

Supplemental Declaration In Response to Dr. Duchin's June 30, 2026 Declaration

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Contents

Summary	2
1 Dr. Duchin's Simulation Depends on an Unexplained Starting Map	4
1.1 The Starting Map Is of Unknown Origin	4
1.2 The Simulation Output Has Little Variation	5
1.3 The Starting Map Pairs More Republican Incumbents	7
1.4 County Splits Are Higher and Different in the Starting Map	8
1.5 The Starting Map Uses a One-Percent Population Tolerance	11
2 Changing the County-Split Choice Changes the Racial Result	12
3 Conclusion	14

Summary

Dr. Duchin's June 30, 2026 declaration rests on a second set of simulations not previously disclosed in her initial report. The new simulations begin from a map that has a highest-BVAP district that is higher than the highest-BVAP district in the 2026 Plan. This is done by dividing a series of rural counties along the state's southern border. The simulation then produces millions of maps, with very little variation, that preserve that county split and high-BVAP pattern. She concludes from that exercise that the 2026 Plan is an outlier, but the result follows from the starting point she supplied to the algorithm. The new simulations therefore show the State could have enacted a plan with different racial demographics if the State had been more willing to split a string of rural counties across the southern border of the state. That is to say, the new simulations show only that a different choice of county divisions would have produced a different racial distribution.

Because the simulations are heavily dependent on the starting map, the origin of the starting map and its features are essential to understand. The starting map used by Dr. Duchin was not one of the millions of computer-simulated, race-neutral plans from her first report. And while that starting map has roughly equivalent partisan advantage as the 2026 Plan using the 2024 presidential election results, the map splits more counties, creates more county-district pieces, pairs six more Republican incumbents with another Republican incumbent, and makes unusual choices about splitting several rural counties. When looking at the racial composition of the map, it has a highest-BVAP district of 34.88 percent, compared with 31.67 percent in the 2026 Plan. Dr. Duchin has not disclosed how she found this starting map, what criteria were used to draw or select it, or whether the search excluded racial considerations.

A statistically valid and informative simulation should produce a representative sample of plans reflecting the valid redistricting criteria the state used. Dr. Duchin's simulation does not do this and so has little value in showing how typical or anomalous the 2026 Plan is. To show this, I ran a new simulation that kept everything the same as Dr. Duchin's most recent simulation, but used a different starting map that improves on Dr. Duchin's additional county splits in her starting map. This "alternative starting map" was drawn without regard to race, satisfies the same all-district 60 percent Trump 2024 floor, and divides fewer counties than the 2026 Plan. With that one change, the racial result changes substantially. The 2026 Plan falls inside the ordinary range of

maps produced by the simulation. Hundreds of thousands of different maps have a highest-BVAP district at or below the 2026 Plan's value.

The comparison between the two starting maps shows that Dr. Duchin's simulations paint a misleading picture. The differing racial demographics of her simulations are just as well explained by the unusual approach taken in her millions of plans. Dr. Duchin offers millions of plans, all of which split a string of rural counties across the southern border of the state. Had Dr. Duchin started with a plan that did not contain this perplexing string of county splits, Dr. Duchin would have concluded the 2026 Plan is no outlier at all. Her simulations therefore do not answer whether the 2026 Plan is racially anomalous among race-blind maps that satisfy the State's partisan and traditional redistricting goals.

Alternative maps have force only when they account for the State's legitimate political and traditional districting objectives at least as well as the enacted map. Dr. Duchin has not supplied such a comparison. For example, Dr. Duchin's alternative maps offered in her June 30, 2026 declaration show that a different racial outcome can be produced by splitting a string of predominantly White rural counties along the state's southern border. The simulation therefore fails to show that the 2026 Plan is a racial outlier or that a valid alternative map can meet or exceed the State's objectives while producing the racial distribution she prefers.

1 Dr. Duchin's Simulation Depends on an Unexplained Starting Map

Dr. Duchin's June 30, 2026 simulation begins with a map in which every district has a partisan lean above 60% Trump 2024. I refer to that map as the Duchin "simulation starting map".¹ The program then repeatedly proposes changes to the district orientation of the starting map. A proposed change is kept only if every district remains at least 60 percent Trump in the 2024 presidential vote. In the simulation run Dr. Duchin discusses, the program makes 10,000,000 proposals, keeps 7,190,871 versions that pass the 60 percent rule, and those maps reduce to 3,724,100 different maps after duplicate maps are removed. The resulting set of simulated maps take the same basic approach with only small variations in district boundaries.

