

Measuring and controlling a risk to Democracy: Election Audits

Philip B. Stark

Department of Statistics
University of California, Berkeley

Statistics/Computer Science/Political Science C79
5 March 2013

[\[Election Leak\]](#) [\[CNN: DC hack\]](#) [\[Voting Machine Wins\]](#) [\[Homer Votes—sort of\]](#)

It doesn't matter who votes. What matters is who counts the votes. – Josef Stalin

The purpose of elections is to convince the losers that they lost. – Dan Wallach

Palm Beach

Software maker takes blame in Wellington vote count mess, by George Bennett

The supplier of Palm Beach County's voting and tabulating equipment says a software "shortcoming" led to votes being assigned to the wrong candidates and the elections office declaring the wrong winners in two recent Wellington council races.

... Unbeknownst to elections officials, the vote totals for the mayor's race ended up being reported and later certified as the results of the Seat 1 race. The Seat 1 vote totals were certified as the Seat 4 results and the Seat 4 vote totals were certified as the mayoral results.

The problem wasn't discovered until six days after the election, during a routine audit. ... The fact that the audit is conducted after winners are certified is a requirement of state law.

THE PALM BEACH POST, 23 MARCH 2012, [http:](http://www.sun-sentinel.com/news/palm-beach/pb-bucher-election-machines-20120323,0,7453964.story)

[//www.sun-sentinel.com/news/palm-beach/pb-bucher-election-machines-20120323,0,7453964.story](http://www.sun-sentinel.com/news/palm-beach/pb-bucher-election-machines-20120323,0,7453964.story)

Saguache County, Colorado crimes

Grand jury has its hands full with Saguache election case, by Troy Hooper

A disputed election in south-central Colorado is now in the hands of a grand jury that is reviewing allegations that the clerk and other officials committed crimes when they tallied the votes.

The officials under investigation stood to benefit from the election's outcome — most notably Saguache County Clerk Melinda Myers — who, along with County Commissioner Linda Joseph, at first lost but then won their races after Myers declared the races had to be retabulated due to a technical glitch.

[Myers won't let the Colorado Secretary of State inspect the ballots.] "There are processes that we are avowed to protect," [Colorado County Clerks] association president Scott Doyle said. "One of them is preserving the sanctity of ballots. The cornerstone of our democracy is based on those ballots. It's what we stand for as clerks."

"The clerks are using the false argument about 'secrecy of ballots' as a scare tactic or sympathy evoking tool to try to get a trusting public to side with them in their effort to block public verification of elections," Al Kolwicz of the Colorado Voter Group said in an email. "Why exactly clerks oppose public verification is unknown."

Officials in Saguache County stand accused of more than 30 misdemeanors. [Myers was recalled this year by a 60% vote.]

THE COLORADO INDEPENDENT, 25 MARCH 2011,

<http://coloradoindependent.com/80819/grand-jury-has-its-hands-full-with-saguache-election-case>

Waukesha County, WI: Oops!

Wisconsin Election Surprise: David Prosser Gains 7,500 Votes After 'Human Error' In Waukesha County, by Amanda Terkel

In a dramatic turn of events on Thursday, the Waukesha County clerk announced that the vote total announced for Tuesday's Wisconsin Supreme Court race had been mistaken – and that the corrected numbers changed the outcome of the entire election.

There were 3,456 missing votes for Democratic-backed challenger JoAnne Kloppenburg and 11,059 for incumbent GOP-backed Justice David Prosser. Kloppenburg has previously been beating Prosser by just 200 votes of the roughly 1.5 million cast statewide.

In the city of New Berlin, the total for one ward was recorded as 37 votes for Prosser, but it was actually 237, she said. In the town of Lisbon, a “typing error” resulted in both candidates losing votes. The most significant error, however, occurred in the city of Brookfield.

“The spreadsheet from Brookfield was imported into a database that was provided by the Government Accountability Board, but it inadvertently was not saved,” Nickolaus said. “As a result, when I ran the report to show the aggregate numbers that were collected from all the municipalities, I assumed that the city of Brookfield was included. It was not. The city of Brookfield cast 14,315 votes on April 5 – 10,859 votes went for Justice David Prosser, 3,456 went for JoAnne Kloppenburg.”

... prior to the election, Nickolaus “was heavily criticized for her decision to keep the county results on an antiquated personal computer, rather than upgrade to a new data system being utilized statewide.”

“Nickolaus cited security concerns for keeping the data herself ...”

HUFFINGTON POST, 7 APRIL 2011,

http://www.huffingtonpost.com/2011/04/07/david-prosser-wisconsin-supreme-court_n_846431.html

Vote-flipping in North Carolina

NC GOP leader: Touchscreen voting machines have programming flaw, by Michael Biesecker

The chairman of the N.C. Republican Party alleged Thursday that a programming flaw with touchscreen voting machines used for early voting in 36 counties is causing votes intended for GOP candidates to be counted for Democrats.

Tom Fetzner, the Republican chairman, said that if the State Board of Elections does not enact a list of demands intended to remedy the problem by the end of today, the party's lawyers will be in federal court Friday morning seeking a statewide injunction. . . .

Johnnie McLean, deputy director of the state elections board, said Thursday that her office has received no widespread reports of problems.

"In every election we will have scattered reports of machines where the screens need to be recalibrated," McLean said. "That sort of comes with the territory with touch-screen technology."

NEWS OBSERVER, 28 OCTOBER 2010, <http://www.newsobserver.com/2010/10/28/766257/>

[nc-republican-party-chair-touchscreen.html#ixzz13gTJCCvp](http://www.newsobserver.com/2010/10/28/766257/nc-republican-party-chair-touchscreen.html#ixzz13gTJCCvp)

Humboldt County CA, 2008

Serious Error in Diebold Voting Software Caused Lost Ballots in California County, by Kim Zetter

Election officials in a small county in California discovered by chance last week that the tabulation software they used to tally votes in this year's general election dropped 197 paper ballots from the totals at one precinct. The system's audit log also appears to have deleted any sign that the ballots had ever been recorded.

Premier has acknowledged . . . its software caused the system to delete votes. The company has apparently known about the problem since 2004 . . .

[RoV] Crnich would never have discovered the problem through her standard canvassing procedures . . . nor would she have discovered it while conducting a mandatory manual audit that California counties are required to do.

Crnich discovered the missing ballots only because she happened to implement a new and innovative auditing system this year that was spearheaded by members of the public who helped her develop it.

WIRED NEWS, 8 DECEMBER 2008, <http://blog.wired.com/27bstroke6/2008/12/unique-election.html>

Polk County NC, 2008

Owens victory in Polk is in doubt, by Times-News staff

Ted Owens went to sleep Tuesday night thinking he had earned another term ... A recount Wednesday showed he may not have. ...

Computer software initially displayed figures that were different than those shown by the voting machines ...

The software installed in the stand-alone computer that ballot results are fed into was the problem ... [Elections Director Dale Edwards] said there was no explanation as to why the computer counted the wrong numbers, and no one is at fault.

BLUERIDGENOW.COM TIMES-NEWS, 6 NOVEMBER 2008, <http://www.blueridgenow.com/article/20081106/NEWS/811050255>

Santa Clara County, CA, 2008

Few problems reported in area despite record turnout, by Karen de Sá and Lisa Fernandez

Record-high voting in the Bay Area on Tuesday mostly defied predictions of unwieldy waits and overwhelmed polls. But in Santa Clara County, concerns about touch-screen voting machines will likely increase following significant malfunctions.

