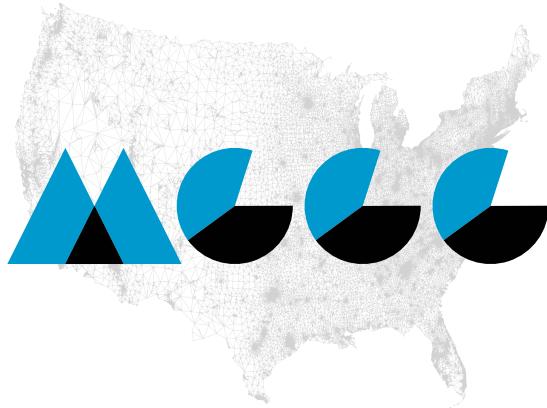


# Analysis of Election Systems for the Portland, OR City Council



MGGG Redistricting Lab

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## Contributors

Amy Becker, Dara Gold, Brad Souders and Thomas Weighill contributed to the data collection and preparation, data analysis, and writing of this report.

## 1 Introduction

Portland, Oregon had 583,776 residents as of the 2010 Census. Table 1 shows the demographic breakdown of the city by total population, Voting Age Population (VAP) and Citizen Voting Age Population (CVAP). Portland does not have a sizable single minority group, but the non-White share of total population is 27.75%. 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). The POC share of CVAP is 22.18% and the POC share of VAP is 23.89%. The distribution of POC residents across Portland is show in Figure 1.

The Portland City Council has 5 members (“Commissioners”), including the mayor of Portland (see Figure 2). Members run for specific City Council seats, but are elected at-large and represent the whole city. If one candidate does not win an outright majority in the primary election, the two candidates with the highest vote shares advance to a runoff election. Commissioners serve 4-year terms. Because all Portland voters can vote for every Commissioner seat, White voters can elect their candidate of choice in every race, resulting in a City Council that doesn’t necessarily reflect Portland’s demographics. Even though the current City Council has three POC Commissioners (Carmen Rubio, Mingus Mapps, and Jo Ann Hardesty), between 1985 and 2019 only one POC Commissioner was elected to the council.

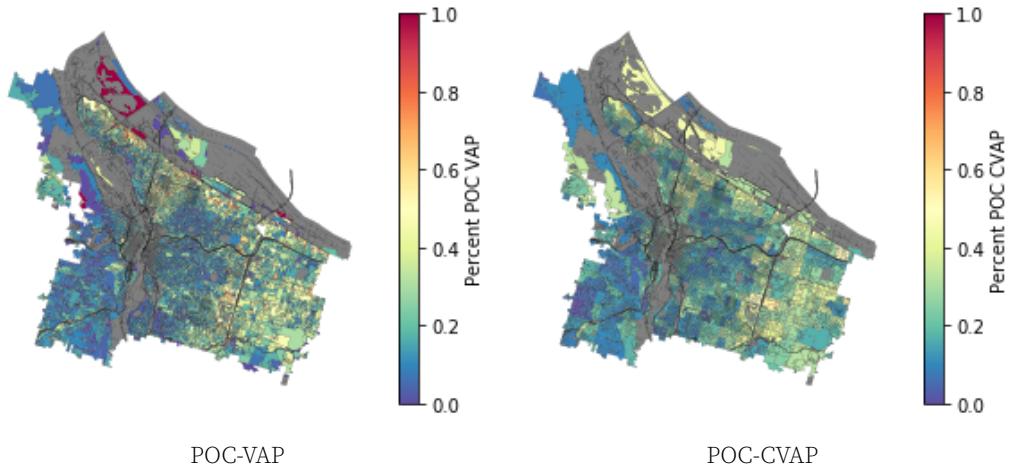
We emphasize that these Commissioners who are themselves people of color may not necessarily have been the candidates preferred by POC voters. POC candidates of choice can come from any racial or ethnic group. In the absence of accurate voter preference data, we use the Council’s racial makeup as an 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.

A potential way to get more consistent minority representation on the City Council would be with a traditional districted system, in which each Commissioner represents one district and is elected only by residents of that district. Alternatively, a switch to city-wide Ranked Choice Voting (RCV), in which multiple candidates are ranked on each ballot, can lead to proportional representation for minority voters with adequate turnout and candidate availability. Hybrid systems - or systems that combine districts with at-large seats and/or multi-member districts (MMD) - can also offer more consistent minority representation on the City Council.

In this report we look at eight alternative election systems for the City Council, some of which expand the size of the council: Citywide RCV for a 5, 7, and 9-member council, a districted system with 5,7, and 9 districts, a hybrid system consisting of 7 districted seat and 2 at-large seats elected via RCV (9-member council), and finally a hybrid system with 3 districts, each of which elects 3 members via RCV (9-member council).

