Foreword

In July 2021 the Metric Geometry and Gerrymandering Group conducted mathematical modeling and analysis of Portland, OR on the potential efficacy of various districting and voting system scenarios with regard to the ability for voters of color to elect their preferred candidates of choice to the city council. After the Portland Charter Review Commission announced its areas of agreement (*specifically 1, establishing geographic districts each electing multiple councilmembers, 2, increasing the size of council to at least 12, and 3, adopting ranked-choice voting*), More Equitable Democracy connected with MGGG to request additional analysis of Portland exploring scenarios more relevant to those areas of agreement; they generously obliged.

Their methodology and analysis is detailed on the following pages. The conclusions drawn from their work can be summarized with the following high-level takeaways:

- **12 member councils are likely to elect four POC-preferred candidates** in close keeping with the POCVAP share of the city (4/12 = **33% of council seats**). These projections are consistent both for three districts each electing four councilmembers (3x4) and four districts each electing three councilmembers (4x3).
- **A 16 member 4x4 council is likely to elect between four and seven POC-preferred candidates**; this is both a lower floor and a higher ceiling than projections for 12-member councils (4/16 = **25% of council seats**, 7/16 = **43% of council seats**).
- **A 20 member 4x5 council is likely to elect seven, eight, or nine POC-preferred candidates**, in each case meeting or exceeding POCVAP share of the city (7/20 = **35%**, 8 / 20 = **40%**, 9 / 20 = **45% of council seats**).

Thanks to Anthony Pizzimenti at the MGGG Redistricting Lab for running the models and conducting the following analysis. Foreword and sample district maps produced by More Equitable Democracy.

Methodology

In this brief, we examine possible consequences of the Portland City Council transitioning to a multi-member districting system combined with a ranked-choice voting (RCV) variant called single transferable vote (STV). Results are drawn from a two-step process, wherein we generate large sets of valid multi-member redistricting plans and then simulate STV elections on a subset of those plans. We take four possible re-configurations into account:

1. A **3x4** configuration with three 4-member districts, and 12 total representatives;
2. A **4x3** configuration with four 3-member districts, and 12 total representatives;
3. A **4x4** configuration with four 4-member districts, and 16 total representatives;
4. A **4x5** configuration with four 5-member districts, and 20 total representatives.

In the first step we generate two *ensembles*, or collections of valid multi-member districting plans. Each ensemble contains 50,000 total plans. The first ensemble is a "neutral" ensemble, where each districting plan is drawn blindly. The second ensemble is a "tilted" ensemble, based on the idea that each district has a set of thresholds or *quotas* for electing candidates: for example, a 3-member district has an electoral quota of 1/4th, as any candidate must receive at least 1/4th of the votes cast to be elected. The tilted ensemble includes plans preferentially drawn to exceed more of these quotas. We create neutral and tilted ensembles for each of the configurations listed above.

In the second step, we sample five plans from each ensemble (for a total of 10 plans per configuration) and run a gauntlet of simulated STV elections on each. These simulated elections are highly customizable, and take into account a variety of parameters:

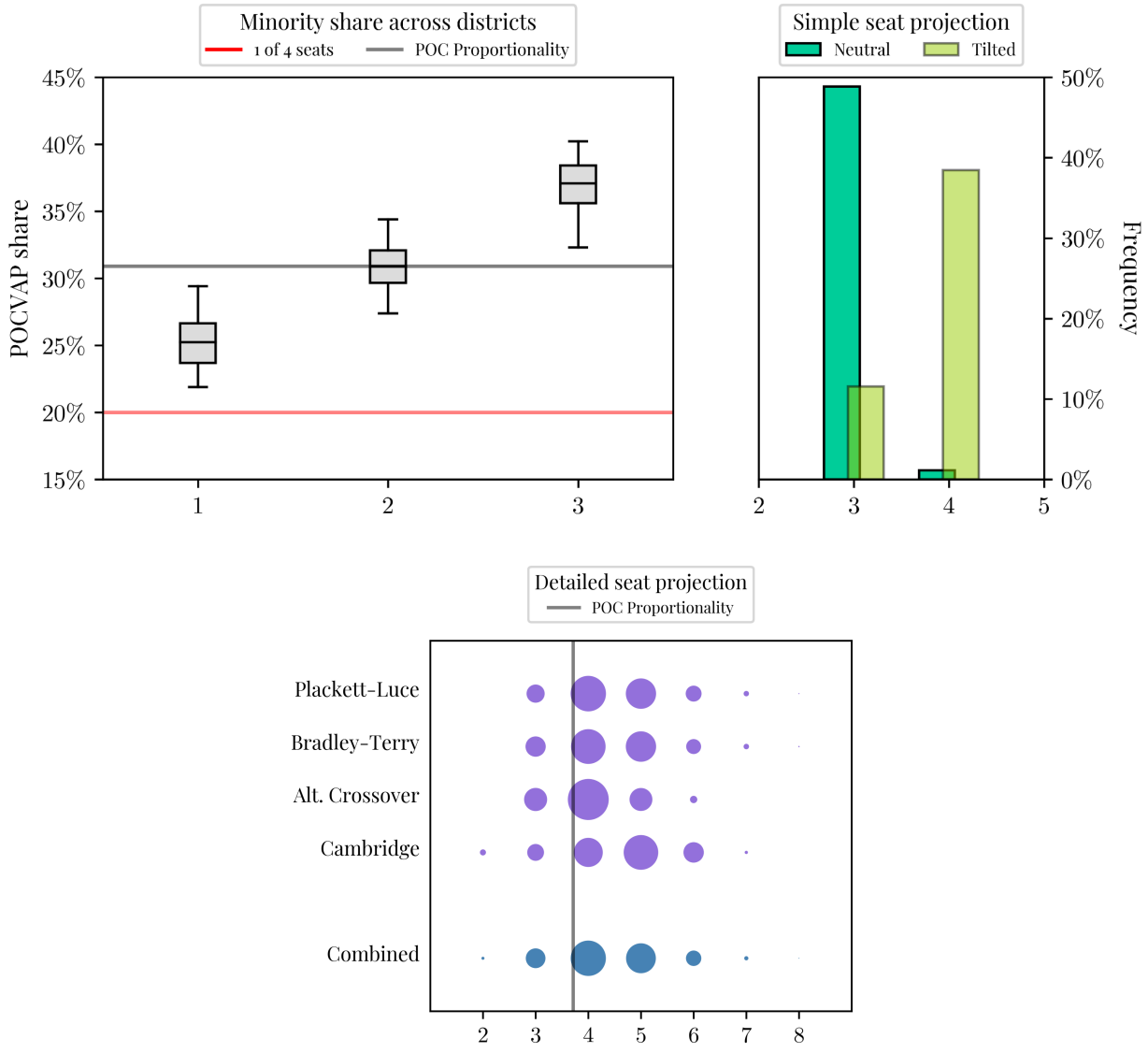
- **The districting configuration, demographics, and candidates.** Includes the number of members per district and the number of districts, the racial makeup of the individual districts (the *POCVAP share*, or the share of voting-age population that is non-White), and the number of White and POC-preferred candidates seeking election (referred to as *candidate pools*). To account for varying candidate availability, we construct four candidate pools for each district. Suppose a district has four seats to be filled and 35% of its voters are people of color. Our candidate pools each contain either 1.5 or 2 times the number of seats to be filled, rounded down.
    a. **Pool 1** has six total candidates: three White-preferred (3W) and three POC-preferred (3C).
    b. **Pool 2** has six total candidates: four White-preferred (5W) and two POC-preferred (2C).
    c. **Pool 3** has eight total candidates: four White-preferred (4W) and four POC-preferred (4C).
    d. **Pool 4** has eight total candidates: six White-preferred (6W) and two POC-preferred (2C).
- **Polarization between slates of candidates.** What is the level of cohesion between voters of the same group? For example, these encode the likelihood that an individual voter of color supports the group of

candidates preferred by voters of color overall. We use the polarization levels outlined in the Redistricting Lab's report on alternative electoral systems in Oregon.

- **Consensus within slates of candidates.** How much do groups of voters disagree on the rank-order of candidates in each slate? For example, these parameters encode whether there is a strongly-preferred candidate in the group of POC-preferred candidates, or support is more evenly distributed. These parameters are typically referred to as *concentration parameters*.