Fifty-seven of the county's Sequoia Voting Systems machines failed on Election Day, resulting in hourslong delays before replacements arrived.

MERCURY NEWS, 4 NOVEMBER 2008, http://www.mercurynews.com/elections/ci_10901166?nclick_check=1

Leon County, FL, 2008

Ballots not being recorded at two Leon County polling places, by Angeline J. Taylor

Leon County Supervisor of Elections Ion Sancho has reported that ballots . . . are not being read properly. The problem, he said, rests with a new machine that has been purchased for polling sites throughout the state. . . .

“Certain ballots are being rejected across the state,” he said. . . . If the machine reads the ballot card as too long, the . . . machine will simply not read the card.

TALLAHASSEE DEMOCRAT, 20 OCTOBER 2008, <http://www.tallahassee.com/article/20081020/BREAKINGNEWS/81020024>

Palm Beach County, FL, 2008

Florida Primary Recount Surfaces Grave Voting Problems One Month Before Presidential Election, by Kim Zetter

At issue is an August 26 primary election in which officials discovered, during a recount of a close judicial race, that more than 3,400 ballots had mysteriously disappeared after they were initially counted on election day. The recount a week later, minus the missing ballots, flipped the results of the race to a different winner.

... officials found an additional 227 ballots that were never counted on election day ... in boxes in the county's tabulation center.

Palm Beach County was using new optical-scan machines that it recently purchased from Sequoia Voting Systems for \$5.5 million.

Palm Beach County, FL, 2008, cont'd

[In a re-scan of ballots the machines had rejected] [o]fficials expected the machines would reject the same ballots again. But that didn't happen. During a first test of 160 ballots, the machines accepted three of them. In a second test of 102 ballots, the machines accepted 13 of them . . . When the same ballots were run through the machines again, 90 of the ballots were accepted.

[T]he county then re-scanned two batches of 51 ballots each that had initially been rejected for having no vote cast in the judicial race, but that were found in a manual examination to contain legitimate votes for one candidate or the other. The first batch of 51 ballots were found to have legitimate votes for Abramson. The second batch of 51 ballots were found to have legitimate votes for Wennet.

In the first batch of 51 ballots . . . 11 of the ballots that had previously been rejected as undervotes were now accepted . . . the remaining 40 ballots were rejected as having no votes. In the second batch of 51 ballots . . . the same machine accepted 2 ballots and rejected 49.

Palm Beach County, FL, 2008, cont'd

The same two batches of ballots were then run through the second ... machine. [I]n the first batch ... the machine accepted 41 ... and rejected 10 others. In the second batch ... the machine accepted 49 of the ballots and rejected 2—the exact opposite of the results from the first machine.

WIRED NEWS, 7 OCTOBER 2008, <http://blog.wired.com/27bstroke6/2008/10/florida-countys.html>

Washington, DC, 2008

Report Blames Speed In Primary Vote Error; Exact Cause of Defect Not Pinpointed, by Nikita Stewart

Speed might have contributed to the Sept. 9 primary debacle involving thousands of phantom votes, according to a D.C. Board of Elections and Ethics report issued yesterday. . . . [T]he report does not offer a definitive explanation. . .

The infamous Precinct 141 cartridge “had inexplicably added randomly generated numbers to the totals that had been reported,” according to the report written by the elections board’s internal investigative team.

. . . 4,759 votes were reflected instead of the actual 326 cast there.

WASHINGTON POST, 2 OCTOBER 2008; PAGE B02

see also hearings at

http://www.octt.dc.gov/services/on_demand_video/channel13/October2008/10_03_08_PUBSVRC_2.aspx

New Jersey 2008

County finds vote errors: Discrepancies discovered in 5% of machines, by Robert Stern

Five percent of the 600 electronic voting machines used in Mercer County during the Feb. 5 presidential primary recorded inaccurate voter turnout totals, county officials said yesterday . . .

23 FEBRUARY 2008, NEW JERSEY TIMES

Ohio 2004

Machine Error Gives Bush Thousands of Extra Ohio Votes, by John McCarthy

An error with an electronic voting system gave President Bush 3,893 extra votes in suburban Columbus, elections officials said. Franklin County's unofficial results had Bush receiving 4,258 votes to Democrat John Kerry's 260 votes in a precinct in Gahanna. Records show only 638 voters cast ballots in that precinct. Bush's total should have been recorded as 365.

5 NOVEMBER 2004, ASSOCIATED PRESS

Florida 2004

Broward Machines Count Backward, by Eliot Kleinberg

[E]arly Thursday, as Broward County elections officials wrapped up after a long day of canvassing votes, something unusual caught their eye. Tallies should go up as more votes are counted. That's simple math. But in some races, the numbers had gone . . . down. Officials found the software used in Broward can handle only 32,000 votes per precinct. After that, the system starts counting backward.

. . . The problem cropped up in the 2002 election. . . Broward elections officials said they had thought the problem was fixed.

5 NOVEMBER 2004, THE PALM BEACH POST

California Elections Code §15360

[T]he official conducting the election shall conduct a public manual tally of the ballots tabulated by those devices, including absent voters' ballots, cast in 1 percent of the precincts chosen at random by the elections official . . .

The elections official shall use either a random number generator or other method specified in regulations . . .

The official conducting the election shall include a report on the results of the 1 percent manual tally in the certification of the official canvass of the vote. This report shall identify any discrepancies between the machine count and the manual tally and a description of how each of these discrepancies was resolved . . .

NJ S507 [1R] (Gill)

[Officials] shall conduct random hand counts of the voter-verified paper records in at least two percent of the election districts where elections are held for federal or State office . . .

Any procedure designed, adopted, and implemented by the audit team shall be implemented to ensure with at least 99% statistical power that for each federal, gubernatorial or other Statewide election held in the State, a 100% manual recount of the voter-verifiable paper records would not alter the electoral outcome reported by the audit . . .

[Procedures] shall be based upon scientifically reasonable assumptions . . . including but not limited to: the possibility that within any election district up to 20% of the total votes cast may have been counted for a candidate or ballot position other than the one intended by the voters[.]

Others

Oregon and New Mexico have audit laws that allow the sample (of races and/or ballots) to be selected before the election.

Florida does not allow auditing before results are final; limits the amount of auditing.

Rep. Rush Holt has proposed federal legislation that has tiered sampling fractions, depending on the margin—but no requirement for followup if errors are found.

Can't correct wrong outcomes without counting the whole audit trail.

Counting the whole audit trail won't give right answer unless it's adequately intact.

What is wanting?

- Law/regulations should require LEOs to give convincing evidence outcomes are right.
- Does not necessarily require radical transparency—but requires a good audit trail.
- Certifying equipment isn't enough: How was the equipment used?
- Election should generate hard evidence, checked for integrity.
- Audit trail needs to be scrutinized to confirm or correct the outcome.
- Why certify equipment but not procedures, especially curation of the audit trail?

Foundations

Strongly Software-Independent Voting System (Rivest & Wack)

A voting system is strongly software-independent if an undetected error or change to its software cannot produce an undetectable change in the outcome, and we can find the correct outcome without re-running the election.

Risk-limiting Audit

Large, known chance of a full hand count if the outcome is wrong, thereby correcting the outcome.

Risk is maximum chance of failing to correct an apparent outcome that is wrong, no matter what caused the outcome to be wrong.