1.1 The Starting Map Is of Unknown Origin

Dr. Duchin has not disclosed the origin of the starting map that seeds her millions of simulations, varying little from that starting point. Her report does not say how she drew it or found it, what criteria were used to select it, or whether race was excluded from the search. Importantly, this starting map is not one of the millions of race-neutral, computer-drawn maps in Dr. Duchin's first simulation from her first declaration. So while Dr. Duchin lauds her starting map for having a higher-BVAP district than the 2026 Plan, it's troubling we do not know where it comes from or whether it was drawn without considering race. The starting map has a highest-BVAP district of 34.88 percent, compared with 31.67 percent in the 2026 Plan, a difference of 3.2 percentage points.

¹While the starting map's districts exceed 60 percent Trump in the 2024 presidential vote, one district would fail to elect a Republican candidate in a closer race—namely, if the state today were to have a race as closely contested as the 2018 US Senate election. Dr. Duchin criticizes my use of a partisan index. A partisan index summarizes several elections into one measure of district partisan lean. Averaging several statewide elections is useful because one election can be affected by candidate quality, incumbency, turnout, national conditions, campaign spending, or local circumstances. Common redistricting practice also uses multi-election summaries to measure district partisanship, including the Cook Political Report's Partisan Voting Index. The same logic appears in numerous expert reports across many redistricting cases. See, for example, expert reports or declarations using partisan indices, composite statewide-election measures, or multi-election partisan summaries in *Harper v. Hall* and *North Carolina League of Conservation Voters v. Hall* (Jowei Chen and Christopher Cooper); *League of Women Voters of Pennsylvania v. Commonwealth* (Jowei Chen); Pennsylvania Legislative Reapportionment Commission proceedings (Christopher Warshaw); *Bennett v. Ohio Redistricting Commission* and *Adams v. DeWine* in Ohio (Jonathan Rodden and Christopher Warshaw); *League of Women Voters of Utah v. Utah State Legislature* (Christopher Warshaw); and *Nairne v. Landry/Nairne v. Ardoin* in Louisiana (Kosuke Imai). My analysis also reports individual elections directly in Figures 4, 7, 9, 10, and 11, and in Table 4 of my earlier report, so the analysis does not depend on the index alone.

Duchin Simulation Starting Map

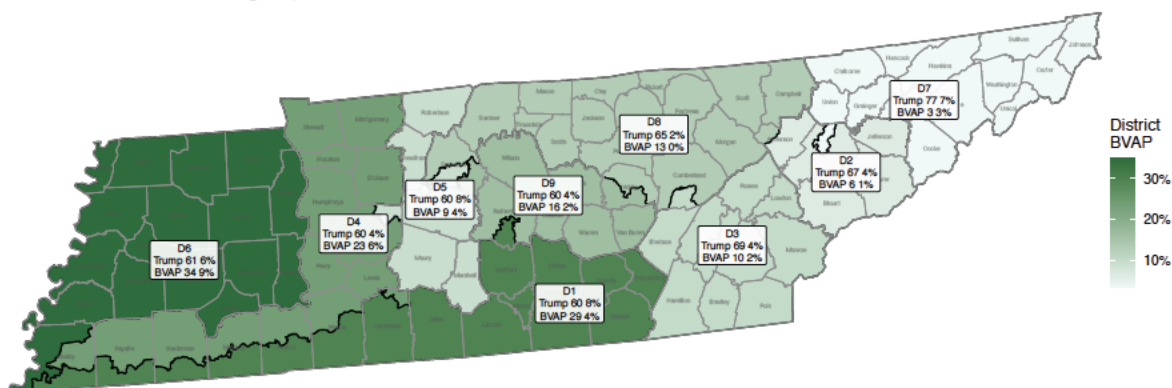


Figure 1: Duchin simulation starting map. District labels report Trump 2024 two-party share and BVAP.

Figure 1 shows the starting map in Dr. Duchin’s latest ensemble. Because the all-60 rule is imposed at every step of the algorithm, the starting map has unusually strong influence on the resulting maps. The program is exploring maps that can be reached from the starting map while never violating the 60 percent Trump condition. This means that the algorithm mostly makes small changes to the starting map that keep all nine districts above the 60% Trump threshold. If the starting map already contains a high-BVAP district, a run of the algorithm that stays close to the starting map will preserve that racial pattern across nearly all of the resulting maps. In practice, the algorithm searches near the starting map while keeping the starting map’s major geographic choices in place.

