UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF NORTH CAROLINA

SHAUNA WILLIAMS, et al., *Plaintiffs*, v. REPRESENTATIVE HUGH BLACKWELL, in his official capacity as Chair of the House Standing Committee on Elections, et al., *Defendants*.	Civil Action No. 23 CV 1057
NORTH CAROLINA STATE CONFERENCE OF THE NAACP, et al., *Plaintiffs*, v. PHILIP BERGER, in his official capacity as the President Pro Tempore of the North Carolina Senate, et al., *Defendants.*	Civil Action No. 23 CV 1104

WILLIAMS PLAINTIFFS' NOTICE OF FILING CORRECTED SUPPLEMENTAL EXPERT REBUTTAL REPORT OF DR. JONATHAN RODDEN AND ERRATA TO THE SUPPLEMENTAL REBUTTAL REPORT OF DR. JONATHAN RODDEN

Williams Plaintiffs hereby notify the Court and all parties of the filing of the Corrected Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025, and an Errata to the Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025. ECF No. 206-4:

1. On November 18, 2024, *Williams* Plaintiffs filed the Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden. ECF No. 206-4.

2. On the morning of November 19, counsel for Legislative Defendants emailed counsel for *Williams* Plaintiffs indicating their expert believed there were errors in the materials underlying certain simulations discussed on pages 11–14 of Dr. Rodden's Supplemental Expert Rebuttal Report.

3. *Williams* Plaintiffs and Dr. Rodden were not able to fully assess the purported errors ahead of the hearing on *Williams* Plaintiffs' Motion for Preliminary Injunction scheduled for the same day, November 19, at 1 pm. However, out of an abundance of caution, in advance of the hearing, counsel for *Williams* Plaintiffs emailed counsel for Legislative Defendants and agreed "to withdraw the portion of Dr. Rodden's report filed [on November 18] that relates to the new simulations Dr. Rodden conducted . . . (e.g., the discussion of the simulations on pp. 11–14 of the report)."

4. Later that day, at the hearing on *Williams* Plaintiffs' Motion for Preliminary Injunction, counsel for *Williams* Plaintiffs notified the Court that it withdrew the portions of Dr. Rodden's Supplemental Expert Rebuttal Report that discussed Dr. Rodden's new simulations on pages 11–14 of the report. Counsel also represented that *Williams* Plaintiffs would provide the Court with additional information after investigating the alleged issues.

5. As identified in the attached Third Declaration of Lalitha D. Madduri in Support of *Williams* Plaintiffs' Motion for Preliminary Injunction, *Williams* Plaintiffs submit: (i) the Corrected Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden dated November 20, 2025; (ii) a redline identifying the changes made in the corrected

report; and (iii) an Errata to the Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, November 20, 2025.

6. The corrections to Dr. Rodden's Supplemental Expert Rebuttal Report appear on pages 12–14 of document (i) described above and on pages 12–14 of document (ii) described above.

Dated: November 20, 2025

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* *Special Appearance pursuant to Local Rule 83.1(d)*

CERTIFICATE OF SERVICE

On this 20th day of November, 2025, I electronically filed the foregoing using the Court's CM/ECF system. Counsel for all parties to the case are registered CM/ECF users and will be served by that system.

/s/ *Lalitha D. Madduri*
Lalitha D. Madduri

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF NORTH CAROLINA

SHAUNA WILLIAMS, et al., *Plaintiffs*, v. REPRESENTATIVE HUGH BLACKWELL, in his official capacity as Chair of the House Standing Committee on Elections, et al., *Defendants*.	Civil Action No. 23 CV 1057
NORTH CAROLINA STATE CONFERENCE OF THE NAACP, et al., *Plaintiffs*, v. PHILIP BERGER, in his official capacity as the President Pro Tempore of the North Carolina Senate, et al., *Defendants.*	Civil Action No. 23 CV 1104

THIRD DECLARATION OF LALITHA D. MADDURI IN SUPPORT OF *WILLIAMS* PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

I, Lalitha D. Madduri, pursuant to 28 U.S.C. § 1746, hereby declare as follows:

1. I am over the age of 18 and competent to make this declaration. I am a partner with the law firm Elias Law Group LLP and am admitted to practice law in the States of California and Arizona and the District of Columbia and before the United States Supreme Court, as well as multiple federal courts of appeals and district courts. I serve as counsel

for *Williams* Plaintiffs in the above-captioned matter. I have appeared by special appearance pursuant to Local Rule 83.1(d) in this case.

2. I submit this third declaration to provide the Court with true and correct copies of materials submitted in support of *Williams* Plaintiffs' Motion for Preliminary Injunction. ECF No. 187.

Exhibit 19 is a true and correct copy of the Corrected Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025.

Exhibit 20 is a true and correct copy of a redline showing the corrections made in the Corrected Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025.

Exhibit 21 is a true and correct copy of the Errata to the Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025.

Dated: November 20, 2025

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* *Special Appearance pursuant to Local Rule 83.1(d)*

UNITED STATES DISTRICT COURT

MIDDLE DISTRICT OF NORTH CAROLINA

SHAUNA WILLIAMS, et al., *Plaintiffs*, v. REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al., *Defendants*.	Civil Action No. 23 CV 1057
NORTH CAROLINA STATE CONFERENCE OF THE NAACP, et al., *Plaintiffs*, v. PHILIP BERGER, in his official capacity as the President Pro Tempore of the North Carolina Senate, et al., *Defendants.*	Civil Action No. 23 CV 1104

CORRECTED SUPPLEMENTAL EXPERT REBUTTAL REPORT OF DR. JONATHAN RODDEN

November 20, 2025

I. INTRODUCTION AND SUMMARY OF FINDINGS

I have been asked to respond to the expert report of Dr. Michael Barber, which was filed on November 14, 2025, along with some characterizations of my October 31, 2025 Supplemental Report that were made in Legislative Defendants' Preliminary Injunction Opposition, which was filed on November 14, 2025. Dr. Barber and Legislative Defendants raise some questions about analyses that were carried out in my earlier reports in this case but not repeated in my Supplemental Report on Eastern North Carolina. In this report, first, I briefly explain why some of these analyses are less appropriate in analyzing the changes the 2025 Plan made in largely rural Eastern North Carolina. Second, I include an analysis of "racial dislocation," which was absent from my October 31, 2025 report purely because of time constraints and provides further confirmation of the findings in my Supplemental Report.

Third, I analyze and discuss Dr. Barber's claim that the North Carolina Legislature's stated interest in the creation of a map with 11 Republican-leaning seats out of 14 necessitated the breakup of historical Black communities in Eastern North Carolina. As he recommends, I hold fixed the boundaries of all districts other than Districts 1 and 3 in Eastern North Carolina and explore 5,000 computer-simulated ways of drawing two compact, contiguous districts based primarily on whole counties. This exercise shows that there are very few districting plans—less than 5 percent of the ensemble of simulated plans—that produce a Black voting-age population share in the congressional district encompassing the "Black Belt" as low as that of the 2025 Plan. Moreover, the simulations demonstrate that it is possible to draw two Republican-leaning districts in ways that produce a district with significantly higher Black voting-age population than the 2025 Plan.

Finally, I point out that the Legislature's approach to district-drawing in the 2023 Plan indicates that there are no constitutional or statutory constraints requiring respect for previous boundaries or increased compactness. These are choices the Legislature made in drawing the 2025 Plan rather than exogenous constraints. Using draft maps considered by the Legislature, I demonstrate that it is possible to draw maps containing 11 Republican seats that do not include the creation of a First Congressional District with exceptionally low Black voting-age population in Eastern North Carolina.

II. ANALYSIS OF LARGE METROPOLITAN AREAS VERSUS EASTERN NORTH CAROLINA

Dr. Barber and defense counsel point out that my Supplemental Report on Eastern North Carolina was slim relatively to my previous reports in this case. Part of the reason for this stems from the extremely short timeframe for producing the Supplemental Report, which was filed about a week after the passage of the 2025 Plan. Additionally, some of the analyses from my previous report are not applicable to the context of redistricting in rural North Carolina, especially given that the

Legislature decided to hold all existing boundaries fixed other than those separating Districts 1 and 3.

First, I did not include any examination of the "county envelope" approach in this instance because the 2025 Plan swapped whole counties in contrast to the 2023 Plan's splitting of counties. Because there are many counties in Eastern North Carolina with relatively low population, the primary unit of analysis for evaluating districts in Eastern North Carolina is the county rather than the VTD. As I described in my Supplemental Report, after selecting its preferred counties, the Legislature was able to achieve population equality in CD-1 and CD-3 by grabbing a small handful of additional precincts in the (overwhelmingly White) town of Swansboro in Onslow County and placing them in District 1. The county envelope approach is one way to examine the role of race in the choice of VTDs where counties are split. This approach is simply not approbative in a setting without county splits, where not many choices were made at the VTD level. This analysis was thus applicable in the Piedmont Triad and Mecklenburg regions, where split counties contained a large number of VTDs and the legislature could have drawn the district any number of ways within the split counties. In those settings, the county envelope analysis was useful for understanding whether and how those counties were split along racial lines. Because the configuration of CDs 1 and 3 in rural Eastern North Carolina in the 2025 Plan was done primarily along county lines, the county envelope analysis is less relevant.

Second, in my Supplemental Report, I provided a full accounting of changes to split counties, municipalities, and VTDs in the redrawn plan. However, I did not update Table 1 of my initial report, which provided compactness data for individual districts. I include that table below.

As Dr. Barber points out, the new North-South arrangement of Districts 1 and 3 is somewhat more compact than the old East-West arrangement. This is not surprising. As discussed further below, there are many ways to draw two relatively compact districts within the territory covered by Districts 1 and 3 in the 2023 Plan. However, while this somewhat more compact north-south arrangement increases average compactness relative to the 2023 plan, it is still lower than the 2022 Plan.

	Reock			**Polsby-Popper**		
District	2022 Plan	2023 Plan	2025 Plan	2022 Plan	2023 Plan	2025 Plan
1	0.379	0.361	0.424	0.383	0.261	0.328
2	0.342	0.397	0.397	0.322	0.277	0.277
3	0.338	0.308	0.570	0.200	0.249	0.268
4	0.413	0.491	0.491	0.455	0.256	0.256
5	0.254	0.240	0.240	0.219	0.219	0.219

6	0.428	0.408	0.408	0.405	0.297	0.297
7	0.456	0.538	0.538	0.369	0.286	0.286
8	0.535	0.319	0.319	0.325	0.274	0.274
9	0.519	0.439	0.439	0.308	0.171	0.171
10	0.414	0.258	0.258	0.341	0.272	0.272
11	0.306	0.263	0.263	0.305	0.265	0.265
12	0.607	0.571	0.571	0.365	0.280	0.280
13	0.456	0.379	0.379	0.296	0.139	0.139
14	0.369	0.294	0.294	0.236	0.160	0.160
Avg.	0.415	0.376	0.399	0.323	0.243	0.249

The 2025 Plan also increased political subdivision splits compared to prior plans. The 2022 Plan included 13 county splits (the minimum required for a 14-district plan). The 2023 Plan included 14 splits, and the new 2025 Plan includes 15 splits. As for VTDs, the 2022 plan split only 13 (the minimum required), while the 2023 Plan split 20, and the 2025 Plan split 21.

The decision to swap counties between CD-1 and CD-3 while retaining the highly non-compact districts and multiple unnecessary municipal splits elsewhere in the state cannot be characterized as an embrace of traditional redistricting criteria.