Evidence-based elections

Evidence = Auditability + Auditing.

Overall election and canvass process should correct its own errors before reporting, or report it can't guarantee that it corrected its errors (e.g., because audit trail can't be shown to be intact).

Role of certification of voting systems

1. Under laboratory conditions, can the vote tabulation system—as delivered from the manufacturer—count votes with a specified level of accuracy?
2. As maintained, deployed, and used in the current election, did the vote tabulation system find the true winners?

In U.S., certification can cost millions and take years. Addresses Q 1.

Q 2 seems more important. Audits address Q 2.

If a jurisdiction uses a certified system, costs more to use it as a component of a resilient canvass framework because auditing will be more expensive.

Moreover, audit is less transparent.

Maintenance costs high; systems not agile; stupefying inertia

Certification still useful for some things, e.g., to ensure accessibility and creation of durable audit trail.

Ingredients for “resilient canvass framework”

- Voters create complete, durable, accurate audit trail.
- LEO curates the audit trail adequately.
- Compliance audit to ensure that the audit trail is adequately intact.

Was the system, as used, strongly software independent?

If not, don't declare an outcome.

- Risk-limiting audit: Examine ballots by hand until there's strong evidence that counting the rest won't change the outcome.

“Explaining” or “resolving” errors isn't enough.

Compliance Audits and Materiality Audits

Effective compliance audit

Determine whether the audit trail is trustworthy enough to determine who won.

If not, do not declare an outcome (nb: danger of DOS attacks).

Effective materiality audit

Correct the outcome if it is wrong.

Requires intact audit trail—need to pass compliance audit first.
Might require counting the entire audit trail by hand.

Compliance audit: Check creation & curation of audit trail

- Did election use equipment that should create an accurate audit trail and adhere to procedures that should keep the audit trail sufficiently accurate to reflect the outcome according to how voters actually voted?
- Should include ballot accounting, checks of seals, chain of custody, surveillance tapes, forensic dismantling of voting machines, etc.
- If compliance audit generates convincing affirmative evidence that a full hand count of the audit trail would show the outcome according to how votes were cast, proceed to risk-limiting audit.
- This evidence is qualitative, like legal evidence: convincing to hypothetical “reasonable person.”
- If insufficient evidence that the outcome is right, don’t declare election outcome.

Materiality audit: check outcome against audit trail

- Did the vote tabulation system count the votes accurately enough to determine who won?
- Relies on the audit trail, which the compliance audit has checked for integrity.
- If hand-to-eye check of sample of ballots generates convincing evidence that a full hand count of the audit trail would show the same outcome that the VTS reported, stop.
- Evidence is quantitative statistical evidence.
- If insufficient evidence, expand the sample and count more votes by hand. Keep expanding until there's convincing evidence or until there has been a full hand count.

Risk-limiting audits

- How much auditing is “enough”? Historically, much debate over how large a sample to start with. Sideways.
- **Answer: If the sample gives compelling evidence that outcome is right, stop; else, audit more.**
- Eventually, either have strong evidence that the outcome is right, or the whole contest has been counted by hand and correct outcome is known.
- “Risk” is pre-specified minimum chance of correcting the outcome if it is wrong, no matter why/how the outcome is wrong.

Role of statistics

Limiting the risk is easy

No statistics needed: just count all the ballots by hand.

Statistics lets you do less counting when the outcome is right, but still ensure a big chance of a full hand count when outcome is wrong.

Measure evidence statistically with a random sample.

Ballot-polling audits and Comparison Audits

- Ballot polling audit: sample ballots at random until there is strong evidence that looking at all of them would show the same election outcome.
- Comparison audit:
 1. Commit to vote data at some level of aggregation.
 2. Check that the committed data produces the same results as claimed. Should be perfect.
 3. Sample the committed data and check until there is strong evidence that it is accurate enough to find the right election outcome.

Tradeoffs

- Ballot polling audit
 - Virtually no set-up costs
 - Requires nothing of voting system
 - Generally, need a ballot manifest to draw sample
 - Preserves voter anonymity except possibly for sampled ballots
 - Counting burden comparable to precinct-based comparison audit unless margin is small
 - Requires more counting than ballot-level comparison audit
 - Does not check tabulation: could be right because of lucky cancellation of errors
- Comparison audit
 - Heavy demands on voting system for reporting and export
 - Requires LEO to commit to subtotals
 - Requires ability to retrieve ballots that correspond to CVRs or subtotals
 - May compromise voter privacy (small-batch or ballot-level reporting) & enable coercion through pattern voting
 - Most efficient (ballot-level) may require re-scanning all ballots
 - Checks tabulation (but not for *transitive audits* unless subtotals are cross checked as well)

Risk-Limiting Audits

- 15 pilot audits in CA, CO, and OH; another 15 planned.
- EAC funding for pilots in CA and CO and Cuyahoga County, OH
- CO has law; CA has pilot law
- simple measures
- measures requiring super-majority
- multi-candidate contests
- vote-for- n contests,
- multiple contests audited simultaneously with one sample
- contest sizes: 200 ballots to 121,000 ballots
- counting burden: 16 ballots to 7,000 ballots
- cost per audited ballot: nil to about \$0.55.

California AB 2023 (Saldaña, sponsored by SoS Bowen)

Unanimous bipartisan support in both houses.

11 counties committed to pilots; 20 interested.

(b)(3) “Risk-limiting audit” means a manual tally employing a statistical method that ensures a large, predetermined minimum chance of requiring a full manual tally whenever a full manual tally would show an electoral outcome that differs from the outcome reported by the vote tabulating device for the audited contest. A risk-limiting audit shall begin with a hand tally of the votes in one or more audit units and shall continue to hand tally votes in additional audit units until there is strong statistical evidence that the electoral outcome is correct. In the event that counting additional audit units does not provide strong statistical evidence that the electoral outcome is correct, the audit shall continue until there has been a full manual tally to determine the correct electoral outcome of the audited contest.

http://www.leginfo.ca.gov/pub/09-10/bill/asm/ab_2001-2050/ab_2023_bill_20100325_amended_asm_v98.html

Intermission: Sequential probability ratio test

Event has probability p_1 if hypothesis 1 is true, $p_2 < p_1$ if hypothesis 2 is true.

Likelihood ratio:

if the event occurs, $p_1/p_2 > 1$

if the event does not occur, $(1 - p_1)/(1 - p_2) < 1$.

Imagine sequence of trials. Multiply the likelihood ratios for all the trials.

The more frequently the event occurs, the larger the product will be; the less frequently, the smaller the ratio will be.

Theorem: if hypothesis 2 is true, the chance that the product ever exceeds $1/\alpha$ is at most α .

Simple ballot-polling audit, 2 candidates, risk limit α

1. Pick D , maximum draws before full hand count. s is winner's share of the valid votes according to the vote tabulation system.
Set $T = 1$, $d = 0$.
2. Select a ballot at random from ballots cast in the contest.
3. If the ballot is an undervote, overvote, or an invalid ballot, return to step 2; else $d \leftarrow d + 1$.
4. If the ballot shows a valid vote for the reported winner, multiply T by
$$2s.$$
5. If the ballot shows a valid vote for anyone else, multiply T by
$$2(1 - s).$$
6. If $T > 1/\alpha$, stop the audit: Reported outcome stands.
Else if $d < D$, return to step 2.
7. Perform full hand count; hand-count results trump reported results.

Theorem: limits risk to α .

