

**IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF FLORIDA**

CUBANOS PA'LANTE, *et al.*,

*Plaintiffs,*

v.

Case No. 1:24-cv-21983-JB

FLORIDA HOUSE OF REPRESENTA-  
TIVES, *et al.*,

*Defendants.*

**EXPERT REPORT OF CORY McCARTAN, Ph.D.  
March 21, 2025  
CONFIDENTIAL**

**I. INTRODUCTION AND SCOPE OF WORK**

1. My name is Cory McCartan, Ph.D., and I am an Assistant Professor of Statistics and a faculty affiliate in Political Science at the Pennsylvania State University. Among other areas, I specialize in the study of legislative redistricting in the United States.

2. I have been retained by counsel representing the Plaintiffs to redraw a portion of the Florida House district map corresponding to enacted districts 112–116 and 118–119, and a portion of the Florida congressional district map corresponding to enacted district 26, while complying with all other statutory and constitutional districting standards. My methodology in redrawing these districts is described in Section IV.

**II. QUALIFICATIONS**

3. I have a B.A. in mathematics from Grinnell College (2019) and an M.A. (2021) and Ph.D. (2023) from Harvard University in statistics. My research focuses on developing and applying

statistical methodology to problems in the social sciences. Specifically, I have extensively studied redistricting in the United States, publishing eight peer-reviewed journal articles and working papers related to redistricting in the last four years.

4. As part of my redistricting research agenda, I have developed a simulation algorithm (the “SMC algorithm”) that can generate many randomly sampled redistricting plans.<sup>1</sup> I have also developed and continue to maintain a variety of open-source software packages for using census data and studying redistricting plans.

5. I have previously submitted expert reports and testified by trial or by deposition in five other cases:

- *GRACE v. City of Miami*, No. 1:22-cv-24066 (S.D. Fla. 2022), involving city commission districts. I testified at trial and by deposition regarding the demographic and geographic features of the districts.
- *Nairne v. Ardoin*, No. 3:22-cv-00178 (M.D. La. 2022), involving state legislative districts and the Voting Rights Act. I testified at trial and by deposition regarding the proper use of redistricting simulation tools.
- *Callais v. Landry*, No. 3:24-cv-00122 (W.D. La. 2024), involving congressional districts and alleged racial gerrymandering. I testified at trial and by deposition regarding the proper use of redistricting simulation tools.
- *McClure v. Jefferson County Commission*, No. 2:23-cv-00443-MHH (N.D. Ala. 2023), involving alleged racial gerrymandering of county commission districts. I testified by deposition and at trial about redistricting simulations investigating the alleged gerrymandering.

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<sup>1</sup>Cory McCartan and Kosuke Imai, “Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans,” *Annals of Applied Statistics* 17, no. 4 (2023): 330–3323.

- *Nord Hodges v. Albritton*, No. 8:24-cv-00879 (M.D. Fla. 2024), involving state legislative districts. I testified by deposition regarding several illustrative plans I developed.

6. A copy of my curriculum vitae, detailing my experience and qualifications, including a list of all publications authored in the last 10 years, is attached as Exhibit A. I am being compensated for my work on this report at an hourly rate of \$125 per hour. No part of my compensation depends on the outcome of this case or on the opinions that I provide.

### **III. SOFTWARE AND DATA**

7. Counsel for the Plaintiffs provided me with block assignment files for the current Florida House and congressional district maps, but with several districts completely removed. Districts 112–116 and 118–119 were removed from the House map, and district 26 was removed from the congressional map.<sup>2</sup> I was not provided with and did not consult the enacted boundaries for these removed House districts.

8. I loaded these partial block assignment files into Dave’s Redistricting App (DRA), redistricting software developed by a non-partisan group of volunteers. I then drew new districts in the unassigned areas and made adjustments to other districts as needed to comply with districting standards, as described below.

9. The software includes 2020 decennial census data about total population, as well as the geographic boundaries of counties, municipalities, census Voting Tabulation Districts, and census blocks. I used these data in drawing the illustrative plans.

10. To produce the boundary score values for this report, I used the Florida Legislature’s

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<sup>2</sup>Although this did not have the effect of de-identifying the enacted District 26, of course.

online redistricting software, version 2.36.<sup>3</sup>

11. To produce the maps and compactness calculations for this report, I also downloaded Census block shapefiles from the U.S. Census Bureau. All compactness calculations were performed with the `redistmetrics` software that I have helped develop.<sup>4</sup>

#### **IV. METHODOLOGY**

12. I have drawn seven illustrative House plans and six illustrative congressional plans.

13. As instructed by counsel for the Plaintiffs, my goals in drawing the illustrative plans were to comply with both tiers of Florida constitutional standards for redistricting to the greatest extent possible. I was provided with a memorandum from Senator Ray Rodrigues, to Jay Ferrin, Staff Director of the Florida Senate's Committee on Apportionment, which contained detailed interpretations of these constitutional criteria.

14. In drawing the illustrative plans, I consulted no partisan or racial data.

##### **A. House Districts**

15. The first illustrative House Plan A1 is shown in Figure 1a. No area outside of any of the maps shown below has been adjusted from the enacted plan. It assigns the remainder of Hialeah, as well as Miami Springs, Virginia Gardens, and the Miami International Airport, to District 112, with Flagler Street in Miami its southern boundary. District 113 consists of central Miami and extends south to US 1 and the Rickenbacker Causeway. The southern boundary of District 108 was brought south to the MacArthur Causeway, and as a result the boundary of District 109 in downtown Miami was adjusted to balance district populations. District 114 consists of Coral Gables,

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<sup>3</sup>Available at <https://web.floridaredistricting.esriemcs.com/redistricting/>.

<sup>4</sup>Christopher T. Kenny et al., "Redistmetrics: Redistricting Metrics" (Available at <https://CRAN.R-project.org/package=redistmetrics>, 2021).

