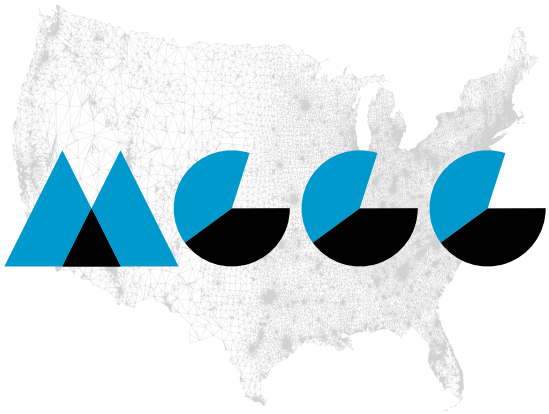
Analysis of Election Systems for the Salem-Keizer Unified School District



MGGG Redistricting Lab

Contents

Contributors

Amy Becker, Moon Duchin, Martin Gao, and Thomas Weighill contributed to the data collection and preparation, data analysis, and writing of this report.

Version 0.0 | July 23, 2021

1 Introduction

The Salem-Keizer Unified School District (hereafter, the School District or school district) had a total population of 242,521 people in the 2010 Census count.

Table 1 shows the demographic breakdown of the district by total population, Voting Age Population (VAP), Citizen Voting Age Population (CVAP), and Students enrolled in Salem-Keizer School District. The district has one sizable minority group: Latino residents, who constitute 21.8% of the total population, 16.7% of VAP and 13.4% of CVAP. We use the term POC (people of color) to refer to residents who are Hispanic or have selected a non-White race in the Census (or both). In total the POC share of CVAP is 21.3%. The distribution of POC residents across the School District is shown in Figure 2.

Race	Share of Total Population	Share of VAP	Share of CVAP	Share of Students
White	69.9%	75.7%	78.7%	47.4%
Latino	21.8%	16.7%	13.4%	40.6%
Asian	2.4%	2.5%	2.0%	2.1%
Black	1.1%	1.1%	1.4%	1.4%
Other	4.8%	3.9%	4.5%	8.5%
Total People	**242,521**	**179,611**	**176,845**	**41,920**

Table 1. Total population, Voting Age Population (VAP) and Citizen Voting Age Population (CVAP) by race in the Salem-Keizer School District. Total population and VAP data is from the 2010 Census, and CVAP data is from the 2018 ACS 5-year rolling average. Student demographics are from the US News and World Report school district profiles: https://www.usnews.com/education/k12/oregon/districts/salem-keizer-sd-24j-104739

Salem-Keizer currently has 7 School Board zones, each of which is represented by a single director on the School Board. However, every voter in the entire school district is eligible to vote for all zones, irrespective of their location of residence. Figure 1 shows the current School Board Directors and Figure 2a shows the currently enacted School Board zones.[1] The school district has never had a Latinx resident elected to the School Board.[2]

We emphasize that school board members who are themselves people of color may not necessarily have been the candidates preferred by POC voters. POC candidates of choice can come from any racial or ethnic group. In the absence of accurate voter preference data, we use the School Board's racial makeup as an imperfect proxy for representation. Furthermore, we know that no community votes as a monolith, and we take care to consider a range of candidate support and voting polarization levels in this report.

One major drawback of holding district-wide elections for every zone is that it can prevent minority voters from being able to elect a candidate of choice. In particular, if voting is highly racially polarized, then the White voters (who constitute 75.7% of VAP and 78.7% of CVAP in the district) can easily elect their preferred candidates for all 7 board seats. Even though Latinx residents make up about $1/6$ of the district by VAP (and almost $1/7$ of the district by CVAP) and POC residents make up

[1] https://salkeiz.k12.or.us/schoolboard/#sb-directors, https://salkeiz.k12.or.us/wp-content/uploads/2017/07/school-board-zone-map.pdf

[2] https://www.opb.org/news/article/school-board-latino-candidates-salem-keizer-oregon/

