2017 Risk-limiting Audit

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History

• Random post-election audits a requirement since 2005

• Risk-limiting audits adopted into law in 2009
  • Implementation delayed to give time for technology and processes to develop
  • Delayed again in 2013 because of adoption of Colorado’s all mail ballot voting model
  • Beginning with 2017 coordinated election, all counties required to conduct RLAs
Comparison vs Ballot Polling Audits

• Two types of risk limiting audits
  • Comparison audit:
    • RLA in which humans compare voter markings on randomly selected paper ballots to ballot-level cast vote records, or data showing how the voting system interpreted those markings on each individual ballot
    • Counties using the new voting system conduct comparison audits
  • Ballot polling audit:
    • RLA for jurisdictions using legacy voting systems that do not export ballot-level CVRs
    • Human beings simply report the markings on randomly selected ballots until the risk limit is satisfied
2017 Coordinated Election RLA

• RLA representative group met February through April
• Began training and preparing in the spring
  • Two rounds of training
    • Round 1 - March and April
      • Conceptual, learned what the RLA is
      • Focused on importance of good processes
    • Round 2 – August and September
      • Showed the tool and trained to specific processes
      • Continued to emphasize importance of good processes
    • Mock RLA and hands-on practice a few days before election day
• Clerk’s group worked on scanning and batching best practices
RLA Software Tool

• Contracted with Free & Fair to develop a tool to help make the audit as efficient as possible
• Development and testing July through November
• Code is open source: https://github.com/FreeAndFair/ColoradoRLA
  • We want other jurisdictions to be able to benefit from our experience
  • It’s transparent – anyone can review the code
  • We want to benefit from anyone who reviews the code and has ideas on improvement
The audit has not yet been defined.

Click to download intermediate audit report.
Download

County Updates

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Submitted</th>
<th>Audited Contest Discrepancies</th>
<th>Non-audited Contest Discrepancies</th>
<th>Disagreements</th>
<th>Remaining in Round</th>
<th>Est. Remaining Ballots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams</td>
<td>Not started</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alamosa</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Contest Updates

Hand Count County Name Discrepancies
Hello, Alamosa County!

Please have the audit board sign in.

Audit board is not signed in.

Click to download intermediate audit report.

Auditor Board  Start Audit

County Info

| County:   | Alamosa     |
| Status:  | Audit underway |
| Current Round: | 1 |
| Ballot cards remaining in round: | 4 |
| Ballot cards audited (all rounds): | 0 |
| Disagreements (all rounds): | 0 |
| Discrepancies (all rounds): | 0 |

Contest Info

Presidential Electors

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillary Clinton / Tim Kaine</td>
<td>DEM</td>
</tr>
<tr>
<td>Donald J. Trump / Michael R. Pence</td>
<td>REP</td>
</tr>
<tr>
<td>Darrell L. Castle / Scott N. Bradley</td>
<td>ACN</td>
</tr>
<tr>
<td>Gary Johnson / Bill Weld</td>
<td>LBR</td>
</tr>
</tbody>
</table>
Coordinated Election Timeline

• Establish the Risk Limits – deadline 32 days before Election Day
  • Met on October 5 and posted on October 6
  • Limit for comparison audit was 9%
  • Limit for ballot polling audit was 20%

• Select audited contests – deadline 3 days after Election Day
  • Met on November 8 and circulated contest to counties for comment
  • Posted on November 9

• County uploads – deadline 9 days after Election Day

• Select Random Seed and commence audit – deadline 10 days after Election day

• Counties conducted audits – 10-14 days after Election day
Outcome

• All 56 counties passed the audit
• 50 comparison audit counties using new voting systems
• 5 ballot polling audit counties using legacy voting systems
• 1 county on new voting system moved to ballot polling audit because of deadline issue
Comparison vs Ballot polling

• Comparison audit counties – 50 counties
  • 35 counties with no discrepancies
  • 8 counties with discrepancies in non-audited contests
  • 4 counties with a discrepancy in the audited and some discrepancies in non-audited contests
  • 3 counties with a single discrepancy in the audited contest, didn’t require a second round
  • 3 counties with enough discrepancies in the audited contest to require a second round

• Ballot polling counties – 6 counties
  • 3 counties satisfied the risk limit in the first round
  • 3 counties conducted second round
Success!

• Notlogisticallyoverwhelming
• Process and training are key
  • Counties created some excellent processes
  • Strong correlation between attending all training and participating in mock RLA and whether experienced issues – in particular hands on
• Some process and training issues identified at county and state level
What’s Next

• Conceptual issues to address
  • Currently no published literature on conducting an audit of the primary election
    • Colorado will conduct it’s first open mail ballot primary in 2018
    • Candidates include federal, state, and local
  • Need to address random selection when there are multiple party ballots
  • Additional new voting system may be purchased
    • Need to ensure the CVR export will import into the RLA tool and properly parse
    • Need to determine whether any process changes are required
What’s Next

• Enhancements to the RLA tool
  • UI changes
    • Review screen and pop-up s for critical actions for state users
    • Pop-up warnings for critical actions for county users
    • Additional instructional text for county users
      • More feedback to the user
      • Clearer instructions for concluding the audit
  • Functional updates
    • Ability for counties with large number of ballots to have multiple teams working simultaneously
    • Addition information in county reports and changes to reports for clarity
    • Ability to correct county status before launching audit
    • Better handling of statewide contest
What’s Next

• Training
  • Debrief and discussions with the counties at the January conference and spring regional meetings
  • Refresher training and more hands-on practice
  • Training for counties moving to new voting systems for the 2018 elections

• Guides and best practices
  • Revise step-by-step user guide
  • Work with clerk’s group to update best practices document based on lessons learned
What’s Next

• Statute and rule changes
  • May need additional rules to address primary election
  • Proposing extension of statutory canvass deadline
  • Adopt rules or voting systems conditions of use requiring uniform ballot style
    and contest naming conventions

• Update contingency plans to reflect lessons learned
  • Temporary loss of power or internet – counties found some additional creative solutions
  • Technical issues that require having a second database on standby
  • Critical staffing changes at the state or a county
Conclusion

• Overall, an extremely successful first effort
• We expected to learn a lot, and we did
• Next year, we’ll conduct our first RLAs of the primary and general elections
• We expect we’ll continue to learn a lot through the next two elections, and we will share those lessons as we go