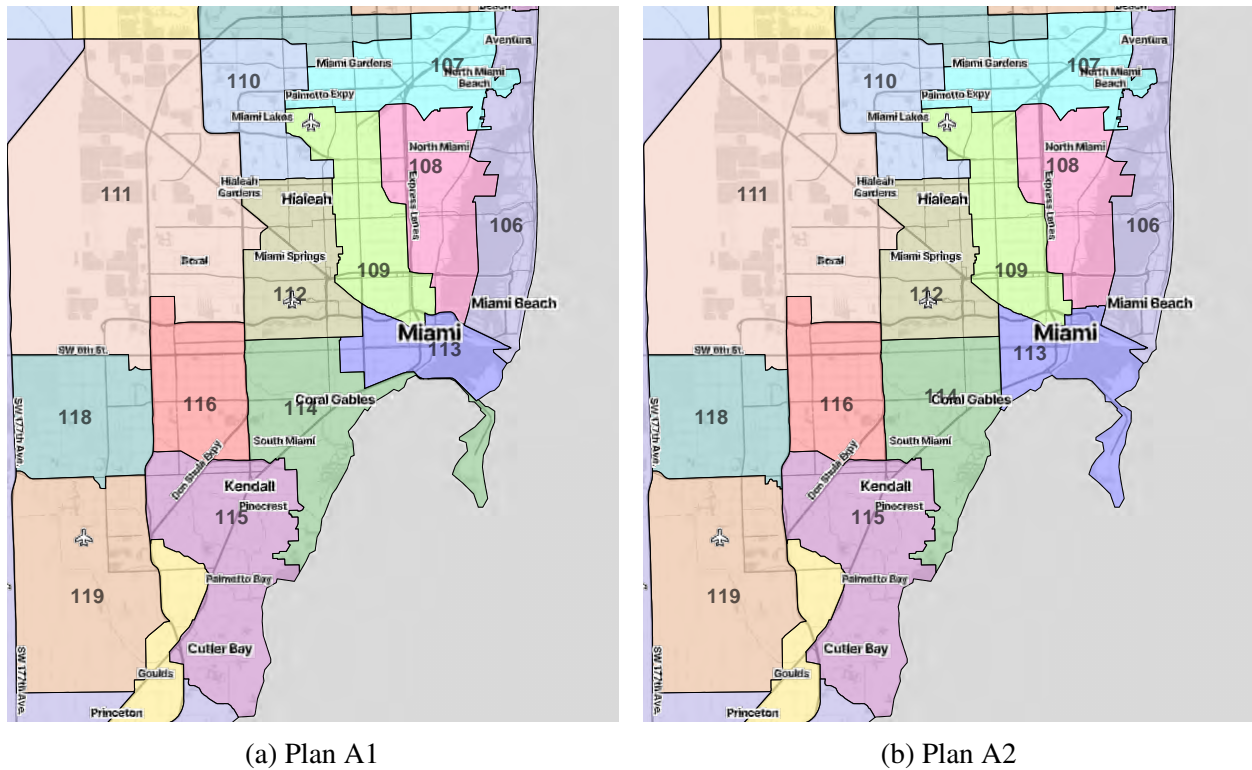


Figure 1: Illustrative House plans A1–A2.

the remainder of Miami, Key Biscayne, West Miami, and South Miami. Its western border aligns with that of District 112. District 115 includes the cities of Pinecrest, Palmetto Bay, and Cutler Bay, and the area north of District 117 up to roughly the Snapper Creek expressway, extending west to the Florida Turnpike, which also marks the western boundary of District 116. Districts 116–119 were drawn to be as compact as possible while remaining within acceptable population bounds. No population was moved into or out of District 117 in this plan or any of the illustrative plans.

16. Illustrative Plan A2, shown in Figure 1b, differs from Plan A1 in assigning Key Biscayne to District 113. This allows the western boundary of that district to be straightened to a single north-south line along 27th Ave. in Miami. Adjustments to the boundaries in and around downtown Miami were then required to balance populations.

17. Figure 2 shows illustrative House Plan B. Unlike Plans A1 and A2, where the city of

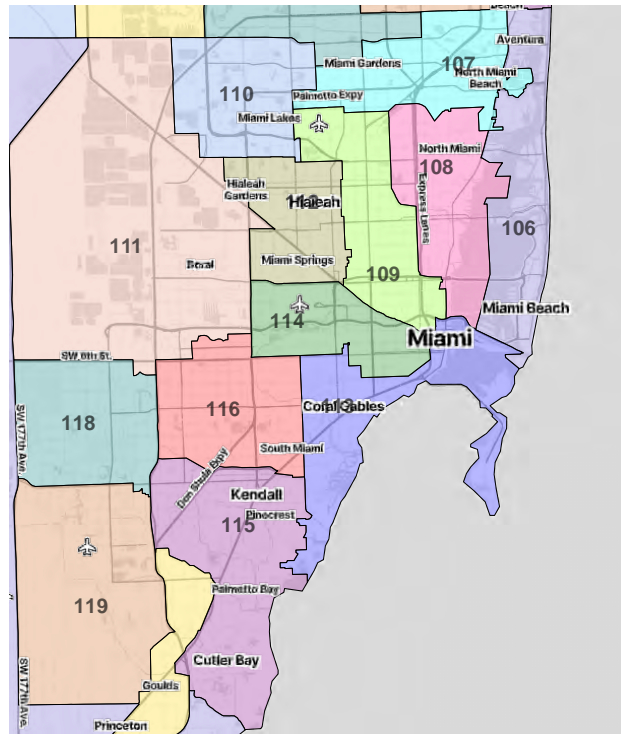


Figure 2: Illustrative House Plan B

Miami is part of five different House districts, in Plan B Miami is split across only four districts. To do so, District 112 of Plan A1 was pushed northward to include more of Hialeah and exclude the Miami International Airport. This necessitated adjustments to Districts 110 and 111. District 114 was moved inland to include the Miami International Airport, with the Miami River forming its northeastern boundary. District 113 was extended up the coast, including downtown Miami. The configuration of Districts 115–116 and 118–119 remained very similar.

18. Figure 3 shows illustrative House Plans C1–C4. These four plans reconfigure Districts 110–112 by making the Miami canal (or immediately neighboring city boundaries) the dividing line between District 111 and Districts 110 and 112. This change enables additional map configurations that keep the city of Miami within just four House districts.

19. Plan C1, shown in Figure 3a, presents a different configuration for Districts 113 and 114, improving on compactness and the utilization of consistent major roadways, but splitting