III. RACIAL DISLOCATION ANALYSIS

In my initial report in this case, I conducted an analysis applying the concept of "dislocation," which is a way of visualizing and quantifying the extent to which electoral districts disrupt local, geographically defined communities. Legislative Defendants fault me for not including this analysis in my Supplemental Report on Eastern North Carolina. This was purely due to time constraints, and at their suggestion, I provide the racial dislocation analysis here. The results of the racial dislocation analysis are consistent with the conclusions in my Supplemental Report as well as my earlier reports on the Piedmont Triad: under the 2025 Plan, Black voters are removed from their proximate communities and combined with rural White communities in districts with unnaturally low Black voting-age population.

This analysis uses the same methodology described in my prior report. Imagine that for each person in North Carolina, there is a bespoke congressional district composed of their nearest 745,670 nearest neighbors. For each Black North Carolina resident, how many members of that bespoke district are also Black? This captures the extent to which the individual lives in a neighborhood—at the scale relevant for drawing congressional districts—with other Black residents. Next, for each Black North Carolina resident, we can ask: how many members of the *district to which they have*

been assigned are also Black? For each individual we can then ask whether the Black population share of the assigned district is larger or smaller than that of the relevant geographic neighborhood. This gives us a sense of whether the racial composition of the district matches that of the neighborhood. Let us refer to this difference as the "racial dislocation" associated with a redistricting plan and let us refer to negative values of racial dislocation—where a Black voter's assigned district has a lower proportion of Black voters than their geographic neighborhood—as instances of "racial dilution."

The larger the difference between the racial composition of the neighborhood and that of the district, the more evidence we have that the districts were drawn in a way that disrupts local clusters of Black voters. To get a broad understanding of whether one set of districts has been drawn in a way that is less consistent with the underlying racial geography than another set of districts, we can then evaluate summary statistics for these differences—for distinct areas, for specific proposed districts, and for a redistricting plan.

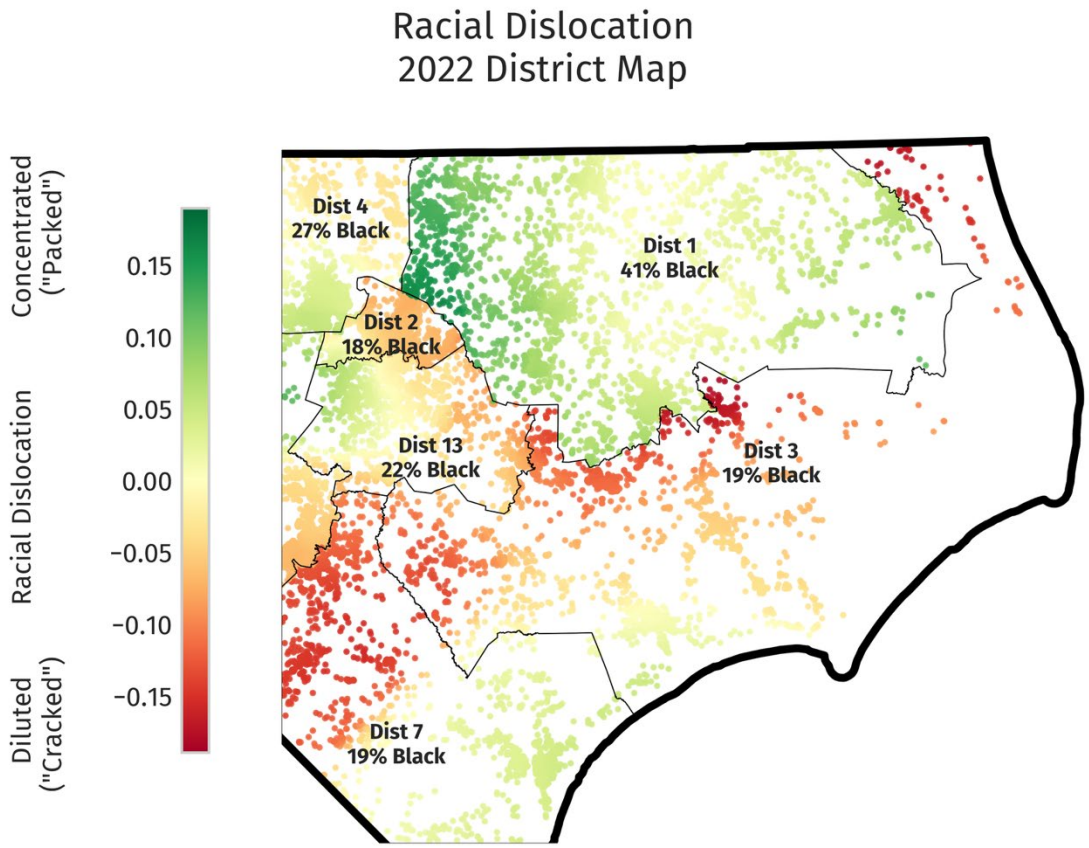
For a set of representative voters, Figure 1 maps the difference between the Black share of the district and the Black share of the voter's 745,670 nearest neighbors.[1] The first panel is for the 2022 Plan; the second panel is the 2023 Plan that was used in the 2024 General Election; and the third panel is the new 2025 Plan. The focus area of the map is Eastern North Carolina.

Yellow and light green colors indicate areas where the racial composition of the district mirrors that of the neighborhood. Figure 1 demonstrates that District 1 in the 2022 Plan was drawn in a way that kept racial dislocation quite low in the Black Belt area of Northeast North Carolina. The same was true of District 1 in the 2023 Plan. There are clusters of high dislocation along the boundaries of District 1, especially in Greenville in the 2023 Plan, where clusters of Black voters end up in districts with relatively low Black population, and within District 1, including areas along the border where the district BVAP is somewhat higher than that of the neighborhood. But in these redistricting plans, a large share of the Black Belt communities are in districts where the size of the local Black community is reflected in the Black voting-age population of the district.

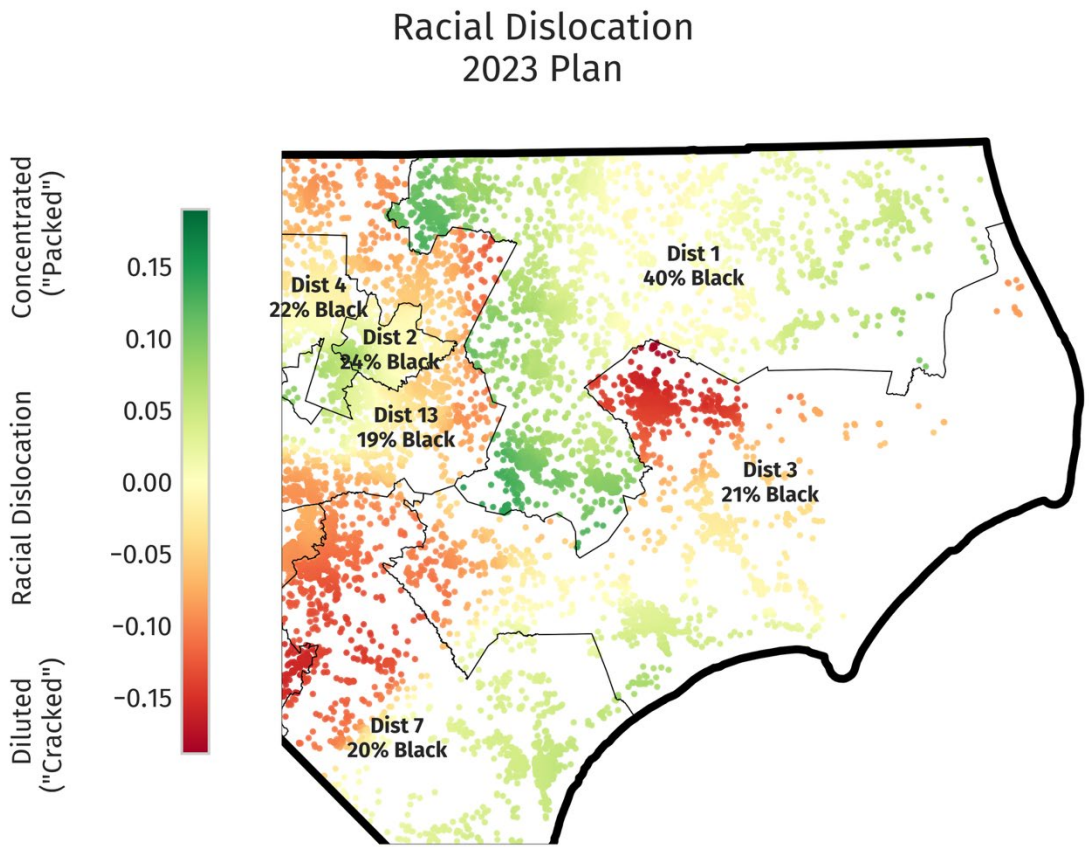
The final panel of Figure 1 shows that this pattern changed with the introduction of the 2025 Plan. The yellow and green dots in the Black Belt have turned to orange, indicating that Black voters are now placed in a district where the Black voting-age population is lower than that of the geographic neighborhood—an indicator that the community has been "cracked." Throughout the territory of Districts 1 and 3, as well as in District 13 and much of District 7, district lines have been drawn to place Black voters in districts where the BVAP is lower than that of the geographic neighborhood.

[1] In preparing the dislocation analysis and maps, I received technical assistance from Nick Eubank, Assistant Research Professor at the Duke University Social Science Research Institute and the Duke University Department of Political Science.

Figure 1: Racial Dislocation



Racial Dislocation is the share of a voter's district that is Any Part Black minus the share of the voter's k Nearest Neighbors who are Any Part Black. Colored dots show racial dislocation for Any Part Black VAP North Carolineans. Non-Black voters not plotted.