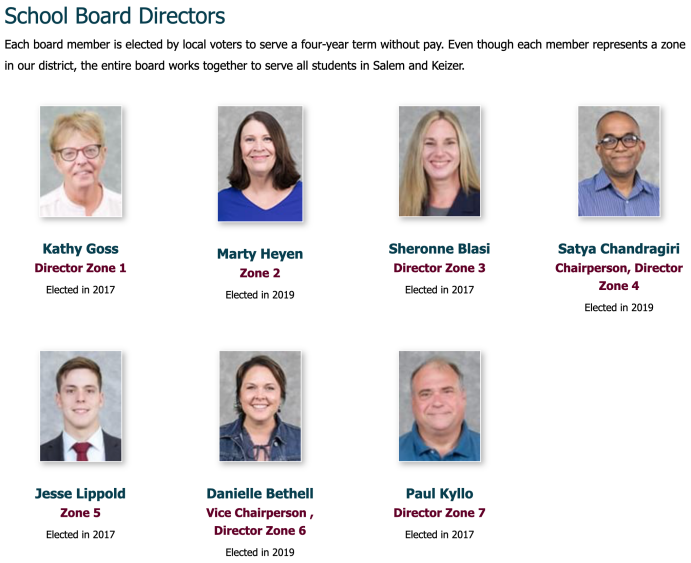
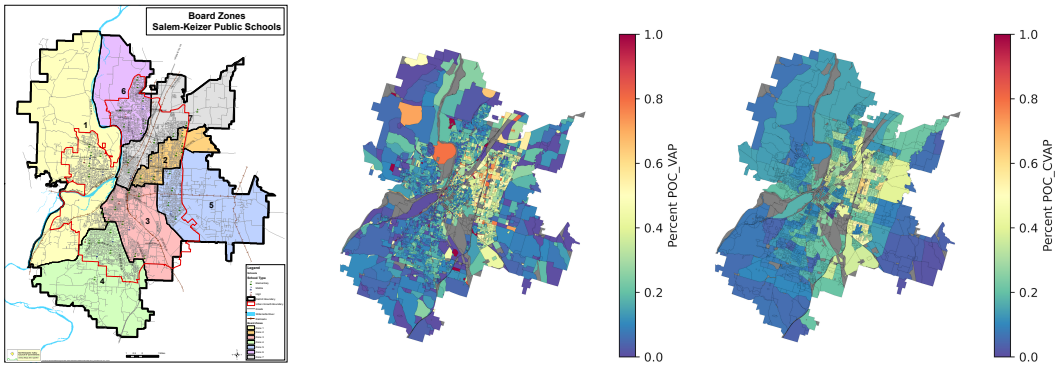


Figure 1. Current Salem-Keizer School Board Directors



(a) Enacted Zones **(b)** Distribution of POC-VAP **(c)** Distribution of POC-CVAP

Figure 2. Maps showing enacted zones as well as POC-VAP and POC-CVAP by block in the Salem-Keizer School District. Note that CVAP by race is disaggregated to blocks from the block group level (the smallest unit for which this data is available). This process requires assumptions to be made about how the CVAP is distributed across the block group that likely differ from the true, unknown, geographic distribution of CVAP.

almost 1/4 of the district's eligible voters, they would never be able to elect even a single candidate of choice to the 7-member board without substantial support from White voters.

A simple alternative would be to restrict the voting for each zone to its own residents. Figure 2b shows the distribution of the POC Voting Age Population (POC-VAP) and Figure 2c shows the distribution of the POC Citizen Voting Age Population (POC-CVAP) across the school district. By visual examination, we can see that the enacted School Board zones stand in no particular relation to the concentration of POC population. That is, as the zones now stand, it is unlikely that a candidate of choice for POC voters would have a good chance of even winning any zone, in the presence of racially polarized voting.

In this report we consider two alternative options: (1) zoned (instead of district-wide) elections with new zone boundaries, and (2) ranked choice voting.

2 Districted Analysis

First, we consider traditional districted elections for the School Board. That is, replacing the current system by re-drawing zone boundaries and limiting the vote for each zone to its own residents. While a cohesive minority group may be too small to elect a candidate of choice in a school-district-wide, at-large election, they may be geographically distributed in such a way as to make up a large share of a local zone, allowing them to elect their candidate of choice.

In this section we evaluate 7-member boards (i.e. the current board size) elected instead by a districted system. We generated a large collection of districting plans with the goal of identifying maps with high-percentage-minority zones. To do this, we ran 100,000 steps of a ReCom[3] Markov chain, which takes into account only contiguity, compactness, and population deviation. We allowed zones to deviate by no more than 5% from the ideal population, in accordance with legal standards for local zones.