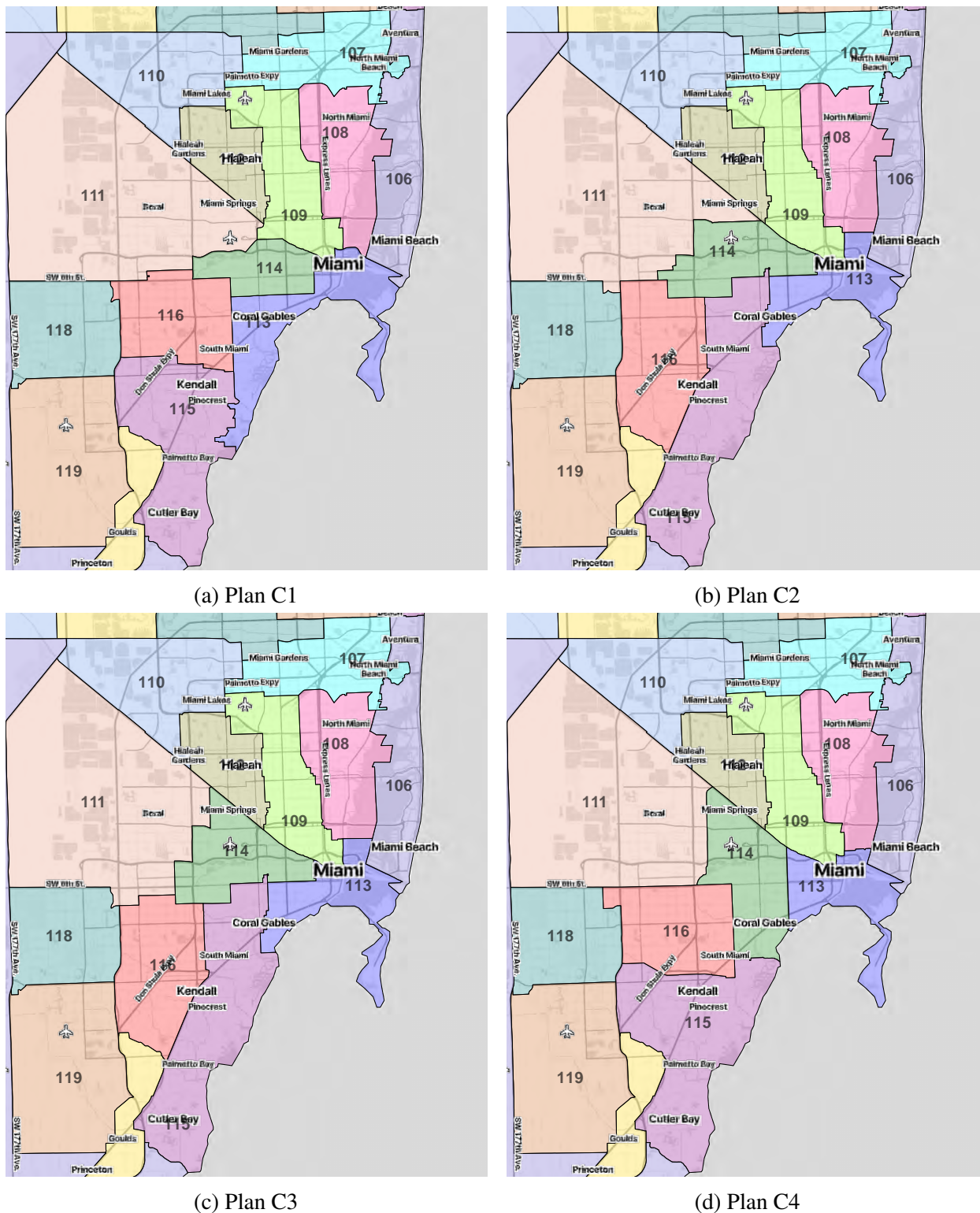


Figure 3: Illustrative House plans C1–C4.

Coral Gables. This straightens the boundary between the two districts. As before, adjustments to Districts 108 and 109 are required to balance populations. The configuration of Districts 115–116 and 118–119 remains very similar.

20. Plan C2 in Figure 3b differs from Plan C1 in extending District 115 north along the coast, placing the whole of South Miami, Coral Gables, Pinecrest, Palmetto Bay, and Cutler Bay in the same district. District 113 takes the coastal portions of Miami, along with Key Biscayne, much like Plan A2. This leaves District 114 to occupy the rest of the city of Miami, as well as the Miami International Airport. District 116 fills the space between the Florida Turnpike and the Palmetto Expressway.

21. Plan C3 in Figure 3c is similar to Plan C2, but with a different configuration of District 111, 114, and 116.

22. Plan C4 in Figure 3d is similar to Plan C1, but splits Coral Gables east-west along SW 72nd Street (Sunset Drive) and the Coral Gables Waterway. This allows for a clean north-south boundary between District 113 and 114 along 27th Avenue, creating a very compact District 116.

## **B. Congressional Districts**

23. The Everglades is a significant natural boundary between cities and other population centers on the east and west coasts of Florida. Additionally, in South Florida, the east and west coasts are separated along county lines. Thus, in following the constitutional standard regarding the use of geographic and political boundaries, and the guidance laid out in the Senate memo, all of the plans I present here respect the major geographic boundary of the Everglades, as well as the political boundary that separates Collier and Hendry counties from Monroe, Miami-Dade, Broward, and Palm Beach counties. This choice necessitates altering the boundaries of districts other than District 26. The illustrative congressional plans are presented here in order of an increasing number

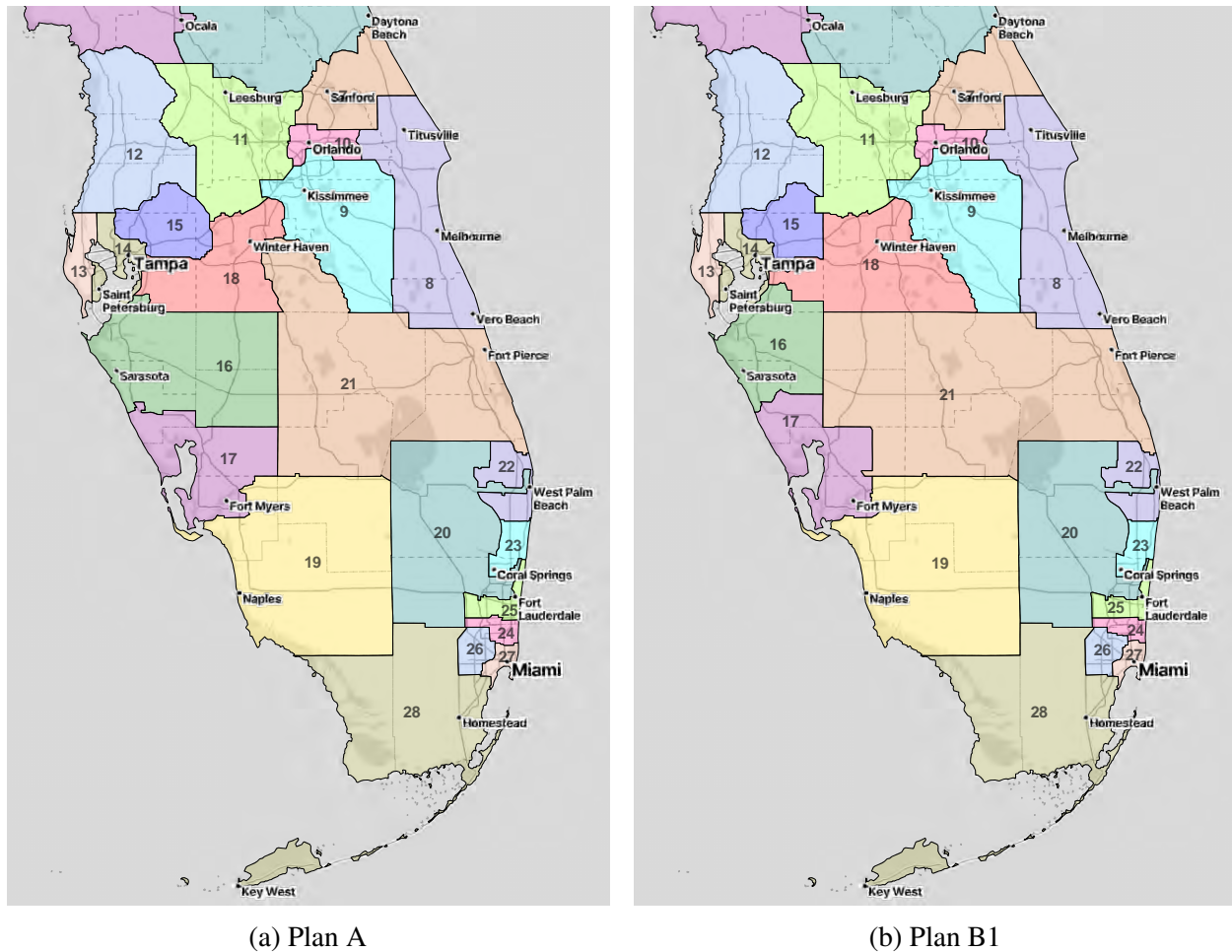


Figure 4: Illustrative congressional plans A–B1.

of changed districts from the enacted plan. While it is possible to change a relatively small number of districts, as in illustrative Plan A, this can lead to inconsistent application of Tier 2 standards across the map; changing more districts can therefore allow districts to better achieve Tier 2 goals. No area outside of any of the maps shown below has been adjusted from the enacted plan.

