

Analysis of Instant Runoff Voting

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Typical Solution to Determine a Winner.

- General election followed by a runoff election between the top two candidates.
 - This ensures a majority.
- Problems:
 - Lower voter turnout for runoff
 - Expenses involved with having a second election.

Instant Runoff Voting (IRV)

- Instant Runoff Voting is a system of voting which combines the runoff with the general election to determine a “majority” winner.
- It allows every voter to rank their choices for all or some number of candidates for the position.
- After the first count, the candidate with the smallest total is eliminated and these votes are redistributed.
- This process is repeated until a “majority” winner is determined.

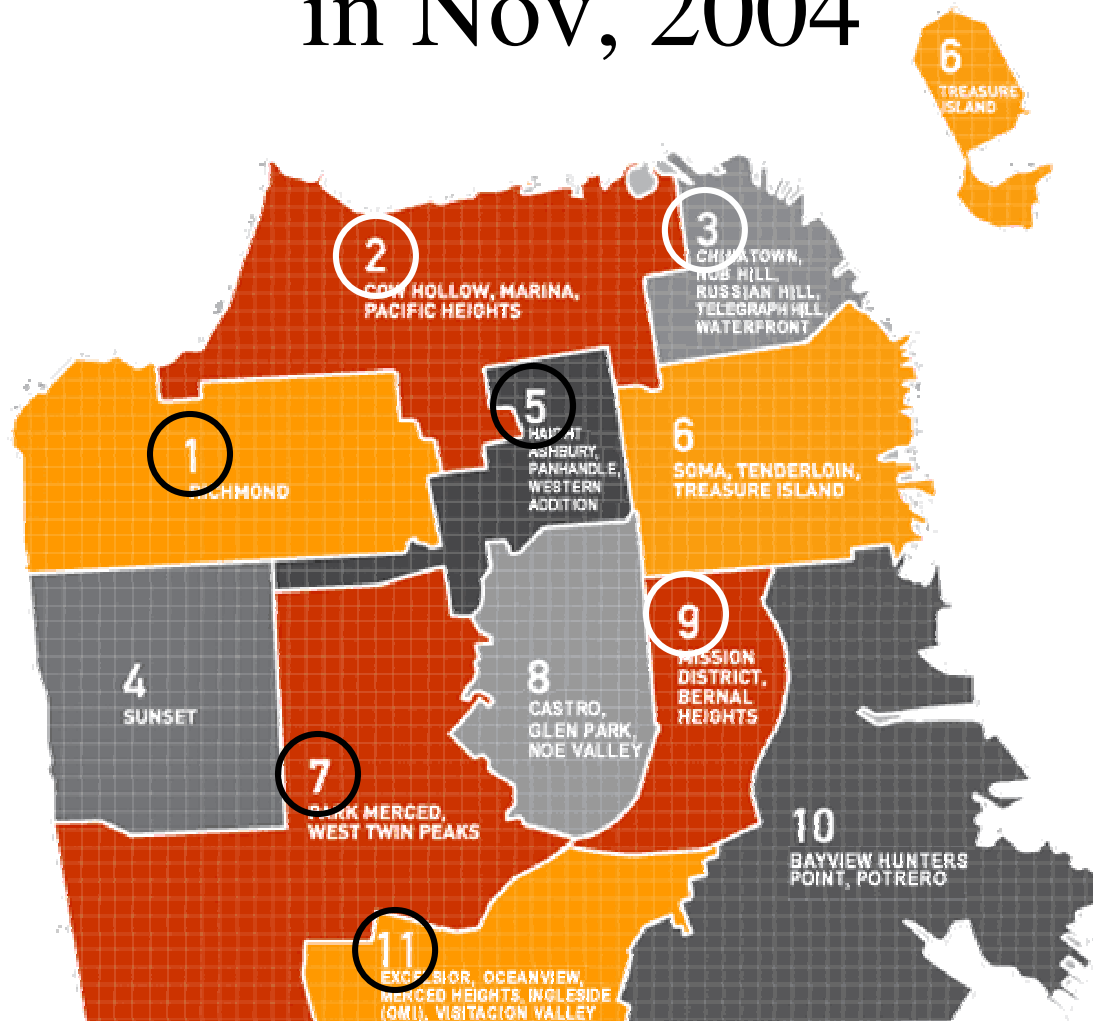
Vocabulary of IRV

- Pass: each round in the instant runoff is called a pass. Generally one candidate is eliminated per pass.
- Exhausted Ballots: Ballots whose choices do not include any of the candidates left. These ballots are not included in the vote total for that pass.

Different Methods of IRV

- Full-Preference Voting: Used by the Australians, voters rank all candidates on the ballot.
- Supplementary Voting: Used in London, voters can vote for a 1st and 2nd choice; involves only two rounds.
- Partial Preference Voting: Used in San Francisco under the name of Ranked Choice Voting (RCV), allows voters to rank up to three candidates.

Used In SF Board of Supervisors Elections for Districts 1,5,7, and 11 in Nov, 2004



Results (First Round)

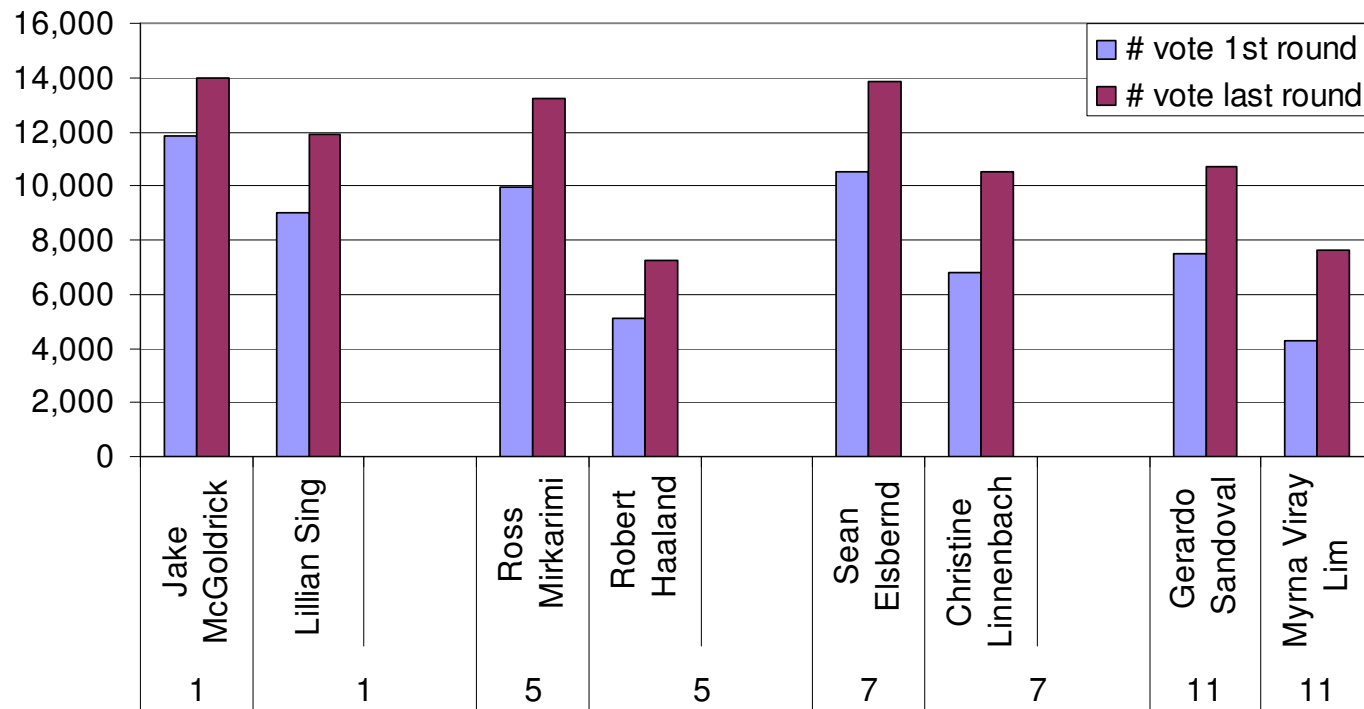
District 1		District 5		District 7		District 11	
Jake McGoldrick	11,815	Ross Mirkarimi	9,947	Sean R. Elsbernd	10,505	Gerardo Sandoval	7,477
Lillian Sing	8,989	Robert Haaland	5,124	Christine Linnenbach	6,784	Myrna Viray Lim	4,280
Matt Tuchow	2,864	Lisa Feldstein	3,257	Isaac Wang	2,728	Jose Medina	2,869
David Heller	2,012	Nick Waugh	3,025	Gregory Corrales	2,560	Anita Grier	2,806
Rose Tsai	1,595	Andrew Sullivan	2,477	Milton "Rennie" O'Brien	2,372	Rolando A. Bonila	2,293
Leanna Dawydiak	1,380	Bill Barnes	1,664	Vernon C. Grigg III	2,091	Rebecca ReynoldsS	1,816
Jeffrey S. Freebairn	132	Jim Siegel	1,540	Shawn Reifsteck	1,108	Tom Yuen	1,328
		Dan Kalb	1,398	Michael Patrick Mallen	975	Fil M. Silvero	307
Total	28,787	Susan C. King	977	Pat Lakey	763		
		Michael E. O'Connor	868	Svetlana Kaff	546	Total	23,176
		Brett Wheeler	832	Art Belenson	510		
		Joseph Blue	802	Sheela Kini	349		
		Tys Sniffen	686	David Parker	348		
		Phoenix Streets	657				
		Julian Davis	418	Total	31,639		
		Emmett Gilman	393				
		Francis Somsel	368				
		Rob Anderson	336				
		Vivian Wilder	130				
		Patrick M. Ciocca	91				
		Phillip House	62				
		H. Brown	57				
		Total	35,109				

Did IRV change any of the results for the SF Supervisor races in 2004?