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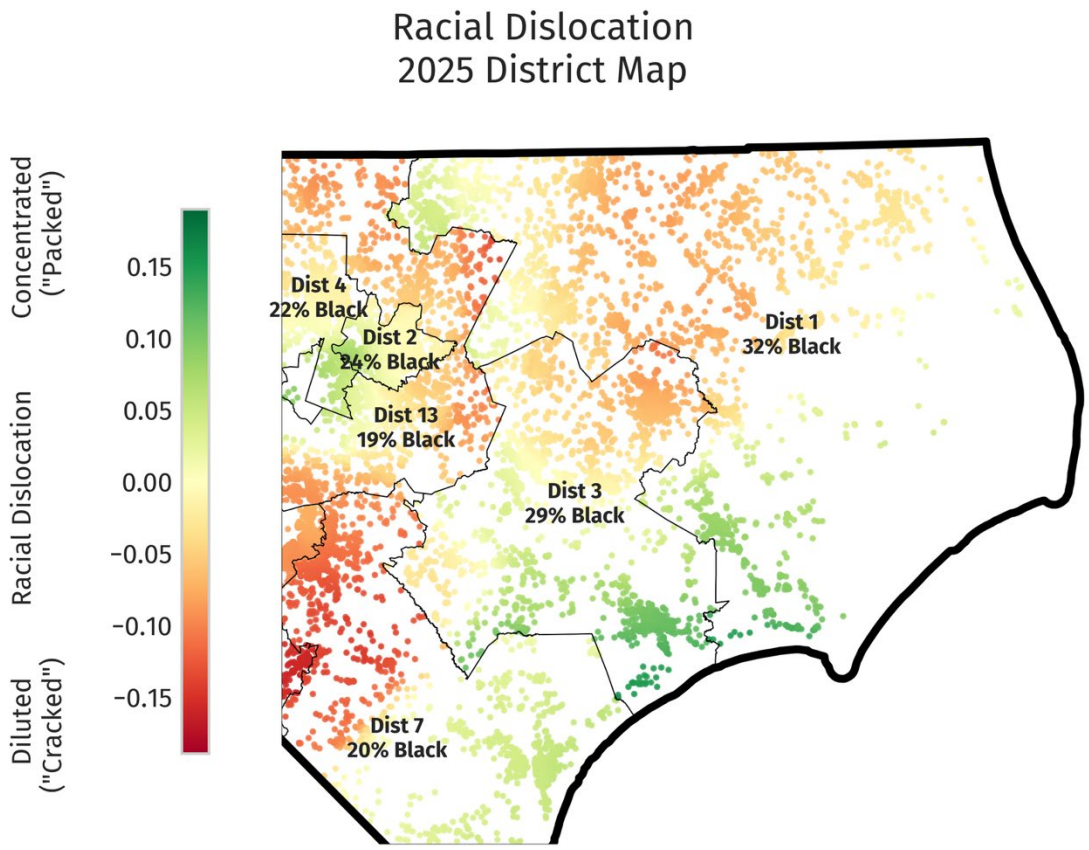
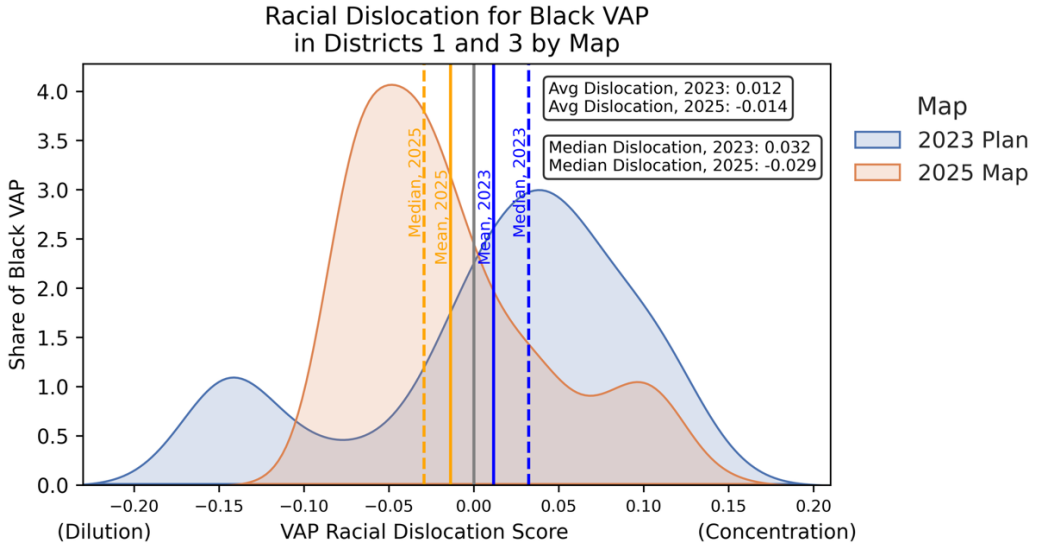


Racial Dislocation is the share of a voter's district that is Any Part Black minus the share of the voter's k Nearest Neighbors who are Any Part Black. Colored dots show racial dislocation for Any Part Black VAP North Carolineans. Non-Black voters not plotted.

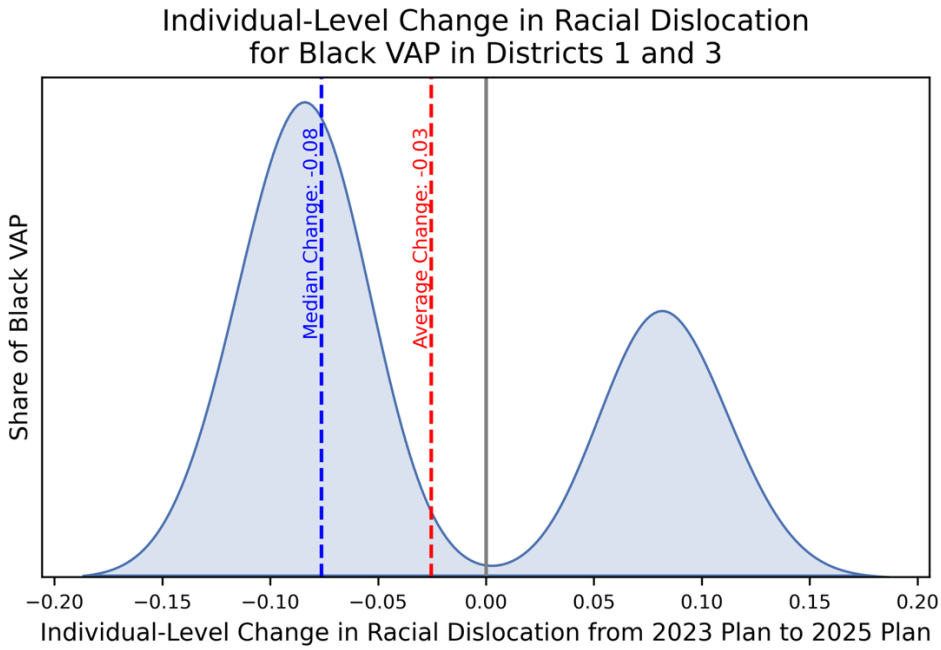
To understand the magnitude of the change between the 2023 and 2025 Plans, Figure 2 provides kernel densities (smoothed histograms) of racial dislocation experienced by Black voters in the two plans, focusing only on voters living within the common territory of District 1 and 3 of the two plans. Again, this is the same methodology presented in my initial report. In Figure 2, the blue area indicates that in the 2023 Plan, most Black voters in Eastern North Carolina lived in places where the Black share of the population was only slightly higher than that of their neighborhood, while a small minority in the left tail of the distribution—mostly the Greenville area—were placed in a district that had a much larger White population than the neighborhood. In the 2025 Plan, indicated in red, most Black voters are now in a district where the BVAP is well below that of the neighborhood.

Figure 2: Racial Dislocation Experienced by Black Residents, Eastern North Carolina



Distribution of Racial Dislocation across Black VAP in the Districts 1 and 3. Negative values indicate a person's district has a lower Any Part Black composition than their geographic neighborhood. Average values indicated with solid blue and orange lines, median values indicated with dashed lines.

Figure 3: Change in Racial Dislocation Experienced by Black Residents, Eastern NC



Distribution of individual-level change in Racial Dislocation for Black VAP in Districts 1 and 3. Negative dislocation values indicate a person's district has a lower Any Part Black composition than their geographic neighborhood (racial dilution). Average change indicated with red dashed line, median change indicated with blue dashed line.

Figure 3 focuses on the *change* in racial dislocation from the 2023 Plan to the 2025 Plan. It shows that for most Black residents of Eastern North Carolina, the 2025 Plan led to a substantial increase

in "cracking" or "dilution" where their district came to have a lower BVAP than their geographic neighborhood.

This pattern is quite similar to the analysis I conducted in my initial report, which focused on the Piedmont Triad, where urban Black communities were extracted from their geographic context and placed in rural districts with demographic compositions that are quite different from what they would experience if the district was drawn to keep proximate communities together.

IV. DOES EXTREME PARTISAN GERRYMANDERING REQUIRE EXTREME RACIAL SORTING?

Like my previous reports in this case, my Supplemental Report on Eastern North Carolina was primarily descriptive. It provides the Court with information about how the Legislature's map divides voters across districts by race. It does not purport to divine the specific intent of individual legislators and makes no claims about racial predominance. Nonetheless, Dr. Barber repeatedly characterizes my report as an unsuccessful attempt to demonstrate racial predominance in line drawing.

As part of that critique, he suggests that instead of descriptive statistics on the racial composition of areas moved in and out of Districts 1 and 3, I should have included regression analysis in which I control for 1) distance to the median population center of the district and 2) residence in certain cities. He also indicates that it would be useful to control for myriad unspecified aspects of history and geography.

Dr. Barber incorrectly implies that my previous report did this for my prior in-out analysis. In my initial report, as part of my study of the selection of VTDs to include or exclude from districts within the "county envelope" that encompasses a particular district, I presented regression models that included control variables for the distance of each VTD from the population center of the district, as well as residence in one of the cities that a district-drawer may have desired to keep together—geographic factors that may have influenced the likelihood that a VTD would end up in a particular district. When I presented statistics about the areas moved into and out of a district when it was redrawn, however, I conducted no such regressions. The in-out analysis is a descriptive accounting exercise, and it appears that Dr. Barber and I have no disagreement about the numbers. Moreover, Dr. Barber and I appear to agree that the 2025 Plan swapped entire counties rather than VTDs, so a regression at the county level would have far too few observations to be meaningful. There are 33 counties in the territory covered by Districts 1 and 2. An empirical model would need to have four possible values for each county: 1) assigned to the core of District 1, 2) assigned to the core of District 3, 3) moved from District 3 to District 1, and 4) moved from District 1 to District 3. Some of these categories have very few observations: only 4 counties moved from District 1 to 3, and 6 moved in the opposite direction. One cannot estimate a meaningful regression model in this situation.

Dr. Barber and I appear to agree about many of the basic facts demonstrated by our analyses. The specific decisions of the Legislature when redrawing its previous map led to a notable reduction in the Black voting-age population of District 1, marking the end of an era of consistent Black representation in Eastern North Carolina that dates to Reconstruction. There is no dispute about this. Nor is there dispute about the way it was achieved: by holding the boundaries of all other districts constant and swapping a set of counties in a way that moved Black voters from District 1 to District 3 and White voters from District 3 to District 1. And Black voters were more likely to be moved out of District 1 and into District 3 regardless of party affiliation.

However, Dr. Barber goes beyond descriptive analysis and makes the strong claim that in order to achieve the Legislature's political goal—adding a Republican-leaning seat so that the congressional map results in 11 Republican-leaning seats out of 14—it was necessary to dramatically decrease the BVAP of District 1. In other words, he implies the pursuit of partisan goals *required* the observed racial sorting of the 2025 Plan.

This is demonstrably false. To demonstrate this, I proceed with two types of analysis. First, I follow Dr. Barber's recommendation: I hold constant all other districts and generate a large ensemble of simulated 2-district arrangements in the area of Eastern North Carolina covered by Districts 1 and 3. Second, I return to the draft maps considered by the Legislature in 2023 and find that it was possible to achieve the Legislature's stated political objectives without creating the racial effects of the 2025 Plan.

Simulations

Dr. Barber cites a document called "2025 Congressional Plan Criteria,"[2] which, among other things, demonstrates that when drawing the 2025 Plan, the Legislature decided to change key aspects of the approach to redistricting that it took when drawing the 2023 Plan. First, when drawing the 2023 Plan, the Legislature paid no attention to previous districts and held nothing fixed, but in its 2025 criteria, the Legislature stated a desire to hold 12 of 14 districts fixed and only make changes to Districts 1 and 3. Second, as demonstrated in my initial report, the Legislature's 2023 approach involved the construction of wildly non-compact districts that violate traditional redistricting criteria in the Piedmont Triad and elsewhere. In 2025, the Legislature reverses course and commits to drawing "compact" districts, but only in Eastern North Carolina.[3]

Dr. Barber interprets these criteria not as strategic choices by the Legislature but as exogenous constraints. He criticizes my discussion of his previous simulations by pointing out that they do

[2] https://webservices.ncleg.gov/ViewDocSiteFile/101156

[3] Although he relies on it, Dr. Barber's report is clearly at odds with the 2025 criteria. The document claims that there is "not legally significant racially polarized voting in North Carolina, including in the counties in northeast North Carolina." One of the key contentions in Dr. Barber's report is that voting in northeast North Carolina is extremely racially polarized.

not play by the Legislature's self-imposed rules: they consider districts that cross outside the "fixed" area of Districts 1 and 3. He argues that I should have held the boundaries of all other districts fixed, and generated an ensemble of two-district plans covering the territory of Districts 1 and 3. I see no reason to accept at face value the characterization of the 2025 Criteria as hard constraints. If one wishes to argue that racial sorting is an inevitable consequence of partisan gerrymandering, it is pertinent to consider alternative arrangements that may have facilitated the same partisan goals with different racial configurations.