24. The first illustrative congressional Plan A is shown in Figure 4a. I drew District 28 to include Monroe County and southern Miami-Dade County. District 27 was drawn within Miami-Dade County, including the whole cities of Miami, Miami Beach, and Coral Gables. District 26 lies to its west and includes Doral and Hialeah. I adjusted District 24 northwards; it covers the

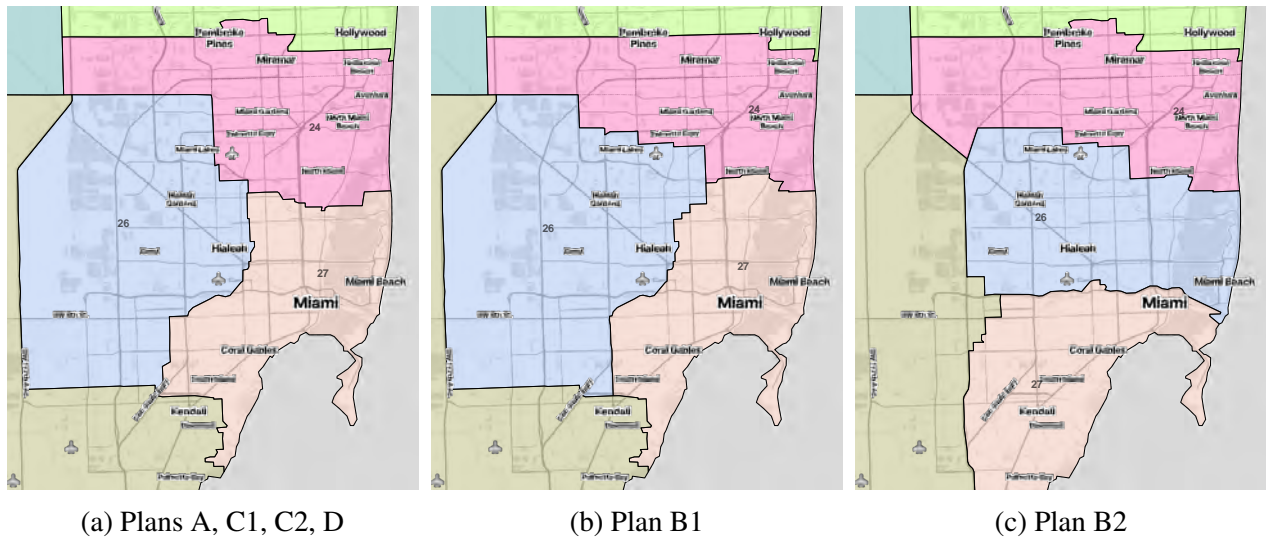


Figure 5: Three configurations of districts in Miami–Dade county present in the illustrative congressional plans.

remainder of Miami-Dade County and the southern portion of Broward County, including Miramar and a portion of Pembroke Pines. I then extended the northern border of District 25 north to the Palm Beach-Broward county line. This required minor adjustments to District 20 to ensure population balance. Districts 23 and 22 likewise had to be moved northwards, with District 22 almost filling the remainder of Palm Beach County, with the exception of a part of the city of Jupiter. District 21 then expanded inland to include Okeechobee, Glades, and Highlands counties, and part of Polk County. I could then adjust District 18 to lie within Polk and Hillsborough counties, and District 16 to include the remainder of Hillsborough County, along with Manatee, Hardee, and DeSoto counties, and Sarasota County north of the city of Venice. Districts 17 and 19 were then adjusted southwards, so that District 19 included Collier County and southern Lee County, outside of Fort Myers. All of these adjustments respected the natural geographic boundaries separating the eastern and western coasts, avoided splitting incorporated municipalities and counties where possible, made districts compact, and otherwise used major geographic and political boundaries in drawing the districts.

25. Plan B1, shown in Figure 4b, is similar to Plan A, but makes further adjustments to

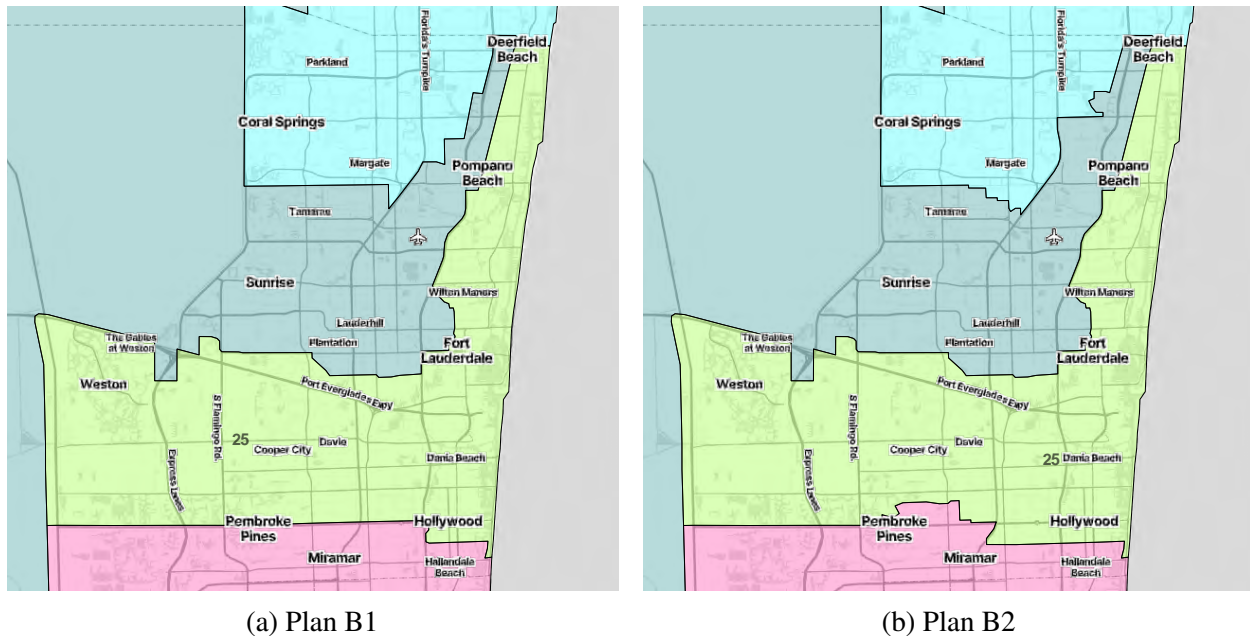


Figure 6: Illustrative congressional plans B1–B2 in Broward County.

reduce the total number of county splits and improve compactness. First, I adjusted the boundaries of Districts 26–28 in Miami-Dade county, and District 24, to make District 24 and 27 more compact. Then, rather than having District 21 extend into Polk County, I moved Hardee and DeSoto counties into District 21 and extended a portion of the district into eastern Charlotte County to equalize population. This left District 18 to fill Polk County. I removed an unnecessary split of Polk County by removing District 15 from the county and extending its southern boundary farther south in Hillsborough County. I then adjusted the remaining districts, including District 11, 16, 17, and 19, to reflect these other changes and balance population.