Race	Share of Total Population	Share of VAP	Share of CVAP
White	72.25%	76.11%	77.82%
Latino	9.39%	7.47%	6.22%
Asian	7.08%	6.89%	6.32%
Black	6.07%	5.45%	5.18%
Other	5.21%	4.08%	4.6%
<b>Total People</b>	<b>583,776</b>	<b>472,253</b>	<b>483,220</b>

**Table 1.** Total population, Voting Age Population (VAP) and Citizen Voting Age Population (CVAP) by race in Portland. Total population and VAP data is from the 2010 Census, and CVAP data is from the 2018 ACS 5-year rolling average.



**Figure 1.** POC-VAP and POC-CVAP by block in Portland. 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.



(a) Ted Wheeler, Mayor



(b) Carmen Rubio, Commissioner



*Kat Berbari/Street Roots*

(c) Mingus Mapps, Commissioner



(d) Jo Ann Hardesty,  
Commissioner



(e) Dan Ryan, Commissioner

**Figure 2.** The Portland, Oregon City Council

## 2 District Analysis

First, we consider districted elections for the City Council. While a cohesive minority group may be too small to elect a candidate of choice in a city-wide, at-large election, they may be geographically distributed in such a way as to make up a large share of a local district, allowing them to elect their candidate of choice.

In this section we evaluate 5,7, and 9-member councils elected by a districted system. For each council size 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<sup>1</sup> 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).

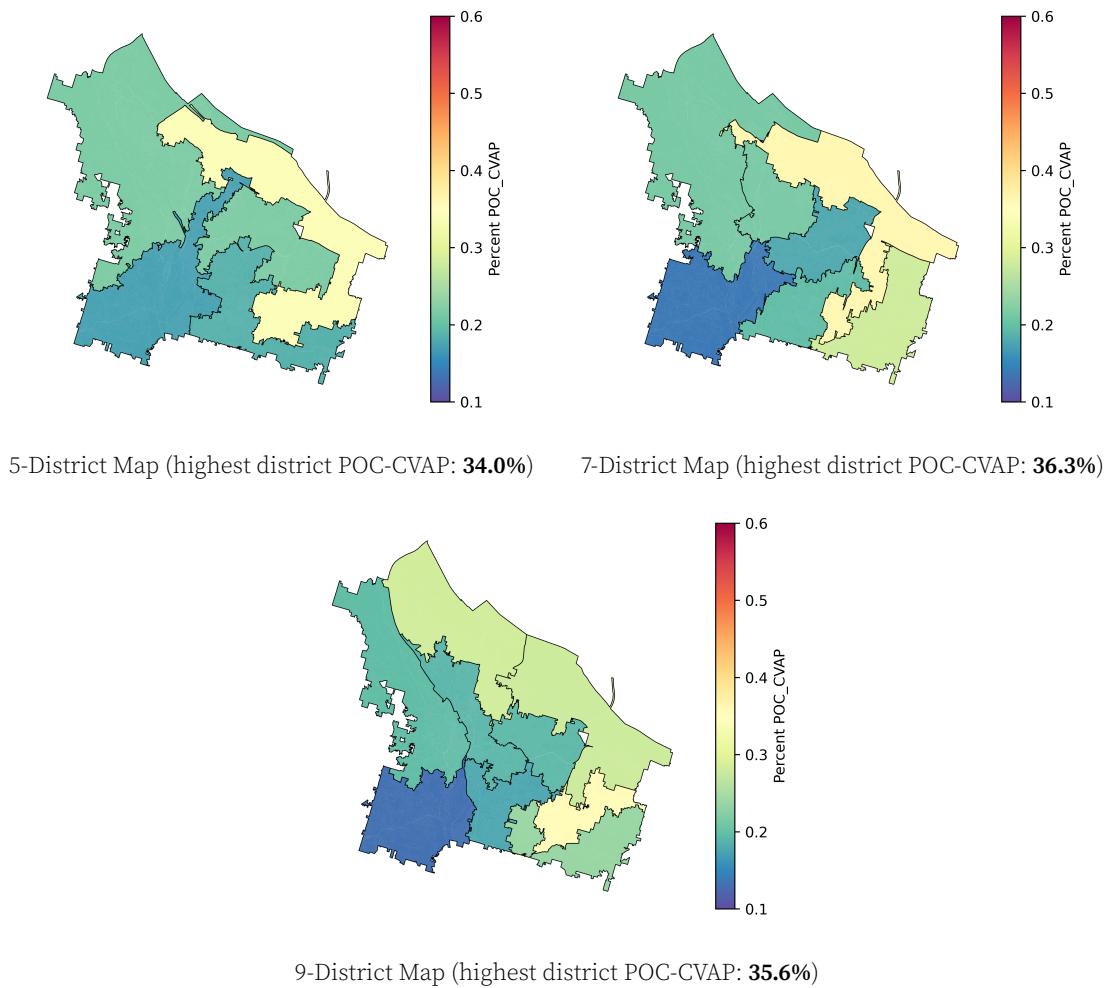
Figure 3 shows the best plans found by these techniques. The highest-percentage POC-CVAP districts found were 34.0%, 36.3%, and 35.6%, respectively, for the 5, 7, and 9-district councils. Though these are not guaranteed to be the true optimum values, it is very unlikely that plans for these council sizes could be found with POC-CVAP significantly higher than 40%, let alone approach the 50% mark.