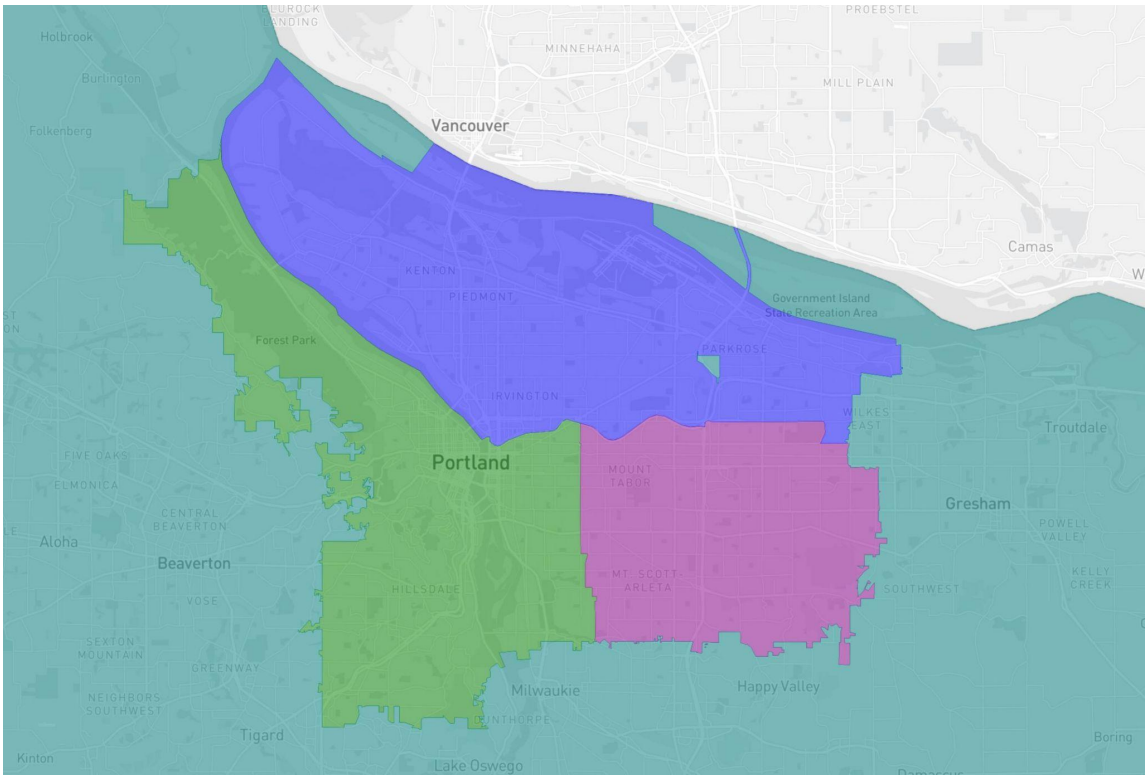
For each of the sample plans, we conduct a simulated STV election for each combination of candidate pool, set of polarization levels, set of concentration parameters, and RCV predictive model (outlined in the Lab's Oregon report). Results for each districting configuration are pictorially described below.

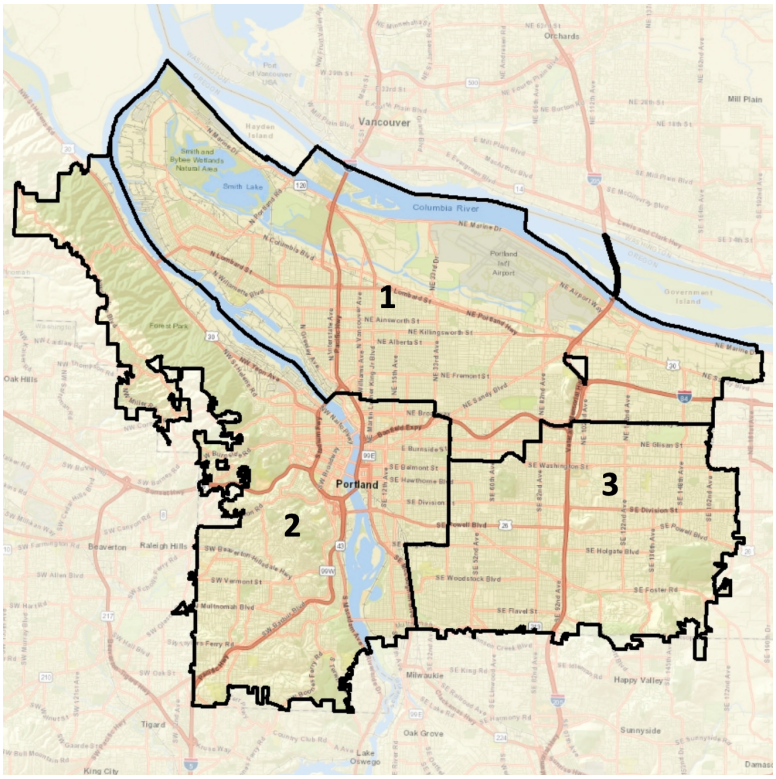
3x4



In the above figures, we visualize the results for the **3x4** configuration; the upper row details ensemble results, and the lower row shows model-projected data. Based on the simple seat projections, we would expect voters of color to elect three or four POC-preferred candidates across Portland (under total voter polarization). However, the detailed seat projections — individually by model, and in aggregate — show that voters of color can elect anywhere between two and seven POC-preferred candidates city-wide, when accounting for variation in polarization, group agreement, bullet voting, and others. The Cambridge Sampler model, which allows voters to truncate ballots, predicts that *five* is the most common number of POC-preferred candidates elected city-wide. In most situations, voters of color are able to elect four POC-preferred candidates, in close keeping with proportionality.