26. Plan B2 differs from Plan B1 in two ways: the districts that overlap Miami-Dade county, and the configuration of District 20. As shown in Figure 6b, I adjusted the lower “spur” of District 20 in Plan B2 to keep the city of Pompano Beach split across only two, rather than three districts, and remove a split of the city of Margate. Inside Miami-Dade, as shown in Figure 5c, District 27 in Plan B2 is nearly identical to the enacted District 27, which splits the city of Miami.

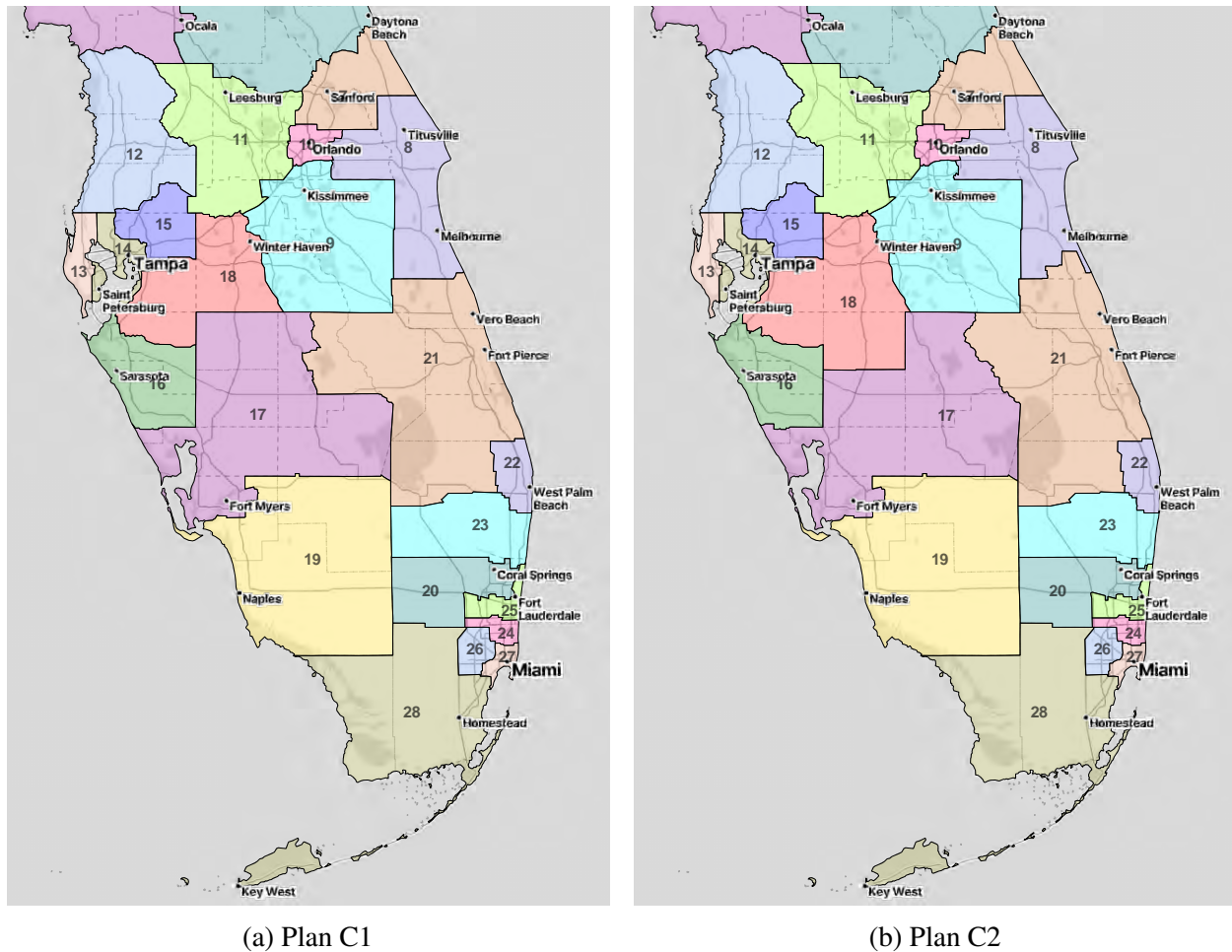


Figure 7: Illustrative congressional plans C1–C2.

District 26 separates Districts 24 and 27 and runs between the Florida Turnpike in the west to the ocean on the east. These changes also resulted in a configuration of the northern boundary of District 24 that is very similar to Plan A.

27. Plans C1 and C2, shown in Figure 7, change additional districts beyond those altered in Plans B1 and B2, to further reduce municipality and county splits and increase compactness. Plan C1, shown in Figure 7a, moves Indian River County into District 21 from District 8, allowing District 21 to have a western border in Highlands County, rather than in Polk or Charlotte. This required adjusting District 8–10, which allows for a more compact configuration of District 10.

