

Supplemental Report

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1 Background and assignment

I am a Professor of Mathematics and a Senior Fellow in the Jonathan M. Tisch College of Civic Life at Tufts University. I have previously submitted an expert report in the current case and have been asked by counsel to provide a supplement presenting the findings from a racial analysis of the voter registration database. In addition I am submitting updated block assignment files correcting the minor anomalies (a small number of mis-assigned census blocks) flagged by Mr. Bryan. None of these corrections has any material effect on any of the findings in my original report. The block assignment files are Appendices A, B, C, and D to this affidavit, and I understand that they will be provided to the court in native format.

2 Voter registration data

As noted in my report of December 20, 2021, a voter registration file can be a useful supporting tool for confirming that districts are indeed majority-Black in the manner most relevant to voting opportunity. The U.S. Census allows for multiple ways for an individual to identify as Black in combination with various other races and any ethnicity, but the Alabama voter registration process asks individuals to choose a single racial identity. We can then see, for each district, how many registered voters self-identified unambiguously as being Black.

I was provided with a voter registration file by counsel and asked to examine it and to determine the share of Black-identified individuals among the registered voters in each plan.

I first geocoded the addresses using the Mapbox API, then used the lat-long coordinates to identify a census block for each individual address in the voter file. (When an address is on the border between two census blocks, I choose one at random to make the assignment.) This allows me to tabulate the total registered population and active registered population in any larger geographical area defined by blocks, such as the districts in the respective plans. Within those totals, I can tabulate the subpopulation that is Black.

The total voting age population of Alabama in the 2020 Decennial Census is 3,917,166. The geolocated addresses in the Alabama voter registration file show a total registered population of 3,610,261, and an active registered population of 3,161,725.¹

¹There are 3,614,742 rows in the original file, of which 3494 have no address listing or a Nonstandard Physical Address. Among the remaining entries, there were 987 addresses that the Mapbox API was unable to geolocate. This is far too few to change the finding that CD2 and CD7 are majority-Black in each of the alternative plans. Active status is defined by the "Registrant Status" field in the voter file, which has each row coded A (active) or I (inactive).

Below, I first report the Black voting age population of each district in each plan using what I understand to be the preferred definition—individuals who checked the box indicating that they are Black or African-American on their census form. Alongside that, I record the share of people who self-identified as Black when registering to vote, in the full database (BRPOP%) and then among active registered voters (BARPOP%). This confirms that the alternative plans have two majority-Black districts by this functional definition as well as by Census demographics.

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CD	BVAP%	BRPOP%	BARPOP%
1	0.2561	0.2575	0.2566
2	0.3012	0.3023	0.2971
3	0.2499	0.2500	0.2431
4	0.0770	0.0776	0.0744
5	0.1806	0.1848	0.1714
6	0.1893	0.1869	0.1834
7	0.5526	0.5943	0.5983

Plan A

CD	BVAP%	BRPOP%	BARPOP%
1	0.1450	0.1397	0.1384
2	0.5137	0.5334	0.5297
3	0.2396	0.2442	0.2395
4	0.0830	0.0828	0.0801
5	0.1602	0.1662	0.1529
6	0.1544	0.1432	0.1374
7	0.5150	0.5515	0.5539

Plan B

CD	BVAP%	BRPOP%	BARPOP%
1	0.1573	0.1523	0.1502
2	0.5106	0.5311	0.5275
3	0.2228	0.2246	0.2198
4	0.1086	0.1082	0.1048
5	0.1566	0.1642	0.1504
6	0.1532	0.1467	0.1409
7	0.5024	0.5367	0.5404

Plan C

CD	BVAP%	BRPOP%	BARPOP%
1	0.1573	0.1523	0.1502
2	0.5006	0.5217	0.5188
3	0.1964	0.1951	0.1922
4	0.1103	0.1100	0.1067
5	0.1566	0.1642	0.1504
6	0.1551	0.1487	0.1433
7	0.5350	0.5690	0.5730


Plan D

CD	BVAP%	BRPOP%	BARPOP%
1	0.1536	0.1487	0.1466
2	0.5005	0.5193	0.5157
3	0.2396	0.2442	0.2395
4	0.0858	0.0845	0.0816
5	0.1602	0.1662	0.1529
6	0.1537	0.1426	0.1367
7	0.5173	0.5530	0.5553

Table 1: The enacted plan only has one majority-Black district, whether considering voting age population, registered voters, or active registered voters. All four alternative plans have two majority-Black districts by any of these ways of counting.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 27th day of December, 2021.



Moon Duchin