Nevertheless, I have implemented Dr. Barber's recommended approach. I isolate all the VTDs of the area covered by Districts 1 and 3, and, using the same redistricting simulation algorithm as Dr. Barber, I generate 5,000 simulated two-district arrangements, requiring that only a single county be split, as in the 2025 Plan, and like Dr. Barber in his earlier report, instructing the algorithm to draw relatively compact districts.

The ensemble produces a wide range of ways to combine the counties of Eastern North Carolina into two districts. For each plan, I identify the district with the highest BVAP. Figure 4a presents a histogram of the BVAP of those top-ranked districts and includes a red dashed line for the BVAP (32.3 percent) of District 1 in the 2025 Plan. Figure 4b presents a histogram of the BVAP of the lower-ranked district in each plan and includes a red dashed line for the BVAP (29.4 percent) of the lower-ranked district in the 2025 Plan. This analysis verifies that a highest-ranked BVAP of 32.3 percent is indeed quite unusual in the ensemble of race-blind plans. Only around 3.8 percent of all plans have a similar or lower BVAP in their highest-ranked district. In Figure 4b, the BVAP is higher in the second-ranked district than in all but 4.1 percent of the plans. Together, Figures 4a and 4b indicate that the 2025 Plan dispersed Black voters relatively evenly between the two districts in a way that rarely happened in the race-blind simulations.

Figure 4a: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Highest* BVAP District

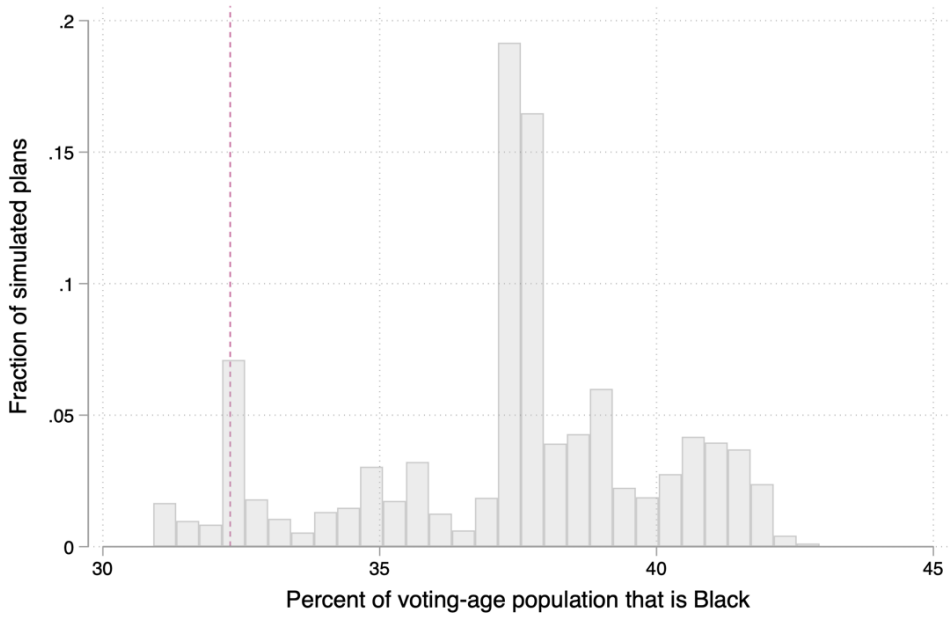
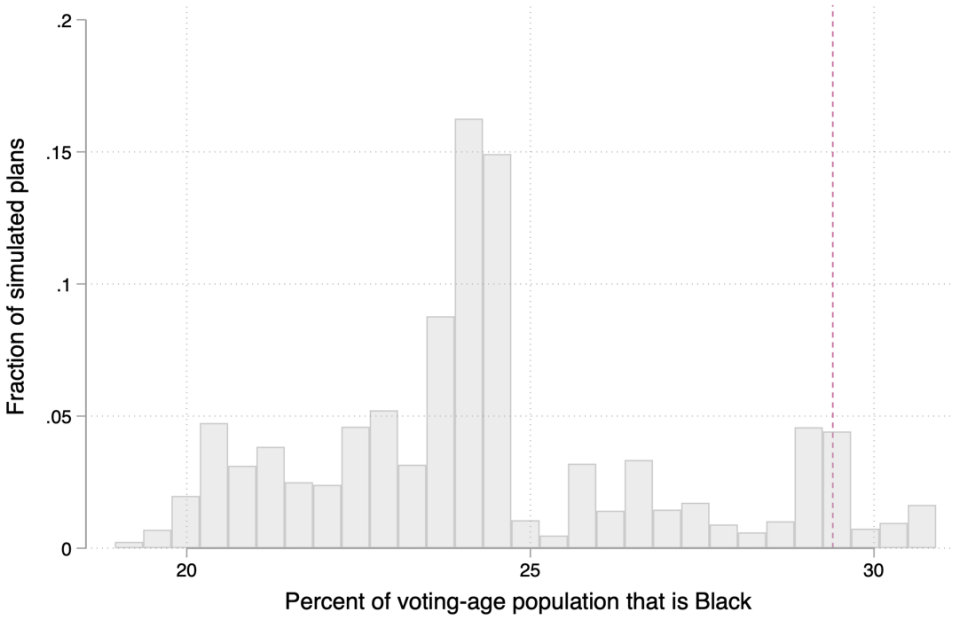


Figure 4b: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Lowest* BVAP District



While the 2025 Plan also displays a partisan composition very uncommon in the simulations, Dr. Barber implies that it is not possible to draw two majority-Republican districts without bringing the district with the higher-ranked BVAP all the way down to about 32 percent. That is not the case. Although the simulations typically produce one Democratic-leaning district and one Republican-leaning district, 1,002 simulated plans (around 20 percent of the ensemble) produced two Republican districts. Of those, 812 (around 81 percent) had a BVAP in the higher-ranked district greater than the 2025 Plan's District 1's BVAP of 32.3 percent. In other words, the simulations reveal that it was quite possible to meet the updated 2025 political goals of the Legislature without such an extreme approach to cracking Black voters in Northeast North Carolina.

Draft Maps

Dr. Barber treats the Legislature's decision to hold 12 districts constant and draw two relatively compact districts in Eastern North Carolina as a hard constraint that must be observed—something like a constitutional or statutory requirement. It is better understood as a choice made by the Legislature—one that is inconsistent with the approach taken only two years earlier. The crucial question is whether, in order to achieve the Legislature's stated political goal—a map where Republicans can expect an 11-3 advantage—it was necessary to minimize the BVAP in CD-1. A quick look at the draft maps considered by the Legislature in September of 2023 reveals that this is not the case. The draft maps from September 2024, which are included in the appendix of my Reply Report of October 17, 2024, demonstrate that it is possible to achieve an 11-3 Republican-leaning configuration without resorting to the stark racial effects of minimizing the BVAP of CD-1 of the 2025 Plan. These maps produce 11 solid Republican seats while producing a district in Eastern North Carolina with Black voting-age population above 38 percent.

And even if we were to accept the decisions of the Legislature and hold the boundaries of all districts other than Districts 1 and 3 fixed, the simulations presented above demonstrate that it was not necessary to reduce the BVAP of District 1 to anywhere near 32 percent to achieve their stated political goals.

V. CONCLUSIONS

My earlier reports focused largely on Mecklenburg County, where metropolitan Black voters were packed into District 12, and the Piedmont Triad, where metropolitan Black voters were extracted from former District 6 and divided across several non-compact, rural, predominantly white districts. In those reports, much of the focus was on the precise location of boundaries within split counties.

In electing to redraw the districts in Eastern North Carolina in 2025, the Legislature followed the approach it previously took in the Piedmont Triad. While the approach in Eastern North Carolina involved moving whole counties rather than individual VTDs within counties and afforded a more

compact arrangement, the effect was the same: district boundaries were drawn to split geographically proximate Black communities with shared history and interests.

The Legislature's professed goals in drawing these Plans were partisan in nature, but my various analyses, including examining simulations and draft plans considered by the Legislature, demonstrated that the splitting of geographically proximate Black communities in the Piedmont Triad had racial effects beyond what was necessary to achieve the Legislature's political goals. In this report, the same techniques also reveal that it was not necessary to split historical rural Black communities in the Northeast to accomplish its newest stated goal of drawing an additional Republican seat. In each case, the observed racial sorting and dismantling of Black communities went beyond what appears necessary to achieve its professed political goals.

Executed on November 20, 2025

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Jonathan Rodden

UNITED STATES DISTRICT COURT

MIDDLE DISTRICT OF NORTH CAROLINA

SHAUNA WILLIAMS, et al., *Plaintiffs*, v. REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al., *Defendants*.	Civil Action No. 23 CV 1057
NORTH CAROLINA STATE CONFERENCE OF THE NAACP, et al., *Plaintiffs*, v. PHILIP BERGER, in his official capacity as the President Pro Tempore of the North Carolina Senate, et al., *Defendants.*	Civil Action No. 23 CV 1104

CORRECTED SUPPLEMENTAL EXPERT REBUTTAL REPORT OF DR. JONATHAN RODDEN

November 2018, 2025

I. INTRODUCTION AND SUMMARY OF FINDINGS

I have been asked to respond to the expert report of Dr. Michael Barber, which was filed on November 14, 2025, along with some characterizations of my October 31, 2025 Supplemental Report that were made in Legislative Defendants' Preliminary Injunction Opposition, which was filed on November 14, 2025. Dr. Barber and Legislative Defendants raise some questions about analyses that were carried out in my earlier reports in this case but not repeated in my Supplemental Report on Eastern North Carolina. In this report, first, I briefly explain why some of these analyses are less appropriate in analyzing the changes the 2025 Plan made in largely rural Eastern North Carolina. Second, I include an analysis of "racial dislocation," which was absent from my October 31, 2025 report purely because of time constraints and provides further confirmation of the findings in my Supplemental Report.

Third, I analyze and discuss Dr. Barber's claim that the North Carolina Legislature's stated interest in the creation of a map with 11 Republican-leaning seats out of 14 necessitated the breakup of historical Black communities in Eastern North Carolina. As he recommends, I hold fixed the boundaries of all districts other than Districts 1 and 3 in Eastern North Carolina and explore 5,000 computer-simulated ways of drawing two compact, contiguous districts based primarily on whole counties. This exercise shows that there are very few districting plans—less than 5 percent of the ensemble of simulated plans—that produce a Black voting-age population share in the congressional district encompassing the "Black Belt" as low as that of the 2025 Plan. Moreover, the simulations demonstrate that it is possible to draw two Republican-leaning districts in ways that produce a district with significantly higher Black voting-age population than the 2025 Plan.

Finally, I point out that the Legislature's approach to district-drawing in the 2023 Plan indicates that there are no constitutional or statutory constraints requiring respect for previous boundaries or increased compactness. These are choices the Legislature made in drawing the 2025 Plan rather than exogenous constraints. Using draft maps considered by the Legislature, I demonstrate that it is possible to draw maps containing 11 Republican seats that do not include the creation of a First Congressional District with exceptionally low Black voting-age population in Eastern North Carolina.