1.2 The Simulation Output Has Little Variation

The repeated maps understate the dependence on Dr. Duchin’s simulation starting map. Among the 3.7 million different maps, the highest-BVAP district repeatedly preserves the same western Tennessee arrangement. In 3,552,532 of the 3,724,100 different maps, the highest-BVAP district repeats a highest-BVAP district version found in another map; the most frequently repeated highest-BVAP district appears in 8,257 maps, meaning that a single highest-BVAP district is repeated 8,256

times after its first appearance. The simulations contain 171,568 different versions of the highest-BVAP district, yet the typical highest-BVAP district shares 94.0 percent of its population with the highest-BVAP district in Dr. Duchin's simulation starting map. The maps may therefore look numerous on paper while still preserving the central feature of the starting map.²

Figure 2 shows this pattern geographically. Each small unit on the map is a voting tabulation district (VTD), a precinct-like unit used to aggregate election and demographic data. The color reports how often that VTD appears in the highest-BVAP district across Dr. Duchin's different simulated maps. Because the map records each VTD's frequency of inclusion, it turns the repeat counts into a visual test of whether the same district keeps reappearing. Areas shown in lighter colors enter the highest-BVAP district less often, while darker areas enter more often. Orange marks extreme repetition with VTDs included in at least 99 percent of the different maps. The large orange and dark band across western Tennessee shows that the simulations repeatedly build the highest-BVAP district from the same group of counties. The lighter edges show where the algorithm makes smaller adjustments around that central core. In simplest terms, Dr. Duchin has created millions of simulations that all contain the same or highly similar district in western Tennessee.

²Dr. Duchin's critique of my Shelby County simulations supplies a useful standard for evaluating her new work. In her June 30, 2026 declaration, she writes that my simulations fail to provide a "representative sample" because they are "highly over-constrained." She then points to repeated maps, writing that a replication run produced plans appearing "identically as many as 4129 times in a batch of 20,000," and concludes that "[s]tatistical conclusions should not be drawn from such a constrained ensemble." Duchin June 30, 2026 Declaration at 2. Dr. Duchin's duplicate criticism gives an incomplete account of Sequential Monte Carlo. SMC builds many maps at the same time, one piece at a time, and promising partial maps can be copied as part of that process. Repeated maps are therefore part of how SMC works. See Cory McCartan and Kosuke Imai, *Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans*, *Annals of Applied Statistics* (2023), doi:10.1214/23-AOAS1763. The same criticism also cuts against Dr. Duchin's new simulation: 3,466,771 maps, or 48.21 percent of the output, are repeated maps.

Highest-BVAP District Inclusion Frequency

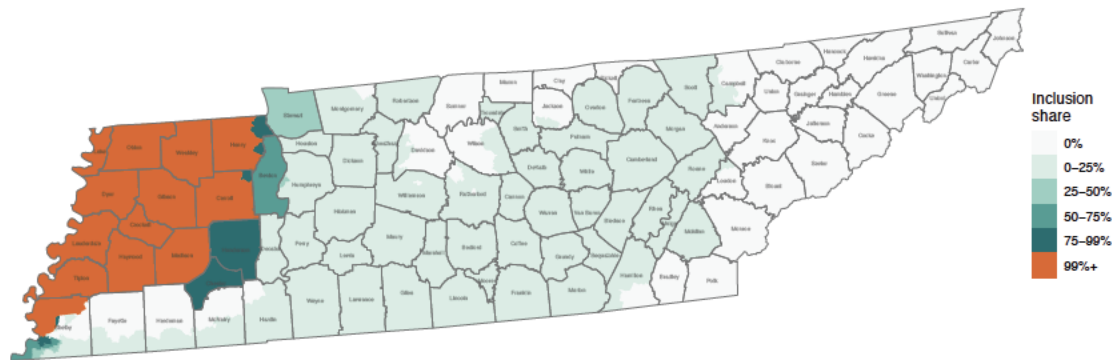


Figure 2: How often each VTD appears in the highest-BVAP district. Orange marks areas appearing in that district in at least 99 percent of different simulated maps.