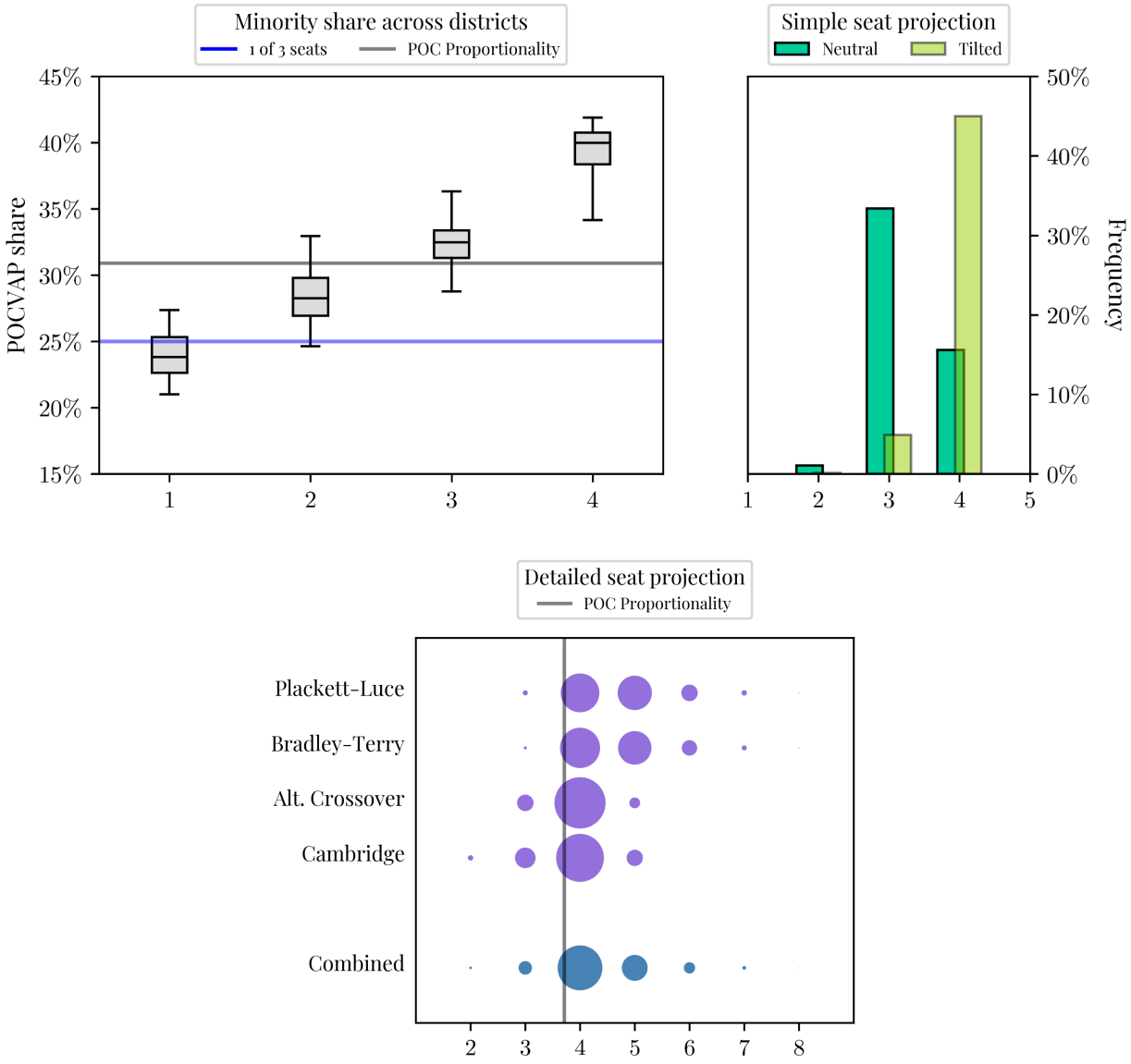
Example Maps (3 Districts)





Example population-balanced district maps generated by More Equitable Democracy for illustrative purposes.

