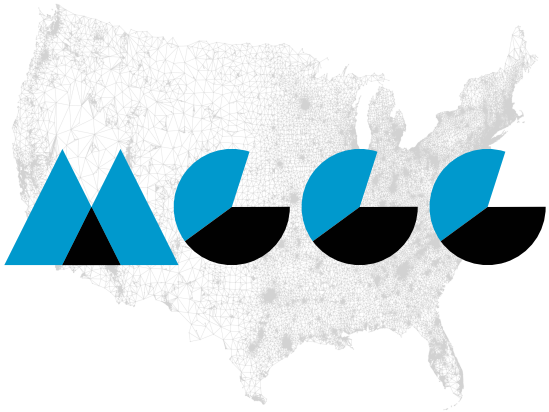
# Analysis of Election Systems for the Chelan County, Washington Board of County Commissioners



MGGG Redistricting Lab

## Contents



## Contributors

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

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# 1 Introduction

Chelan County had 72,453 residents as of the 2010 Census. Table 1 shows the demographic breakdown of the county by total population, Voting Age Population (VAP) and Citizen Voting Age Population (CVAP). Chelan has one sizable minority group: Latino residents constitute 15.6% of CVAP, 20.4% of VAP and 25.8% of total population. 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 19.3%. The distribution of POC residents across the county is show in Figure 1.

The Chelan Board of County Commissioners is a 3-member board, each member representing one district. Only district residents can vote in the district primary election. However, the primary's top two vote-getters advance to the district general, in which *all* Chelan residents can vote. This means that even if a district is majority-POC and successfully advances their preferred candidate to the general, they could be unable to ultimately elect them to the board if Chelan county *as a whole* is racially polarized. This is because White voters from across the county would still outnumber POC voters.

Figure 2 shows the district map and Figure 3 shows the current county commissioners.[1] POC candidates of choice can come from any racial or ethnic group. In the absence of accurate voter preference data, we sometimes use the 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.

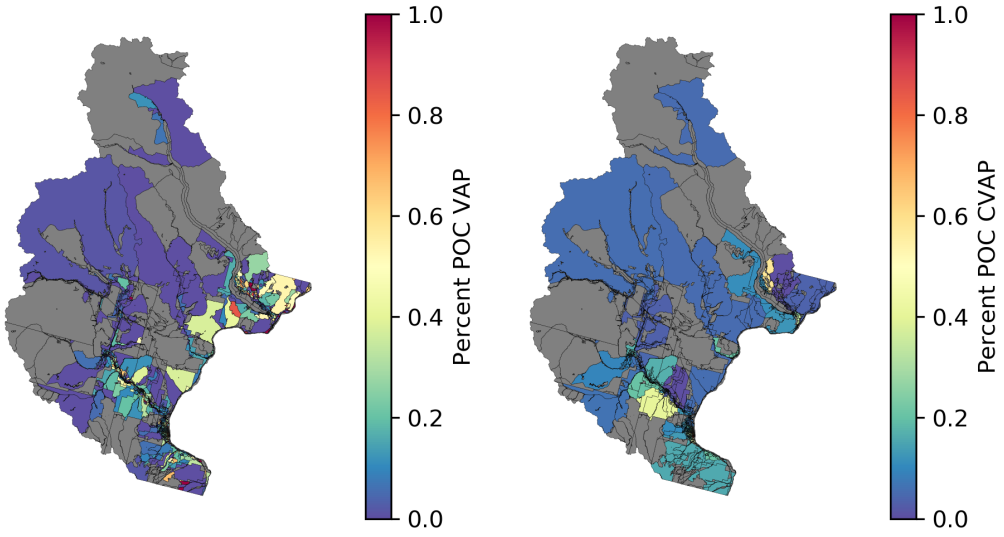
One way to provide more minority opportunity on the Board of Commissioners would be to use a traditional districted system, or one in which board members still represent one district, but voting in the primary *and* general elections is restricted only to residents of that district. Alternatively, a switch to district-wide Ranked Choice Voting (RCV), in which multiple candidates are ranked on each ballot, can promote more proportional representation for minority voters given adequate turnout and candidate availability.