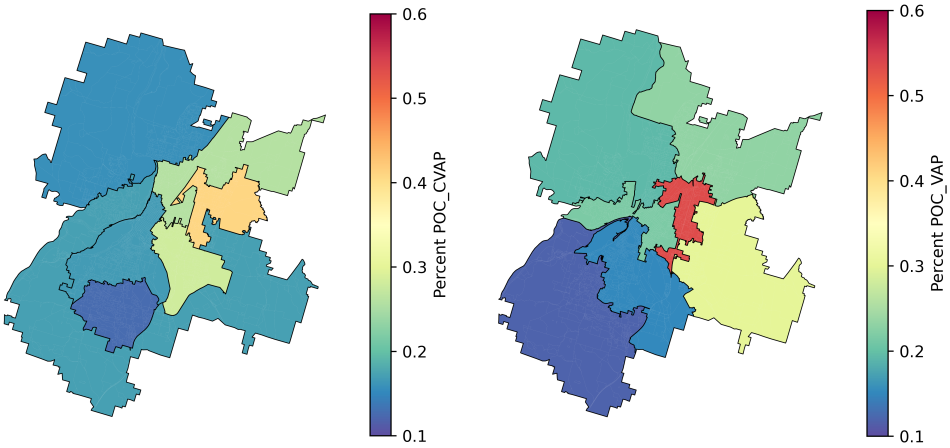
Proposed plans that satisfied these basic constraints were probabilistically accepted for inclusion in our *ensemble*, or collection of alternative plans, with a probability depending on their largest minority zone (the zone with the highest POC share of total CVAP): If a newly proposed plan's highest-proportion minority zone had a higher POC share than that of its predecessor plan's, it had a very *high* probability of being included, but if its highest-proportion POC zone had a lower POC-share, it had a very *low* probability of being included. This probabilistic inclusion created a *guided* chain run that targeted plans with concentrated POC zones. These heuristic optimization techniques are quite successful in identifying strong plans, but are not guaranteed to identify the *best possible* plans (finding such a *global optimum* is often computationally intractable).

Figure 3 shows the best plans found by these techniques. The highest percentage POC-CVAP zone found was 41.0%. When instead targeting plans with high POC-VAP (rather than high POC-CVAP), we were able to identify plans with a POC-VAP as high as 53.5% POC-VAP.

Because CVAP better captures actual eligible voting populations, it is unlikely that a plan can be drawn with a majority POC-voter zone. That is, even with a high degree of POC turnout and voter cohesion none of the plans we identified would be likely to perform for POC voters without high levels of White *crossover voting* (i.e. White voters' support for POC-preferred candidates).

[3] https://mggg.org/uploads/ReCom.pdf

Moreover, even if the lines are carefully drawn to capture population patterns at one moment in time, movement of population over the course of a decennial Census cycle makes the performance less secure in the future. Ultimately, switching to a traditional districted system is unlikely to be reliable way of ensuring POC-representation on the School Board.



(a) Map with highest zone POC-CVAP identified: **41.0%**

(b) Map with highest zone POC-VAP identified: **53.5%**

Figure 3. Results of techniques targeting identification of zones with high POC-CVAP and POC-VAP. While these techniques can identify zones that are over 50% POC-VAP, they were unable to identify zones even close to 50% POC-CVAP.

3 Ranked Choice Voting

As an alternative to re-zoning, we consider the prospects for ranked choice voting (RCV) in the Salem-Keizer School District. If a standard single-transferable vote system with $m = 7$ seats were implemented, then the threshold for election would be $\frac{1}{m+1} = \frac{1}{8} = 12.5\%$ of the votes. In other words, in this RCV system, any candidate who is the first choice of 12.5% of the voting population would be immediately elected to the school board, and someone can easily be elected with just 8-10% of the first-place votes if they are frequently ranked second or third by enough voters. Since 21.3% of the citizen voting age population (and 24.3% of voting age population) consists of people of color, RCV is likely to provide a more secure opportunity to elect candidates of choice for POC communities.

Because RCV is not currently used for many elections in the Pacific Northwest[4], we are not able to estimate RCV outcomes using ranking data from past elections. Instead, our analysis must use models of ranked choice voting behavior to simulate how RCV *could* perform in various scenarios.

[4]To date, the only known election to use RCV in the Pacific Northwest was the November 2020 County Commissioner race in Benton County, Oregon (https://www.oregonrcv.org/rcv-in-oregon/benton-county/).