It is extremely unlikely that any plan found by our techniques would reliably elect POC-preferred candidates from even one of its districts without a *significant* rate of White *crossover voting* (i.e. White voters' support for POC-preferred candidates) *and* very high turnout and cohesion among POC voters. Additionally, 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, we expect traditional districted systems with 5,7 or 9-member councils to be *unlikely* to reliably secure POC-representation on the council.

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<sup>1</sup><https://mggg.org/uploads/ReCom.pdf>



**Figure 3.** Example plans with 5, 7, and 9 districts. These plans had the highest single-district POC-CVAP identified by our optimization techniques.

## 3 Ranked Choice Voting (RCV) Analysis

As an alternative to a districted system, we consider the prospects for ranked choice voting (RCV) to elect the Portland City Council. If a standard single-transferable vote system with  $m = 5$  seats were implemented, then the threshold for election would be  $\frac{1}{m+1} = \frac{1}{6} = 16.67\%$  of the votes. In other words, in this RCV system, any candidate who is the first choice of 16.67% of the voting population would be immediately elected to the City Council, and someone can easily be elected with just 12-15% of the first-place votes if they are frequently ranked second or third by enough voters. Since 22.18% of CVAP (and 23.89% of VAP) is POC, RCV is likely to provide more consistent opportunity to elect POC-preferred candidates.

Because RCV is not currently used for many elections in the Pacific Northwest<sup>2</sup>, 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.

In this section we evaluate 5, 7, and 9-member councils elected by RCV.

### 3.1 Models and voting scenarios

We use four different models to estimate minority representation under ranked choice voting for POC voters in Portland. 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.

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<sup>2</sup>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/>).

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

- **Balanced Pools:**

- **5-member council:** 5 POC candidates and 5 White candidates run for office
- **7-member council:** 7 POC candidates and 7 White candidates run for office
- **9-member council:** 9 POC candidates and 9 White candidates run for office

- **Unbalanced Pools:**

- **5-member council:** 3 POC candidates and 5 White candidates run for office
- **7-member council:** 3 POC candidates and 7 White candidates run for office
- **9-member council:** 3 POC candidates and 9 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 22.18%. 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 Tables 2, 3, and 4 below.

Across all model scenarios, polarization categories and candidate pools, POC-preferred candidates are shut out in only a few cases, all of which are Scenario C with the Cambridge Sampler (CS) under polarization Categories 1, 2, and 3, and all but one occur only for balanced pools. Recall these cases represent little or modest support for POC candidates from White crossover voters, 5-9 POC candidates running, and no consensus on which of these candidates are the strongest<sup>3</sup>.

Otherwise results across the board are promising: we typically expect 1-2 POC candidates to be elected onto a 5-member council, 1-3 onto a 7-member council and 2-4 onto a 9-member council. A

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<sup>3</sup>We see 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.

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 Portland.

		<b>5 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	1.4	1.5	1.0	1.0	1.1
	BT	1.4	1.4	1.0	1.0	1.1
	AC	1.0	1.0	1.0	1.0	1.0
	CS	2.0	2.0	0.0	1.0	1.2
<b>5 At-Large RCV; Unbalanced Pool</b>						
Category 1 Polarization (POC: 95.0%, W: 5.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	1.5	1.5	1.1	1.0	1.2
	BT	1.4	1.4	1.0	1.0	1.1
	AC	1.0	1.0	1.0	1.0	1.0
Category 2 Polarization (POC: 90.0%, W: 20.0%)	CS	2.0	2.0	0.1	1.0	1.3
	<b>5 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.0	2.1	1.7	1.6	1.8
Category 2 Polarization (POC: 90.0%, W: 20.0%)	BT	2.0	2.1	1.4	1.3	1.7
	AC	2.0	2.0	1.0	1.0	1.5
	CS	2.0	2.0	0.0	1.0	1.2
	<b>5 At-Large RCV; Unbalanced Pool</b>					
Category 2 Polarization (POC: 90.0%, W: 20.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.0	2.1	1.9	1.7	1.9
	BT	1.9	2.0	1.7	1.6	1.8
	AC	2.0	2.0	1.1	1.0	1.5
Category 3 Polarization (POC: 75.0%, W: 20.0%)	CS	2.0	2.0	1.8	1.0	1.7
	<b>5 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.0	2.1	1.3	1.3	1.7
Category 3 Polarization (POC: 75.0%, W: 20.0%)	BT	2.0	1.9	1.5	1.3	1.6
	AC	1.6	1.9	1.0	1.0	1.4
	CS	2.0	2.0	0.0	1.0	1.2
	<b>5 At-Large RCV; Unbalanced Pool</b>					
Category 3 Polarization (POC: 75.0%, W: 20.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	1.9	2.0	1.7	1.6	1.7
	BT	1.9	1.9	1.6	1.6	1.7
	AC	1.6	2.0	1.0	1.0	1.4
Category 4 Polarization (POC: 60.0%, W: 40.0%)	CS	2.0	2.0	1.1	1.0	1.5
	<b>5 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.4	2.4	2.2	2.1	2.3
Category 4 Polarization (POC: 60.0%, W: 40.0%)	BT	2.5	2.4	2.1	2.2	2.3
	AC	2.0	2.0	1.0	1.0	1.5
	CS	2.0	2.0	0.9	1.0	1.5
	<b>5 At-Large RCV; Unbalanced Pool</b>					
Category 4 Polarization (POC: 60.0%, W: 40.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.1	2.2	2.4	2.2	2.2
	BT	2.3	2.2	2.2	2.2	2.2
	AC	2.0	2.0	2.0	1.9	2.0
Category 4 Polarization (POC: 60.0%, W: 40.0%)	CS	2.0	2.0	3.0	2.7	2.4