1.3 The Starting Map Pairs More Republican Incumbents

The starting map also pairs six Republican incumbents with another Republican incumbent, compared with zero such pairings in the 2026 Plan. Incumbent protection is a familiar nonracial districting consideration, and the 2026 Plan avoids forcing Republican incumbents to run against one another. A comparison map that pairs six Republican incumbents departs from another objective reflected in the 2026 Plan.

Figure 3 shows the incumbent-pairing problem directly. The map colors Republican incumbents paired with another Republican incumbent in orange. A starting map that pairs six Republican incumbents is not equally faithful to an incumbent-protection criterion reflected in the 2026 Plan.

Duchin Simulation Starting Map and Incumbent Pairing

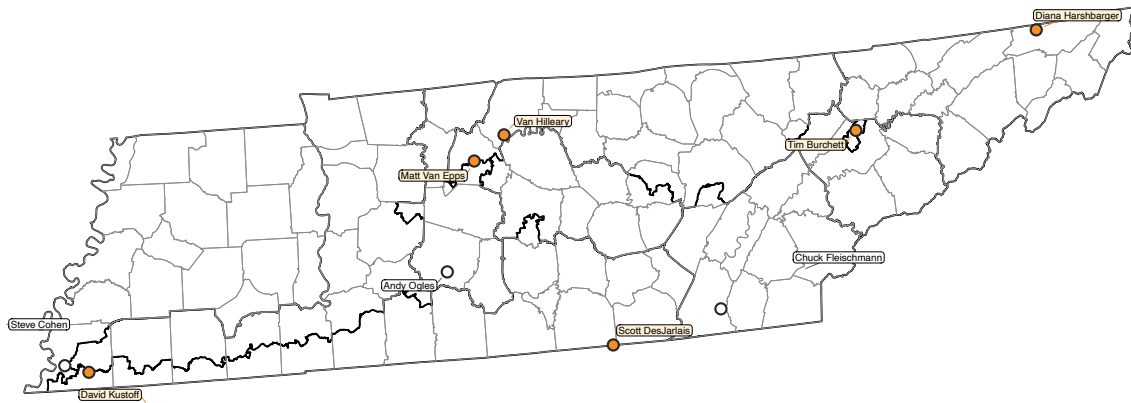


Figure 3: Duchin simulation starting map with incumbent addresses provided by the Division of Elections through counsel. Incumbent addresses are those disclosed to the Division in candidate qualifying records. Orange markers identify Republican incumbents placed in a district with another Republican incumbent.

1.4 County Splits Are Higher and Different in the Starting Map

At the statewide level, the Duchin simulation starting map splits 14 counties and creates 111 county-district pieces, compared with 12 split counties and 109 county-district pieces in the 2026 Plan. The full simulation set has a median of 14 split counties and 112 county-district pieces. Only 20.78 percent of different simulated maps split as few or fewer counties than the 2026 Plan, and only 17.15 percent create as few or fewer county-district pieces. Those aggregate counts already show that the simulation set is generally less respectful of county boundaries. The geographic pattern behind those counts is even more important for the racial comparison.

Figure 4 compares the district boundaries in southwest Tennessee between the 2026 Plan (left) and the Duchin simulation starting map (right). Dr. Duchin's millions of simulations all take the same perplexing approach: they split a string of rural counties (Fayette, Hardeman, McNairy, and Hardin) along the State's southern border. These are predominantly white, rural counties.³ It is difficult to understand why Dr. Duchin would make that choice. Meanwhile, her starting

³Hardeman County has the highest BVAP of this group, at 39.4%. McNairy, Hardin, and Wayne counties all have single-digit BVAPs.

map keeps the higher-BVAP rural counties of Lauderdale, Haywood, and Madison whole.⁴ This is an unusual geographic choice, especially given plaintiffs' own criticism that the 2026 Plan created elongated Shelby County districts and lowered compactness through extensions into Shelby County.⁵ Furthermore, given the sparse population in this region of the state, the division of these counties cannot be explained by a need to equalize population, maintain contiguity, or achieve the partisan goals of the state.

