up at the aggregation step.

Aggregation was slowed somewhat by batches that arrived without chain of custody information filled in. Mostly it was the tally station which was not filled in on the tally sheets and the batch bag. When the tally team had signed the tally sheet it was not too difficult to take the batch back to the tally table and get the information entered correctly, but some tally teams only initialed the tally sheet and it took more detective work to figure out which of 10 tables those batches came from. After an announcement to make sure to fill in tally station information, the tally teams did better, and runners started checking for all information to be filled out before moving the batch.

Runners were somewhat of an afterthought, so were not chosen as experienced people, but the stations often asked runners what to do about something and got conflicting answers from different runners. If runners are chosen from the most experienced people, they could function as floor

managers since they are in a position to see what other teams are doing well or having problems with. Experienced runners would understand the need to check that all information is fully filled out before moving the batch to the next step.

Belongings were set on a table off to the side of the room, but many people kept their water bottles and many did not like having to put phones aside. There are obvious reasons not to have food and drink at the table, but perhaps water bottles could be kept at the tables at floor level. The current election system often forbids phones and taking pictures, but in general, in a transparent hand count, there should be no reason to ban either. In cases of highly contentious elections, it could be useful to keep phones out of the area to keep people from taking pictures of partial totals, or posting pictures of honest mistakes presented as if they were malicious. However, since it is fairly easy to take pictures without being noticed, prohibiting pictures probably won't solve the problem. The better policy might be to allow phones and pictures, but not tolerate arguments and distractions that slow the process.

What can we improve on and how?

Formulas for Future Estimates

As a test with an extreme number of ballots (more ballots than any precinct in the state would expect to have to handle in any one election) numbers from the recount suggest a general formula to estimate time and people required to count a number of ballots. The formula, expressed three different ways, is:

Hours = ballots/(12 * people)

People = ballots/(12 * hours)

Ballots = 12 * people * hours

The minimum team will always be four people, or preferably five because it is good to plan on at least one spare person for every team. Keep in mind that the first batch will probably be much slower than other batches, so when there are not many ballots compared to people counting, the count will take longer because the first batch is a larger percentage of the total time.

A more detailed estimation formula goes by the number of choices on a ballot, which is an important consideration since recent general election ballots in Colorado have been extremely long.

Talliers = (ballots * choices)/(500 * hours)

The above formula is just for tallying. If the talliers are also the batchers, add to the tallying time the batching time according to the formula below. (If batchers are separate, just add 5 minutes for the first batch to get to a tally station.)

Total batching time = (ballots * 3)/(25 * batching teams)

If the talliers are also the aggregators, allow time for aggregation at about 15 minutes per 600 ballots. If not, aggregation could be finished within a few minutes of the final batch being tallied.

Another consideration which this event didn't help with is the density of votes on a ballot. A race where voters pick 1 of 18 candidates is much faster to count than 9 yes-no ballot questions, or a race where voters pick 12 of 18 candidates, even though each ballot would have 18 choices. With more marks on the tally sheet, it is easier to accidentally mark the wrong box, and finding the mistake will probably be slower. Also, more dense races result in more columns to be counted in tallying and in aggregation, more individual numbers to add together. (In a non-dense race, such as picking one of 18 candidates, almost all the votes are likely to concentrate in just a few columns.)

Other Improvements:

Make it hard for teams to forget filling out the chain-of-custody information.

- Put the "batch station" box at the very top of the tally sheet.
- Have checklists at each station showing what must be done before the batch moves on.

- Have runners check that all station information is filled out before they take a batch to the next step.
- Consider appointing the most experienced people as runners, people who understand the big picture.

Recruit and invite well ahead of time.

- Recruit 1.5 times the number of people needed, several weeks ahead of time, then confirm the week before.
- Calling people personally to explain what we were doing worked well – many people thought the hand count had happened at the assembly.
- Increase awareness by demonstrating to all concerned how hand counting works. At least a week ahead of time, invite observers such as:
    - County commissioners
    - City councils
    - Political candidates
    - Reporters, podcasters, influencers
    - General public
- Recruit especially among people under 40, down to 16 or even 15:
    - Homeschoolers (good availability).
    - Honor societies, scouts, similar extracurricular groups (students are often looking for service hours).
    - Professional groups looking for service opportunities with public exposure.

Speed up the process by reducing down time.

- Recycle batchers as aggregators (timing fits well with the end of batching, but may not need all the batchers.)
- Recycle batchers as additional tally teams (have extra tables and supplies available).
- Identify aggregators and super-aggregators from the beginning so they don't leave early, thinking they are done after some other task finishes.
- Have another set of floor managers for each set of ballots. The floor managers/supervisors were occupied with the first set of ballots until they were aggregated, but with a second set of supervisors, the batchers and talliers could have started the second set of ballots as soon as they were done with the first ones, saving some down time.
- Tally and aggregation callers and watchers can check over the chain-of-custody information and any other paperwork while talliers/aggregators are adding up columns and cross-checking.
- Don't spend the time (and potential ballot alteration issues; Colorado statute forbids altering the ballot but numbering a ballot in the corner is arguably not an alteration) to number the ballots. Instead, have the caller hand each ballot to the watcher who piles up the batch in crosswise groups of five so a particular ballot is quick to find in case of questions during cross-checking. Numbering the ballots may be overkill anyway because once the team understands what they are doing, they are motivated to tally right the first time, so

most teams don't have many discrepancies to resolve, and few of those require another look at the ballot. The worst that could happen if ballots get out of order is having to take a few minutes, and a new set of tally sheets, to re-do the batch.

- If a job can be done by either batchers or talliers, it will probably speed up the overall count to have the batchers do it.
- If using overlays, consider lining up the whole batch under the overlay and removing each ballot as it is called, rather than shuffling the ballots one by one under the overlay.
- Allow for food, drink, bathroom, and general tiredness breaks, but in general people did not seem fatigued even after a couple hours. Consider that denser ballots will probably increase fatigue.

Speed up the process by reducing mistakes:

- Problems compound if they get to the level of aggregation. Head off problems before that point to save time.
- Recruit as aggregators accountants and other people who are very careful with numbers.
- Recruit people under 40, who may be less available than retirees but who tend to understand the process faster and do it much quicker and with very few mistakes (often doubling or tripling the speed.)
- As with reading the directions to a game, verbal instructions don't work well until people have actually gone through the process. People often say with a game, "Let's just start; you'll pick it up as you go along." So instead of instruction, consider having the group arrive early enough to go through a sample batch (of ballots, tally sheets, and aggregation sheets that cannot possibly be confused with the real thing) and walk through with each batch, tally, and aggregation team what they will be doing.
- Have prior training on chain-of-custody information and complications, but don't rely on people remembering.
- Have checklists at all stations showing the basics of what must be done with a batch before it moves to the next step.
- Have checklists at tally and aggregation stations explaining what to do with complications such as write-ins, undervotes, overvotes, and spoiled ballots. No doubt there will still be questions, but at least everyone will refer to the same procedure.
- Have sample sheets (VERY clearly marked "Sample") at each station to show how to fill them out. The sample might be combined with the checklist, or in addition to the checklist.
- Plastic bags are more slippery than paper, and stacked bags of batches could get mixed up if they slip out of their pile. When there are enough ballots (more than 600 or so) to need more than one set of aggregation sheets, don't try to stack them; keep each set of aggregation sheets with its batches in a separate large bag or box.
- Consider timers like chess timers for each station, to measure the time from arrival to departure of each batch – speed competition among teams will tend to improve accuracy, because teams figure out quickly that mistakes slow things down and doing it right the first time is fastest.