Intermission: Sequential probability ratio test

Event has probability p_1 if hypothesis 1 is true, p_2 if hypothesis 2 is true.

Imagine sequence of trials. If event

Actual ballot-polling audit in Monterey County, CA

Conducted in Monterey County in May, 2011, before certification.

10% risk limit

The expected number of ballots to examine: 58.

Actually took 92 draws (89 distinct ballots).

Workload

Winner's True Share	Quantiles					Mean
	25 th	50 th	75 th	90 th	99 th	
70%	12	22	38	60	131	30
65%	23	38	66	108	236	53
60%	49	84	149	244	538	119
58%	77	131	231	381	840	184
55%	193	332	587	974	2,157	469
54%	301	518	916	1,520	3,366	730
53%	531	914	1,619	2,700	5,980	1,294
52%	1,188	2,051	3,637	6,053	13,455	2,900
51%	4,725	8,157	14,486	24,149	53,640	11,556
50.5%	18,839	32,547	57,838	96,411	214,491	46,126

Means and percentiles of number of ballots with valid votes to inspect for 10% risk limit using BRAVO, as a function of the winner's share of vote, 2-candidate contest (estimated using 10^7 replications)

General case: C -candidate, k -winner contest

Test that every winner w beat every loser ℓ .

$k(C - k)$ null hypotheses: loser ℓ beat winner w .

Test w/ℓ same sample but different test statistics $\{T_{w\ell}\}$.

Define $s_{w\ell} \equiv s_w / (s_w + s_\ell)$, fraction of votes w was reported to have received among ballots reported to show a vote for w or ℓ or both.

Can be calculated from standard reported election results.

Define $\pi_{w\ell}$ to be actual fraction of votes w received among ballots that show a vote for *exactly one* of $\{w, \ell\}$.

Assertion and Sufficient Condition

$\forall w, \ell$:

- If w reportedly beat ℓ , $s_{w\ell} > 0.5$.
- If w actually beat ℓ , $\pi_{w\ell} > 0.5$.

Workload

For fixed α , the expected draws to confirm a correct outcome depends primarily upon the smallest margin of decision, unless there is more than one small margin.

But if one or more other margins of decision are close to the smallest one, expected number of ballots may be substantially larger, as it becomes harder to reject all the pairwise null hypotheses at once.

For **255 state presidential contests** between 1992 and 2008, the **median expected sample size** to confirm the plurality winner in each state using BRAVO was **307 ballots** (per state).

2008 Presidential election in California could have been verified at 10% risk by examining about **100 ballots statewide** (in expectation).

auditTools.htm

Need simple, friendly tools for auditing, e.g.:

`statistics.berkeley.edu/~stark/Vote/auditTools.htm`

Used for audits in Alameda, Humboldt, Marin, Merced, Napa, Stanislaus, Ventura.

auditTools in action

Initial sample size

Contest information

Ballots cast in all contests: Smallest margin (votes): 192. Diluted margin: 2.7%.

Contest 1. Contest name:

Vote for no more than

Reported votes:

Candidate 1 Name:	THURSTON	Votes:	2234
Candidate 2 Name:	GABRIULT-ACOSTA	Votes:	1206
Candidate 3 Name:	BLAKE	Votes:	2042
Candidate 4 Name:	SPRIGGS	Votes:	1192
Candidate 5 Name:	RIGGLEMAN	Votes:	270

Contest 2. Contest name:

Vote for no more than

Reported votes:

Candidate 1 Name:	CARLISLE	Votes:	1819
Candidate 2 Name:	CERVANTES	Votes:	2420
Candidate 3 Name:	GALLARDO	Votes:	943
Candidate 4 Name:	BOLIN	Votes:	364
Candidate 5 Name:	LOR	Votes:	3740
Candidate 6 Name:	MURPHY	Votes:	3383
Candidate 7 Name:	DOSSETTI	Votes:	3676
Candidate 8 Name:	POLLARD	Votes:	1018

Audit parameters

Risk limit:

Expected rate of 1-vote overstatements (a decimal number): Expected rate of 2-vote overstatements (a decimal number):

Expected rate of 1-vote understatements (a decimal number): Expected rate of 2-vote understatements (a decimal number):

Starting size

Round up 1-vote differences. Round up 2-vote differences. 198.

Random sampling

Pseudo-Random Sample of Ballots

Seed: 12082217

Number of ballots: 7120

Current sample number: 198

Draw this many ballots: 198

draw sample

reset

Ballots selected: show sequence numbers show hash values

sequence_number, ballot

```
1,2660
2,5463
3,5334
4,2208
5,3459
6,6223
7,2407
8,5245
9,1899
```

Ballots selected, sorted:

```
35, 82, 98, 99, 197, 220, 241, 254, 256, 369, 389, 416, 422, 447, 501, 573, 638, 738, 760, 831, 932, 940, 964, 986, 1006, 1
027, 1067, 1197, 1208, 1234, 1285, 1298, 1410, 1446, 1464, 1476, 1495, 1509, 1548, 1568, 1621, 1647, 1745, 1778, 1
877, 1879, 1899, 1947, 1973, 2023, 2061, 2133, 2173, 2208, 2241, 2318, 2339, 2398, 2400, 2407, 2514, 2557, 2654, 2
660, 2666, 2725, 2744, 2760, 2847, 2866, 2894, 3119, 3123, 3197, 3223, 3227, 3232, 3233, 3299, 3366, 3370, 3405, 3
444, 3459, 3585, 3588, 3598, 3624, 3629, 3637, 3718, 3758, 3774, 3802, 3839, 3875, 3906, 3977, 4168, 4177, 4223, 4
243, 4261, 4286, 4321, 4357, 4382, 4410, 4426, 4427, 4429, 4449, 4517, 4528, 4536, 4542, 4571, 4668, 4712, 4715, 4
748, 4749, 4755, 4779, 4803, 4805, 4812, 4814, 4817, 4828, 4899, 4922, 4976, 4988, 5073, 5116, 5119, 5138, 5194, 5
210, 5240, 5245, 5305, 5334, 5414, 5429, 5463, 5523, 5534, 5554, 5658, 5681, 5691, 5730, 5740, 5787, 5854, 5878, 5
904, 5980, 5998, 6001, 6029, 6032, 6032, 6043, 6052, 6078, 6113, 6161, 6166, 6223, 6233, 6258, 6291, 6379, 6421, 6
428, 6446, 6518, 6549, 6567, 6599, 6607, 6628, 6644, 6697, 6716, 6784, 6818, 6853, 6877, 6908, 6972, 7001, 7017, 7024, 7
```

