Post Election Risk-Limiting Audit Pilot Program 2011-2012
Overview

The mission of the Secretary of State's office is to strengthen democracy by overseeing fair and accurate local, state and federal elections and build confidence and participation in elections. The Secretary of State has a responsibility to ensure that voting systems approved for use in California are secure, accurate, reliable, and accessible, and that every ballot is counted as it was cast.

In 2007, the Secretary of State commissioned an independent, top-to-bottom review of many of the voting systems approved for use in California. Following the review, the Secretary of State strictly limited the use of direct recording electronic (DRE) voting systems, and imposed significant security and auditing requirements on voting systems used in California elections.

Also in 2007, the Secretary of State created a Post-Election Audit Standards Working Group to review the state's 1% manual tally law and new post-election audit models. The Working Group's report recommended a risk-based approach to post-election audits, an adjustable sample model, and a comprehensive methodology to verifying election results, including rules for escalating an audit when the hand count of the initial audit sample cannot confirm that the voting system results are correct. The Working Group included University of California Berkeley Statistics Professor Philip B. Stark, who has since expanded his research on post-election auditing and developed a number of peer-reviewed and field-tested risk-limiting audit methods.

In 2010, the California Legislature approved and the Governor signed, AB 2023 (Saldana), Chapter 122, Statutes of 2010, which authorized the Secretary of State to conduct a post election audit pilot program to test risk-limiting audits in California counties.

In 2011, the federal Election Assistance Commission (EAC) awarded the Secretary of State $230,000 in new federal Help America Vote Act (HAVA) grant funding to conduct the pilot program over two years and conduct audits in up to 20 California counties through 2012.

<u>County Selection</u>

In selecting counties to participate in the pilot program, AB 2023 encourages the Secretary of State to create a balance of:

❑ Urban and rural counties
❑ Northern, Central, Southern California counties
❑ Voting systems in use in California

The following counties have volunteered to participate:

❑ Alameda

- ❑ Alpine
- ❑ Colusa
- ❑ El Dorado
- ❑ Humboldt
- ❑ Madera
- ❑ Marin
- ❑ Merced
- ❑ Monterey
- ❑ Napa
- ❑ Orange
- ❑ Sacramento
- ❑ San Diego
- ❑ San Francisco
- ❑ San Luis Obispo
- ❑ Santa Cruz
- ❑ Stanislaus
- ❑ Sutter
- ❑ Ventura
- ❑ Yolo
- ❑ Yuba

<u>Public Observation</u>

To ensure these pilot audits would be conducted in a public fashion similar to the manner in which the 1% manual tally must be conducted under California law, AB 2023 requires counties to do the following:

- ❑ Provide public notice five days before each audit;
- ❑ Publish election results by batch before the audit begins;
- ❑ Conduct audits using a hand tally of selected ballots; and
- ❑ Conduct audits in view of the public.

<u>Reporting</u>

AB 2023 requires the Secretary of State to report to the Legislature by March 1, 2012, on the effectiveness and efficiency of the pilot program, including an analysis of the cost of performing each audit as compared to the one percent manual tally conducted in the same election.

<u>EAC Grant</u>

<u>What The Pilot Audit Program Will Provide</u>

The pilot program team will conduct up to 20 risk-limiting audits following elections held in California counties through 2012. At the conclusion of the program, the team will produce:

1. Documentation of Findings and Recommendations

The team will document the pilot audits, including:

❑ Details of the contests audited;
❑ Procedures used to generate and export batch subtotals or individual cast-vote records, to select the sample, to count votes by hand, and to measure discrepancies between voting system and hand tallies;
❑ Statistical methods employed;
❑ Audit results;
❑ Voting system(s) audited;
❑ Jurisdictions involved; and
❑ Costs incurred.

The team will analyze and present findings and recommendations on the effectiveness, efficiency, usability, challenges, mitigations, costs, and benefits of risk-limiting audits, based on the audit results.

2. Recommendations for Modifications to Voting Systems and Tally Processes

The team will recommend modifications to existing voting systems and vote tally processes that can allow efficient risk-limiting audits using small-batch or ballot-level sampling to be conducted.

3. Development of Audit Tools, Processes and Best Practices

The team will develop and document a set of tools, processes and best practices for conducting risk-limiting post-election audits. The materials will address ballot accounting, chain of custody, election data, voter anonymity, cast vote records, reported results, random samples, statistical formulae, and public observation. To the extent the specific procedures are needed for a given voting method or system, they will be developed. Materials will be designed to be user-friendly and written in plain English.