3.1 Models and voting scenarios

We use four different models to estimate minority representation under ranked choice voting for POC voters in the School District. All four models take a simple input consisting of three values: (1) the support from POC voters for POC candidates, (2) the support from White voters for POC candidates and (3) POC share of total CVAP. The Plackett-Luce (PL) and Bradley-Terry (BT) models rely on classical probabilistic forms of ranking, using what is called a Dirichlet distribution to allocate support to candidates within each group. The Alternating Crossover (AC) and Cambridge Sampler (CS) models are newly designed for this analysis. For these, we use estimated probabilities for whether voters will rank a White or POC candidate first, then rely on specific assumptions on how the rest of the ballot will be completed. The AC model assumes that voters are either bloc voters or alternate in their support. For instance, a POC voter may vote CCCWWW, ranking all candidates of color above all White candidates, or else WCWCWC. The CS model uses ballot data from a decade's worth of ranked choice city council ballots in Cambridge, MA. Each voter's first choice is filled in with support estimates, and then their subsequent ballot is drawn at random from the observed ballot types in Cambridge.

We also consider five scenarios of how voters divide their support among White and POC candidates.

- **Scenario A: Unanimous Order.** All voters agree on who are the strongest candidates in each group.
- **Scenario B: POC vary POC.** POC voters vary preferences among POC candidates.
- **Scenario C: All Vary Order.** No agreement on strongest candidates.
- **Scenario D: White Vary Order.** White voters don't agree on strongest candidates.
- **Scenario E: Generic.** All levels of agreement equally likely.

Finally, we consider the effect of candidate availability by comparing two different candidate pools.

- **Balanced Pool:** 7 POC candidates and 7 White candidates run for office
- **Unbalanced Pool:** 3 POC candidates and 7 White candidates run for office

These RCV models require estimates for the rate at which POC and White voters support POC candidates. Typically, we would want to use local single-winner elections to estimate these levels of support. However, precise estimates (with a high degree of confidence) are not always available—especially for jurisdictions with low turnout and a small number of precincts. We consider four hypothetical levels of polarization: **Category 1 Polarization**, where the support from POC and White voters for POC candidates is 95% and 5% respectively, **Category 2 Polarization**, where the support from POC and White voters for POC candidates is 90% and 20% respectively, **Category 3 Polarization**, where the support from POC and White voters for POC candidates is 75% and 20% respectively, and **Category 4 Polarization**, where the support from POC and White voters for POC candidates is 60% and 40% respectively.

Finally, the RCV models require estimates for the proportions of POC and White voters. We use CVAP for these values. That is, we assume that the proportion of POC voters is roughly equivalent

to the proportion of POC citizens of voting age, namely 21.3%. These estimates make the implicit assumption that voter turnout is comparable for White and POC voters, which might not reflect actual voting behaviors. We note that substantially different turnout rates for White and POC voters may affect the following model results.

3.2 Results

For every combination of model, scenario, and candidate pool, we simulate 100 ranked choice elections, count how many POC candidates are elected in each trial, and compute the average across elections. The results are reported in Table 2 below.

Across all model scenarios, polarization categories and candidate pools, POC-preferred candidates are shut out in only three cases: Scenario C in the balanced candidate pool for the Cambridge Sampler (CS) under polarization Categories 1, 2, and 3. Recall these cases represent little or modest support for POC candidates from White crossover voters, 7 POC candidates running, and no consensus on which of these candidates are the strongest[5].

Otherwise results across the board are promising: we typically expect 1-3 POC candidates to be elected. A higher number of POC winners are predicted in Category 4 Polarization cases due to higher support from White voters.

However, we emphasize that the support estimates used here are hypothetical values that are an imperfect reflection of local voting behavior in the school district.

[5]We can observe that the Cambridge sampler has the greatest variability over the voter behavior scenarios. This is because it is drawn from actual votes, and they display a high frequency of “bullet voting," in which the voter selects only one candidate and leaves the rest of the ballot blank. Bullet voting can nullify the proportionality effects of ranked choice because the ballot is quickly exhausted, with nowhere to transfer the vote.