- Is it likely that the voters 2nd and 3rd choices will change the standings from the 1st round?

Did IRV Change the Overall Results?

Votes For Top Two candidates in First and Last Round
(All Districts)

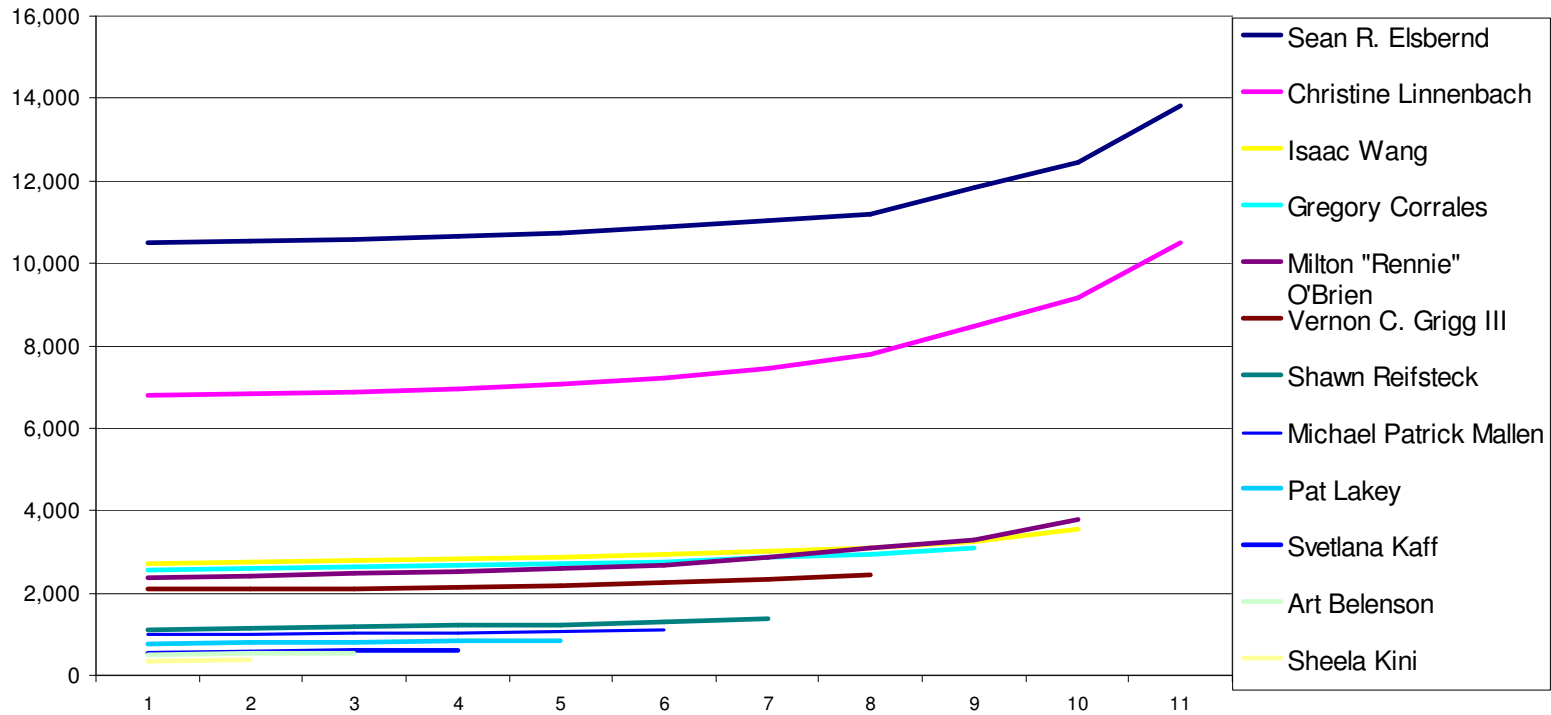


Did IRV Change any Candidates' Rank after a Pass

- There were a total of 40 passes made in all of the BOS elections, with 314 opportunities for one candidate to pass another.
- Only 4 times did redistribution of votes push a candidate ahead of another.
- None of these candidates made it into the final pass of their ballots.

Vote Redistribution

D7 Progression of Votes

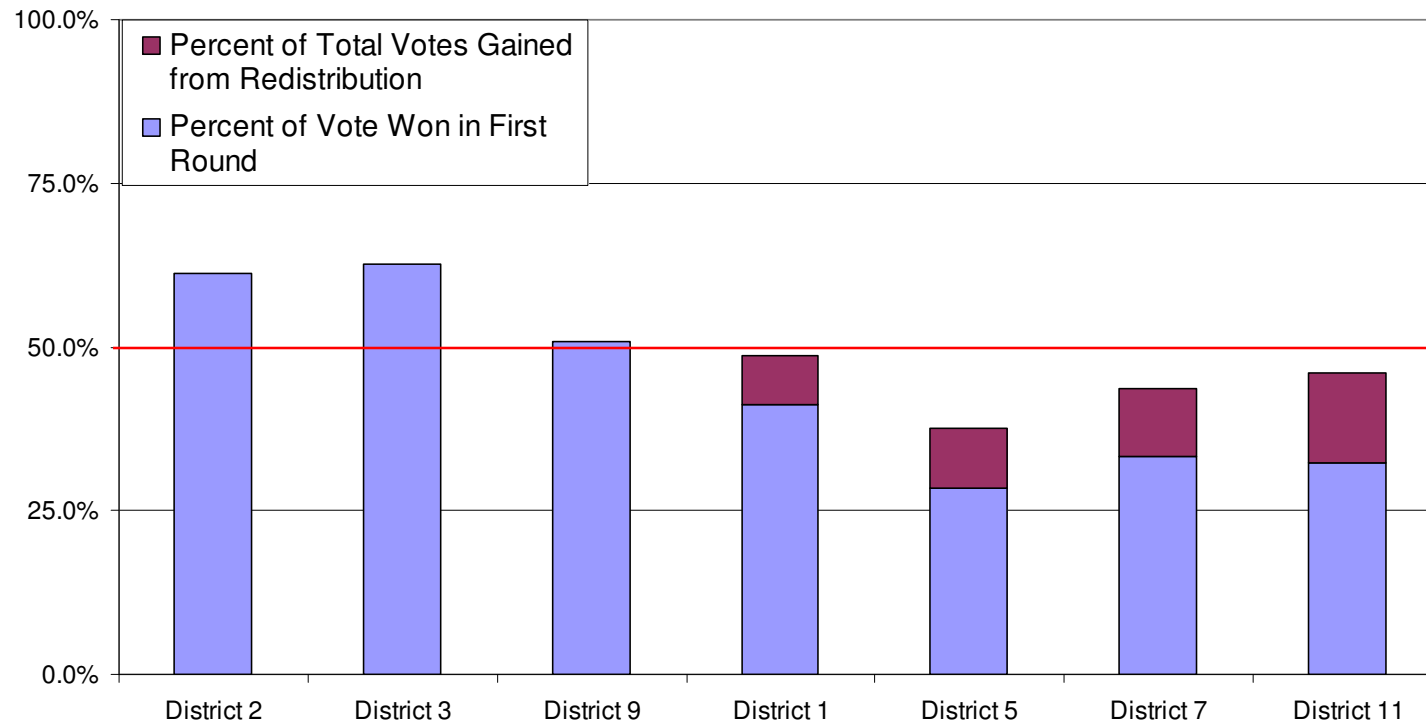


How to define “Majority”?

- To get a majority, does a candidate need to get 50%+1 of the total ballots cast, or just 50%+1 of the ballots remaining by the final pass?
- San Francisco chose to determine the majority winner only counting ballots remaining on the final pass.
- This may leave the winner of the election with only a plurality of the total votes.