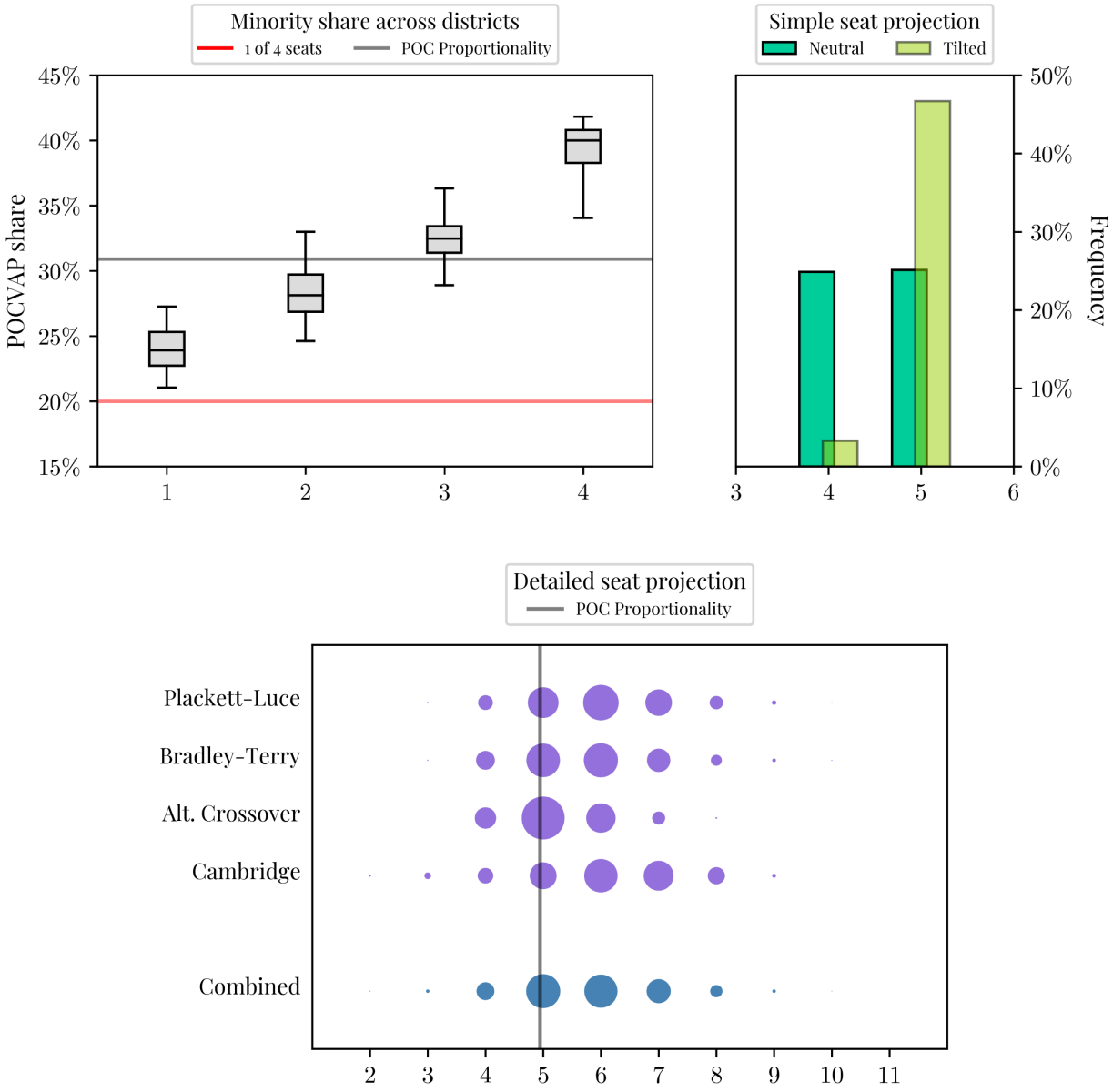
4x3



In the above figures, we visualize the results for the **4x3** configuration. Portland's voters of color make up 31% of the voting-age population and are most populous in North Portland, Northeast/Southeast Portland immediately adjacent to and east of Interstate 205 toward Gresham, and Northwest Portland toward Bethany. Because of the distribution of POC voters across the city and the introduction of an additional district (with fewer representatives), nearly three-fourths of all plans contain a district that does not meet the minimum electoral quota. Based on the simple seat projection, we expect voters of color to elect anywhere between two and four candidates of choice; the detailed seat projection, which better accounts for variation in voter behavior and preference, shows voters of color can most commonly elect four POC-preferred candidates to the Council. Because this configuration stretches the POC voting-age population thinner and requires that voters of color

make up a *greater* share of each district's population than the 3x4 configuration to elect a similar number of preferred candidates, POC voters are less able to elect more than one preferred candidate in each district. In short, the distribution of POC voters and the configuration of the districts forces predicted RCV outcomes closer to proportionality than the 3x4 configuration.