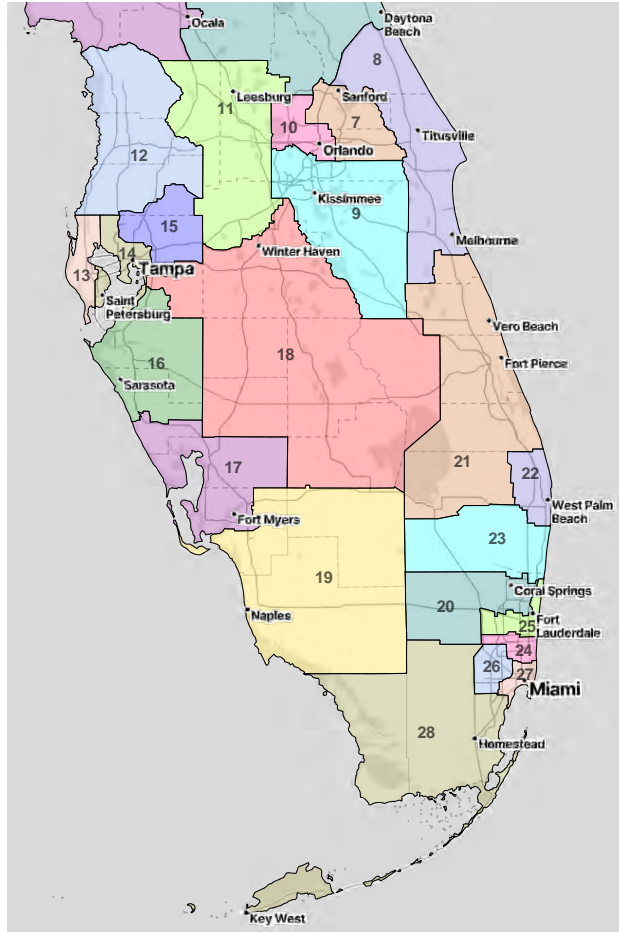


Figure 8: Illustrative congressional Plan D

It also allows District 16 to be contained only within Manatee and Sarasota counties, rather than extending into Hillsborough County. Finally, Plan C1 also adjusts District 20 to be contained wholly within Broward County. This required significant adjustments to Districts 21–23.

28. Plan C2 differs from Plan C1 in the configuration of District 21. In it, District 21 terminates at Okeechobee County, removing the split of Highlands County, and then extends north into Brevard County to balance population. This requires adjustments to Districts 8–10 and 16–18.

29. Finally, Plan D, shown in Figure 8, provides a possible alternative configuration that also changes District 7 from the enacted plan. It does so starting from Plan B1 and limiting District 21 to Martin, St. Lucie, Indian River, and Brevard counties. This has the effect of pushing District

8 up the coast to the border with District 6, which was also adjusted, allowing District 7 to move inland, covering the entirety of Seminole County and part of Orange County. I then adjusted District 10 to include the northwest corner of Orange County, and District 9 to include the remainder of the county. These changes allowed District 18 to contain a larger portion of Polk County, as well as the entirety of Glades, Okeechobee, Highlands, DeSoto, and Hardee counties. I chose to straighten the boundary between Districts 11 and 18 in Polk County, which had the effect of splitting more municipalities, given the extremely irregular municipality borders in that region of the state. Overall, Plan D presents a plan that improves on compactness and eliminates unnecessary county splits compared to other plans.

## **V. PLAN CHARACTERISTICS**

30. To help understand how the illustrative plans comply with the requirements of the Florida constitution, this section reports various summary statistics measuring traditional redistricting criteria.

### **A. Population Balance**

31. My changes to the House districts in the illustrative plans kept all district populations within the same range as the enacted plan. My changes to the congressional districts kept all districts at mathematically exact equality. Population statistics for the illustrative and enacted plans are contained in Appendix A.

### **B. County and municipality splits**

32. Tables 1 and 2 report statistics on the county and municipality splits of the illustrative and enacted plans. Columns labeled “Split 1+” count the number of counties or municipalities split across more than one district. Columns labeled “Split 2+” count the number of counties or

municipalities split across more than two districts. Columns labeled “Total splits” count the total number of splits across all counties or municipalities. Counts for the House plans are restricted to Miami–Dade County, since the only changes to the enacted plan were in that county.

Plan	Municipalities		
	Split 1+	Split 2+	Total splits
HD-A1	5	3	10
HD-A2	5	3	10
HD-B	6	2	9
HD-C1	6	2	9
HD-C2	5	2	8
HD-C3	5	2	8
HD-C4	6	2	9
HD-Enacted	5	3	10

Table 1: Municipality splits for illustrative and enacted House plans within Miami–Dade county.

33. All of the House plans split 5 or 6 municipalities in Miami–Dade County, compared to 5 for the enacted plan. All split 2 or 3 municipalities more than once, compared to 3 for the enacted plan. The total number of municipality splits ranges from 8–10 in the illustrative plan, compared to 10 in the enacted plan.

34. Thus the illustrative plans respect municipality boundaries at least as well as the enacted plan, and in some cases better. Plans C2 and C3 are strict (Pareto) improvements over the enacted plan in terms of county and municipality splits.

35. The illustrative congressional plans split between 17 and 19 counties, compared to 17 in the enacted plan, but all split only 6 counties more than once, compared to 7 in the enacted plan. Total county splits range from 27–30 in the illustrative plans, compared to 29 in the enacted plan.

36. The illustrative congressional plans split between 11 and 16 municipalities, compared

to 16 in the enacted plan, but all split between 1 and 3 municipalities more than once, compared to 4 in the enacted plan. Total municipality splits range from 13–19 in the illustrative plans, compared to 20 in the enacted plan.

Plan	Counties			Municipalities		
	Split 1+	Split 2+	Total splits	Split 1+	Split 2+	Total splits
CD-A	17	6	30	15	2	17
CD-B1	18	6	29	16	3	19
CD-B2	18	6	29	15	2	17
CD-C1	19	6	28	11	1	13
CD-C2	19	6	28	12	1	14
CD-D	18	6	27	13	1	14
CD-Enacted	17	7	29	16	4	20

Table 2: County and municipality splits for illustrative and enacted congressional plans.

37. All the illustrative plans respect county and municipality boundaries at least as well as the enacted plan, and in most cases better. Plans B1, B2, C1, C2, and D are Pareto improvements over the enacted plan in terms of total county and municipality splits.

### C. Boundary Scores

38. In addition to county and municipality splits, another way to measure the tier two requirement that districts “utilize existing political and geographical boundaries” is using a specific numerical score developed by the Legislature and included in its online redistricting software. This “boundary score” measures the fraction of each district’s boundary (in terms of length) that coincides with a set of boundaries chosen by the Legislature’s software: certain bodies of water, certain roads (including state and federal highways), county and municipality boundaries, and railroads. The boundary scores can be further summarized by looking at the fraction of the boundary that does *not* fall into one of these categories.

39. The calculated boundary scores are summarized in Table 3 for the challenged districts.

The table averages the boundary scores across the redrawn areas for each type of boundary. The full boundary scores are reported in Appendix B.

Plan	Mean Boundary Score					
	City	County	Road	Water	Rail	Other
House (Districts 108–116 and 118–119)						
HD-A1	29.7%	2.9%	52.0%	25.4%	0.8%	8.0%
HD-A2	30.5%	3.3%	47.5%	28.5%	0.1%	10.0%
HD-B	40.4%	3.5%	42.9%	19.7%	0.4%	15.2%
HD-C1	39.5%	3.3%	45.4%	24.5%	1.1%	11.8%
HD-C2	39.8%	3.5%	39.7%	26.1%	0.4%	15.5%
HD-C3	40.2%	3.5%	39.6%	26.5%	0.4%	15.4%
HD-C4	38.4%	3.5%	39.3%	33.2%	1.0%	11.7%
HD-Enacted	30.6%	3.5%	42.5%	24.6%	0.9%	16.7%
Congressional (Districts 5–11, 15–28)						
CD-A	19.4%	45.4%	20.8%	31.8%	1.3%	14.4%
CD-B1	16.9%	46.7%	19.9%	33.7%	0.8%	14.5%
CD-B2	16.2%	46.5%	19.8%	35.4%	0.9%	13.9%
CD-C1	20.0%	47.9%	17.8%	30.7%	1.5%	14.0%
CD-C2	20.3%	48.7%	17.6%	31.3%	1.4%	14.2%
CD-D	20.3%	52.2%	16.3%	35.1%	0.5%	11.9%
CD-Enacted	16.1%	51.3%	20.0%	34.4%	0.9%	13.5%

Table 3: Mean boundary scores in redrawn areas districts for each illustrative plan and the enacted plan. Not all listed districts were changed in every plan.