II. ANALYSIS OF LARGE METROPOLITAN AREAS VERSUS EASTERN NORTH CAROLINA

Dr. Barber and defense counsel point out that my Supplemental Report on Eastern North Carolina was slim relatively to my previous reports in this case. Part of the reason for this stems from the extremely short timeframe for producing the Supplemental Report, which was filed about a week after the passage of the 2025 Plan. Additionally, some of the analyses from my previous report are not applicable to the context of redistricting in rural North Carolina, especially given that the

Legislature decided to hold all existing boundaries fixed other than those separating Districts 1 and 3.

First, I did not include any examination of the "county envelope" approach in this instance because the 2025 Plan swapped whole counties in contrast to the 2023 Plan's splitting of counties. Because there are many counties in Eastern North Carolina with relatively low population, the primary unit of analysis for evaluating districts in Eastern North Carolina is the county rather than the VTD. As I described in my Supplemental Report, after selecting its preferred counties, the Legislature was able to achieve population equality in CD-1 and CD-3 by grabbing a small handful of additional precincts in the (overwhelmingly White) town of Swansboro in Onslow County and placing them in District 1. The county envelope approach is one way to examine the role of race in the choice of VTDs where counties are split. This approach is simply not approbative in a setting without county splits, where not many choices were made at the VTD level. This analysis was thus applicable in the Piedmont Triad and Mecklenburg regions, where split counties contained a large number of VTDs and the legislature could have drawn the district any number of ways within the split counties. In those settings, the county envelope analysis was useful for understanding whether and how those counties were split along racial lines. Because the configuration of CDs 1 and 3 in rural Eastern North Carolina in the 2025 Plan was done primarily along county lines, the county envelope analysis is less relevant.

Second, in my Supplemental Report, I provided a full accounting of changes to split counties, municipalities, and VTDs in the redrawn plan. However, I did not update Table 1 of my initial report, which provided compactness data for individual districts. I include that table below.

As Dr. Barber points out, the new North-South arrangement of Districts 1 and 3 is somewhat more compact than the old East-West arrangement. This is not surprising. As discussed further below, there are many ways to draw two relatively compact districts within the territory covered by Districts 1 and 3 in the 2023 Plan. However, while this somewhat more compact north-south arrangement increases average compactness relative to the 2023 plan, it is still lower than the 2022 Plan.

	Reock			**Polsby-Popper**		
District	2022 Plan	2023 Plan	2025 Plan	2022 Plan	2023 Plan	2025 Plan
1	0.379	0.361	0.424	0.383	0.261	0.328
2	0.342	0.397	0.397	0.322	0.277	0.277
3	0.338	0.308	0.570	0.200	0.249	0.268
4	0.413	0.491	0.491	0.455	0.256	0.256
5	0.254	0.240	0.240	0.219	0.219	0.219

6	0.428	0.408	0.408	0.405	0.297	0.297
7	0.456	0.538	0.538	0.369	0.286	0.286
8	0.535	0.319	0.319	0.325	0.274	0.274
9	0.519	0.439	0.439	0.308	0.171	0.171
10	0.414	0.258	0.258	0.341	0.272	0.272
11	0.306	0.263	0.263	0.305	0.265	0.265
12	0.607	0.571	0.571	0.365	0.280	0.280
13	0.456	0.379	0.379	0.296	0.139	0.139
14	0.369	0.294	0.294	0.236	0.160	0.160
Avg.	0.415	0.376	0.399	0.323	0.243	0.249

The 2025 Plan also increased political subdivision splits compared to prior plans. The 2022 Plan included 13 county splits (the minimum required for a 14-district plan). The 2023 Plan included 14 splits, and the new 2025 Plan includes 15 splits. As for VTDs, the 2022 plan split only 13 (the minimum required), while the 2023 Plan split 20, and the 2025 Plan split 21.

The decision to swap counties between CD-1 and CD-3 while retaining the highly non-compact districts and multiple unnecessary municipal splits elsewhere in the state cannot be characterized as an embrace of traditional redistricting criteria.

III. RACIAL DISLOCATION ANALYSIS

In my initial report in this case, I conducted an analysis applying the concept of "dislocation," which is a way of visualizing and quantifying the extent to which electoral districts disrupt local, geographically defined communities. Legislative Defendants fault me for not including this analysis in my Supplemental Report on Eastern North Carolina. This was purely due to time constraints, and at their suggestion, I provide the racial dislocation analysis here. The results of the racial dislocation analysis are consistent with the conclusions in my Supplemental Report as well as my earlier reports on the Piedmont Triad: under the 2025 Plan, Black voters are removed from their proximate communities and combined with rural White communities in districts with unnaturally low Black voting-age population.

This analysis uses the same methodology described in my prior report. Imagine that for each person in North Carolina, there is a bespoke congressional district composed of their nearest 745,670 nearest neighbors. For each Black North Carolina resident, how many members of that bespoke district are also Black? This captures the extent to which the individual lives in a neighborhood—at the scale relevant for drawing congressional districts—with other Black residents. Next, for each Black North Carolina resident, we can ask: how many members of the *district to which they have*

been assigned are also Black? For each individual we can then ask whether the Black population share of the assigned district is larger or smaller than that of the relevant geographic neighborhood. This gives us a sense of whether the racial composition of the district matches that of the neighborhood. Let us refer to this difference as the "racial dislocation" associated with a redistricting plan and let us refer to negative values of racial dislocation—where a Black voter's assigned district has a lower proportion of Black voters than their geographic neighborhood—as instances of "racial dilution."

The larger the difference between the racial composition of the neighborhood and that of the district, the more evidence we have that the districts were drawn in a way that disrupts local clusters of Black voters. To get a broad understanding of whether one set of districts has been drawn in a way that is less consistent with the underlying racial geography than another set of districts, we can then evaluate summary statistics for these differences—for distinct areas, for specific proposed districts, and for a redistricting plan.

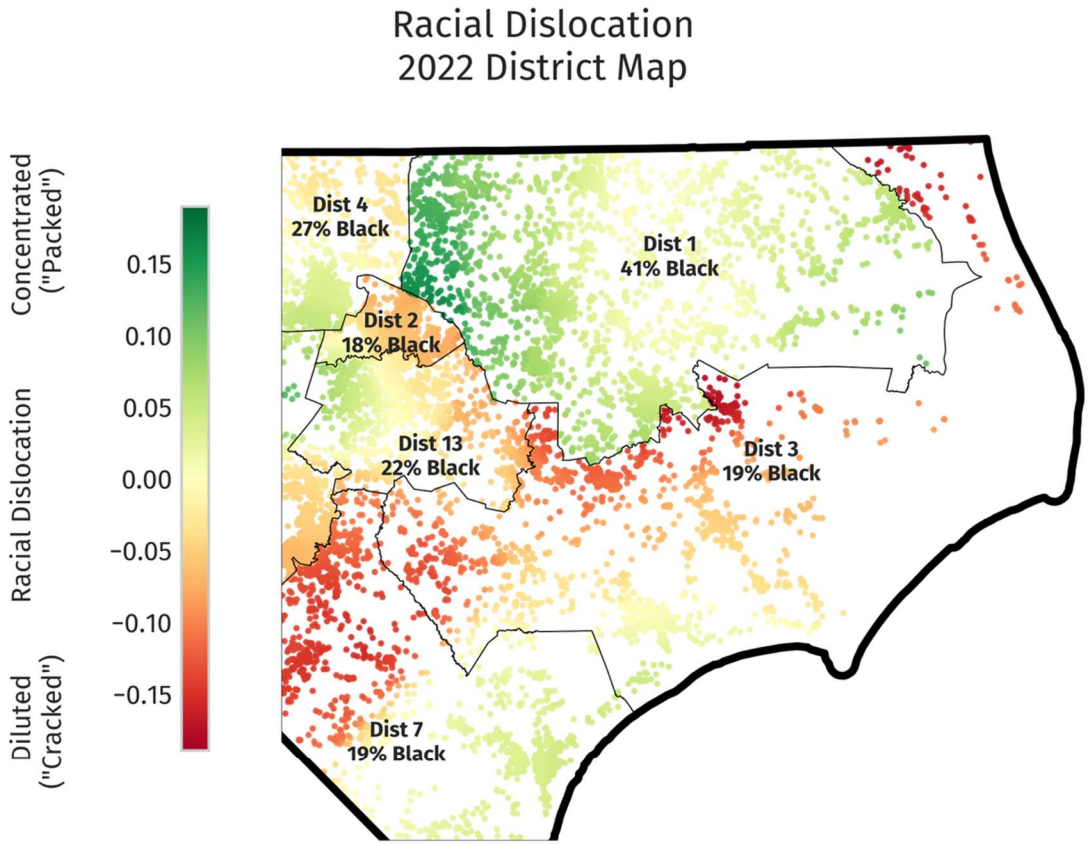
For a set of representative voters, Figure 1 maps the difference between the Black share of the district and the Black share of the voter's 745,670 nearest neighbors.[1] The first panel is for the 2022 Plan; the second panel is the 2023 Plan that was used in the 2024 General Election; and the third panel is the new 2025 Plan. The focus area of the map is Eastern North Carolina.

Yellow and light green colors indicate areas where the racial composition of the district mirrors that of the neighborhood. Figure 1 demonstrates that District 1 in the 2022 Plan was drawn in a way that kept racial dislocation quite low in the Black Belt area of Northeast North Carolina. The same was true of District 1 in the 2023 Plan. There are clusters of high dislocation along the boundaries of District 1, especially in Greenville in the 2023 Plan, where clusters of Black voters end up in districts with relatively low Black population, and within District 1, including areas along the border where the district BVAP is somewhat higher than that of the neighborhood. But in these redistricting plans, a large share of the Black Belt communities are in districts where the size of the local Black community is reflected in the Black voting-age population of the district.

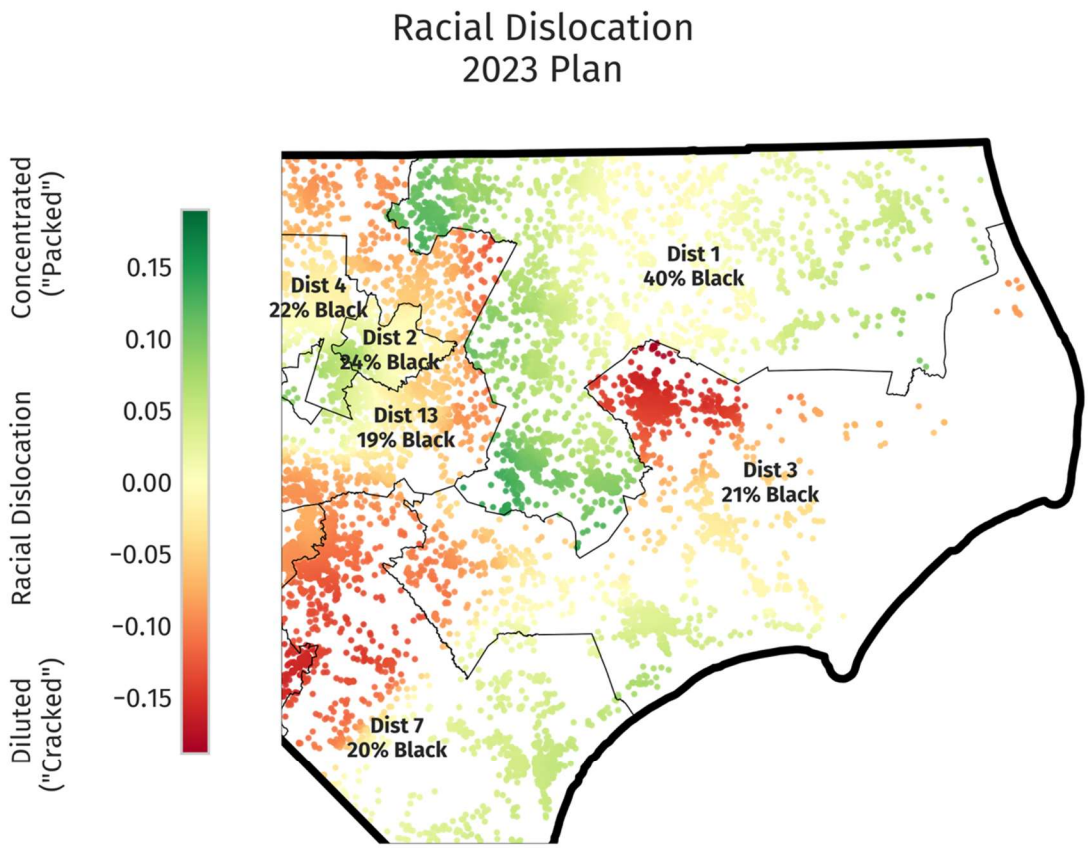
The final panel of Figure 1 shows that this pattern changed with the introduction of the 2025 Plan. The yellow and green dots in the Black Belt have turned to orange, indicating that Black voters are now placed in a district where the Black voting-age population is lower than that of the geographic neighborhood—an indicator that the community has been "cracked." Throughout the territory of Districts 1 and 3, as well as in District 13 and much of District 7, district lines have been drawn to place Black voters in districts where the BVAP is lower than that of the geographic neighborhood.