**Table 2.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill 5 at-large seats on the council.

		<b>7 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	2.1	2.2	1.2	1.3	1.6
	BT	1.9	1.9	1.0	1.0	1.2
	AC	1.9	2.0	1.0	1.0	1.5
	CS	2.9	3.0	0.0	1.0	1.7
<b>7 At-Large RCV; Unbalanced Pool</b>						
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	2.0	2.1	1.7	1.5	1.9
	BT	1.9	2.0	1.2	1.1	1.6
	AC	1.9	2.0	1.0	1.0	1.5
	CS	2.6	3.0	1.2	1.0	2.0
Category 2 Polarization (POC: 90.0%, W: 20.0%)		<b>7 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 2 Polarization (POC: 90.0%, W: 20.0%)	PL	2.8	3.1	2.3	2.2	2.7
	BT	2.9	3.1	1.9	1.7	2.3
	AC	2.0	2.0	1.9	1.1	1.7
	CS	2.9	3.0	0.1	1.0	1.7
<b>7 At-Large RCV; Unbalanced Pool</b>						
Category 2 Polarization (POC: 90.0%, W: 20.0%)	PL	2.5	2.5	2.5	2.4	2.5
	BT	2.4	2.5	2.2	2.2	2.4
	AC	2.0	2.0	2.0	2.0	2.0
	CS	2.7	3.0	3.0	2.0	2.7
Category 3 Polarization (POC: 75.0%, W: 20.0%)		<b>7 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 3 Polarization (POC: 75.0%, W: 20.0%)	PL	2.8	2.9	2.0	1.8	2.4
	BT	2.8	2.8	1.9	1.6	2.2
	AC	2.0	2.0	1.0	1.0	1.5
	CS	2.9	3.0	0.0	1.0	1.7
<b>7 At-Large RCV; Unbalanced Pool</b>						
Category 3 Polarization (POC: 75.0%, W: 20.0%)	PL	2.4	2.4	2.3	2.1	2.3
	BT	2.3	2.4	2.2	2.1	2.4
	AC	2.0	2.0	2.0	2.0	2.0
	CS	2.8	3.0	2.9	2.0	2.7
Category 4 Polarization (POC: 60.0%, W: 40.0%)		<b>7 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 4 Polarization (POC: 60.0%, W: 40.0%)	PL	3.4	3.3	3.1	2.9	3.2
	BT	3.3	3.3	3.1	2.8	3.3
	AC	3.0	3.0	1.5	1.0	2.1
	CS	3.0	3.0	1.2	1.5	2.2
<b>7 At-Large RCV; Unbalanced Pool</b>						
Category 4 Polarization (POC: 60.0%, W: 40.0%)	PL	2.6	2.6	2.8	2.8	2.7
	BT	2.5	2.6	2.8	2.7	2.8
	AC	2.7	3.0	3.0	3.0	2.9
	CS	3.0	3.0	3.0	3.0	3.0