The unexplained southern-county splits create a direct problem for Dr. Duchin's racial inference. One available explanation is that the split was used to produce a map with a higher BVAP than the 2026 Plan. That explanation would undermine the starting map in two ways. First, it departs from the 2026 Plan's choice to keep those rural counties whole, a choice consistent with traditional districting criteria.⁶ Second, without some alternative explanation, the specific choice to split these counties appears to be done for the race-based purpose of increasing the BVAP of CD-6 in Dr. Duchin's starting map to the north.

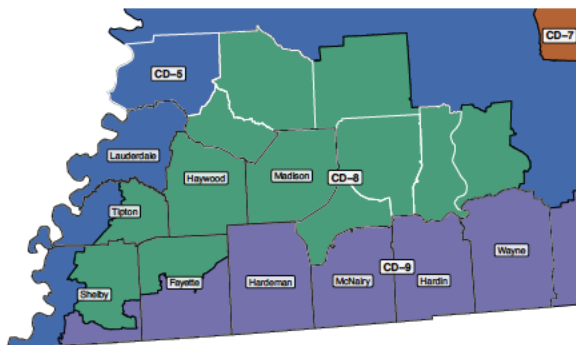
⁴The BVAP of these counties is 33.0, 50.6, and 35.7 percent, respectively.

⁵Fairfax Report at paras. 67–77; Plaintiffs' Memorandum in Support of Motion for Preliminary Injunction at 20–21.

⁶An alternative map need not exactly reproduce every county split in the enacted map. But where an alternative map deviates from those choices, the analyst should explain why those counties were split and how that choice follows from a nonracial redistricting objective, such as population equality, compactness, or communities of interest.

West Tennessee district orientations

2026 enacted map



Duchin simulation starting map

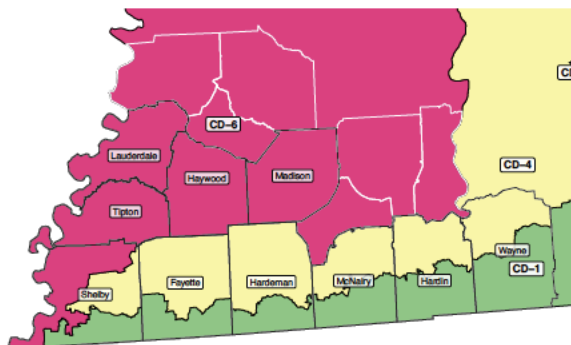


Figure 4: West Tennessee district orientations. The left panel shows the 2026 Plan. The right panel shows the Duchin simulation starting map. County labels identify the counties central to the comparison in the southwestern corner of the state, including Wayne County.

In every one of the 3,724,100 different maps from Dr. Duchin's second simulation run, Fayette, Hardeman, McNairy, and Hardin Counties are split. The same maps keep Tipton, Lauderdale, Haywood, and Madison Counties whole, and they split Shelby County into three districts.⁷ Those repeated choices are central to the racial comparison because they keep higher-BVAP rural counties together while sending the other two districts into Shelby County through the narrow splitting of these predominantly white southern border counties. The 2026 Plan reaches Shelby County without splitting Hardeman, McNairy, or Hardin Counties.

⁷This result also undercuts Dr. Duchin's earlier statement that "this level of cracking is not necessary to match the partisanship of the State's plan." Duchin First Declaration at 5. Her new simulation set was offered to match the State's partisan performance more closely, yet every different map in that set divides Shelby County among three districts. The new simulations therefore do not supply an example of a 60-percent-Trump map that avoids the same three-way Shelby County division.

County-split pattern	Maps	Share
Fayette, Hardeman, McNairy, and Hardin all split	3,724,100	100.00%
Tipton, Lauderdale, Haywood, and Madison all kept whole	3,724,100	100.00%
Shelby County split into three districts	3,724,100	100.00%

Table 1: County-split patterns in Dr. Duchin’s second simulation set. Each row reports the number and share of different maps with the listed pattern.

Every different map in Dr. Duchin’s simulation set makes the same choice in this part of Tennessee. It splits Fayette, Hardeman, McNairy, and Hardin Counties and keeps Tipton, Lauderdale, Haywood, and Madison Counties whole. Dr. Duchin’s simulations show different racial demographics would have resulted had the legislature split a string of rural counties. They are not useful for proving any racial motivation.

1.5 The Starting Map Uses a One-Percent Population Tolerance

Dr. Duchin’s simulations allow for more population variation than the 2026 Plan. The algorithm allows districts to vary by about 7,500 people above or below the ideal district population, given that a congressional district in Tennessee has a target population of 767,871 people. That is typical of redistricting simulations because the computer needs some room to propose new maps without being trapped by exact population equality. The 2026 Plan, by comparison, has zero population deviation.