Was a true “majority” achieved?

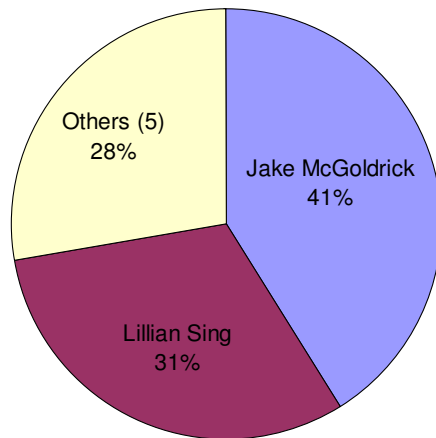
Trying to Reach a Majority



1st Round Distribution of Votes

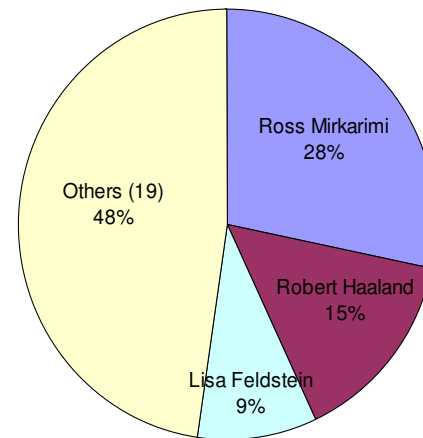
District 1 1st Round Distribution of Votes

Total Votes: 28,787



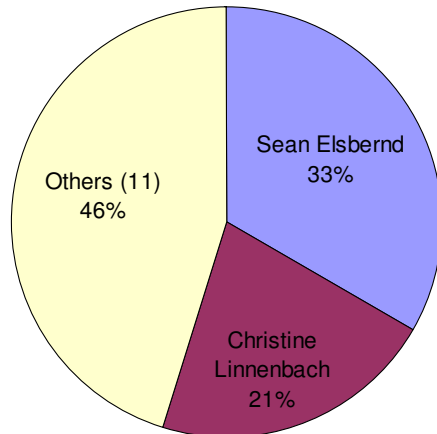
District 5 1st Round Distribution of Votes

Total Votes: 35,109



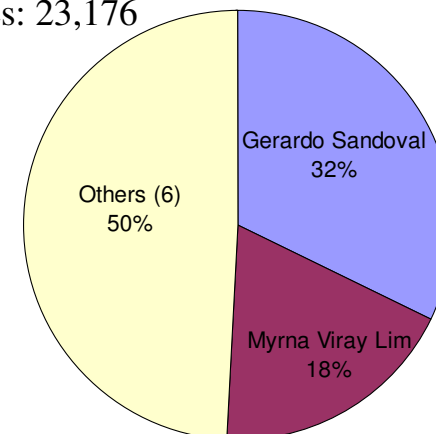
District 7 1st Round Distribution of Votes

Total Votes: 31,639



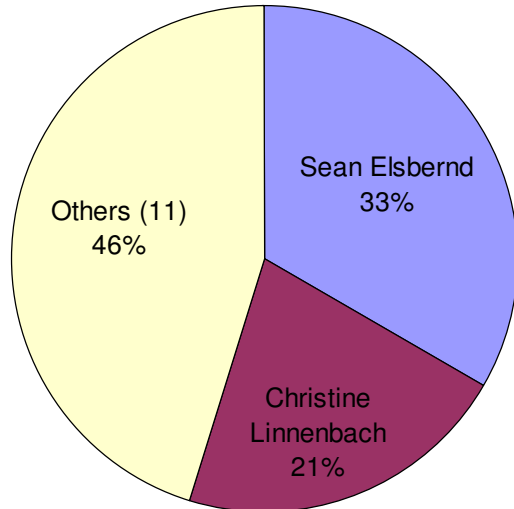
District 11 1st Round Distribution of Votes

Total Votes: 23,176



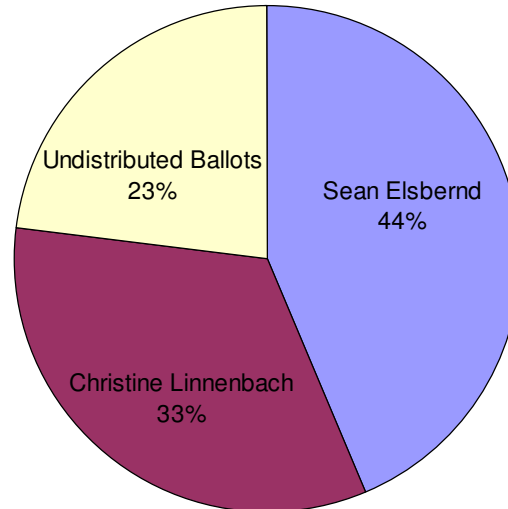
Following District 7's Distribution of Votes

District 7 1st Round Distribution of Votes



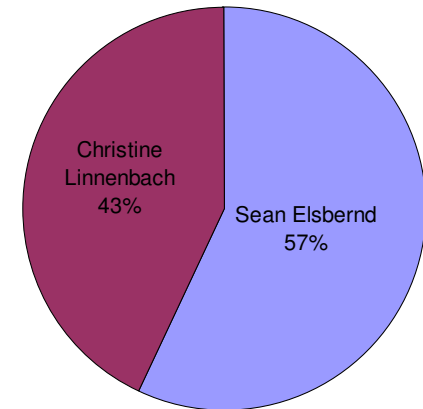
Total Votes: 31,639

District 7 Last Round Distribution of Votes



Total Votes: 31,639

**District 7 Last Round Distribution of Votes,
Not Including Undistributed Ballots**



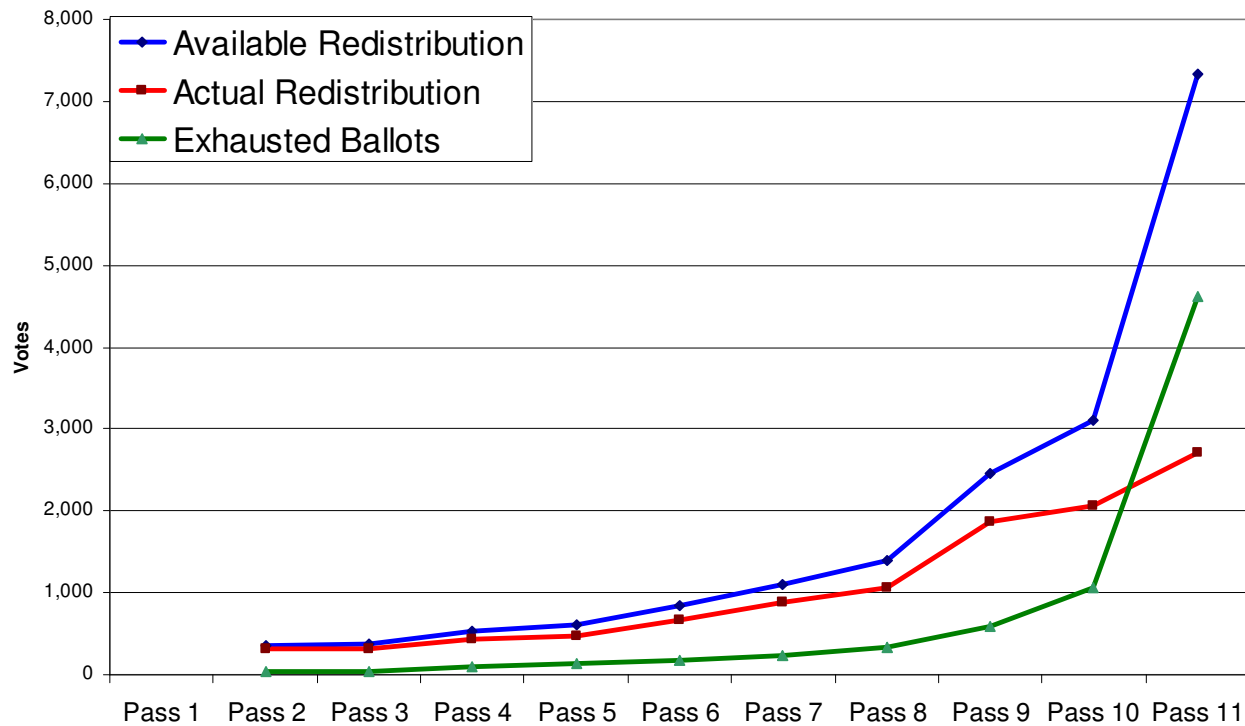
Total Votes: 24,325

What happened to reduce the number of Total Votes?

- As more and more candidates become eliminated, voters second and third choices become reassigned to candidates already eliminated from the race.
- This leads to ballots becoming exhausted, significantly reducing the number of Total Votes.