Category 1 Polarization (POC: 95%, W: 5%)	7 At-Large RCV; Balanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.1	2.2	1.3	1.1	1.7
	BT	1.8	2.0	1.0	1.0	1.3
	AC	1.0	1.3	1.0	1.0	1.1
	CS	2.8	3.0	0.0	1.0	1.7
	7 At-Large RCV; Unbalanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.1	2.0	1.7	1.4	1.8
	BT	2.0	2.0	1.2	1.2	1.5
	AC	1.1	1.6	1.0	1.0	1.2
	CS	2.7	3.0	1.1	1.0	1.9

Category 2 Polarization (POC: 90%, W: 20%)	7 At-Large RCV; Balanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	3.1	3.1	2.3	2.1	2.4
	BT	2.9	2.9	2.0	1.7	2.4
	AC	2.0	2.0	1.4	1.0	1.6
	CS	3.0	3.0	0.0	1.0	1.7
	7 At-Large RCV; Unbalanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.5	2.5	2.5	2.3	2.4
	BT	2.3	2.5	2.2	2.2	2.4
	AC	2.0	2.0	2.0	2.0	2.0
	CS	2.8	3.0	3.0	2.0	2.7

Category 3 Polarization (POC: 75%, W: 20%)	7 At-Large RCV; Balanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.8	3.0	2.0	1.9	2.3
	BT	2.9	2.8	1.8	1.6	2.2
	AC	2.0	2.0	1.0	1.0	1.5
	CS	3.0	3.0	0.0	1.0	1.7
	7 At-Large RCV; Unbalanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.4	2.5	2.3	2.2	2.4
	BT	2.4	2.5	2.2	2.1	2.3
	AC	2.0	2.0	2.0	1.9	2.0
	CS	2.6	3.0	2.9	2.0	2.6

Category 4 Polarization (POC: 60%, W: 40%)	7 At-Large RCV; Balanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	3.3	3.4	3.0	3.0	3.3
	BT	3.4	3.3	3.1	2.9	3.4
	AC	3.0	3.0	1.4	1.0	2.1
	CS	3.0	3.0	1.0	1.4	2.1
	7 At-Large RCV; Unbalanced Pool					
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	PL	2.5	2.6	2.8	2.7	2.6
	BT	2.5	2.6	2.8	2.8	2.7
	AC	2.6	3.0	3.0	2.9	2.9
	CS	3.0	3.0	3.0	3.0	3.0

Table 2. Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill 7 seats in the school district.

4 Conclusion

In this report, we estimated the opportunity for POC voters to elect candidates of choice under two different voting systems: districted and RCV. These results are summarized in Figure 4. For reference, Figure 4 also shows the number of current seats held by board members who are themselves people of color, as an imperfect proxy for POC voter representation on the School Board.

We considered a districted system that still has 7 zones, but in which voting is restricted to each zone. If the zone boundaries are re-drawn we are able to find zones with up to to 41.0% POC-CVAP. With using POC-VAP we were able to find zones with POC-VAP as high as 53.5%. As our techniques could not find a safely majority POC zone using either CVAP, we conclude that a districted system would be unlikely to guarantee POC electoral opportunity without a high degree of White crossover voting.

On the other hand, our ranked choice analysis suggests that, whether voting is highly polarized or follows more moderate patterns, an RCV election system could enable POC voters in the Salem-Keizer School District to elect 1-3 candidates of choice to the school board. In fact, the POC share of overall population is 30.1%, so the proportional share of a seven-member school board is roughly 2.1 seats. Under most models and scenarios considered here, ranked choice would secure an expectation that approaches or even exceeds this proportion.

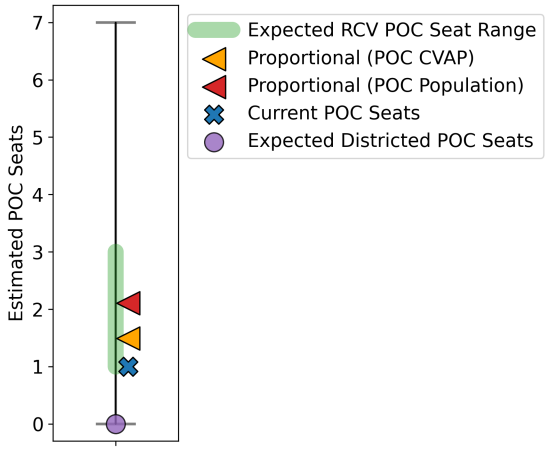


Figure 4. Summary of expected POC seat shares for alternative voting systems.