**Table 3.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill 7 at-large seats on the council.

		<b>9 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	2.7	3.0	2.0	2.0	2.2
	BT	2.7	2.7	2.0	2.0	2.1
	AC	2.0	2.0	2.0	2.0	2.0
	CS	3.9	4.0	0.0	1.0	2.2
<b>9 At-Large RCV; Unbalanced Pool</b>						
Category 1 Polarization (POC: 95.0%, W: 5.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.5	2.5	2.1	2.0	2.2
	BT	2.3	2.4	2.0	1.9	2.1
	AC	2.0	2.0	2.0	2.0	2.0
Category 2 Polarization (POC: 90.0%, W: 20.0%)	CS	2.8	3.0	2.6	2.0	2.6
	<b>9 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	3.8	4.1	3.1	2.9	3.4
Category 2 Polarization (POC: 90.0%, W: 20.0%)	BT	3.7	3.9	2.6	2.4	3.2
	AC	3.0	3.0	2.0	2.0	2.5
	CS	3.9	4.0	0.1	1.8	2.4
	<b>9 At-Large RCV; Unbalanced Pool</b>					
Category 3 Polarization (POC: 75.0%, W: 20.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.7	2.9	2.9	2.8	2.9
	BT	2.7	2.8	2.8	2.6	2.8
	AC	3.0	3.0	3.0	3.0	3.0
Category 3 Polarization (POC: 75.0%, W: 20.0%)	CS	3.0	3.0	3.0	2.8	3.0
	<b>9 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	3.7	3.8	2.6	2.5	3.1
Category 3 Polarization (POC: 75.0%, W: 20.0%)	BT	3.8	3.5	2.4	2.3	3.1
	AC	3.0	3.0	2.0	1.6	2.4
	CS	3.9	4.0	0.0	1.2	2.3
	<b>9 At-Large RCV; Unbalanced Pool</b>					
Category 4 Polarization (POC: 60.0%, W: 40.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.5	2.6	2.9	2.6	2.7
	BT	2.5	2.9	2.7	2.6	2.7
	AC	3.0	3.0	3.0	2.0	2.8
Category 4 Polarization (POC: 60.0%, W: 40.0%)	CS	2.9	3.0	3.0	2.6	2.9
	<b>9 At-Large RCV; Balanced Pool</b>					
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	4.3	4.3	3.9	3.9	4.2
Category 4 Polarization (POC: 60.0%, W: 40.0%)	BT	4.2	4.2	4.0	3.8	4.2
	AC	4.0	4.0	2.0	1.6	2.9
	CS	3.9	4.0	1.6	2.1	2.9
	<b>9 At-Large RCV; Unbalanced Pool</b>					
Category 4 Polarization (POC: 60.0%, W: 40.0%)	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	
	PL	2.7	2.9	2.9	2.8	2.9
	BT	2.8	2.8	3.0	2.9	2.8
	AC	3.0	3.0	3.0	3.0	3.0
Category 4 Polarization (POC: 60.0%, W: 40.0%)	CS	3.0	3.0	3.0	3.0	3.0

**Table 4.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill 9 at-large seats on the council.

## 4 Hybrid Systems

So far we've shown two ways to elect a 9-member City Council: a districted system with 9 districts and city-wide RCV for 9 at-large seats. However, there are many ways to combine districts with RCV that have the potential of exhibiting benefits of both systems. We explore two alternatives in this section. Although we only show these for a 9-member council, similar systems can be adapted for 5 and 7-member councils as well.

### 4.1 7 Districts + 2 At-Large

The first hybrid system we consider has 7 districted council seats (elected by the districts they represent) and 2 at-large RCV council seats (elected city-wide). We already have results for a 7-district map from Section 2, where we concluded that no seats would be reliably secured for POC-preferred candidates to be elected to the council.

We can estimate RCV results for 2 at-large RCV seats under each of the polarization categories described in Section 3. Note that here balanced candidate pools consist of 2 POC candidates and 2 White candidates, whereas unbalanced candidate pools consist of 1 POC candidate and 2 White candidates. Results for the 2 at-large RCV seats are shown in Table 5. The table shows we would expect 0 or 1 POC-preferred candidates to be elected to the at-large RCV seats.

Combining these estimates, we expect this hybrid system to secure 0-1 seats overall for POC-preferred candidates on a 9-member council.

		<b>2 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	0.4	0.4	0.0	0.0	0.3
	BT	0.3	0.4	0.0	0.0	0.2
	AC	0.0	0.0	0.0	0.0	0.0
	CS	1.0	1.0	0.0	0.0	0.5
<b>2 At-Large RCV; Unbalanced Pool</b>						
Category 1 Polarization (POC: 95.0%, W: 5.0%)	PL	0.6	0.5	0.1	0.1	0.3
	BT	0.5	0.4	0.1	0.1	0.3
	AC	0.0	0.0	0.0	0.0	0.0
	CS	1.0	1.0	0.0	0.0	0.5
Category 2 Polarization (POC: 90.0%, W: 20.0%)		<b>2 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 2 Polarization (POC: 90.0%, W: 20.0%)	PL	0.8	0.8	0.6	0.5	0.7
	BT	0.8	0.9	0.4	0.3	0.6
	AC	1.0	1.0	0.0	0.0	0.5
	CS	1.0	1.0	0.0	0.0	0.5
<b>2 At-Large RCV; Unbalanced Pool</b>						
Category 2 Polarization (POC: 90.0%, W: 20.0%)	PL	1.0	1.0	1.0	1.0	1.0
	BT	0.9	0.9	0.9	0.8	0.9
	AC	1.0	1.0	1.0	1.0	1.0
	CS	1.0	1.0	1.0	1.0	1.0
Category 3 Polarization (POC: 75.0%, W: 20.0%)		<b>2 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 3 Polarization (POC: 75.0%, W: 20.0%)	PL	0.7	0.7	0.4	0.4	0.5
	BT	0.8	0.6	0.3	0.3	0.6
	AC	1.0	0.7	0.0	0.0	0.4
	CS	1.0	1.0	0.0	0.0	0.5
<b>2 At-Large RCV; Unbalanced Pool</b>						
Category 3 Polarization (POC: 75.0%, W: 20.0%)	PL	0.9	0.9	0.8	0.9	0.9
	BT	0.8	1.0	0.7	0.7	0.8
	AC	1.0	1.0	0.0	0.0	0.5
	CS	1.0	1.0	0.1	0.5	0.7
Category 4 Polarization (POC: 60.0%, W: 40.0%)		<b>2 At-Large RCV; Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Category 4 Polarization (POC: 60.0%, W: 40.0%)	PL	1.0	1.0	0.9	0.8	0.9
	BT	1.0	1.0	0.9	0.8	0.9
	AC	1.0	1.0	0.0	0.1	0.5
	CS	1.0	1.0	0.4	1.0	0.8
<b>2 At-Large RCV; Unbalanced Pool</b>						
Category 4 Polarization (POC: 60.0%, W: 40.0%)	PL	1.0	1.0	1.0	1.0	1.0
	BT	1.0	1.0	1.0	1.0	1.0
	AC	1.0	1.0	1.0	1.0	1.0
	CS	1.0	1.0	1.0	1.0	1.0