Ballots selected, sorted, duplicates removed:

```
35, 82, 98, 99, 197, 220, 241, 254, 256, 369, 389, 416, 422, 447, 501, 573, 638, 738, 760, 831, 932, 940, 964, 986, 1006, 1
027, 1067, 1197, 1208, 1234, 1285, 1298, 1410, 1446, 1464, 1476, 1495, 1509, 1548, 1568, 1621, 1647, 1745, 1778, 1
877, 1879, 1899, 1947, 1973, 2023, 2061, 2133, 2173, 2208, 2241, 2318, 2339, 2398, 2400, 2407, 2514, 2557, 2654, 2
660, 2666, 2725, 2744, 2760, 2847, 2866, 2894, 3119, 3123, 3197, 3223, 3227, 3232, 3233, 3299, 3366, 3370, 3405, 3
444, 3459, 3585, 3588, 3598, 3624, 3629, 3637, 3718, 3758, 3774, 3802, 3839, 3875, 3906, 3977, 4168, 4177, 4223, 4
243, 4261, 4286, 4321, 4357, 4382, 4410, 4426, 4427, 4429, 4449, 4517, 4528, 4536, 4542, 4571, 4668, 4712, 4715, 4
748, 4749, 4755, 4779, 4803, 4805, 4812, 4814, 4817, 4828, 4899, 4922, 4976, 4988, 5073, 5116, 5119, 5138, 5194, 5
210, 5240, 5245, 5305, 5334, 5414, 5429, 5463, 5523, 5534, 5554, 5658, 5681, 5691, 5730, 5740, 5787, 5854, 5878, 5
904, 5980, 5998, 6001, 6029, 6032, 6043, 6052, 6078, 6113, 6161, 6166, 6223, 6233, 6258, 6291, 6379, 6421, 6428, 6
446, 6518, 6549, 6567, 6599, 6607, 6628, 6644, 6697, 6716, 6784, 6818, 6853, 6877, 6908, 6972, 7001, 7017, 7024, 7
```

Repeated ballots:

```
Ballot, multiplicity
6032, 2
```

Finding ballots using a ballot manifest

Ballot look-up tool

Ballot manifest: (batch label, ballots) pairs separated by commas, one pair per line

```
Merced1-cvr.txt,162
Merced11-cvr.txt,284
Merced13&15-cvr.txt,423
Merced14-cvr.txt,163
Merced16-cvr.txt,257
Merced17-cvr.txt,172
Merced18-cvr.txt,237
Merced2-cvr.txt,249
Merced20&21-cvr.txt,756
Merced22&29-cvr.txt,415
Merced23&26-cvr.txt,465
Merced24&25-cvr.txt,504
Merced27&32-cvr.txt,534
Merced28-cvr.txt,484
Merced3&30-cvr.txt,257
Merced31&33-cvr.txt,312
Merced4&12-cvr.txt,394
Merced5&9&10-cvr.txt,357
Merced6&19-cvr.txt,326
Merced7&8-cvr.txt,369
```

Ballots to look up (separated by commas):

```
35,82,98,99,197,220,241,254,256,369,389,416,422,447,501,573,638,738,760,831,932,94
0,964,986,1006,1027,1067,1197,1208,1234,1285,1298,1410,1446,1464,1476,1495,1509,
1548,1568,1621,1647,1745,1778,1877,1879,1899,1947,1973,2023,2061,2133,2173,2208,
2241,2318,2339,2398,2400,2407,2514,2557,2654,2660,2666,2725,2744,2760,2847,2866,
2894,3119,3123,3197,3223,3227,3232,3233,3299,3366,3370,3405,3444,3459,3585,3588,
3598,3624,3629,3637,3718,3758,3774,3802,3839,3875,3906,3977,4168,4177,4223,4243,
4261,4286,4321,4357,4382,4410,4426,4427,4429,4449,4517,4528,4536,4542,4571,4668,
4712,4715,4748,4749,4755,4779,4803,4805,4812,4814,4817,4828,4899,4922,4976,4988,
5073,5116,5119,5138,5194,5210,5240,5245,5305,5334,5414,5429,5463,5523,5534,5554,
5568,5681,5691,5730,5740,5787,5854,5878,5904,5980,5998,6001,6029,6032,6032,6043;
```

Look up ballots

Sorted lookup table:

```
sorted_number,ballot, batch_label, which_ballot_in_batch
1, 35, Merced1-cvr.txt, 35
2, 82, Merced1-cvr.txt, 82
3, 98, Merced1-cvr.txt, 98
4, 99, Merced1-cvr.txt, 99
5, 197, Merced11-cvr.txt, 35
6, 220, Merced11-cvr.txt, 58
7, 241, Merced11-cvr.txt, 79
8, 254, Merced11-cvr.txt, 92
9, 256, Merced11-cvr.txt, 94
```

Should more ballots be audited?

Stopping sample size and escalation

Ballots audited so far: 198

1-vote overstatements: Rate: 0

2-vote overstatements: Rate: 0

1-vote understatements: Rate: 0

2-vote understatements: Rate: 0

Estimated stopping size

Audit complete

If no more differences are observed: 178.

If differences continue at the same rates: 178.

Estimated additional ballots if difference rates stay the same: 0.

Secret sauce

- To implement ballot-level comparison audits, have to associate individual cast vote records (CVRs) with individual physical ballots.
Impossible with current U.S. federally certified systems.
- “Transitive” auditing uses an unofficial vote tabulation system that does produce CVRs and confirms transitively that the apparent outcome is correct.
If official system says “Lincoln won” and unofficial system says “Lincoln won,” then if unofficial system is right, so is official system.
- Performed transitive audits in Alameda, Humboldt, Marin, Merced, Napa, Stanislaus, Ventura, using CVR-extraction software written by Prof. Wagner and his students.

Selecting ballots at random

For transparency, want initial mechanical source of randomness (Cordero, Wagner, & Dill).



Dice courtesy of Ron Rivest.

Use as Seed in Good PRNG

SHA-256 of seed catenated with sample number (Rivest)

Random sampling

Pseudo-Random Sample of Ballots

Seed:

Number of ballots:

Current sample number:

Draw this many ballots:

Ballots selected: show sequence numbers show hash values

```
sequence_number, ballot
1,2086
2,2462
3,3320
4,4719
5,4813
6,3838
7,2655
8,2747
9,3059
```

Ballots selected, sorted:

```
19,34,37,38,51,90,96,96,99,101,109,114,150,156,163,175,187,187,195,197,198,244,280,281,301,316,
372,395,403,404,407,417,429,444,450,451,471,477,480,481,482,491,514,542,545,550,554,577,585,58
5,596,597,613,614,615,629,645,647,657,685,692,692,694,739,750,763,768,792,795,798,819,832,841,
842,857,862,871,874,876,884,901,906,923,923,934,937,937,958,963,973,978,1018,1049,1050,1071,1
081,1097,1105,1125,1126,1130,1165,1205,1210,1218,1219,1224,1226,1284,1288,1291,1318,1327,13
57,1370,1372,1388,1406,1422,1425,1432,1433,1434,1446,1447,1457,1484,1494,1496,1507,1512,152
3,1524,1540,1572,1574,1575,1576,1611,1614,1626,1634,1638,1642,1644,1665,1677,1685,1718,1735,
1761,1764,1774,1788,1791,1793,1816,1827,1851,1855,1893,1921,1978,1989,2010,2017,2034,2056,2
056,2058,2062,2069,2083,2086,2100,2112,2152,2189,2192,2206,2208,2210,2213,2224,2249,2266,22
91,2295,2302,2331,2332,2390,2391,2395,2398,2401,2422,2436,2462,2463,2474,2495,2513,2514,252
```