4. Development of Rules for Setting Initial Sample Size and Escalation Triggers

Included in the materials to be developed will be easy-to-follow statistical formulae and rules to set the initial sample size and to decide whether the audit should be escalated in light of any discrepancies the audit finds. The formulae will be programmed as a spreadsheet or other user-friendly software that jurisdictions can use to determine how many batches or ballots to initially manually tally and when and how much to expand the audit if errors are found.

5. Development of Methods to Create Small Batches with Reported Vote Totals

Smaller batches increase the efficiency and cost-effectiveness of post-election audits. California counties report election results by precinct and conduct a post-election manual tally involving the random selection of 1% of precincts. Some counties may have methods of creating smaller batches of ballots with

corresponding reported vote totals. The team will develop methods for creating smaller batches, including vote-by-mail ballots and ballots cast at polling places.

6. Development of Ballot-Level Audit Methods

Ballot-level auditing means using each individual ballot as an audit unit, rather than using batches of ballots (e.g., stacks of ballots or entire precincts). Enormous efficiency can be achieved with ballot-level audits, because election results are confirmed by drawing and hand tallying individual ballots, so that only a small fraction of the ballots have to be hand counted compared to audits involving batches that contain hundreds of ballots. In order to audit at the ballot level, a parallel scan and tally of the ballots may be necessary, because some voting systems cannot report individual ballot results in a way that allows an auditor to match the physical ballot to the results for that ballot that were tallied by the voting system. For a parallel ballot scan and tally, all ballots are scanned to create digital images of the ballots and independent software is used to tally the votes on the ballot images. As long as the parallel tally shows the same outcomes (winners) as the voting system results, then an audit of the parallel tally can transitively confirm the official results. The team will develop statistical methods and audit procedures for conducting ballot-level audits.

7. Development of Template Audit Result Reports

California law requires counties to report to the Secretary of State the results of the state-mandated manual tally of 1% of precincts following each election. The Secretary of State has developed easy-to-use reporting forms for counties to prepare these reports. The team will develop similar reporting forms to report results of a risk-limiting audit conducted to confirm election results. The audit result reporting forms will include fields for reporting details on discrepancies and their causes. The forms will include standard examples of findings and conclusions and recommended standard terms and definitions. In developing the report format, the team will consider how best to present result data to help election officials improve elections, help researchers analyze elections, and allow comparisons across jurisdictions.

8. Comparison of Risk-Limiting Audits and California's 1% Manual Tally Law

The team will report on the efficiency of risk-limiting audits compared to the cost of conducting California's 1% manual tally, which requires every contest on 100% of the ballots in 1% of all precincts statewide to be manually tallied after each election.

9. Involvement of Key Stakeholders and Beneficiaries

The research will involve gathering input from stakeholders including the Secretary of State, county elections officials, and election integrity advocates. To gather input from key stakeholders and beneficiaries, the Secretary of State has

established an advisory panel of experts, advocates, and community activists in the field of election auditing and reform.

10. Demonstration of Effectiveness of Risk-Limiting Audits

In conducting up to 20 risk-limiting audits in California counties, the team will assess the effectiveness and efficiency of risk-limiting audits and determine how efficiency can be improved by procedures and technology to reduce batch sizes, down to the level of individual ballots.

11. Research Methodology and Phases: Data Gathering, Testing, Review

Audits will be conducted following elections held through 2012. The audits will occur during or immediately after the statutory 28-day canvass period during which all ballots are tallied by the voting systems. The Secretary of State will seek to include counties using voting systems made by all major voting system vendors in California and nationally. The team will work with participating counties and voting system vendors to plan the audits and develop procedures beginning 60 days before each election in the pilot. The team will provide on site assistance to jurisdictions in carrying out the audits, including performing all computations and helping with the manual tally as required.

The team's experiences and results will be documented in working papers as the audits are conducted, with annual summaries and annual reports to the California Legislature and the EAC. Overall findings, recommendations and deliverables will be completed in the final months of the two-year program following the last audits in November 2012.

12. Data Collection

During the audits, the team will collect data on pre-audit procedures, audit processes and procedures, audit results, and observations made by pilot program participants and audit observers. The team will develop an observation checklist to ensure data are collected on each aspect of the audit process and will train observers in participant-observation techniques.

13. Dissemination of Results

Research findings and recommendations as well as other project outcomes and deliverables will be published on the SOS's website, shared with the media and public, shared widely among the elections officials in California and shared with Secretaries of State and elections officials in other states. The results will also be disseminated to the National Association of Secretaries of State (NASS), National Association of State Election Directors (NASED), California Association of Clerks and Election Officials (CACEO), Election Verification Network (EVN), Joint Statistical Meetings, American Political Science Association, Conference on Empirical Legal Studies, and journals on Statistics, Computer Science, and Political Science.