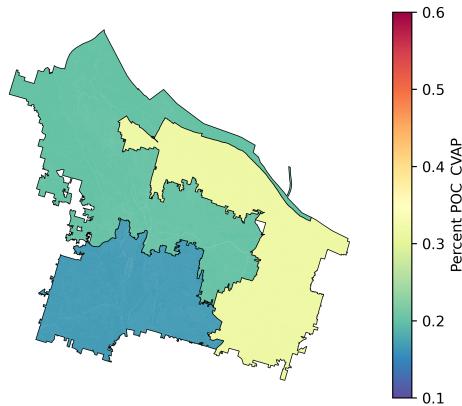
**Table 5.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill 2 at-large seats on the council.

## 4.2 3 Districts with 3 Members Each

The second hybrid system we consider has 3 council members elected by RCV in each of 3 multi-member districts (MMDs), forming a 9-member council in total. We used the same optimization techniques described in Section 2 to identify a 3-district plan with a high-percentage POC-CVAP district. The best plan identified by our methods is shown in Figure 4 and has district POC-CVAP values of 31.6%, 20.0%, and 16.8%. Although it is unlikely that any of these districts would reliably elect POC-preferred candidates under a *typical* districted system, using *RCV* in each district can offer more proportional representation.

We can estimate RCV results in each of the 3 districts under each of the polarization categories described in Section 3. Note that here balanced candidate pools consist of 3 POC candidates and 3 White candidates, whereas unbalanced candidate pools consist of 2 POC candidates and 3 White candidates. RCV model results are in Tables 6, 7, and 8.

We see that we would typically expect 1 POC-preferred candidate to be elected to the high-POC-CVAP district and 0-1 POC-preferred candidates to be elected to each of the lower-POC-CVAP districts. In total, we would expect 1-3 POC-preferred candidates to be elected to the 9-member council.



3-District Map (highest district POC-CVAP: **31.6%**)

**Figure 4.** Example plan with 3 districts. This plan had the highest single-district POC-CVAP identified by our optimization techniques. District POC-CVAP percentages are 31.6%, 20.0%, and 16.8%.

		<b>3 MMD RCV (16.8% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	0.8	0.8	0.1	0.1	0.4	
BT	0.6	0.6	0.1	0.1	0.3	
AC	0.0	0.0	0.0	0.0	0.0	
CS	1.0	1.0	0.0	0.0	0.5	
		<b>3 MMD RCV (16.8% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	0.8	0.7	0.1	0.2	0.4	
BT	0.6	0.7	0.2	0.1	0.5	
AC	0.0	0.0	0.0	0.0	0.0	
CS	1.0	1.0	0.0	0.0	0.5	
		<b>3 MMD RCV (16.8% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.1	1.1	0.9	0.8	1.0	
BT	1.2	1.1	0.6	0.6	0.8	
AC	1.0	1.0	0.0	0.0	0.5	
CS	1.0	1.0	0.0	0.5	0.6	
		<b>3 MMD RCV (16.8% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.2	1.1	1.0	0.9	1.0	
BT	1.1	1.2	0.9	0.9	1.0	
AC	1.0	1.0	0.1	0.2	0.6	
CS	1.0	1.0	0.2	1.0	0.8	
		<b>3 MMD RCV (16.8% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.0	1.2	0.6	0.6	0.9	
BT	1.1	1.1	0.6	0.5	0.8	
AC	1.0	1.0	0.0	0.0	0.5	
CS	1.0	1.0	0.0	0.0	0.5	
		<b>3 MMD RCV (16.8% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.0	1.1	0.9	0.9	1.0	
BT	1.1	1.1	0.8	0.8	1.0	
AC	1.0	1.0	0.0	0.1	0.5	
CS	1.0	1.0	0.0	0.9	0.7	
		<b>3 MMD RCV (16.8% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.4	1.4	1.2	1.2	1.2	
BT	1.4	1.4	1.2	1.2	1.2	
AC	1.0	1.0	0.0	0.1	0.5	
CS	1.0	1.0	0.6	1.0	0.9	
		<b>3 MMD RCV (16.8% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	1.3	1.4	1.4	1.4	1.3	
BT	1.4	1.2	1.3	1.3	1.4	
AC	1.0	1.0	1.0	1.0	1.0	
CS	1.0	1.0	1.6	1.0	1.2	

**Table 6.** This table shows the expected number of POC-preferred candidates elected under ranked choice to fill the 3 of 9 seats on the council representing a multi-member district with 16.8% POC-CVAP.