Ballots selected, sorted, duplicates removed:

```
19,34,37,38,51,90,96,99,101,109,114,150,156,163,175,187,195,197,198,244,280,281,301,316,372,395
403,404,407,417,429,444,450,451,471,477,480,481,482,491,514,542,545,550,554,577,585,596,597,6
13,614,615,629,645,647,657,685,692,694,739,750,763,768,792,795,798,819,832,841,842,857,862,871
,874,876,884,901,906,923,934,937,958,963,973,978,1018,1049,1050,1071,1081,1097,1105,1125,1126
,1130,1165,1205,1210,1218,1219,1224,1226,1284,1288,1291,1318,1327,1357,1370,1372,1388,1406,1
422,1425,1432,1433,1434,1446,1447,1457,1484,1494,1496,1507,1512,1523,1524,1540,1572,1574,15
75,1576,1611,1614,1626,1634,1638,1642,1644,1665,1677,1685,1718,1735,1761,1764,1774,1788,179
1,1793,1816,1827,1851,1855,1893,1921,1978,1989,2010,2017,2034,2056,2058,2062,2069,2083,2086
,2100,2112,2152,2189,2192,2206,2208,2210,2213,2224,2249,2266,2291,2295,2302,2331,2332,2390,2
391,2395,2398,2401,2422,2436,2462,2463,2474,2495,2513,2514,2520,2549,2556,2558,2563,2578,25
```

Ballot Manifest

Find ballots using a ballot manifest

Ballot look-up tool

Ballot manifest: Each line must have a batch label, a comma, and one of the following:

- (i) the number of ballots in the batch
- (ii) a range specified with a colon (e.g., 131:302), or
- (iii) a list of ballot identifiers within parentheses, separated by spaces (e.g., (996 998 1000)).

Each line should have exactly one comma.

```
001_211161_01,23
002_211162_02,9
003_211561_03,32
004_211561_03,50
005_211561_03,50
006_211562_04,14
007_211562_04,50
008_211562_04,50
009_211562_04,50
010_211563_05,12
011_211751_06,27
012_211761_07,2
013_211761_07,50
014_211761_07,50
015_211761_07,50
016_211761_07,50
017_211771_08,2
018_221161_09,16
019_221161_09,50
020_221161_09,50
021_221161_09,50
022_221162_10,30
023_221162_10,50
024_221162_10,50
025_221162_11,50
```

Ballots to look up (separated by commas):

```
19,34,37,38,51,90,96,96,99,101,109,114,150,156,163,175,187,187,195,197,198,244,280,281,301,316,
372,395,403,404,407,417,429,444,450,451,471,477,480,481,482,491,514,542,545,550,554,577,585,58
5,596,597,613,614,615,629,645,647,657,685,692,692,694,739,750,763,768,792,795,798,819,832,841,
842,857,862,871,874,876,884,901,906,923,923,934,937,937,958,963,973,978,1018,1049,1050,1071,1
081,1097,1105,1125,1126,1130,1165,1205,1210,1218,1219,1224,1226,1284,1288,1291,1318,1327,13
57,1370,1372,1388,1406,1422,1425,1432,1433,1434,1446,1447,1457,1484,1494,1496,1507,1512,152
3,1524,1540,1572,1574,1575,1576,1611,1614,1626,1634,1638,1642,1644,1665,1677,1685,1718,1735,
1761,1764,1774,1788,1791,1793,1816,1827,1851,1855,1893,1921,1978,1989,2010,2017,2034,2056,2
056,2058,2062,2069,2083,2086,2100,2112,2152,2189,2192,2206,2208,2210,2213,2224,2249,2266,22
91,2295,2302,2331,2332,2390,2391,2395,2398,2401,2422,2436,2462,2463,2474,2495,2513,2514,252
```

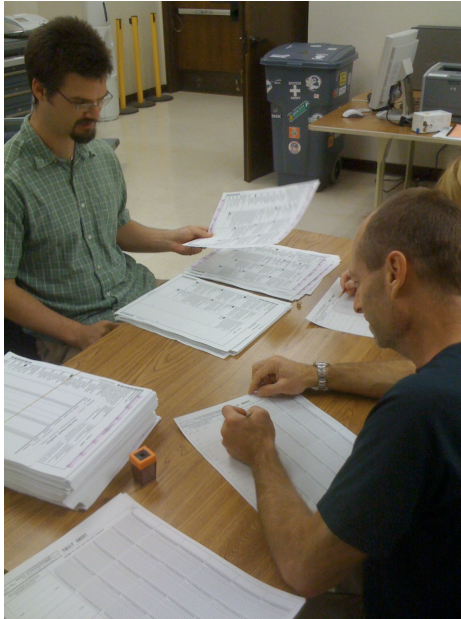
Look-up

look up ballots

Sorted lookup table:

```
sorted_number, ballot, batch_label, which_ballot_in_batch
1, 19, 001_211161_01, 19
2, 34, 003_211561_03, 2
3, 37, 003_211561_03, 5
4, 38, 003_211561_03, 6
5, 51, 003_211561_03, 19
6, 90, 004_211561_03, 26
7, 96, 004_211561_03, 32
8, 96, 004_211561_03, 32
9, 99, 004_211561_03, 35
10, 101, 004_211561_03, 37
11, 109, 004_211561_03, 45
12, 114, 004_211561_03, 50
13, 150, 005_211561_03, 36
14, 156, 005_211561_03, 42
15, 163, 005_211561_03, 49
16, 175, 006_211562_04, 11
17, 187, 007_211562_04, 9
18, 187, 007_211562_04, 9
19, 195, 007_211562_04, 17
20, 197, 007_211562_04, 19
21, 198, 007_211562_04, 20
22, 244, 008_211562_04, 16
23, 280, 009_211562_04, 2
24, 281, 009_211562_04, 3
```

2008 Yolo County, CA Measure W Audit





Presidential General Election
YOLO COUNTY
November 04, 2008

Vote Both Sides

Vote Both Sides

Precinct 100063

100063020062

Proposition 8
ELIMINATES RIGHT OF SAME-SEX
COUPLES TO MARRY. INITIATIVE
CONSTITUTIONAL AMENDMENT

Changes California Constitution to eliminate the right of same-sex couples to marry. Provides that only marriage between a man and a woman is valid or recognized in California.

Fiscal Impact: Over next five years, potential revenue loss, mainly sales taxes, totaling in the several tens of millions of dollars, to state and local governments. In the long run, likely little fiscal impact on state and local governments.

Yes
 No

Proposition 9
CRIMINAL JUSTICE SYSTEM. VICTIMS'
RIGHTS. PAROLE. INITIATIVE
CONSTITUTIONAL AMENDMENT AND
STATUTE

Requires notification to victims and opportunity for input during phases of criminal justice process, including bail, sentencing, and parole. Establishes victim safety on consideration for bail or parole.

Fiscal Impact: Potential loss of state savings of \$20 million operations and increased security cost costs annually to hundreds of millions of dollars annually. Potential revenue loss in the tens of millions of dollars in state savings in the fourth proposition.

Yes
 No

Proposition 10
ALTERNATIVE FUEL VEHICLES AND
RENEWABLE ENERGY BONDS.
INITIATIVE STATUTE

Authorizes \$1 billion in bonds paid from state's General Fund to help consumers and others purchase certain vehicles, and to fund research in renewable energy and alternative fuel vehicles.

Fiscal Impact: State cost of about \$10 billion over 10 years to repay bonds. Increased state and local administrative costs up to about \$10 million annually.

Bonds Yes
 Bonds No

Proposition 11
REDISTRICTING. INITIATIVE
CONSTITUTIONAL AMENDMENT AND
STATUTE

Changes authority for establishing state office boundaries from elected representatives to commission. Establishes multistep process to select commissioners from registered voter Republicans, and representatives of neither party.

Fiscal Impact: Potential increase in state redistricting costs once every ten years due to two entities performing redistricting. Any increase in costs probably would not be significant.