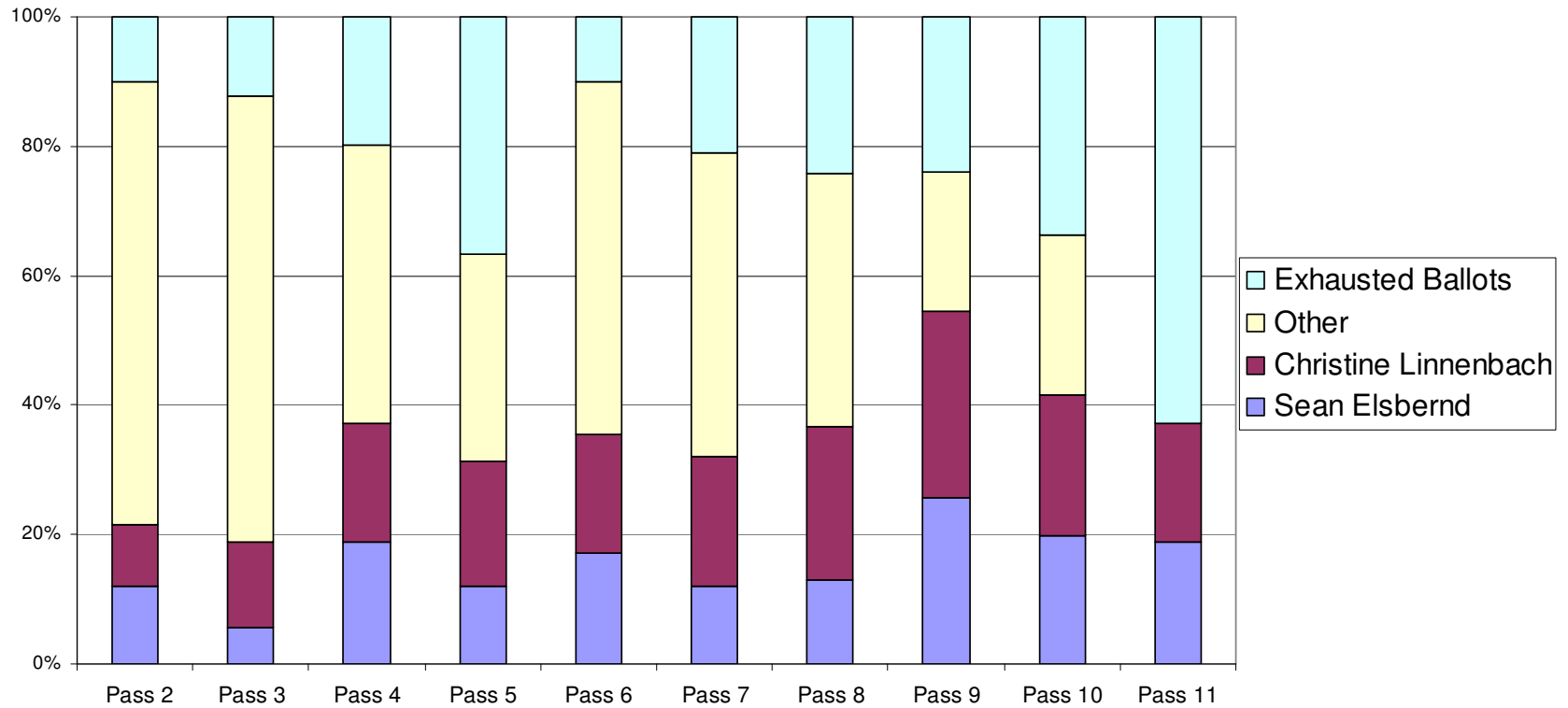
Exhausted Ballots

- These undistributed ballots are called exhausted ballots, and in some cases outnumber the ballots that are redistributed. **District 7 Redistribution of Votes**



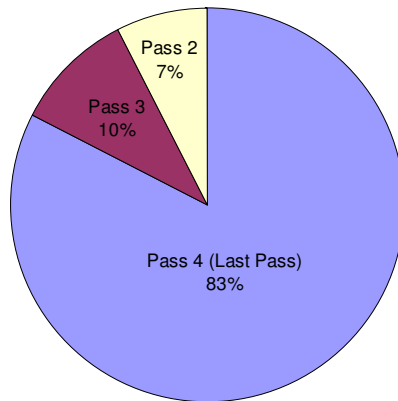
Exhausted Ballots

Votes Redistributed to Top 2 candidates (District 7)

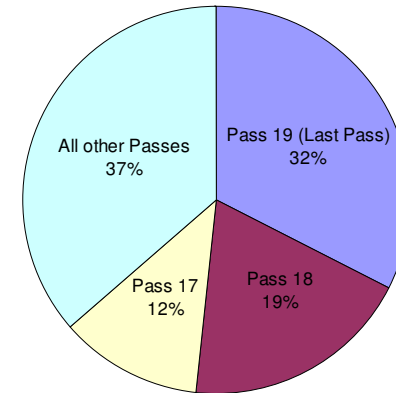


Exhausted Ballots by Round

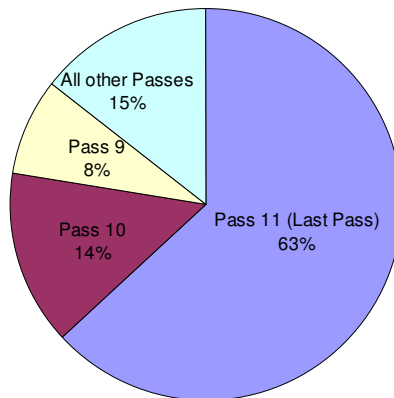
Undistributed Ballots (district 1)



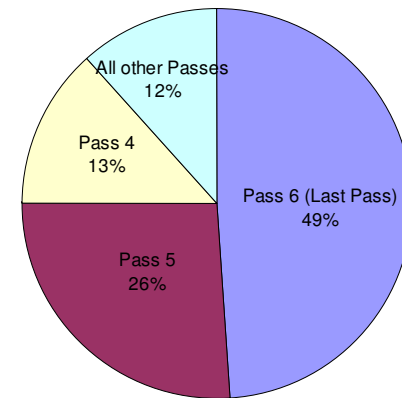
Undistributed Ballots (district 5)



Undistributed Ballots (district 7)

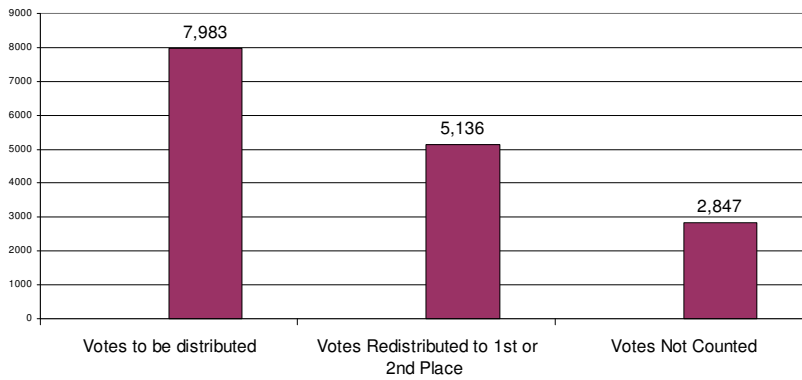


Undistributed Ballots (District 11)

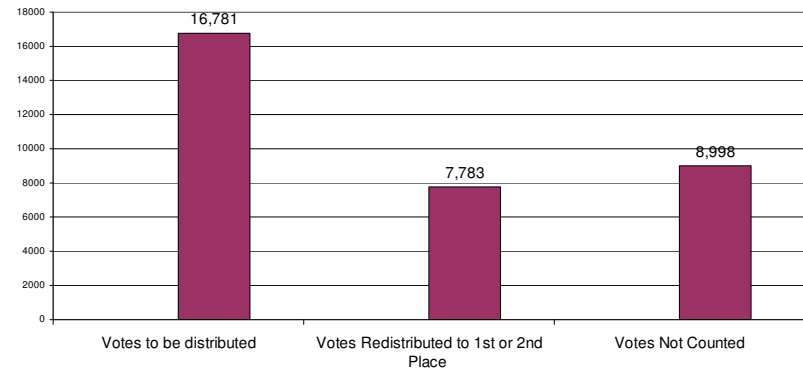


Redistribution of Votes

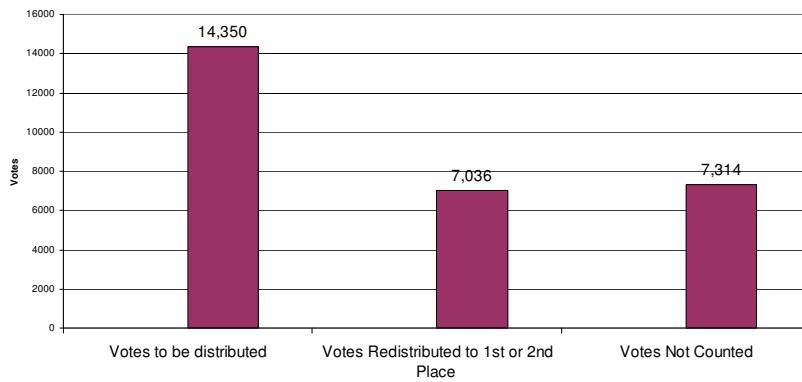
Redistribution of Votes (District 1)