		<b>3 MMD RCV (20.0% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	Category 1 Polarization (POC: 95.0%, W: 5.0%)	0.8	0.8	0.2	0.1	0.5
BT		0.7	0.8	0.1	0.1	0.5
AC		0.0	0.0	0.0	0.0	0.0
CS		1.0	1.0	0.0	0.0	0.5
<b>3 MMD RCV (20.0% POC-CVAP); Unbalanced Pool</b>						
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		0.8	0.9	0.3	0.3	0.6
BT		0.6	0.8	0.2	0.2	0.5
AC		0.0	0.0	0.0	0.0	0.0
CS		1.0	1.0	0.0	0.0	0.5
		<b>3 MMD RCV (20.0% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	Category 2 Polarization (POC: 90.0%, W: 20.0%)	1.2	1.2	0.9	0.9	1.0
BT		1.1	1.1	0.8	0.8	0.9
AC		1.0	1.0	0.2	0.1	0.6
CS		1.0	1.0	0.0	1.0	0.8
<b>3 MMD RCV (20.0% POC-CVAP); Unbalanced Pool</b>						
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.1	1.1	1.0	1.0	1.1
BT		1.1	1.1	0.9	0.9	1.0
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	0.9	1.0	1.0
		<b>3 MMD RCV (20.0% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	Category 3 Polarization (POC: 75.0%, W: 20.0%)	1.1	1.1	0.7	0.8	1.0
BT		1.1	1.1	0.6	0.5	0.9
AC		1.0	1.0	0.0	0.0	0.5
CS		1.0	1.0	0.0	0.6	0.7
<b>3 MMD RCV (20.0% POC-CVAP); Unbalanced Pool</b>						
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.1	1.2	0.9	1.0	1.1
BT		1.1	1.1	0.9	0.8	1.0
AC		1.0	1.0	0.2	0.8	0.8
CS		1.0	1.0	0.1	1.0	0.8
		<b>3 MMD RCV 20.0% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL	Category 4 Polarization (POC: 60.0%, W: 40.0%)	1.4	1.4	1.1	1.2	1.3
BT		1.4	1.4	1.2	1.2	1.3
AC		1.0	1.0	0.1	0.7	0.7
CS		1.0	1.0	0.7	1.0	0.9
<b>3 MMD RCV (20.0% POC-CVAP); Unbalanced Pool</b>						
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.4	1.4	1.4	1.3	1.3
BT		1.4	1.2	1.3	1.3	1.3
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	1.8	1.0	1.2

**Table 7.** This table shows the expected number of POC-preferred candidates elected under ranked choice to fill the 3 of 9 seats on the council representing a multi-member district with 20.0% POC-CVAP.

		<b>3 MMD RCV (31.6% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.1	1.1	1.0	1.0	1.0
BT		1.1	1.0	1.0	1.0	1.0
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	0.0	1.0	0.8
		<b>3 MMD RCV (31.6% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.1	1.1	1.0	1.0	1.0
BT		1.1	1.0	1.0	1.0	1.0
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	0.7	1.0	0.9
		<b>3 MMD RCV (31.6% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.3	1.3	1.1	1.1	1.2
BT		1.3	1.3	1.1	1.0	1.2
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	0.3	1.0	0.8
		<b>3 MMD RCV (31.6% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.3	1.4	1.2	1.1	1.3
BT		1.2	1.2	1.1	1.0	1.1
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	1.2	1.0	1.0
		<b>3 MMD RCV (31.6% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.2	1.2	0.9	1.0	1.1
BT		1.3	1.3	1.0	1.0	1.1
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	0.0	1.0	0.8
		<b>3 MMD RCV (31.6% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.3	1.3	1.1	1.1	1.2
BT		1.2	1.3	1.0	1.0	1.1
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	1.0	1.0	1.0
		<b>3 MMD RCV (31.6% POC-CVAP); Balanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.5	1.4	1.2	1.3	1.4
BT		1.4	1.5	1.4	1.2	1.4
AC		1.0	1.0	1.0	1.0	1.0
CS		1.0	1.0	1.0	1.0	1.0
		<b>3 MMD RCV (31.6% POC-CVAP); Unbalanced Pool</b>				
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
PL		1.5	1.4	1.6	1.5	1.5
BT		1.4	1.4	1.6	1.4	1.4
AC		1.0	1.0	1.4	1.0	1.1
CS		1.0	1.0	2.0	1.1	1.3

**Table 8.** This table shows the expected number of POC-preferred candidates elected under ranked choice to fill the 3 of 9 seats on the council representing a multi-member district with 31.6% POC-CVAP.