Yes
 No

Proposition 12
VICTIMS' BOND ACT OF 2008

This act provides for a bond issue of one hundred million dollars (\$100,000,000) to provide bond and home aid for California veterans.

Fiscal Impact: Costs of about \$1.8 billion to one of both the principal (\$900 million) and interest (\$900 million) on the bonds, over the participating veterans' average payment for principal and interest of about \$10 million per year for 30 years.

Bonds Yes
 Bonds No

Los Rios Community College District
Measure M

This act allows the Los Rios Community College District to authorize to issue \$475 million in bonds at the lowest available interest rates to improve student academic performance by building classrooms, libraries and laboratory facilities and to fund general fund activities including teaching center, instructional, nursing and healthcare programs, architecture, engineering and construction management, and to fund research in renewable energy and alternative fuel vehicles.

Fiscal Impact: State cost of about \$10 billion over 10 years to repay bonds. Increased state and local administrative costs up to about \$10 million annually.

Bonds Yes
 Bonds No

City of Davis
Measure N
Shall the Proposed Charter of the City of Davis Be Adopted?

Yes
 No

Davis Joint Unified School District
Measure W
Shall the Davis Joint Unified School District approve existing classroom programs, including math and science, English, music, physical education, librarians, secondary class size reduction, technical and occupational programs including drama, debate, and journalism by being subjected to a special tax for a period of three years not to exceed the annual rate of \$20.00 per dwelling unit for multi-dwelling units and \$100.00 per acre for all other parcels?

Fiscal Impact: Potential increase in state redistricting costs once every ten years due to two entities performing redistricting. Any increase in costs probably would not be significant.

Yes
 No

Vote Both Sides

100303149

100063020062

Presidential General Election
YOLO COUNTY
November 04, 2008

Proposition 8
ELIMINATES RIGHT OF SAME-SEX
COUPLES TO MARRY. INITIATIVE
CONSTITUTIONAL AMENDMENT

Changes California Constitution to eliminate the right of same-sex couples to marry. Provides that only marriage between a man and a woman is valid or recognized in California.

Fiscal Impact: Over next five years, potential revenue loss, mainly sales taxes, totaling in the several tens of millions of dollars, to state and local governments. In the long run, likely little fiscal impact on state and local governments.

Yes
 No

Proposition 9
CRIMINAL JUSTICE SYSTEM. VICTIMS'
RIGHTS. PAROLE. INITIATIVE
CONSTITUTIONAL AMENDMENT AND
STATUTE

Requires notification to victim and opportunity for input during phases of criminal justice process, including bail, plea, sentencing and parole. Establishes victim safety on consideration for bail or parole.

Fiscal Impact: Potential loss of state savings on prison operations and increased county jail costs annually. Potential net savings in the low tens of millions of dollars annually on security programs.

Yes
 No

Proposition 10
ALTERNATIVE FUEL VEHICLES AND
RENEWABLE ENERGY BONDS.
INITIATIVE STATUTE

Authorizes \$2 billion in bonds paid from state's General Fund to help consumers and others purchase certain vehicles, and to fund research in renewable energy and alternative fuel vehicles.

Fiscal Impact: State cost of about \$10 billion over 10 years to repay bonds. Increased state and local revenue, potentially totaling several tens of millions of dollars through 2015. Potential state administrative costs up to about \$10 million annually.

Bonds Yes
 Bonds No

Proposition 11
REDISTRICTING. INITIATIVE
CONSTITUTIONAL AMENDMENT AND
STATUTE

Changes authority for establishing state office boundaries from elected representatives to commission. Establishes multistep process to select commissioners from registered voter party. Commission comprised of Democrats, Republicans, and representatives of neither party.

Fiscal Impact: Potential increase in state redistricting costs once every ten years due to two entities performing redistricting. Any increase in costs probably would not be significant.

Yes
 No

Proposition 12
VETERANS' BOND ACT OF 2008

This act provides for a bond issue of one hundred million dollars (\$100,000,000) to provide farm and home aid for California veterans.

Fiscal Impact: Costs of about \$1.8 billion to one of both the principal (\$900 million) and interest (\$900 million) on the bonds, costs paid by participating veterans. Average payment for principal and interest of about \$95 million per year for 30 years.

Bonds Yes
 Bonds No

Los Rios Community College District
Measure M

This act allows the Los Rios Community College District to authorize to issue \$475 million in bonds at the lowest available interest rates to improve student academic performance by building classrooms, libraries and labs throughout the district including for teaching center, instructional, nursing and healthcare construction, architecture, engineering and computer management, computer sciences, early childhood development, and fire and police public safety programs at the American River, Cosumnes River, El Dorado, Folsom, and Four Corners City College campuses?

Fiscal Impact: State cost of about \$10 billion over 10 years to repay bonds. Increased state and local revenue, potentially totaling several tens of millions of dollars through 2015. Potential state administrative costs up to about \$10 million annually.

Bonds Yes
 Bonds No

City of Davis
Measure N
Shall the Proposed Charter of the City of Davis Be Adopted?

Yes
 No

Davis Joint
Measure W

Shall the Davis Joint Unified School District approve existing classroom programs, including math and science, English, music, physical education, librarians, secondary class size reduction, technical and occupational programs including drama, debate, and journalism by being subjected to a special tax for a period of three years not to exceed the annual rate of \$20.00 per dwelling unit for multi-dwelling units and \$100.00 per acre for all other parcels?

Yes
 No

Vote Both Sides

Vote Both Sides

Precinct 100063

Da Joint Unified School District

Measure W

Shall the Davis Joint Unified School District
 provide existing classroom programs
 including math and science, English, music,
 physical education, librarians, secondary class
 size reduction, athletics and co-curricular
 programs including drama, debate, and
 journalism by being authorized to levy a
 special tax for a period of three years not to
 exceed the annual rate of \$50.00 per dwelling
 unit on multi-dwelling parcels and \$120.00 per
 parcel for all other parcels?

Yes

No

Bonds Yes

Bonds No

City of Davis

Measure N

Shall the Proposed Charter of the City
 of Davis Be Adopted?

Yes

No

2009 Yolo County, CA Measure P Audit

Special Election November 2009
City of Davis
November 03, 2009

Precinct

Instruction Text:
Please use a black or blue ink pen to mark your choices on the ballot.
To vote for your choice in each contest, completely fill in the box provided to the left of your choice.

MEASURE P
Shall Resolution No. 09-132, amending the Davis General Plan to change the land use designations for the Wildhorse Ranch property from agriculture to residential uses, as set forth in the Resolution and establishing the Base Line Project Features for development of the Wildhorse Ranch Project be approved?

Yes
 No

10000210100046

Special Election November 2009
City of Davis
November 03, 2009

Precinct

Instruction Text:
Please use a black or blue ink pen to mark your choices on the ballot.
To vote for your choice in each contest, completely fill in the box provided to the left of your choice.

MEASURE P
Shall Resolution No. 09-132, amending the Davis General Plan to change the land use designations for the Wildhorse Ranch property from agriculture to residential uses, as set forth in the Resolution and establishing the Base Line Project Features for development of the Wildhorse Ranch Project be approved?

Yes
 No

10000170100059

Special Election November 2009
City of Davis
November 03, 2009

Precinct

Instruction Text:
Please use a black or blue ink pen to mark your choices on the ballot.
To vote for your choice in each contest, completely fill in the box provided to the left of your choice.