[1] In preparing the dislocation analysis and maps, I received technical assistance from Nick Eubank, Assistant Research Professor at the Duke University Social Science Research Institute and the Duke University Department of Political Science.

Figure 1: Racial Dislocation



Racial Dislocation is the share of a voter's district that is Any Part Black minus the share of the voter's k Nearest Neighbors who are Any Part Black. Colored dots show racial dislocation for Any Part Black VAP North Carolineans. Non-Black voters not plotted.



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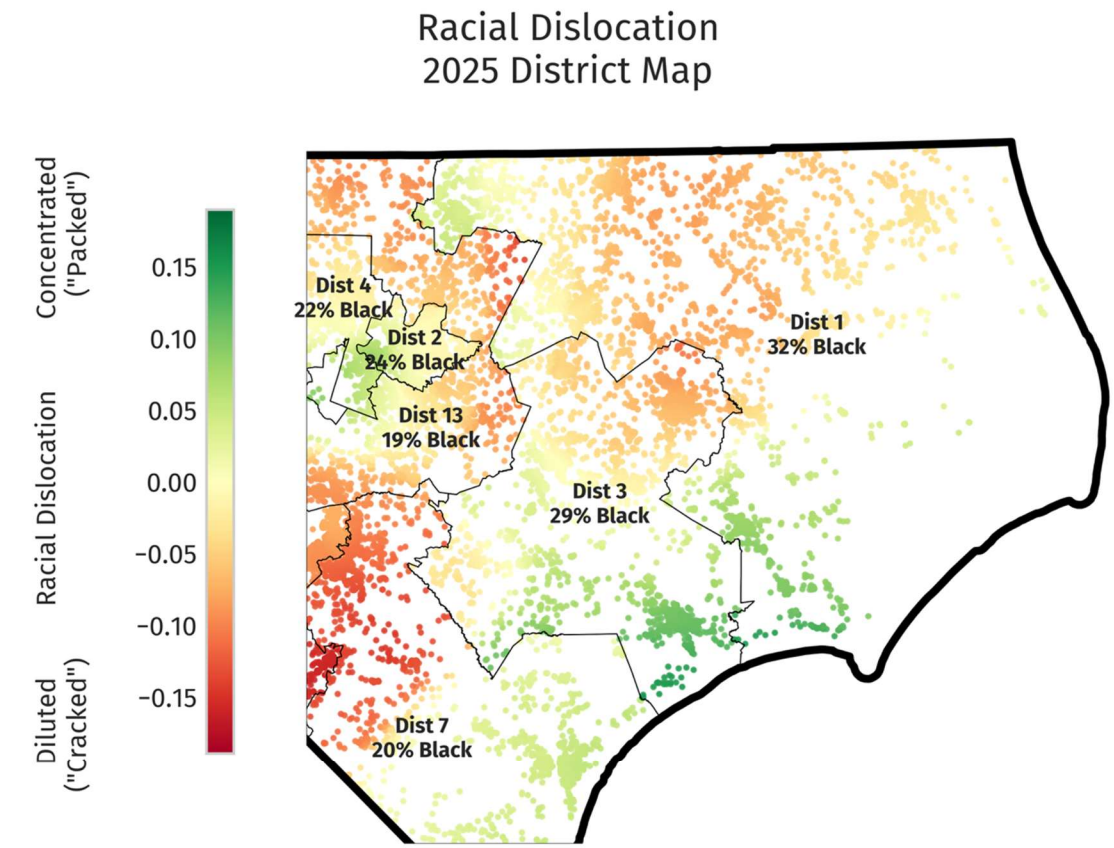
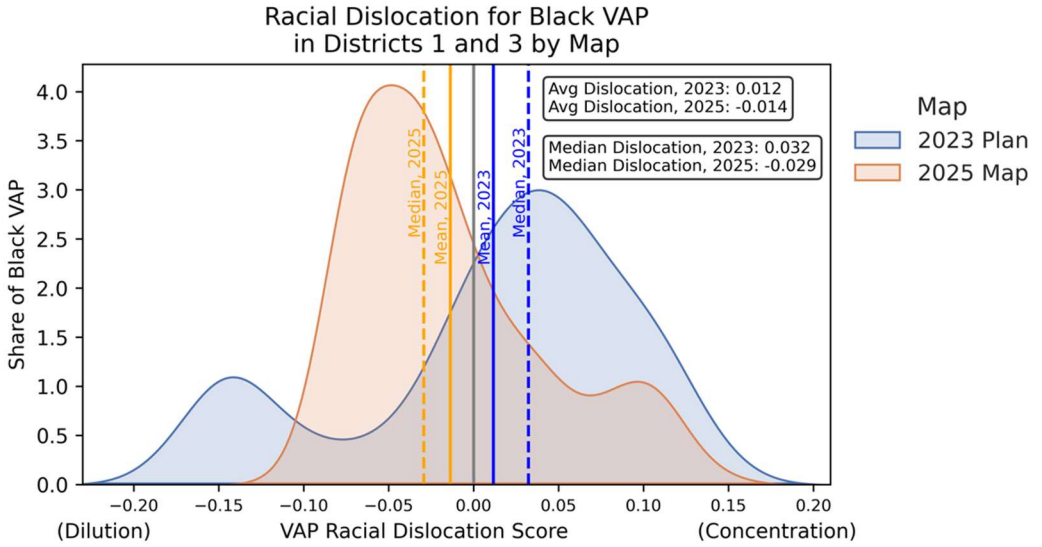


Racial Dislocation is the share of a voter's district that is Any Part Black minus the share of the voter's k Nearest Neighbors who are Any Part Black. Colored dots show racial dislocation for Any Part Black VAP North Carolineans. Non-Black voters not plotted.

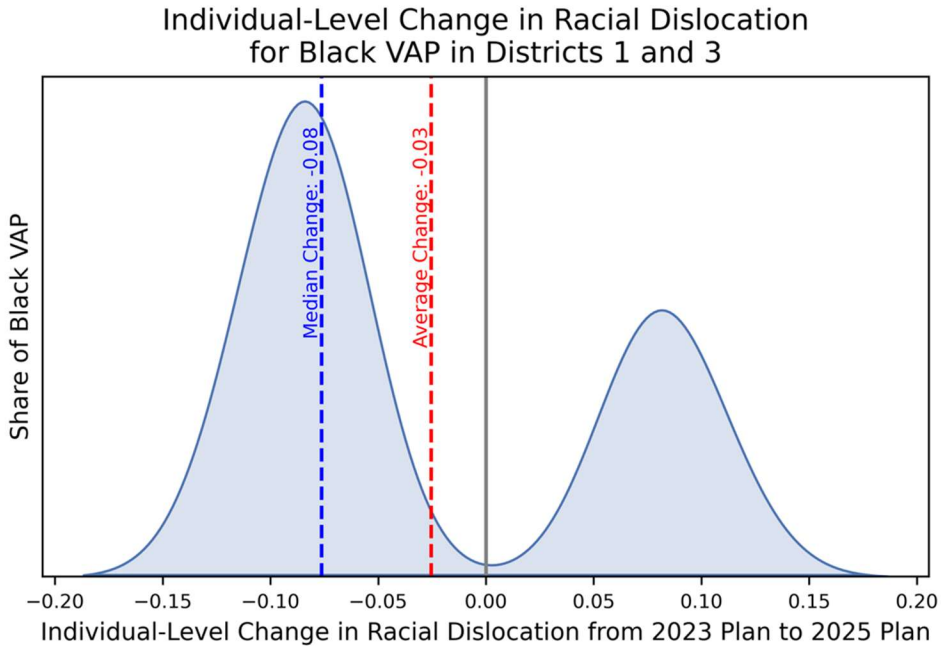
To understand the magnitude of the change between the 2023 and 2025 Plans, Figure 2 provides kernel densities (smoothed histograms) of racial dislocation experienced by Black voters in the two plans, focusing only on voters living within the common territory of District 1 and 3 of the two plans. Again, this is the same methodology presented in my initial report. In Figure 2, the blue area indicates that in the 2023 Plan, most Black voters in Eastern North Carolina lived in places where the Black share of the population was only slightly higher than that of their neighborhood, while a small minority in the left tail of the distribution—mostly the Greenville area—were placed in a district that had a much larger White population than the neighborhood. In the 2025 Plan, indicated in red, most Black voters are now in a district where the BVAP is well below that of the neighborhood.

Figure 2: Racial Dislocation Experienced by Black Residents, Eastern North Carolina



Distribution of Racial Dislocation across Black VAP in the Districts 1 and 3. Negative values indicate a person's district has a lower Any Part Black composition than their geographic neighborhood. Average values indicated with solid blue and orange lines, median values indicated with dashed lines.

Figure 3: Change in Racial Dislocation Experienced by Black Residents, Eastern NC



Distribution of individual-level change in Racial Dislocation for Black VAP in Districts 1 and 3. Negative dislocation values indicate a person's district has a lower Any Part Black composition than their geographic neighborhood (racial dilution). Average change indicated with red dashed line, median change indicated with blue dashed line.

Figure 3 focuses on the *change* in racial dislocation from the 2023 Plan to the 2025 Plan. It shows that for most Black residents of Eastern North Carolina, the 2025 Plan led to a substantial increase

in “cracking” or “dilution” where their district came to have a lower BVAP than their geographic neighborhood.

This pattern is quite similar to the analysis I conducted in my initial report, which focused on the Piedmont Triad, where urban Black communities were extracted from their geographic context and placed in rural districts with demographic compositions that are quite different from what they would experience if the district was drawn to keep proximate communities together.

IV. DOES EXTREME PARTISAN GERRYMANDERING REQUIRE EXTREME RACIAL SORTING?

Like my previous reports in this case, my Supplemental Report on Eastern North Carolina was primarily descriptive. It provides the Court with information about how the Legislature’s map divides voters across districts by race. It does not purport to divine the specific intent of individual legislators and makes no claims about racial predominance. Nonetheless, Dr. Barber repeatedly characterizes my report as an unsuccessful attempt to demonstrate racial predominance in line drawing.