In this report we consider two alternative options: (1) traditional districted elections (with 3, 5 and 7 districts) with new district boundaries, and (2) ranked choice voting (for a 3, 5 or 7-member board). We note that several of the cases we consider expand the size of the Board of Commissioners.

| Race | Share of Population | Share of VAP | Share of Total CVAP |
|---|---|---|---|
| White | 70.7% | 76.5% | 80.7% |
| Latino | 25.8% | 20.4% | 15.6% |
| Other | 3.5% | 3.2% | 3.7% |
| **Total People** | **72,453** | **54,390** | **52,555** |

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

[1] https://www.co.chelan.wa.us/files/elections/archives/election/Area%20Maps/County%20Commissioner%20District%20Lines.pdf




POC-VAP POC-CVAP

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

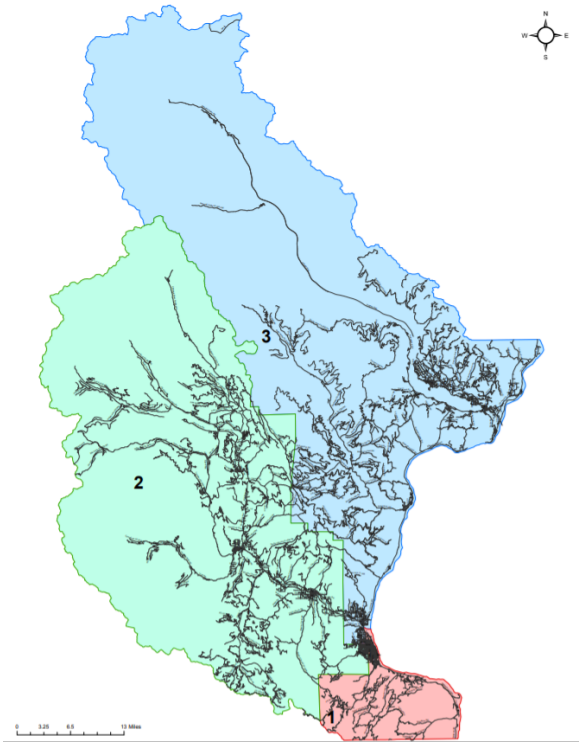



**Figure 2.** Chelan County Commissioner districts as of 2018. District 1 (red): 30.9% POC-CVAP; District 2 (green): 14.4% POC-CVAP; District 3 (blue): 12.7% POC-CVAP

**(a)** Kevin Overbay, District 1

**(b)** Bob Bugert, District 2

**(c)** Doug England, District 3

**Figure 3.** The Chelan Board of County Commissioners as of October 2020. Each board member represents one of three districts.

# 2 District Analysis

First, we consider districted elections for the Board of Commissioners. 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.

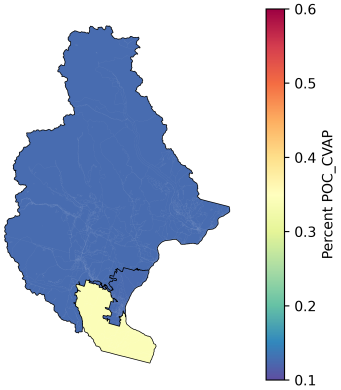
In this section we evaluate 3, 5, and 7-member boards elected by a districted system. For each board size we generated a large collection of districting plans with the goal of identifying maps with high-percentage-minority districts. To do this, we ran 100,000 steps of a ReCom[2] Markov chain, which takes into account only contiguity, compactness, and population deviation. We allowed districts to deviate by no more than 5% from the ideal population, in accordance with legal standards for local districts.