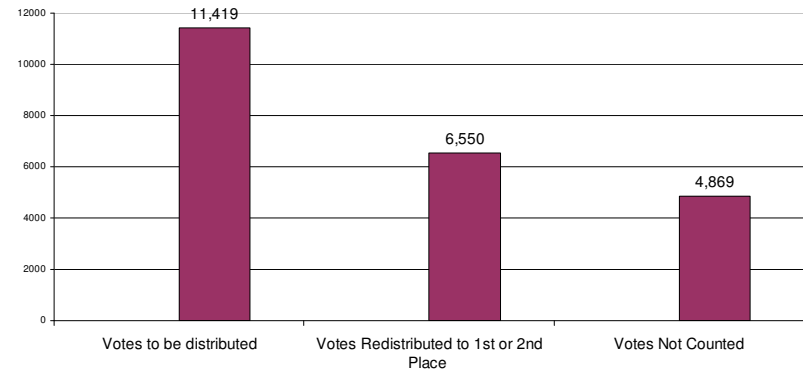
Redistribution of Votes (District 5)



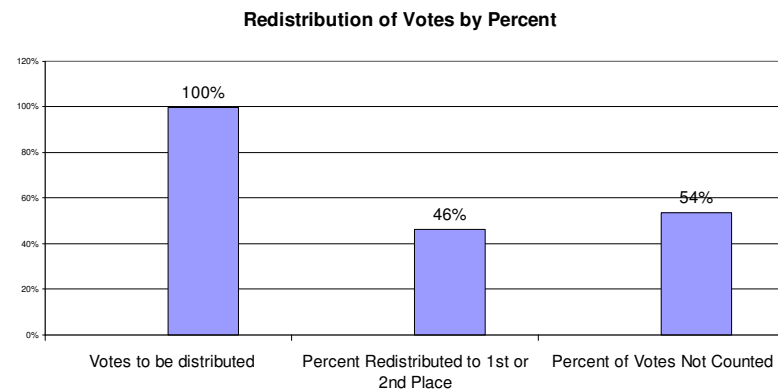
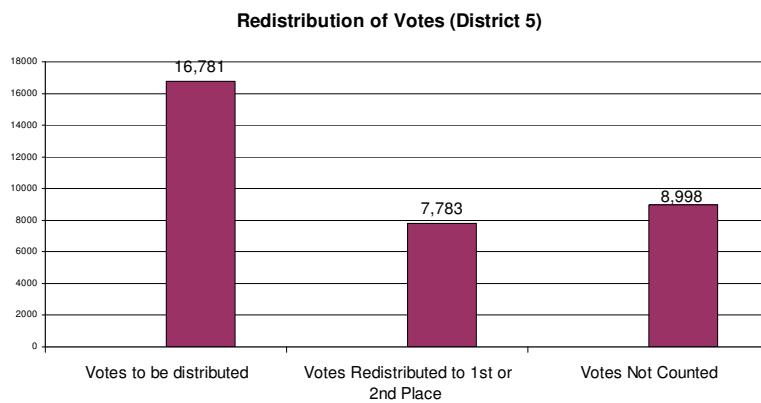
Redistribution of Votes (SF District 7)



Redistribution of Votes (District 11)



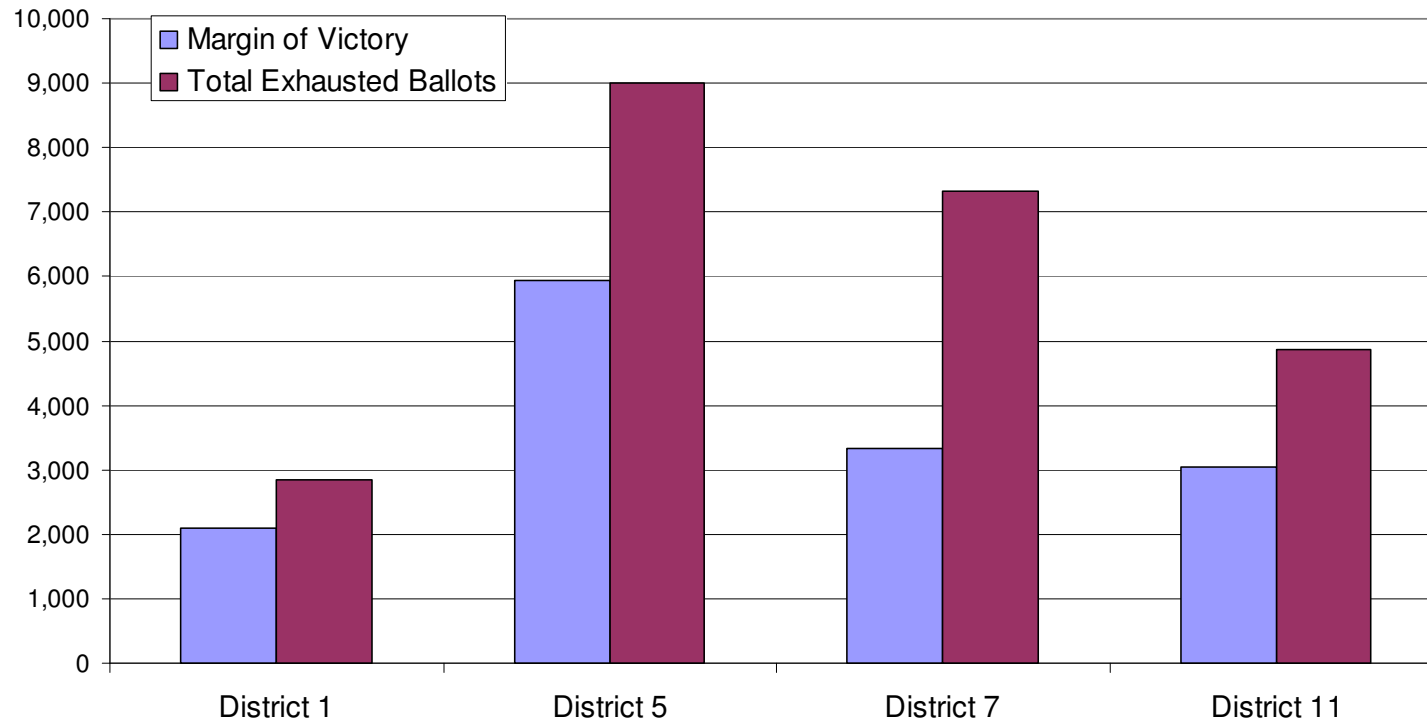
Redistribution of Votes



- In District 5, 54% of votes available for redistribution were Exhausted, and therefore not counted in the final pass.
- Does this limit the effectiveness of IRV?