40. Every single illustrative House plan improves on the overall boundary score (i.e., has a lower “Other” boundary score) in the challenged districts compared to the enacted plan.

41. The overall boundary scores for the illustrative congressional plans are similar, on average, in the enacted districts, ranging from 11.9% to 14.5% for the “Other” score, compared to 13.5% for the enacted plan. The boundary scores are also similar for roads, water, and rail boundaries. The illustrative plans have much higher city boundary scores, and lower county boundary scores, due to the different configuration of District 26 in all of the illustrative plans compared to the enacted plan.

**D. Compactness**

42. Compactness can also be measured numerically in a number of ways. The Legislature has historically used three specific compactness measures: the Polsby–Popper score, the Reock score, and the Convex Hull score. These scores are the ones calculated by the Legislature’s online redistricting software. The Polsby–Popper score compares the area of a district to the area of a circle with the same perimeter. The Reock score compares the area of a district to the area of the smallest circle that can cover the entire district. Informally, the Convex Hull score compares the area of a district to the area covered by a rubber band stretched around the edge of the district. For all three scores, larger values indicate greater compactness.

43. None of the scores is perfect, and each can be affected to a greater or lesser extent by natural boundaries, such as irregular and meandering rivers or the inclusion of large areas of coastal waters. Moreover, changes in one district can affect compactness scores of surrounding districts in different amounts. It can therefore be helpful to average compactness scores across districts as a summary measure.

Plan	House			Plan	Congressional		
	Polsby–Popper	Reock	Convex Hull		Polsby–Popper	Reock	Convex Hull
HD-A1	0.0087	0.0032	−0.0015	CD-A	−0.0038	0.0061	0.0035
HD-A2	0.0099	0.0034	0.0000	CD-B1	−0.0019	0.0132	0.0079
HD-B	0.0108	0.0063	0.0005	CD-B2	−0.0014	0.0142	0.0050
HD-C1	0.0108	0.0030	0.0011	CD-C1	0.0139	0.0295	0.0102
HD-C2	0.0102	0.0026	0.0007	CD-C2	0.0104	0.0289	0.0135
HD-C3	0.0111	0.0041	0.0009	CD-D	0.0015	0.0068	0.0086
HD-C4	0.0133	0.0035	0.0024				

Table 4: Difference in average compactness scores from the enacted plan.

44. Table 4 reports the difference in the compactness scores, averaged across all districts,

between the illustrative plans and the enacted plan. Positive values, colored blue, indicate a plan that has higher compactness scores than the enacted plan, on average. Negative values, colored gold, indicate the opposite.

45. Every illustrative House plan has a higher average compactness score than the enacted plan, across all three numerical compactness measures, with the exception of Plan A1 for the Convex Hull measure.

46. Every illustrative Congressional plan has a higher average Reock score and a higher Convex Hull score than the enacted plan. Three of six plans have a higher average Polsby–Popper score, with the largest negative difference being  $-0.0038$  for Plan A.

47. Overall, the illustrative House and congressional plans score as well or higher than the enacted plan, on average, on the Legislature’s three preferred compactness measures.

48. Additionally, based on my experience, and comparing the redrawn challenged districts in each illustrative map to other districts drawn by the legislature, the redrawn illustrative districts are visually compact.

#### **E. Summary**

49. The illustrative plans perform similarly to or better than the enacted plan in terms of the traditional redistricting criteria of population balance, county and municipality splits, and geographic compactness.

### **VI. COMPARISONS TO DISTRICTS DRAWN BY LEGISLATURE**

50. I also reviewed the entire set of legislative and congressional districts, and compared the choices I made in drawing the illustrative plans to those made by the Florida Legislature in drawing other districts not changed by the illustrative plans here. This section reports my findings

from these comparisons.

51. All of the illustrative congressional plans preserve the Everglades as a significant geographic boundary, including specifically the boundary between Collier and Miami–Dade counties. This approach is shared by the enacted House and Senate plans, where these boundaries are not spanned by any district.

52. All of the illustrative congressional plans place District 26 in the northwest populated portion of Miami–Dade county. In five of the six plans, Krome Avenue forms its western boundary and the county line forms its northern boundary. This approach is shared by the enacted Senate plan, with District 39 configured very similarly.

53. Congressional Plans C1 and C2 redraw District 20 to lie wholly within Broward County. In comparing this change to past changes in previous rounds of redistricting, I found several similar examples involving re-drawing of protected districts to lie in fewer counties. For example, Senate District 29 in the 2002 plan, which had encompassed portions of Broward and Palm Beach counties that overlap with Congressional District 20, was redrawn to lie wholly within Broward County in the 2012 plan as District 31. Senate District 39 in the 2012 plan was redrawn to lie wholly within Miami–Dade County in the 2022 plan as District 38. Congressional District 20 itself was redrawn in 2012 to span three counties (down from five in the 2002 plan), and again in 2016 to span just two counties.

54. All of the illustrative congressional plans redraw District 21 to include more area inland, in order to equalize populations. This is consistent with the configuration of Senate District 29 in the enacted plan, which covers Glades, Highlands, and Okeechobee counties.

55. Some of the illustrative congressional plans utilize more regular boundaries in Polk county than the enacted plan, splitting more municipalities while keeping districts compact. The

approach in these illustrative plans is similar to the approach taken in the enacted Senate plan, where the boundary between Senate Districts 12 and 27 is quite regular, and cuts through the irregularly shaped municipalities of Lake Wales, Lakeland, and (unpopulated regions of) Winter Haven.

56. Illustrative congressional Plans A, B1, B2, and D contain a District 22 that wraps around an appendage of District 20, reducing its compactness. A similar wrap-around configuration is present in the enacted Senate Districts 4 and 5, and House Districts 117 and 120.

57. District 25 in all of the illustrative congressional plans contains the entire coastline of Broward County. This mirrors the approach taken in the enacted Senate plan, where District 37 contains the entire coast.

58. The illustrative House Plans C1 and C4 split the city of Coral Gables east–west. A similar split appears in the enacted Senate plan, involving Districts 36 and 38.

59. Overall, I find that various choices about district configurations made by the illustrative plans are consistent with those made by the Legislature in other districts or other plans.