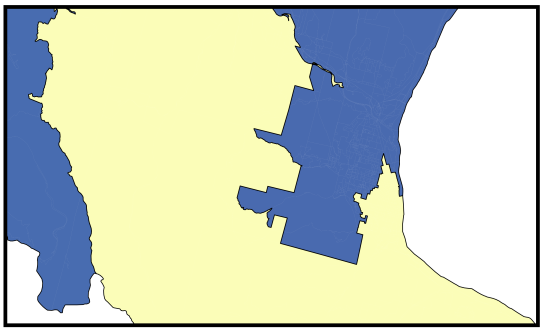
Proposed plans that satisfied these basic constraints were probabilistically accepted for inclusion in our *ensemble*, or collection of alternative plans, with a probability depending on their largest minority district (the district with the highest POC share of total CVAP): If a newly proposed plan's biggest minority district had a higher POC share than that of its predecessor plan's, it had a very *high* probability of being included, but if its biggest POC district 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 districts. 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 4 shows the best plans found by these techniques. The highest percentage POC-CVAP districts found were 34.1%, 42.9%, and 50.2%, respectively, for the 3, 5, and 7-member boards. Though these are not guaranteed to be the true optimum values, it is very unlikely that a 3-district plan could be found with a district POC-CVAP significantly higher than 35%, let alone approach the 50% mark. Though 5-member boards can come closer to this mark, they still fall short (there is unlikely to be 5-district plans with a district POC-CVAP significantly higher than 45%). Such a district would need relatively high POC voter turnout and a significant rate of White *crossover voting* (i.e. White voters' support for POC-preferred candidates) in order to consistently elect POC-preferred candidates. However, for the 7-district board our techniques were able to find plans with districts that passed the 50% mark (though not by much). Such districts are likely to perform for POC voters–even without high levels of crossover voting–provided POC voters have adequate turnout and vote cohesion.

Importantly, 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 a reliable way of ensuring POC-representation on a 3-member board, could *possibly* establish one seat on a 5-member board, and would *likely* secure one seat for a POC-preferred candidate on a 7-member board.

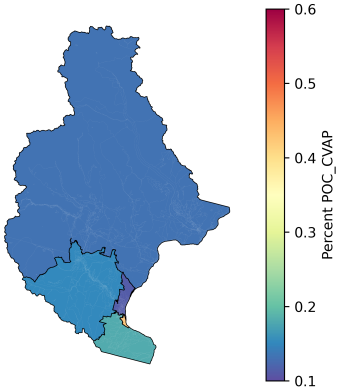
[2] https://mggg.org/uploads/ReCom.pdf



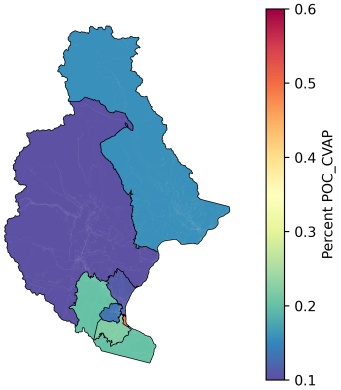
Wenatchee Area

3 Districts; Highest identified district POC-CVAP: **34.1%**




Wenatchee Area

5 Districts; Highest identified district POC-CVAP: **42.9%**




Wenatchee Area

7 Districts; Highest identified district POC-CVAP: **50.2%**

**Figure 4.** Example plans with 3, 5, and 7 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 Chelan County Board of Commissioners. If a standard single-transferable vote system with $m = 3$ seats were implemented, then the threshold for election would be $\frac{1}{m+1} = \frac{1}{4} = 25\%$ of the votes. In other words, in this RCV system, any candidate who is the first choice of 25% of the voting population would be immediately elected to the Board of Commissioners, and someone can easily be elected with just 15-20% of the first-place votes if they are frequently ranked second or third by enough voters. Since 19.3% of CVAP (and 23.5% 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[3], 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 3, 5, and 7-member boards 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 Chelan County. 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.

[3]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:**
  - **3-member board:** 3 POC candidates and 3 White candidates run for office
  - **5-member board:** 5 POC candidates and 5 White candidates run for office
  - **7-member board:** 7 POC candidates and 7 White candidates run for office
- **Unbalanced Pools:**
  - **3-member board:** 2 POC candidates and 3 White candidates run for office
  - **5-member board:** 3 POC candidates and 5 White candidates run for office
  - **7-member board:** 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 19.3%. 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 Tables 2, 3, and 4 below.

For the 3-member board, the RCV models predict one POC-preferred board member elected in the Category 2, 3, and 4 Polarization cases (across models and most scenarios) but in the Category 1 Polarization case our models predict no POC-preferred candidates would be elected via RCV.

For the 5 and 7-member boards, 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, 5-7 POC candidates running, and no consensus on which of these candidates are the strongest[4].