MEASURE P
Shall Resolution No. 09-132, amending the Davis General Plan to change the land use designations for the Wildhorse Ranch property from agriculture to residential uses, as set forth in the Resolution and establishing the Base Line Project Features for development of the Wildhorse Ranch Project be approved?

Yes
 No

Neatness counts

No
 Yes

10000170100059



Special Election November 2009
City of Davis
November 03, 2009

Instruction Text:
Please use a black or blue ink pen to mark your choice on the ballot.
To vote for your choice in each contest, completely fill in the box provided to the left of your choice.

MEASURE P
Shall Resolution No. 09-132, amending the Davis General Plan to change the land use designations for the Wildhorse Ranch property from agriculture to residential uses, as set forth in the Resolution and establishing the Base Line Project Features for development of the Wildhorse Ranch Project be approved?

Yes
 No

10000170100059

2011 Orange County, first audit under AB 2023

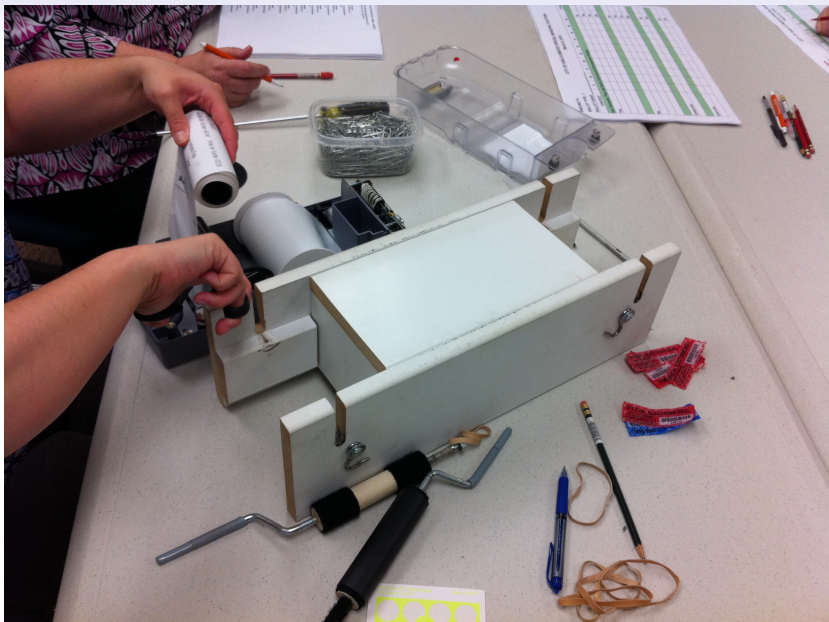


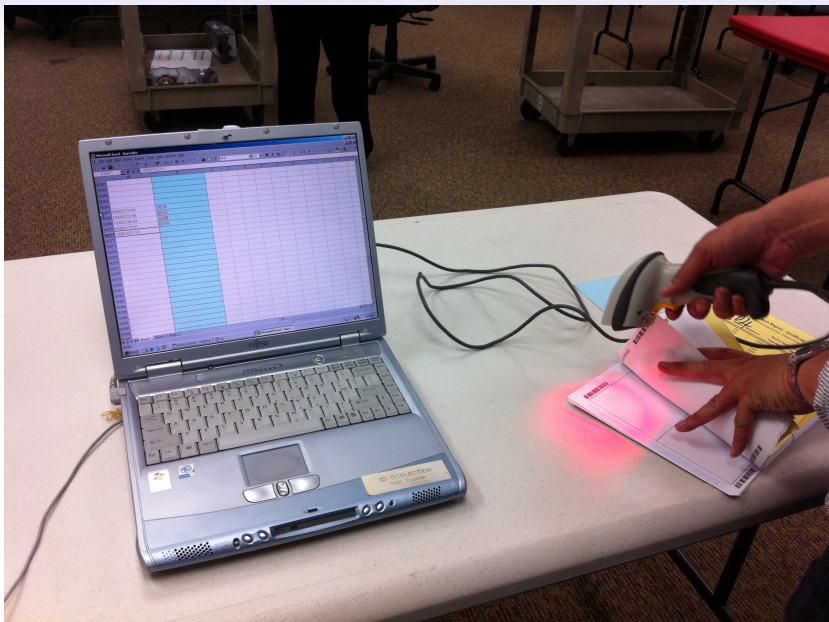


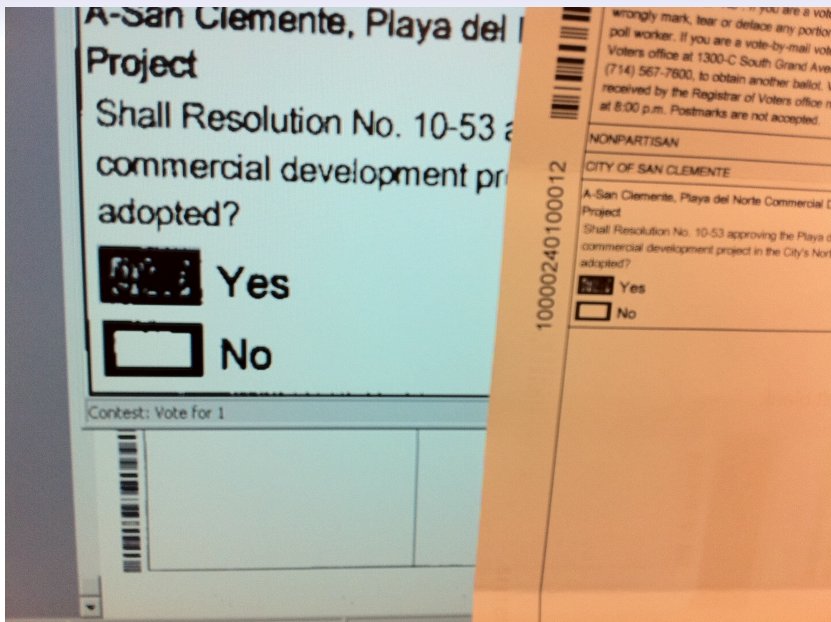












Gotchya!

Better ballot accounting

Ballot manifests are *not* a solved problem.

Warehouse worker finds Sacramento County uncounted ballots

By Loretta Kalb

The Sacramento County Elections office reported today that a member of its warehouse crew found 407 uncounted ballots cast in the Nov. 6 election sitting unopened in a sealed bag on a shelf.

Jill LaVine, registrar of voters for Sacramento County, said that 92 precincts were associated with the newly discovered ballots. The ballots were found Feb. 7 as workers were going through red supply bags in preparation for the next election.

LaVine said an analysis showed that the ballots - had they been counted - would not have changed the outcome of any of contest in the 92 affected precincts. . . .

THE SACRAMENTO BEE, 14 FEBRUARY 2013,

<http://www.sacbee.com/2013/02/14/5191836/warehouse-worker-finds-sacramento.html>

Hopes and plans

- Move to evidence-based requirements instead of equipment-based requirements.
- Work with elections officials at the state and local level, integrity advocates, vendors, computer scientists, political scientists, statisticians, financial auditors, attorneys, to draft model legislation for election auditing. (White paper was result of a 1-year collaboration.)
- Clarify tradeoff of risks and costs. What kinds of errors are we (as a society) willing to tolerate? With what frequency? What are we willing to pay? How long are we willing to make the canvass?
- Work with computer scientists, usability experts, security experts, and others to build voting systems that support efficient audits, procedures for curating the audit trail, and procedures for compliance and materiality audits.