As part of that critique, he suggests that instead of descriptive statistics on the racial composition of areas moved in and out of Districts 1 and 3, I should have included regression analysis in which I control for 1) distance to the median population center of the district and 2) residence in certain cities. He also indicates that it would be useful to control for myriad unspecified aspects of history and geography.

Dr. Barber incorrectly implies that my previous report did this for my prior in-out analysis. In my initial report, as part of my study of the selection of VTDs to include or exclude from districts within the “county envelope” that encompasses a particular district, I presented regression models that included control variables for the distance of each VTD from the population center of the district, as well as residence in one of the cities that a district-drawer may have desired to keep together—geographic factors that may have influenced the likelihood that a VTD would end up in a particular district. When I presented statistics about the areas moved into and out of a district when it was redrawn, however, I conducted no such regressions. The in-out analysis is a descriptive accounting exercise, and it appears that Dr. Barber and I have no disagreement about the numbers. Moreover, Dr. Barber and I appear to agree that the 2025 Plan swapped entire counties rather than VTDs, so a regression at the county level would have far too few observations to be meaningful. There are 33 counties in the territory covered by Districts 1 and 2. An empirical model would need to have four possible values for each county: 1) assigned to the core of District 1, 2) assigned to the core of District 3, 3) moved from District 3 to District 1, and 4) moved from District 1 to District 3. Some of these categories have very few observations: only 4 counties moved from District 1 to 3, and 6 moved in the opposite direction. One cannot estimate a meaningful regression model in this situation.

Dr. Barber and I appear to agree about many of the basic facts demonstrated by our analyses. The specific decisions of the Legislature when redrawing its previous map led to a notable reduction in the Black voting-age population of District 1, marking the end of an era of consistent Black representation in Eastern North Carolina that dates to Reconstruction. There is no dispute about this. Nor is there dispute about the way it was achieved: by holding the boundaries of all other districts constant and swapping a set of counties in a way that moved Black voters from District 1 to District 3 and White voters from District 3 to District 1. And Black voters were more likely to be moved out of District 1 and into District 3 regardless of party affiliation.

However, Dr. Barber goes beyond descriptive analysis and makes the strong claim that in order to achieve the Legislature's political goal—adding a Republican-leaning seat so that the congressional map results in 11 Republican-leaning seats out of 14—it was necessary to dramatically decrease the BVAP of District 1. In other words, he implies the pursuit of partisan goals *required* the observed racial sorting of the 2025 Plan.

This is demonstrably false. To demonstrate this, I proceed with two types of analysis. First, I follow Dr. Barber's recommendation: I hold constant all other districts and generate a large ensemble of simulated 2-district arrangements in the area of Eastern North Carolina covered by Districts 1 and 3. Second, I return to the draft maps considered by the Legislature in 2023 and find that it was possible to achieve the Legislature's stated political objectives without creating the racial effects of the 2025 Plan.

Simulations

Dr. Barber cites a document called "2025 Congressional Plan Criteria,"[2] which, among other things, demonstrates that when drawing the 2025 Plan, the Legislature decided to change key aspects of the approach to redistricting that it took when drawing the 2023 Plan. First, when drawing the 2023 Plan, the Legislature paid no attention to previous districts and held nothing fixed, but in its 2025 criteria, the Legislature stated a desire to hold 12 of 14 districts fixed and only make changes to Districts 1 and 3. Second, as demonstrated in my initial report, the Legislature's 2023 approach involved the construction of wildly non-compact districts that violate traditional redistricting criteria in the Piedmont Triad and elsewhere. In 2025, the Legislature reverses course and commits to drawing "compact" districts, but only in Eastern North Carolina.[3]

Dr. Barber interprets these criteria not as strategic choices by the Legislature but as exogenous constraints. He criticizes my discussion of his previous simulations by pointing out that they do

[2] https://webservices.ncleg.gov/ViewDocSiteFile/101156

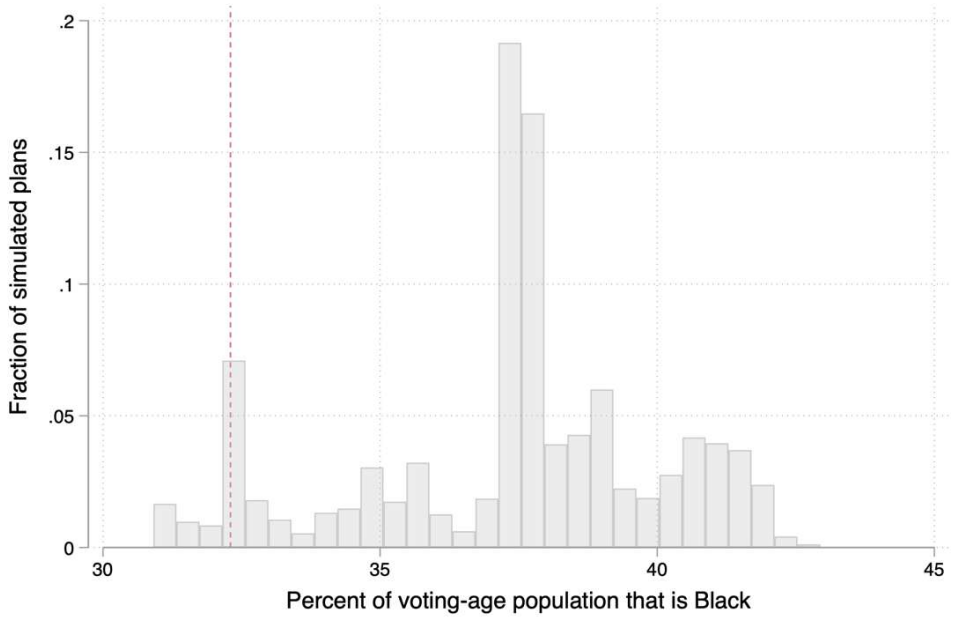
[3] Although he relies on it, Dr. Barber's report is clearly at odds with the 2025 criteria. The document claims that there is "not legally significant racially polarized voting in North Carolina, including in the counties in northeast North Carolina." One of the key contentions in Dr. Barber's report is that voting in northeast North Carolina is extremely racially polarized.

not play by the Legislature's self-imposed rules: they consider districts that cross outside the "fixed" area of Districts 1 and 3. He argues that I should have held the boundaries of all other districts fixed, and generated an ensemble of two-district plans covering the territory of Districts 1 and 3. I see no reason to accept at face value the characterization of the 2025 Criteria as hard constraints. If one wishes to argue that racial sorting is an inevitable consequence of partisan gerrymandering, it is pertinent to consider alternative arrangements that may have facilitated the same partisan goals with different racial configurations.

Nevertheless, I have implemented Dr. Barber's recommended approach. I isolate all the VTDs of the area covered by Districts 1 and 3, and, using the same redistricting simulation algorithm as Dr. Barber, I generate 5,000 simulated two-district arrangements, requiring that only a single county be split, as in the 2025 Plan, and like Dr. Barber in his earlier report, instructing the algorithm to draw relatively compact districts.

The ensemble produces a wide range of ways to combine the counties of Eastern North Carolina into two districts. For each plan, I identify the district with the highest BVAP. Figure 4a presents a histogram of the BVAP of those top-ranked districts and includes a red dashed line for the BVAP (32.3 percent) of District 1 in the 2025 Plan. Figure 4b presents a histogram of the BVAP of the lower-ranked district in each plan and includes a red dashed line for the BVAP (29.4 percent) of the lower-ranked district in the 2025 Plan. This analysis verifies that a highest-ranked BVAP of 32.3 percent is indeed quite unusual in the ensemble of race-blind plans. Only around ~~4.9~~3.8 percent of all plans have a similar or lower BVAP in their highest-ranked district. In Figure 4b, the BVAP is higher in the second-ranked district than in all but 4.1~~3~~ percent of the plans. Together, Figures 4a and 4b indicate that the 2025 Plan dispersed Black voters relatively evenly between the two districts in a way that rarely happened in the race-blind simulations.

Figure 4a: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Highest* BVAP District



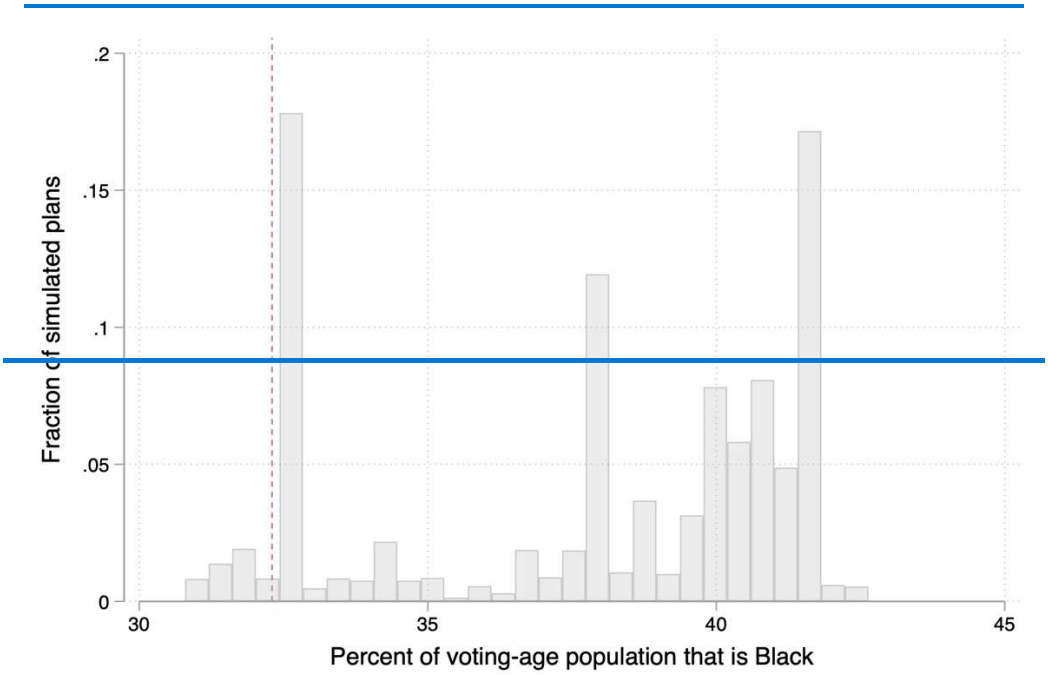
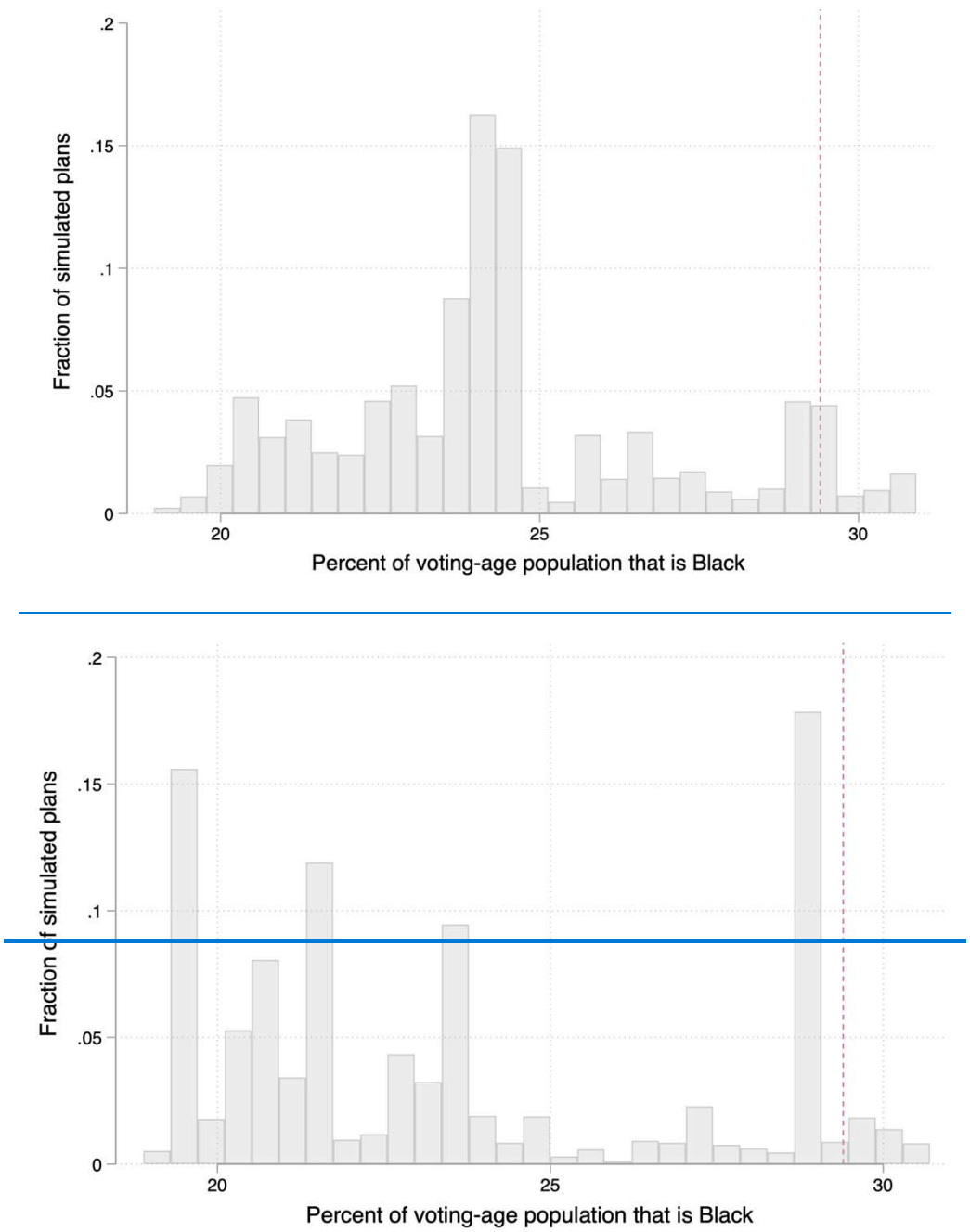