Exhausted Ballots and the Margin of Victory

Margin of Victory vs. Total Exhausted Ballots

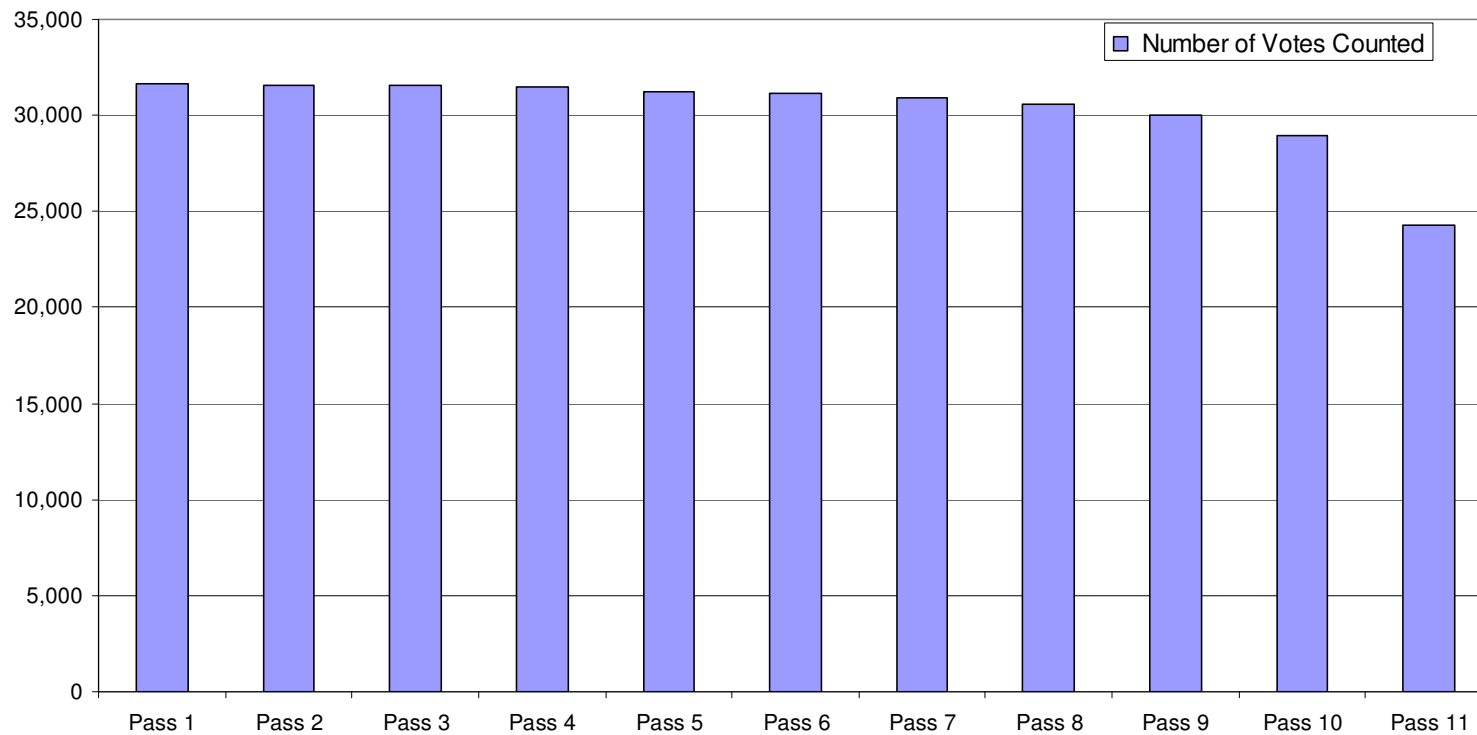


Exhausted Ballots

- The exhausted ballots created in the election have the same effect as low voter turnout in a runoff election.
- Fewer people are able to voice their opinion on the top two candidates.
- It is in the last few rounds of redistribution that the majority of votes are exhausted

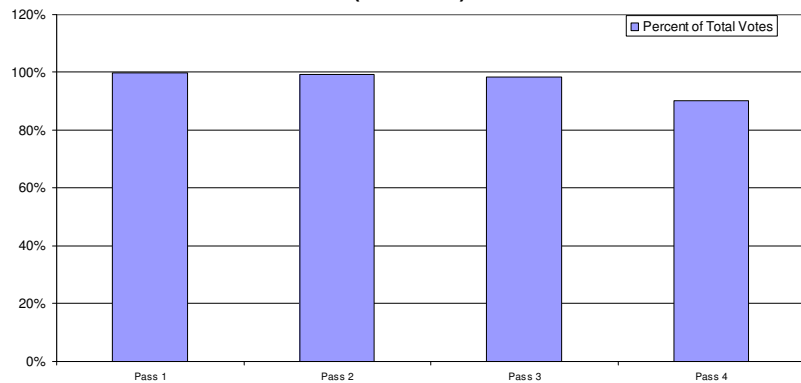
As Rounds Progress, Fewer Votes are Counted.

Vote Conservation: Are all votes counted? (District 7)

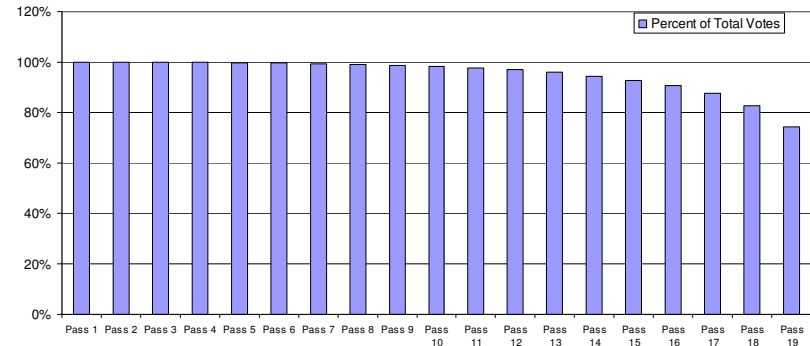


Vote Conservation: Percent of Votes Being Counted.

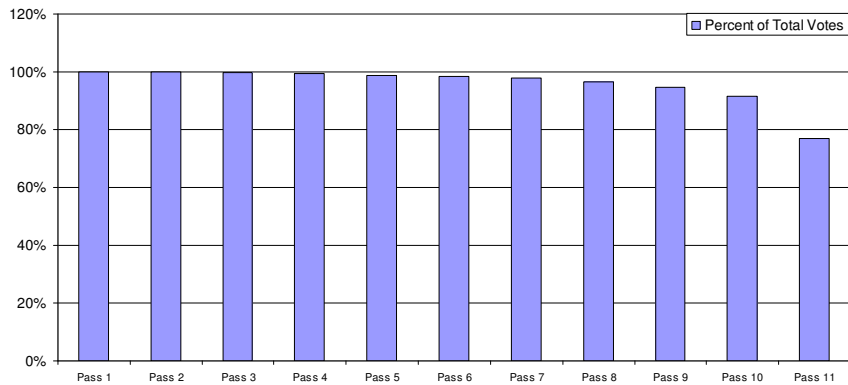
Vote Conservation: Percent of Total Votes Being Counted (District 1)



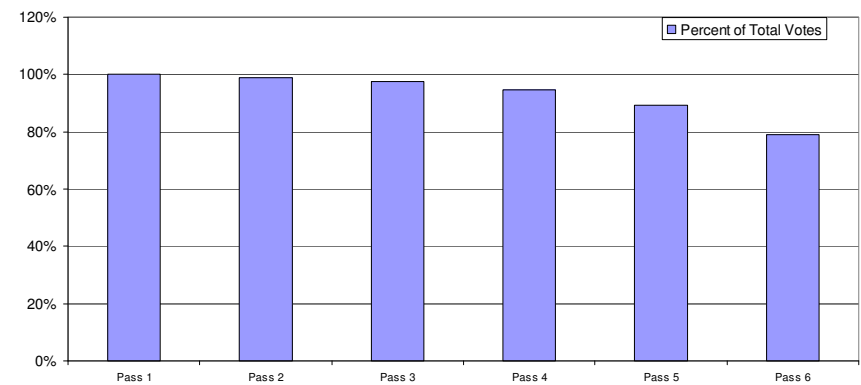
Vote Conservation: Percent of Total Votes Being Counted. (District 5)



Vote Conservation: Percent of Total Votes Being Counted. (District 7)



Vote Conservation: Percent of Total Votes being Counted. (District 11)



Are all Voting Systems Fair?

- Are all voters treated the same
 - Variation in Hardware:
 - Punch Card Ballots
 - Optical Scan ballots
 - Electronic Touch Screen Technology
- Does IRV allow all voters to be treated equally?

Voter Equality in SF elections

- English Speakers had prior knowledge of IRV at 70%, Chinese speakers knew at 69%, Spanish only knew at 56%, while other languages knew at 63%
 - *An Assessment of Ranked-Choice Voting in the San Francisco 2004 Election* by SF State's PRI, page 41
- “Ranking three candidates was least common among African-Americans, Latinos, voters with less education, and people whose first language is not English”
 - Page 13

Voter Equality in SF Elections

- The study found a strong correlation between voters who did not have prior knowledge of IRV and voters who ranked only one candidate.
- If a voter ranks only one candidate, unless he or she votes for one of the top two, then the voter will not have his or her ballot counted in the final round.

3 different types of voters.

- 1st- Voter AA casts 1st choice for one of the two finalists
- 2nd- Voter BB casts 1st choice for someone who placed 3rd or worse. Casts 2nd or 3rd choice for one of the two finalists.
- 3rd- Voter CC casts 1st choice for someone who placed third or worse. Casts 2nd and 3rd choices for candidates who don't make it to final round.

Whose Votes Count?