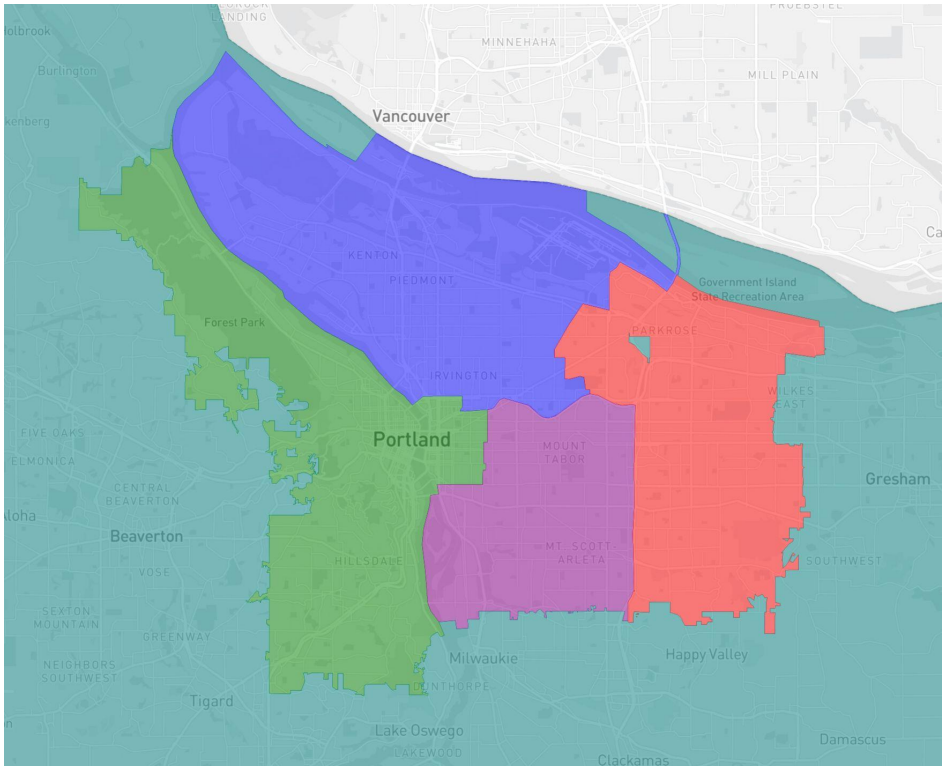
4x4

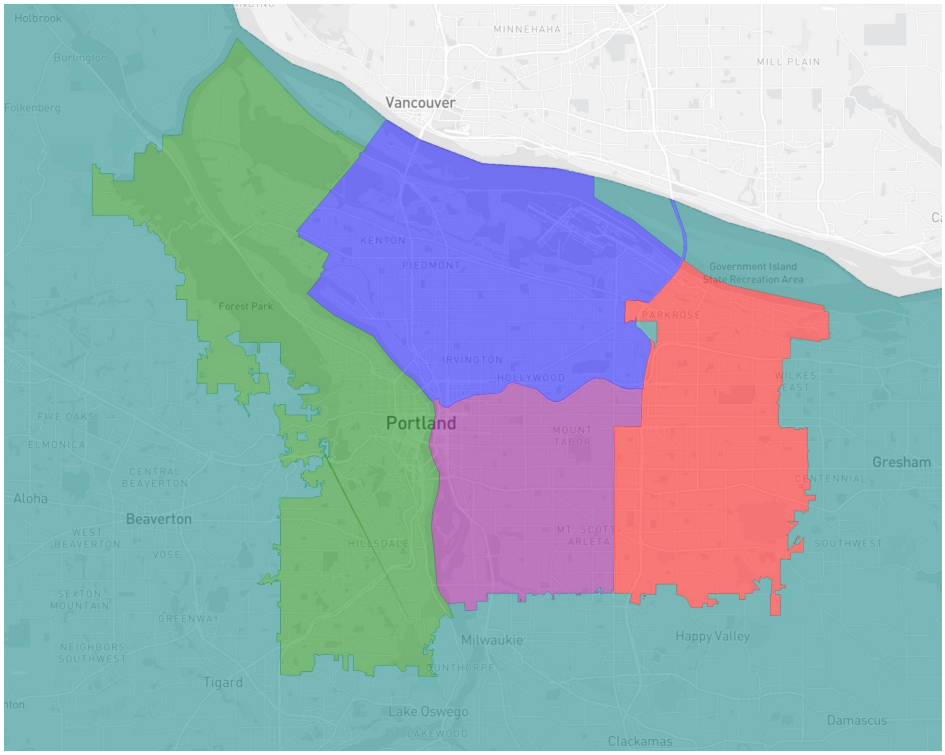


Above are figures for the **4x4** configuration. Based on the simple seat projections, we would expect voters of color to elect four or five POC-preferred candidates out of sixteen total seats under total polarization. Proportionality dictates that POC voters elect five candidates of their choice, but the models show that POC voters can frequently elect far more than the proportionality mark — it is possible for voters of color to elect anywhere between two and *nine* POC-preferred candidates to the city Council, though the most typical results are between four and seven seats, following — in fact, typically *outperforming* — proportionality. This configuration fixes the number of districts at four, but increases the number of representatives per district: now, POC-preferred candidates need only capture 20% of votes cast to be elected, as opposed to 25% of votes cast in

the previous configuration. By increasing the number of representatives, it is virtually guaranteed that POC voters can elect *at least one* candidate of choice in each district; it is extremely common for voters of color to elect more than one preferred candidate in districts with higher concentrations of POC voters, outperforming proportionality by one, two, or even three seats.