## 5 Conclusion

In this report we've evaluated eight alternative systems to elect the Portland City Council, whose 5 members are currently elected under an at-large plurality system. Though the council currently has 3 POC members, only one POC commissioner was elected between 1985 and 2019, as the current system does not reliably provide a consistent opportunity for POC voters to elect candidates of choice. We looked at 5, 7, and 9-member councils elected by districts or at-large RCV, as well as two hybrid systems that combine features of both districts and RCV. Though districted systems would be unlikely to secure seats on the council for POC-preferred candidates, both RCV and hybrid alternatives show a high likelihood of more sustained POC-representation.

Our results are summarized in Figure 5 and Table 9. These summaries compare the predicted number of seats that POC-preferred candidates could reasonably secure under each voting system. For reference, Figure 5 also shows the number of current seats held by Commissioners who are themselves people of color, as an imperfect proxy for POC voter representation on the Council.

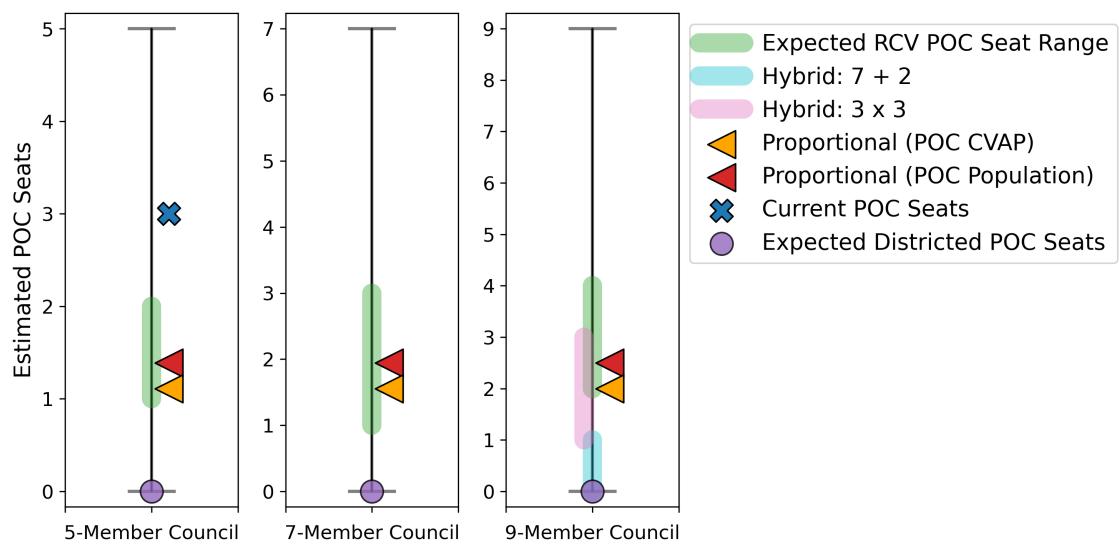
We considered traditional districted systems with 5, 7, and 9 council seats, but in which voting is restricted to residents within the candidate's district. Because of the geographic distribution of POC voters, it is unlikely that near-majority POC districts exist for any of these council sizes. As such we don't expect any POC representatives on the City Council under the purely districted systems we looked at. We were able to find districting plans with district POC-CVAP as high as 36.3%, but such plans would be unlikely to provide POC representation on the council without having to rely on significant 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 Portland to elect 1-2 candidates of choice to a 5-member council, 1-3 candidates of choice to a 7-member council, and 2-4 candidates of choice to a 9-member council. In fact, the POC share of overall population is 27.75%, so the proportional shares of the council would be 1.4 seats on a 5-member council, 1.9 seats on a 7-member council, and 2.5 seats on a 9-member council. Under most models and scenarios considered here, ranked choice would secure an expectation that approaches or even exceeds this proportion.

Finally, the hybrid systems we considered showed alternative methods for electing a 9-member council. A system with 7 districted seats and 2 at-large RCV seats would only be expected to reliably elect 0-1 POC-candidates of choice. Whereas a system with 3 multi-member districts each electing 3 members by RCV would be expected to consistently secure 1-3 seats for POC-preferred candidates on the 9-member council.

	Districts			RCV			Hybrid: 7+2		Hybrid: 3x3		
	5	7	9	5	7	9	7 Districts	2 RCV	D1	D2	D3
Expected POC on Council	0	0	0	1-2	1-3	2-4	0	0-1	1	0-1	0-1
Expected POC Share of Council	0%	0%	0%	20-40%	14-43%	22-44%	0-11%		11 - 33%		

**Table 9.** Summary of expected POC council members under eight election systems: 5, 7, and 9 districts, 5, 7, and 9-member at-large RCV, and two hybrid systems.



**Figure 5.** Summary of expected POC seat shares for alternative voting systems.