Figure 4b: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Lowest* BVAP District



While the 2025 Plan also displays a partisan composition very uncommon in the simulations, Dr. Barber implies that it is not possible to draw two majority-Republican districts without bringing the district with the higher-ranked BVAP all the way down to about 32 percent. That is not the case. Although the simulations typically produce one Democratic-leaning district and one Republican-leaning district, 1,002~~429~~ simulated plans (around 2~~0~~9 percent of the ensemble) produced two Republican districts. Of those, 812~~1,184~~ (around 8~~1~~3 percent) had a BVAP in the

higher-ranked district greater than the 2025 Plan's District 1's BVAP of 32.3 percent. In other words, the simulations reveal that it was quite possible to meet the updated 2025 political goals of the Legislature without such an extreme approach to cracking Black voters in Northeast North Carolina.

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Dr. Barber treats the Legislature's decision to hold 12 districts constant and draw two relatively compact districts in Eastern North Carolina as a hard constraint that must be observed—something like a constitutional or statutory requirement. It is better understood as a choice made by the Legislature—one that is inconsistent with the approach taken only two years earlier. The crucial question is whether, in order to achieve the Legislature's stated political goal—a map where Republicans can expect an 11-3 advantage—it was necessary to minimize the BVAP in CD-1. A quick look at the draft maps considered by the Legislature in September of 2023 reveals that this is not the case. The draft maps from September 2024, which are included in the appendix of my Reply Report of October 17, 2024, demonstrate that it is possible to achieve an 11-3 Republican-leaning configuration without resorting to the stark racial effects of minimizing the BVAP of CD-1 of the 2025 Plan. These maps produce 11 solid Republican seats while producing a district in Eastern North Carolina with Black voting-age population above 38 percent.

And even if we were to accept the decisions of the Legislature and hold the boundaries of all districts other than Districts 1 and 3 fixed, the simulations presented above demonstrate that it was not necessary to reduce the BVAP of District 1 to anywhere near 32 percent to achieve their stated political goals.

V. CONCLUSIONS

My earlier reports focused largely on Mecklenburg County, where metropolitan Black voters were packed into District 12, and the Piedmont Triad, where metropolitan Black voters were extracted from former District 6 and divided across several non-compact, rural, predominantly white districts. In those reports, much of the focus was on the precise location of boundaries within split counties.

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communities in the Northeast to accomplish its newest stated goal of drawing an additional Republican seat. In each case, the observed racial sorting and dismantling of Black communities went beyond what appears necessary to achieve its professed political goals.

Executed on November 2018, 2025

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Jonathan Rodden

Errata to the Supplemental Expert Rebuttal Report of Dr. Jonathan Rodden, dated November 20, 2025

I am thankful to Dr. Barber for pointing out a problem with the underlying geographic boundary file used to conduct redistricting simulations in Eastern North Carolina in my Supplemental Rebuttal Report, dated November 18, 2025. In an effort to include the newest election results in my analysis, I created a new geographic boundary file for North Carolina VTDs. It did not include county identifiers, so I overlaid a geographic boundary file for counties and attempted to apply county identifiers to the VTDs. However, due to the representation of Albermarle Sound and the rivers, estuaries, and marshland in the county boundary file I used, some counties were given the wrong identifiers. This could indeed be a problem for conducting simulations, because as Dr. Barber pointed out, "the algorithm cannot minimize county divisions correctly." It is possible that a handful of plans may have allowed unnatural configurations, although it should be noted that none of the plans produced non-contiguous districts.

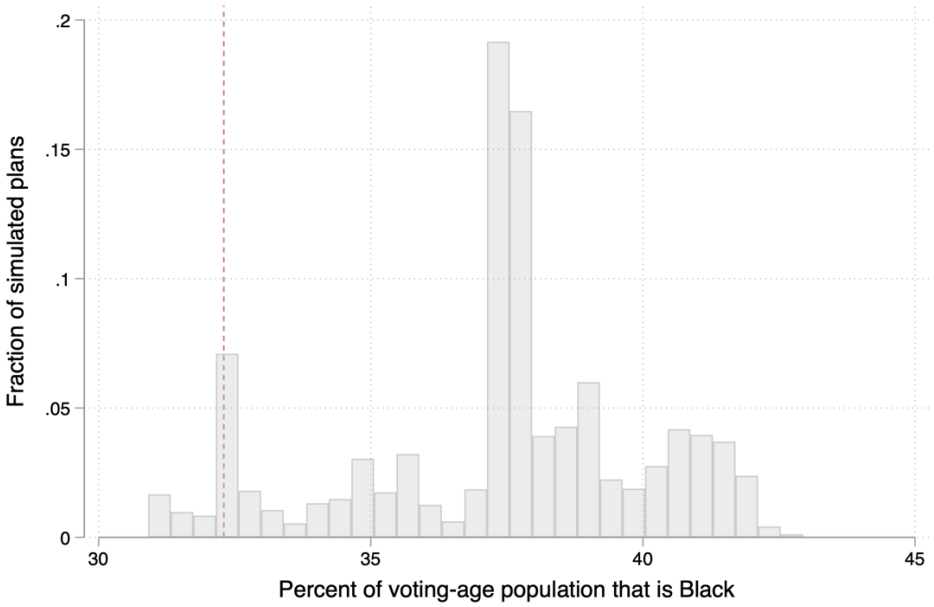
I have rectified this mistake by going back to exactly the VTD boundary files used by Dr. Barber in his original report, which includes correct county identifiers, and likewise, I use the same census and election data as Dr. Barber's original report, with election results up to the 2022 General Election.

Dr. Barber also points out a much smaller problem. I used a population equality standard that was relatively strict. This had the impact of reducing the diversity of the plans. That is to say, it was possible to optimize the parameters of the algorithm so that it discovers a wider range of plans with only a single county split than in the original ensemble I produced. I have slightly tuned the parameters so that the "resample efficiency" described by Dr. Barber is now above 96 percent, and there are now no discernible bottlenecks.

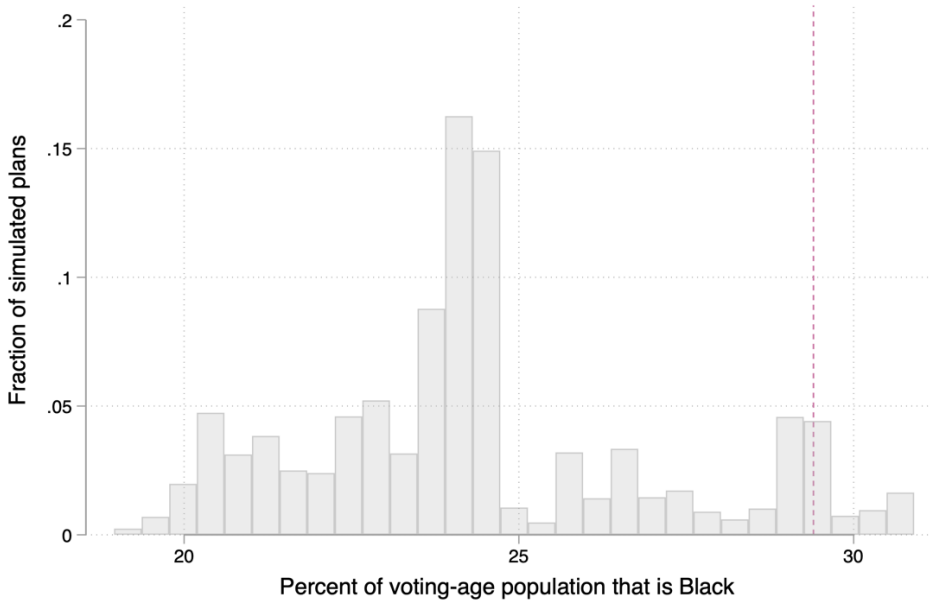
Using this new set of simulations, I reproduce the figures related to the simulations below. The inference drawn from these alternative simulations is the same as in my earlier report, although the numbers are slightly different. My previous report found that "a highest-ranked BVAP of 32.3 percent is indeed quite unusual in the ensemble of race-blind plans. Only around 4.9 percent of all plans have a similar or lower BVAP in their highest-ranked district." ECF No. 206-4 at 12. In the new simulations, that number is 3.8 percent. In my previous report, I wrote that in the ensemble of simulated plans, "the BVAP is higher in the second-ranked district than in all but 4.3 percent of the plans." *Id*. With the new simulations, this number is 4.1 percent.

I previously wrote that 1,429 simulated plans (around 29 percent of the ensemble) produced two Republican districts. *Id*. at 14. With the new simulations, the number is 1,002 (20 percent). I previously wrote that of those, 1,184 (around 83 percent) had a BVAP in the higher-ranked district greater than the 2025 Plan's District 1's BVAP of 32.3 percent. *Id*. That number is now 812 (81 percent). These are small differences, and they do not lead me to alter the conclusions in my earlier report.

Errata Figure 4a: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Highest* BVAP District



Errata Figure 4b: Histograms of BVAP in Ensemble of Two-District Eastern North Carolina Plans, *Lowest* BVAP District



Executed on November 20, 2025

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Jonathan Rodden