The population-tolerance issue deserves attention because the racial difference between the 2026 Plan and her simulations is small. The starting map’s highest-BVAP district is 34.88 percent BVAP, compared with 31.67 percent in the 2026 Plan, a difference of 3.21 percentage points. Eliminating the starting map’s population deviation would require moving many thousands of people across district lines. Those changes would obviously alter the racial composition of the districts. When the claimed racial difference is only a few percentage points when compared to the starting map and the resulting simulated maps, population-equalizing changes could shrink that difference even further.

2 Changing the County-Split Choice Changes the Racial Result

To separate the county-split explanation from Dr. Duchin's racial explanation, I reran her simulation while changing only the starting map. The alternative starting map was drawn without regard to race, and satisfies the same 1% population deviation and all-district 60 percent Trump 2024 floor. The map pairs no Republican incumbents, and divides Shelby County among three Republican-leaning districts. The alternative starting map also reduces the number of county splits. The map splits Tipton County while keeping Fayette, Hardeman, McNairy, Hardin, and Wayne Counties whole. It contains fewer overall county splits than Dr. Duchin's starting map and the 2026 Plan.⁸

Everything else about Dr. Duchin's second simulation was kept the same. If the algorithm were producing a representative sample of maps, the racial distribution should remain broadly stable when the analyst supplies a different valid starting map. A well-explored simulation should reflect the broader set of valid plans and should lose its dependence on the particular starting map selected by the analyst.⁹

This test asks whether the racial gap in Dr. Duchin's simulations is driven by the southern-border county splits built into her starting map and then preserved in the resulting simulation maps. It also asks whether her algorithm sufficiently explores alternative ways of drawing three Republican districts into Shelby County, or whether it mostly repeats the geography of the first map it is given.

⁸I do not offer this alternative starting map as an illustrative plan, remedial proposal, recommendation for enactment, or statement of what the legislature should have enacted. Its purpose is simply diagnostic. It changes only the starting point in Dr. Duchin's simulation framework to test whether the racial result of the simulations is explained by the algorithm's dependence on the starting map and by the starting map's southern-border county-splitting choice.

⁹Daryl DeFord, Moon Duchin, and Justin Solomon, *Recombination: A Family of Markov Chains for Redistricting*, *Harvard Data Science Review* 3(1) (2021), doi:10.1162/99608f92.eb30390f. The article describes ReCom as a Markov-chain method for sampling from a space of valid plans and discusses the use of different starting plans as a check on whether the chain has moved away from its initial condition.

Alternative Starting Map

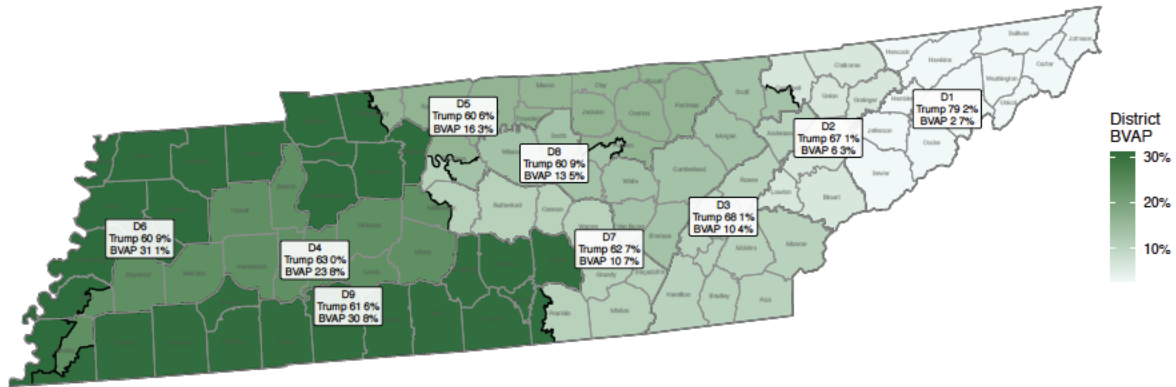


Figure 5: Alternative starting map. District labels report Trump 2024 two-party share and BVAP. The map satisfies the same all-district 60 percent Trump floor while keeping Fayette, Hardeman, McNairy, and Hardin Counties whole.