[4]We see that the Cambridge sampler has the greatest variability over the voter behavior scenarios. This is because it is

In all other cases, RCV model predictions for the 5 and 7-member boards are more promising: we typically expect 1-2 POC-preferred candidates to be elected to a 5-member board and 1-3 POC-preferred candidates to be elected to a 7-member board. A higher number of POC winners are predicted in Category 4 Polarization cases due to higher support from White voters. Note that several of these outcomes would be supra-proportional for Chelan county's 19.3% (of CVAP) POC population.

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

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: 95.0%, W: 5.0%) | 3 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 0.8 | 0.7 | 0.2 | 0.2 | 0.5 |
| | BT | 0.7 | 0.8 | 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 |
| | 3 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 0.8 | 0.8 | 0.3 | 0.3 | 0.6 |
| | BT | 0.7 | 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 |

| Category 2 Polarization (POC: 90.0%, W: 20.0%) | 3 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.1 | 1.2 | 0.9 | 0.9 | 1.0 |
| | BT | 1.1 | 1.1 | 0.7 | 0.7 | 0.9 |
| | AC | 1.0 | 1.0 | 0.1 | 0.1 | 0.5 |
| | CS | 1.0 | 1.0 | 0.0 | 1.0 | 0.8 |
| | 3 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 |
| | BT | 1.1 | 1.2 | 0.9 | 0.9 | 1.0 |
| | AC | 1.0 | 1.0 | 1.0 | 0.9 | 1.0 |
| | CS | 1.0 | 1.0 | 0.7 | 1.0 | 0.9 |

| Category 3 Polarization (POC: 75.0%, W: 20.0%) | 3 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.1 | 1.1 | 0.7 | 0.7 | 0.9 |
| | BT | 1.2 | 1.1 | 0.6 | 0.6 | 0.9 |
| | AC | 1.0 | 1.0 | 0.0 | 0.0 | 0.5 |
| | CS | 1.0 | 1.0 | 0.0 | 0.3 | 0.6 |
| | 3 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.1 | 1.1 | 1.0 | 0.9 | 1.0 |
| | BT | 1.1 | 1.2 | 0.8 | 0.8 | 1.0 |
| | AC | 1.0 | 1.0 | 0.1 | 0.7 | 0.7 |
| | CS | 1.0 | 1.0 | 0.0 | 1.0 | 0.8 |

| Category 4 Polarization (POC: 60.0%, W: 40.0%) | 3 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.4 | 1.4 | 1.2 | 1.2 | 1.3 |
| | BT | 1.4 | 1.3 | 1.2 | 1.2 | 1.2 |
| | AC | 1.0 | 1.0 | 0.1 | 0.6 | 0.7 |
| | CS | 1.0 | 1.0 | 0.7 | 1.0 | 0.9 |
| | 3 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.4 | 1.3 | 1.4 | 1.3 | 1.4 |
| | BT | 1.3 | 1.3 | 1.4 | 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 2.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill a 3-member board.

| Category 1 Polarization (POC: 95.0%, W: 5.0%) | 5 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.4 | 1.5 | 1.0 | 1.0 | 1.1 |
| | BT | 1.3 | 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 |
| | 5 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.4 | 1.4 | 1.0 | 1.0 | 1.1 |
| | BT | 1.5 | 1.3 | 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 |

| Category 2 Polarization (POC: 90.0%, W: 20.0%) | 5 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.1 | 2.2 | 1.5 | 1.4 | 1.8 |
| | BT | 2.0 | 2.1 | 1.3 | 1.2 | 1.7 |
| | AC | 1.1 | 1.9 | 1.0 | 1.0 | 1.2 |
| | CS | 2.0 | 2.0 | 0.0 | 1.0 | 1.2 |
| | 5 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.9 | 1.9 | 1.9 | 1.7 | 1.9 |
| | BT | 2.0 | 1.9 | 1.5 | 1.5 | 1.8 |
| | AC | 1.1 | 2.0 | 1.0 | 1.0 | 1.3 |
| | CS | 2.0 | 2.0 | 1.1 | 1.0 | 1.5 |