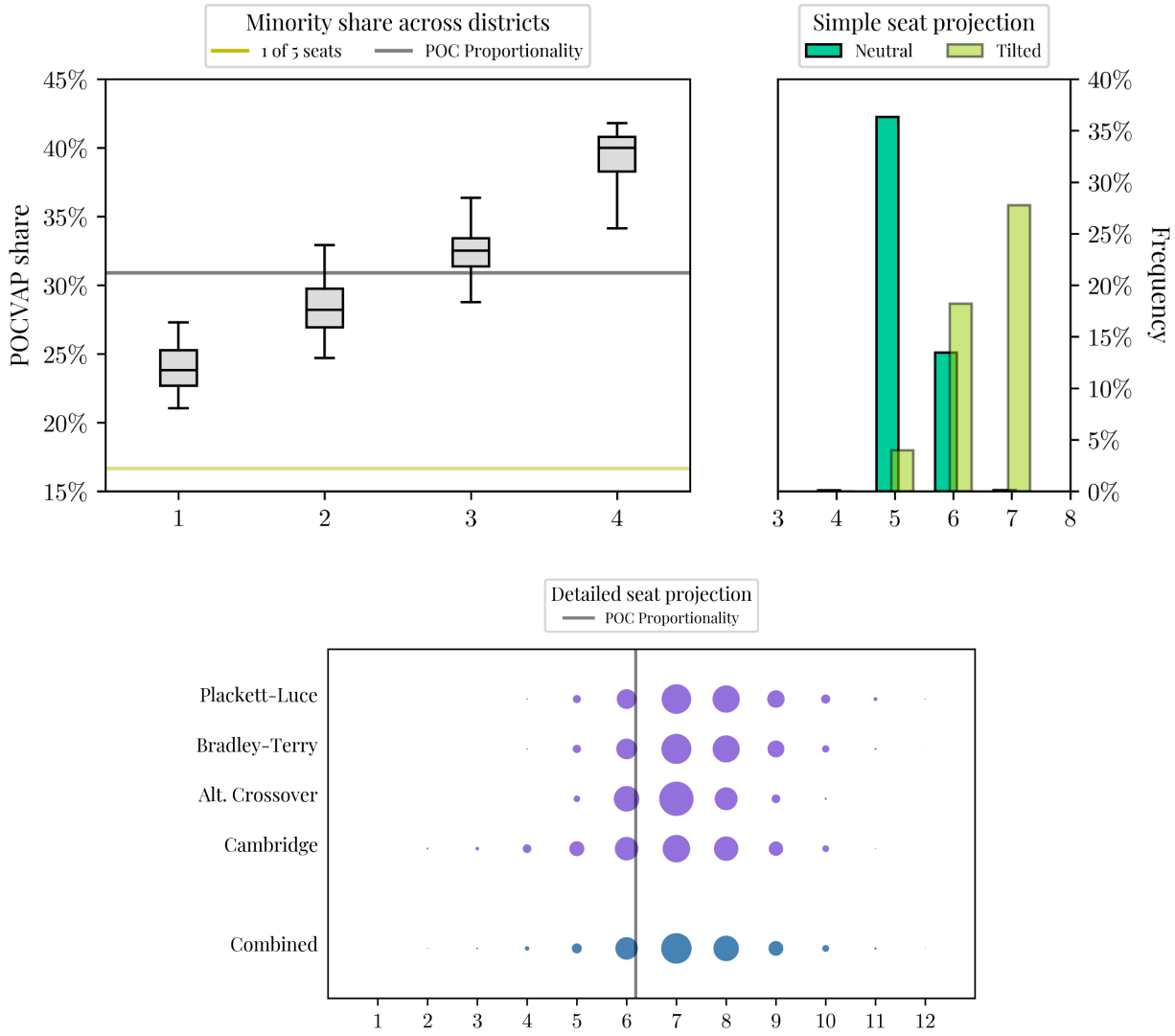
Example Maps (4 Districts)





Example population-balanced district maps generated by More Equitable Democracy for illustrative purposes.