	1st Round	2nd Round	Final
Voter AA	1	1	1
Voter BB	1	1	1
Voter CC	1	0	0

1-Vote Counted

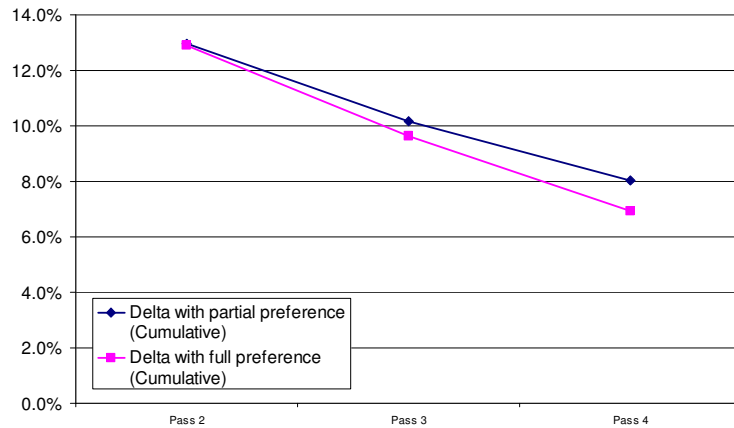
0-Vote not Counted

What Would Happen in Full-Preference Voting?

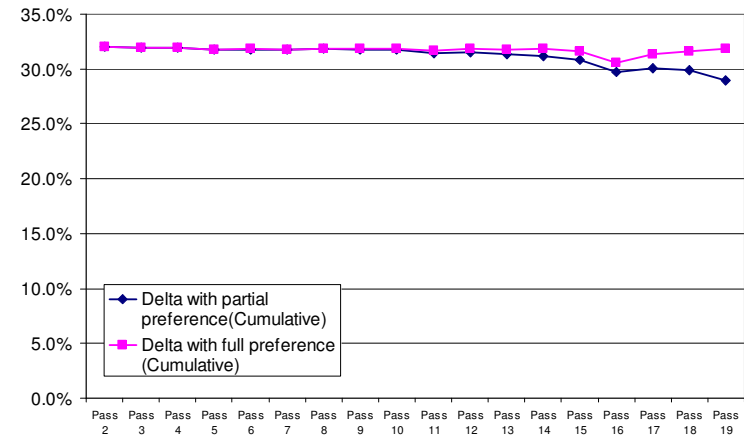
- We distributed the exhausted ballots to the candidates in proportion with the already distributed ballots, so each winning candidate would get a majority.
- We were trying to determine if full-preference would make a difference in the margin of victory.

Percent Δ Between First and Second Place (Comparing real results with results when we redistributed exhausted ballots proportionally)

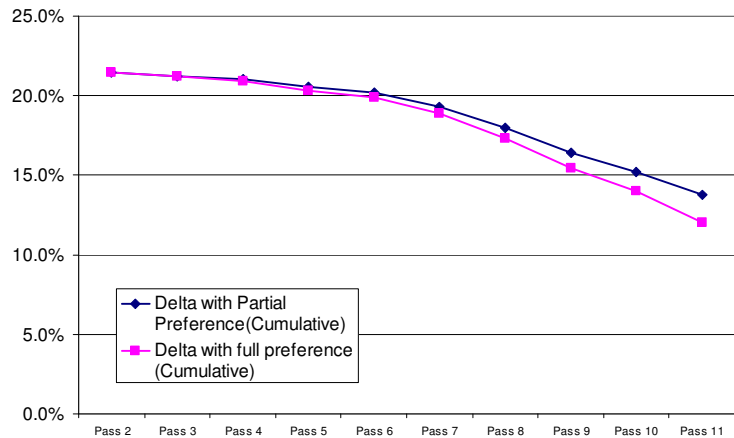
Partial Vs. Full Preference Voting (District 1)



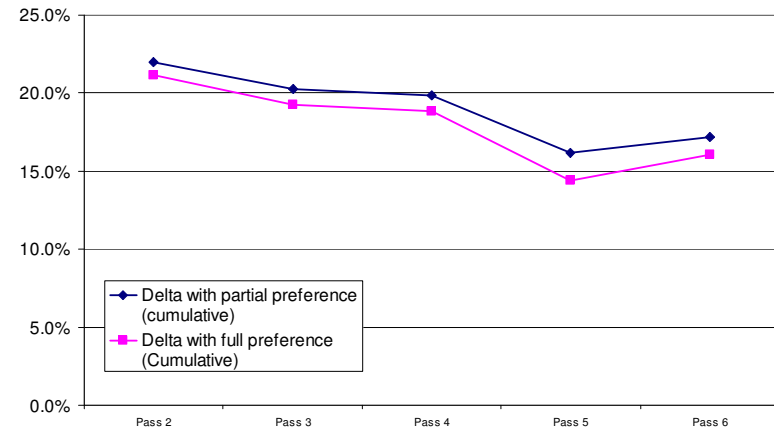
Parital Vs. Full Preference Voting (District 5)



Partial Vs. Full Preference Voting (District 7)



Partial Vs. Full Preference Voting (District 11)



How can we make all votes count?

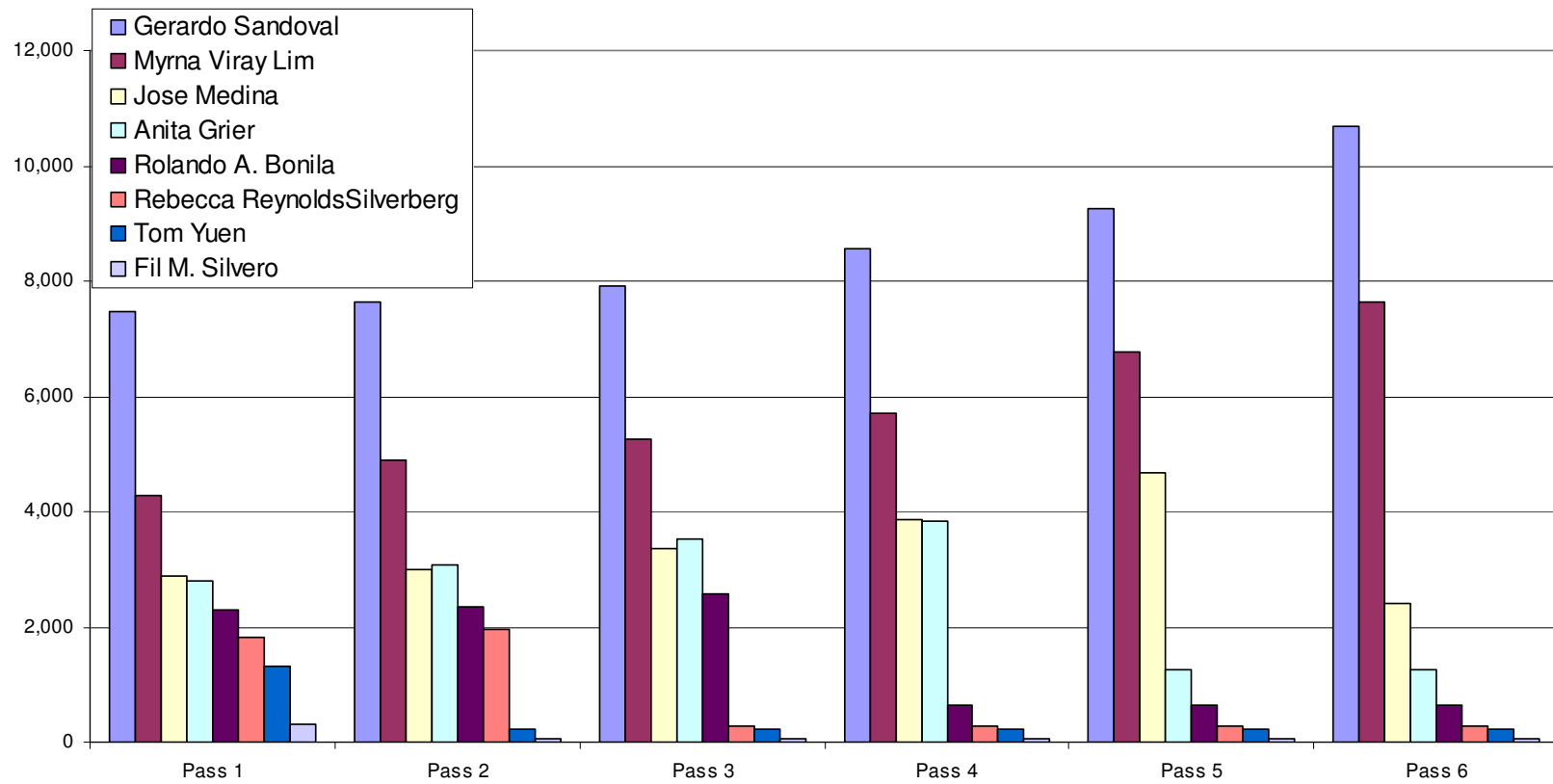
- In a Full Preference system, there would be no exhausted ballots
- But can there be a system that limits exhausted ballots without forcing voters to rank all the candidates?
- We've come up with an alternate form of IRV that prevents exhausted ballots.