| Category 3 Polarization (POC: 75.0%, W: 20.0%) | 5 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.0 | 1.9 | 1.2 | 1.3 | 1.6 |
| | BT | 2.1 | 2.0 | 1.2 | 1.2 | 1.6 |
| | AC | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| | CS | 2.0 | 2.0 | 0.0 | 1.0 | 1.2 |
| | 5 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.8 | 1.7 | 1.6 | 1.6 | 1.8 |
| | BT | 1.9 | 1.9 | 1.4 | 1.4 | 1.7 |
| | AC | 1.0 | 1.3 | 1.0 | 1.0 | 1.1 |
| | CS | 2.0 | 2.0 | 1.0 | 1.0 | 1.5 |

| Category 4 Polarization (POC: 60.0%, W: 40.0%) | 5 At-Large RCV; Balanced Pool | | | | | |
|---|---|---|---|---|---|---|
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.2 | 2.4 | 2.0 | 2.1 | 2.3 |
| | BT | 2.5 | 2.3 | 2.1 | 2.1 | 2.2 |
| | AC | 2.0 | 2.0 | 1.0 | 1.0 | 1.5 |
| | CS | 2.0 | 2.0 | 0.7 | 1.0 | 1.4 |
| | 5 At-Large RCV; Unbalanced Pool | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 |
| | BT | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 |
| | AC | 2.0 | 2.0 | 2.0 | 1.7 | 1.9 |
| | CS | 2.0 | 2.0 | 3.0 | 2.6 | 2.4 |

**Table 3.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill a 5-member board.

| Category 1 Polarization (POC: 95.0%, W: 5.0%) | | | | | | |
|---|---|---|---|---|---|---|
| | **7 At-Large RCV; Balanced Pool** | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 1.9 | 2.1 | 1.1 | 1.1 | 1.4 |
| | BT | 1.9 | 2.0 | 1.0 | 1.0 | 1.3 |
| | AC | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| | CS | 2.9 | 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 | 2.0 | 2.0 | 1.5 | 1.3 | 1.6 |
| | BT | 1.9 | 1.8 | 1.2 | 1.1 | 1.4 |
| | AC | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| | CS | 2.7 | 3.0 | 1.0 | 1.0 | 1.9 |

| Category 2 Polarization (POC: 90.0%, W: 20.0%) | | | | | | |
|---|---|---|---|---|---|---|
| | **7 At-Large RCV; Balanced Pool** | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 3.0 | 3.0 | 2.1 | 2.1 | 2.6 |
| | BT | 2.9 | 2.9 | 1.7 | 1.6 | 2.4 |
| | AC | 2.0 | 2.0 | 1.0 | 1.0 | 1.5 |
| | CS | 2.9 | 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 | 2.4 | 2.2 | 2.4 |
| | BT | 2.4 | 2.4 | 2.2 | 2.1 | 2.3 |
| | 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%) | | | | | | |
|---|---|---|---|---|---|---|
| | **7 At-Large RCV; Balanced Pool** | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.8 | 3.0 | 1.9 | 1.8 | 2.3 |
| | BT | 2.6 | 2.7 | 1.9 | 1.6 | 2.3 |
| | AC | 2.0 | 2.0 | 1.0 | 1.0 | 1.5 |
| | CS | 2.9 | 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 | 2.2 | 2.2 | 2.2 | 2.2 |
| | BT | 2.4 | 2.4 | 2.2 | 2.1 | 2.3 |
| | AC | 2.0 | 2.0 | 2.0 | 1.2 | 1.8 |
| | CS | 2.7 | 3.0 | 2.5 | 2.0 | 2.5 |

| Category 4 Polarization (POC: 60.0%, W: 40.0%) | | | | | | |
|---|---|---|---|---|---|---|
| | **7 At-Large RCV; Balanced Pool** | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 3.2 | 3.4 | 3.1 | 3.0 | 3.1 |
| | BT | 3.4 | 3.3 | 3.0 | 2.9 | 3.3 |
| | AC | 3.0 | 3.0 | 1.0 | 1.0 | 2.0 |
| | CS | 3.0 | 3.0 | 1.1 | 1.3 | 2.1 |
| | **7 At-Large RCV; Unbalanced Pool** | | | | | |
| | | Scenario A | Scenario B | Scenario C | Scenario D | Scenario E |
| | PL | 2.6 | 2.6 | 2.8 | 2.8 | 2.6 |
| | BT | 2.5 | 2.6 | 2.9 | 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 4.** Using POC CVAP, this table shows the expected number of POC-preferred candidates elected under ranked choice to fill a 7-member board.