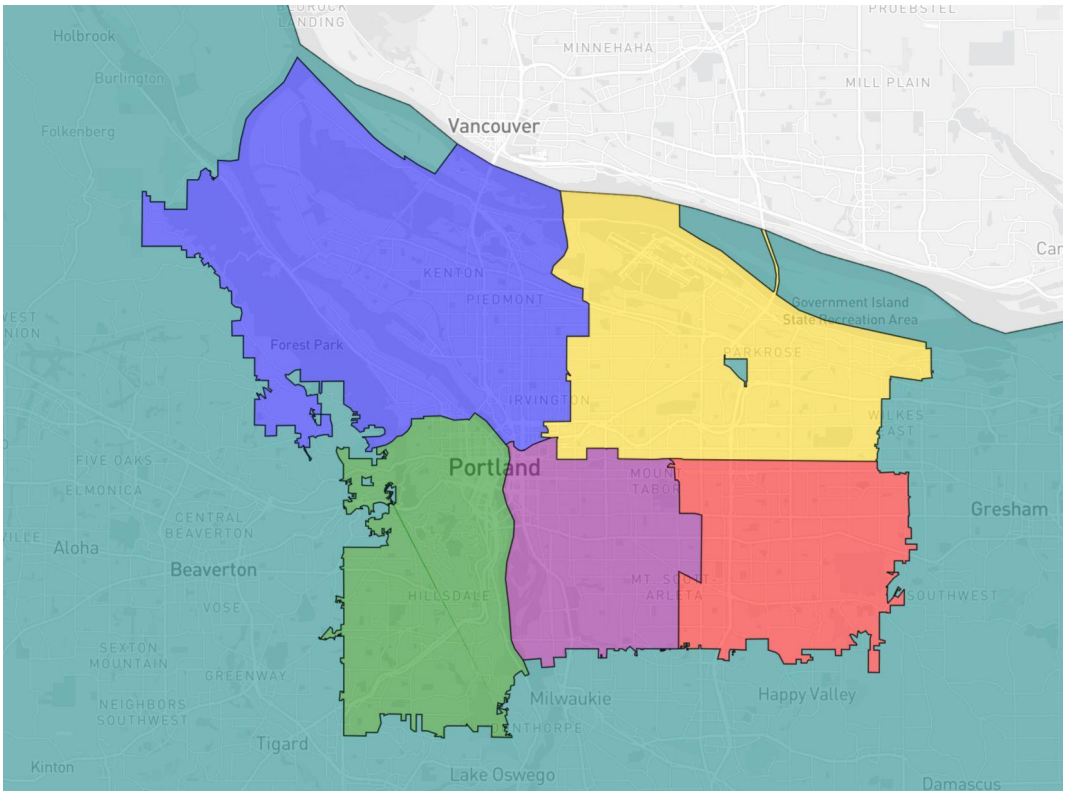
4x5

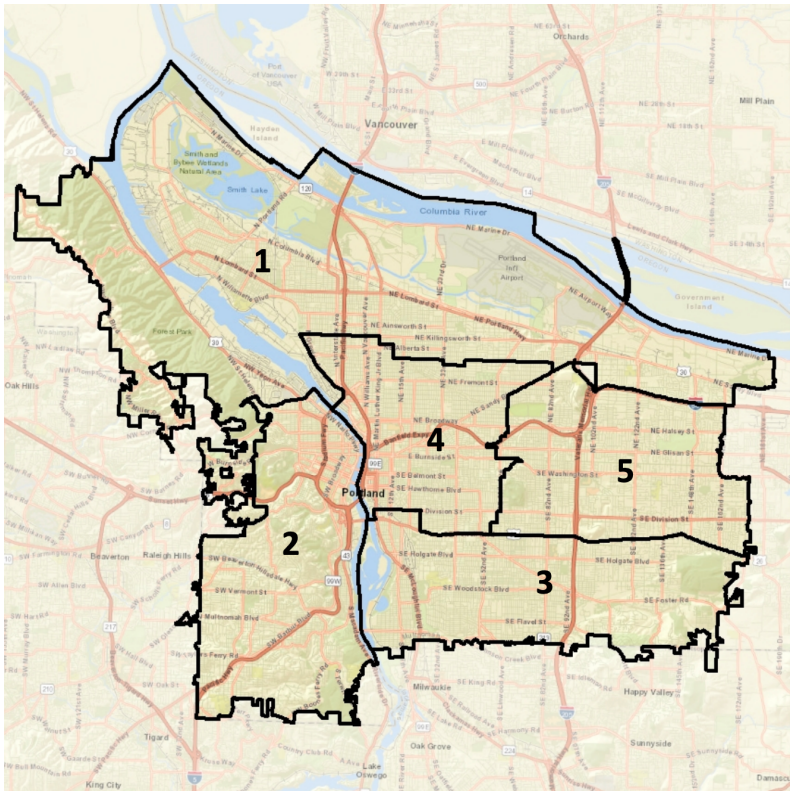


The above figures show ensemble and simulated election results for the **4x5** districting configuration. In line with previous configurations, we fix the number of districts at four and increase the number of representatives per district, consequently lowering the minimum electoral quota in each district. Across all 100,000 plans encountered in the ensembles, no plan had a district with a POCVAP share below the minimum electoral quota of ~16% — simple seat projections expect that voters of color, under total voter polarization, can elect anywhere between four and seven candidates city-wide. The detailed seat projections, on the other hand, predict that POC voters can elect anywhere between two and *twelve* candidates of choice, with the most typical city-wide totals between six and nine. The bulk of model-predicted seat totals are better than proportionality (similarly to the other configurations), but this is the only configuration wherein the most common city-wide seat total is nearly a full seat *better* than proportionality in aggregate. Again, we can see the combined effects of Portland's POC voter distribution and an increased number of representatives — voters of color can *nearly always* elect *at least*

one candidate of choice per district, and it is extremely common for those same voters to elect *more than one* preferred candidate per district.

Example Maps (5 Districts)





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