Alternative IRV System

- Voters can rank as many choices as they want.
- Once a candidate is eliminated, all possible votes are to be distributed to candidates that remain.
- If there is no way to pass on the votes, either because votes are distributed to candidates already eliminated or no other choices were made, then those ballots remain with the candidate. (This total cannot be added to in subsequent rounds)
- This leads to no exhausted ballots but does not guarantee a majority.

Alternative IRV

Alternative IRV for District 11

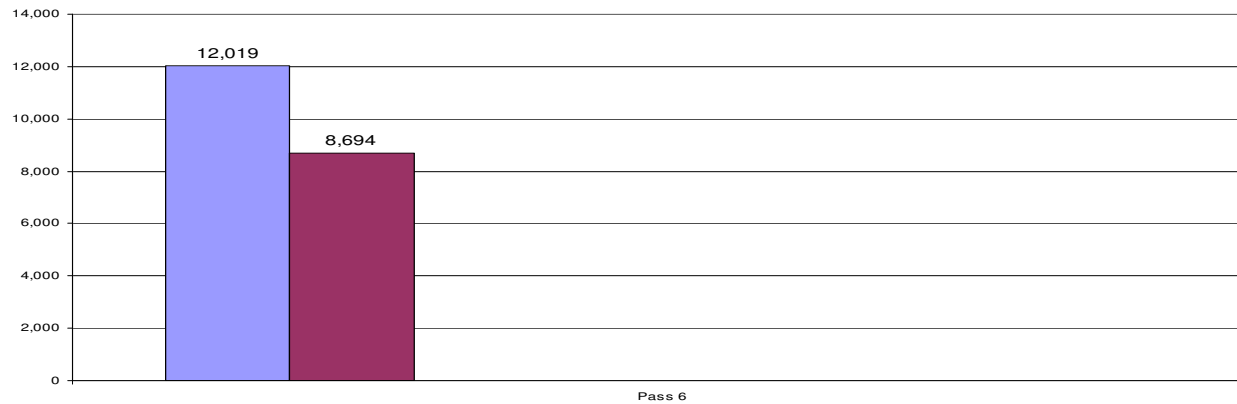


District 11: Final Vote Distribution.

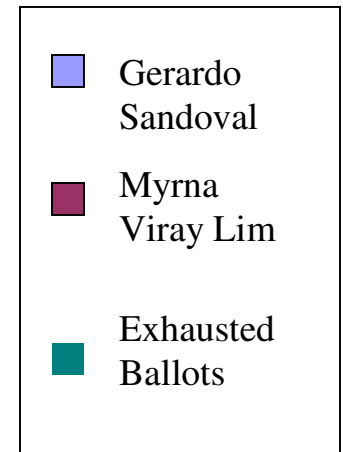
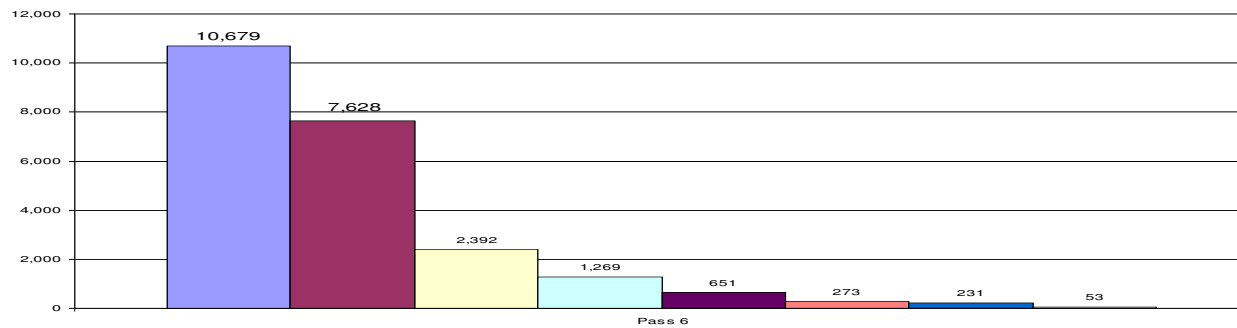
San Francisco's RCV final round



Simulated Full-Preference IRV



Final Round of District 11 using Alternative IRV

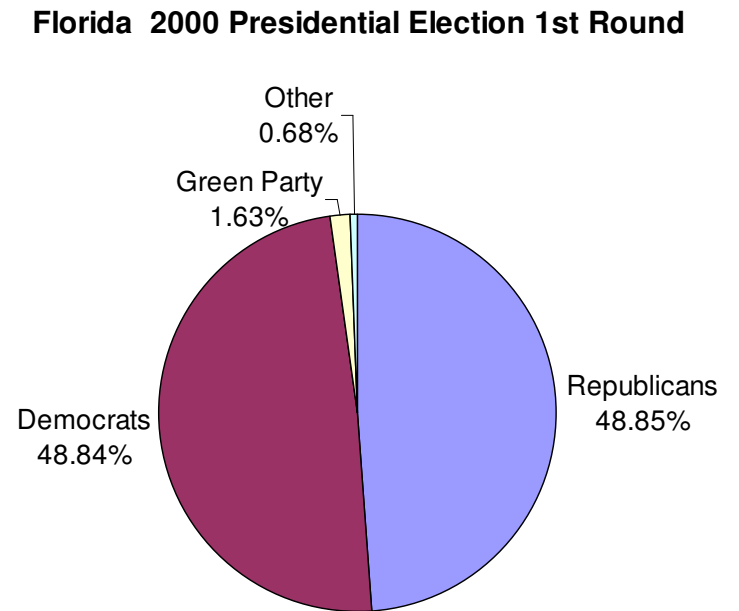


Summary

- Instant Runoff Voting did not change the ranking of the top two candidates in any election.
- Exhausted Ballots created by people ranking already eliminated candidates prevent the winner of the election from gaining a true majority.
- Voters whose ballots become exhausted before the last round do not get a say in the outcome of the election.
- There are other types of IRV that could be more effective than Partial-Preference Voting.

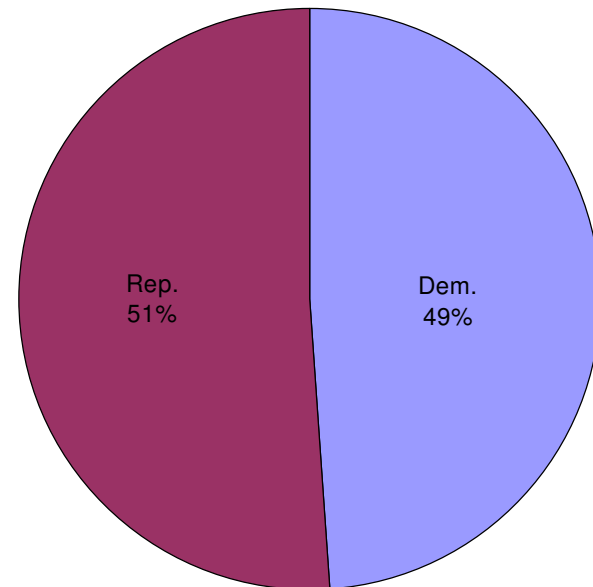
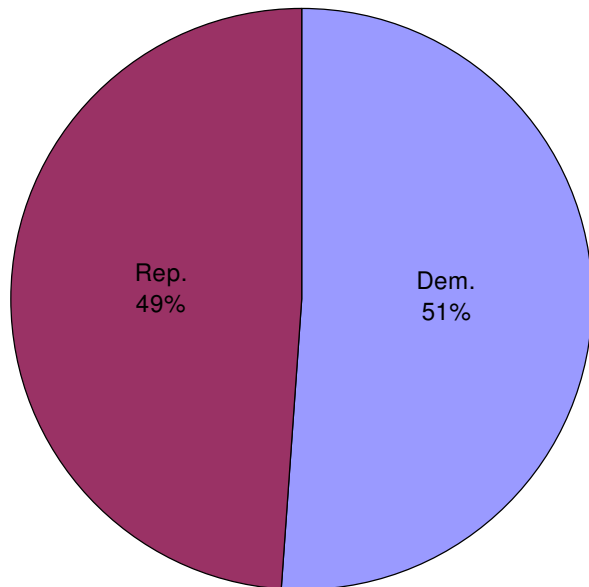
Looking at the 2000 Florida Presidential Election

- If IRV were used in the 2000 Florida Presidential Election, the Results after the first round would be the same as the present results.



Looking at the 2000 Florida Presidential Election

In the final round, only the two main parties would remain, giving way to one of the two possibilities shown below. Although effective in this situation, IRV could prevent third parties from getting the credit they would have gotten from a regular election.



Sources

- www.sfgov.org/elections
- Neely, Francis, Lisel Blash and Corey Cook. *An Assessment of Ranked-Choice Voting in the San Francisco 2004 Election*. San Francisco State's Public Research Institute (March 2005).