This alternative ensemble uses the same partisan rule as Dr. Duchin and keeps only maps that contain all 60% Trump districts. The output contains 7,654,737 maps, including the alternative starting map. After removing repeated maps, there were 3,848,637 different maps remaining. Among these different maps, the median highest-BVAP district has a BVAP of 32.77 percent, compared with 31.67 percent in the 2026 Plan, a difference of just over one percentage point. The BVAP values of the highest BVAP district in these different maps range from 29.35 percent to 37.58 percent. In 635,180 of the 3,848,637 different maps, or 16.50 percent, the highest-BVAP district is at or below the 2026 Plan's value.

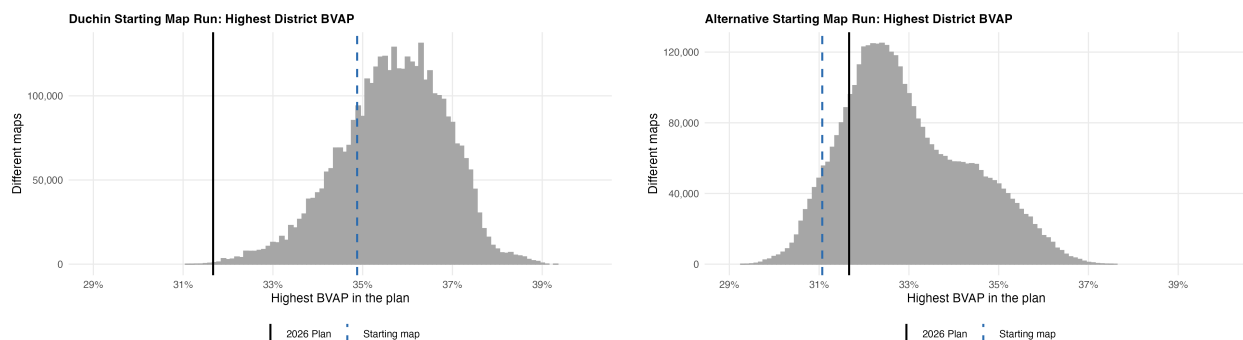


Figure 6: Highest district BVAP under two starting maps. The left panel shows the simulation run in Dr. Duchin’s second report. The right panel shows the run that changes only the starting map while keeping everything else the same about the algorithm. In both panels, the black vertical line shows the 2026 Plan and the dashed blue line shows the starting map for that run.

Figure 6 shows how the starting map dramatically changes the substantive conclusion. In Dr. Duchin’s ensemble, the highest-BVAP district in the 2026 Plan sits well below the simulation distribution, making the 2026 Plan appear to be an outlier. In the alternative-starting-map run, the 2026 Plan falls well inside the ordinary range of maps produced by the ensemble and would lead to a very different conclusion. The only changed input is the starting map. The contrast shows that the racial comparison between the 2026 Plan and Dr. Duchin’s simulation method is highly dependent on the choice of which counties to split in western Tennessee. It also demonstrates that the simulation is highly dependent on the map supplied at the first step. Importantly, Dr. Duchin’s starting map was not one of her millions of race-neutral simulations from her initial report. It splits counties in a way that appears to be racially motivated. This is not how a valid redistricting algorithm should behave. The starting map should not strongly influence the results of the ensemble.

3 Conclusion

Dr. Duchin’s second simulation shows, at most, different racial demographics would result had the State split a string of rural counties along the southern border of the State. That perplexing feature of her simulations seems to be racially motivated. If the starting map was selected for some other reason, that reason has not been disclosed.

Had Dr. Duchin used a starting map that did not contain that particular string of split ru-

ral counties, her same algorithm produces a set of simulations with substantially different racial demographics. The 2026 Plan falls well inside the ordinary range of those maps. A difference in county-split choices is therefore enough to change the BVAP comparison, which means that the BVAP gap by itself cannot support an inference that the 2026 Plan used race as the operative criterion.

I reserve the right to modify, update, or supplement my opinions in light of additional facts, testimony and/or materials that may become available. Pursuant to 28 U.S.C. § 1746, the above is true and correct to the best of my knowledge.

A handwritten signature in black ink, appearing to read "Michael Barber", is positioned above a horizontal line.

Michael Barber

July 7, 2026