# 4 Conclusion

In this report we've evaluated six alternative systems to elect the Chelan Board of Commissioners, whose 3 members are currently voted on in primary elections by their district's residents, but voted on at-large in general elections. We looked at 3, 5, and 7-member boards elected by districts or at-large RCV. Both districted and RCV alternatives show a high likelihood of more sustained POC-representation if the board size is increased.

Our results are summarized in Table 5 and Figure 5. 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 Board.

We considered traditional districted systems with 3, 5, and 7 seats, but in which voting (in both primaries and generals) is restricted to residents within the candidate's district. We were able to find districting plans with district POC-CVAP as high as 34.1% for a 3-member board, 42.9% for a 5-member board, and 50.2% for a 7-member board. Such plans would be unlikely to provide POC representation on a 3-member board, could possibly provide opportunity for POC representation on a 5-member board with some support from White crossover voters, and would likely provide a seat for a POC-preferred candidate on a 7-member board without having to rely on support from White voters. We were only able to identify 5 and 7-member board plans with at most *one* such POC-opportunity district.

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 Chelan County to elect 0-1 candidates of choice to a 3-member board, 1-2 candidates of choice to a 5-member board, and 1-3 candidates of choice to a 7-member board. In fact, the POC share of overall population is 29.3%, so the proportional shares of the board would be 0.9 seats on a 3-member board, 1.5 seats on a 5-member board, and 2.1 seats on a 7-member board. Under most models and scenarios considered here, ranked choice would secure an expectation that approaches or even exceeds this proportion.

| | Districts | | | RCV | | |
|---|---|---|---|---|---|---|
| | **3** | **5** | **7** | **3** | **5** | **7** |
| Expected POC on Council | 0 | 0-1 | 1 | 0-1 | 1-2 | 1-3 |
| Expected POC Share of Council | 0% | 0 - 20% | 14% | 0-33% | 20-40% | 14-43% |

**Table 5.** Summary of expected POC council members under six election systems: 3, 5, and 7 districts and 3, 5, and 7-member at-large RCV.

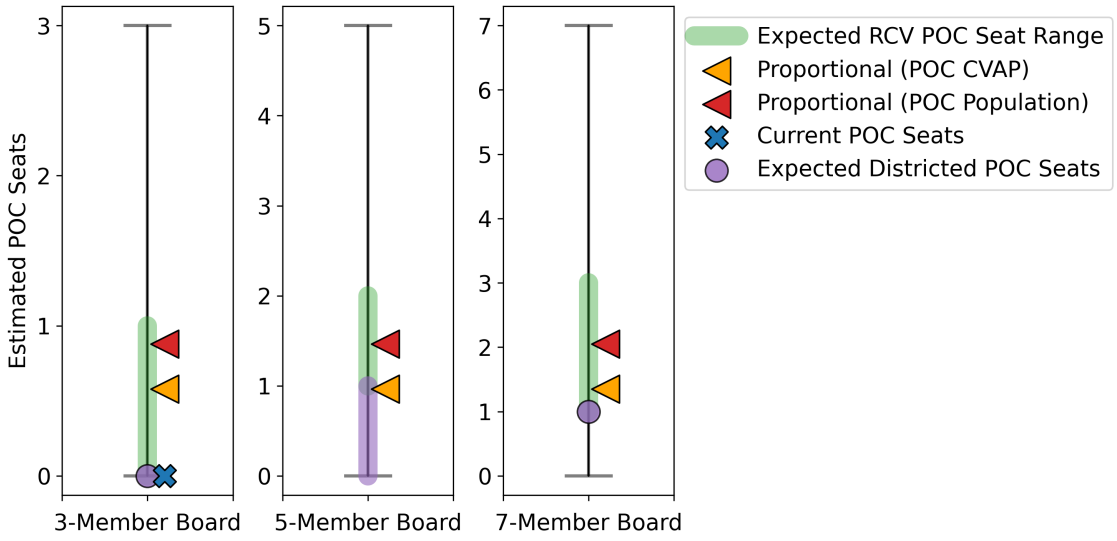



**Figure 5.** Summary of expected POC seat shares for alternative voting systems.