## **VII. MAP OF HISPANIC VOTING-AGE POPULATION**

60. After completing the bulk of the drawing and analysis of the illustrative maps presented in this report, I was asked by counsel for the Plaintiffs to produce two additional maps, included as Figure 9 and Figure 10, showing the Hispanic voting-age population in the area of enacted congressional Districts 26–28, and in the area of enacted House Districts 110–118 and 119, with the enacted district boundaries overlaid. In producing these maps, I for the first time accessed demographic data other than total population counts.

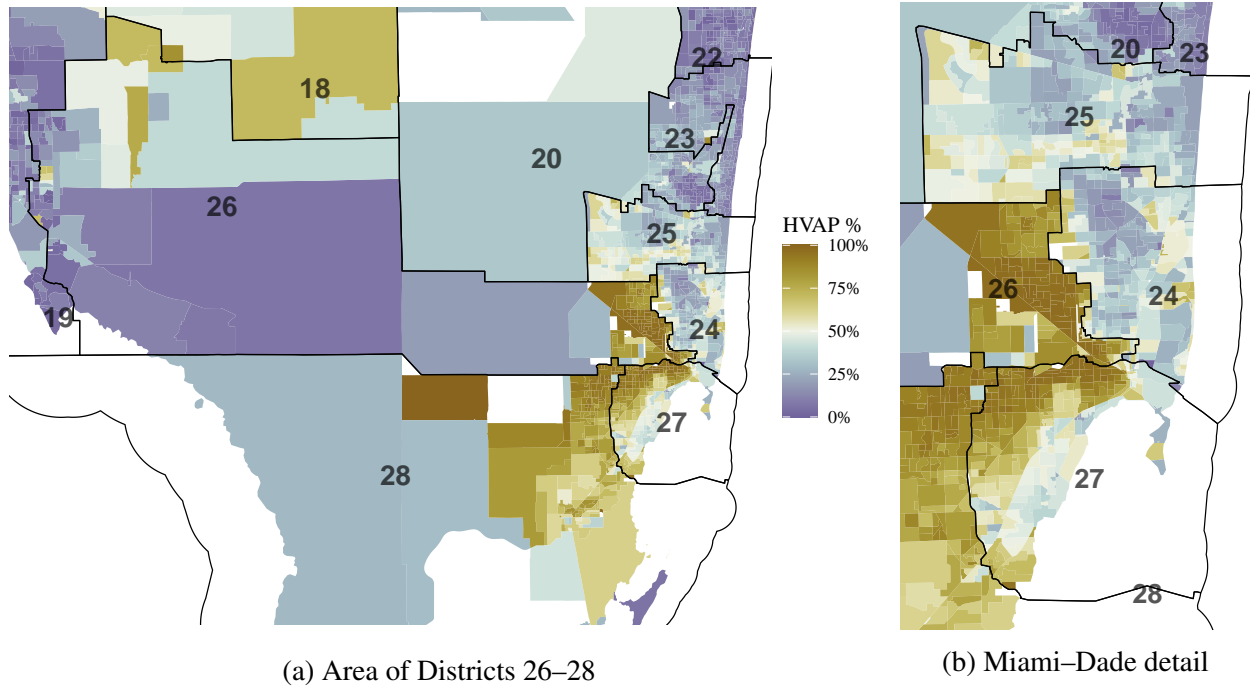


Figure 9: Hispanic fraction of the voting-age population in each voting tabulation district (VTD; with split VTDs separated).

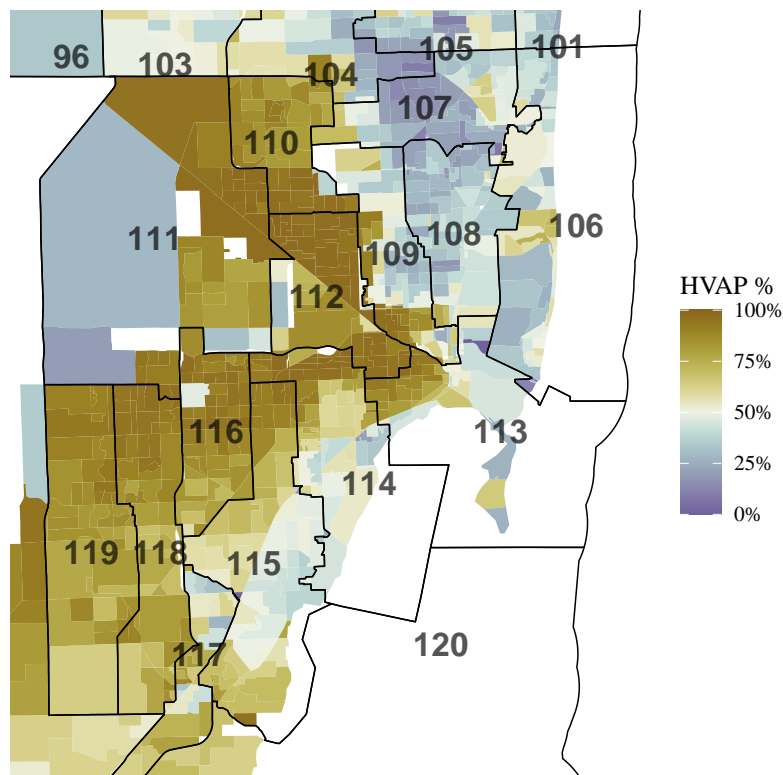
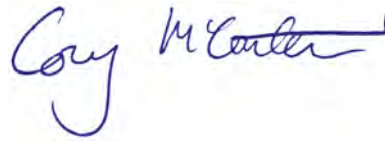


Figure 10: Hispanic fraction of the voting-age population in each voting tabulation district in the area of Districts 110-118 and 119

My work in this matter is ongoing, and I reserve the right to supplement this analysis in the future.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed this 21st day of March, 2025.

A handwritten signature in blue ink, reading "Cory McCartan". The signature is written in a cursive style with a large, stylized "C" and a horizontal line extending from the end.

Cory McCartan, Ph.D.

# **APPENDICES**

**A. POPULATION STATISTICS**

District	Plan							
	HD-A1	HD-A2	HD-B	HD-C1	HD-C2	HD-C3	HD-C4	HD-Enacted
108	182,430	183,435	183,035	183,094	183,706	183,706	183,355	181,345
109	183,568	183,579	183,147	183,237	183,711	183,711	183,517	183,366
110	178,199	178,199	177,623	183,144	183,144	183,144	183,144	178,199
111	182,999	182,999	182,332	180,564	176,382	178,405	181,380	182,977
112	182,260	182,260	183,152	183,726	183,726	183,726	183,726	179,362
113	181,246	182,852	182,908	182,272	183,634	183,634	183,178	182,742
114	182,802	180,180	182,898	183,347	179,026	183,545	183,547	181,962
115	181,499	181,499	180,270	180,406	182,283	180,677	179,727	183,386
116	182,747	182,747	182,385	176,699	182,138	175,941	181,712	182,984
118	182,413	182,393	183,327	183,643	182,382	183,643	179,498	183,694
119	183,509	183,529	182,595	183,540	183,540	183,540	180,888	183,655

Table 5: District populations for House plans.

District	Plan						
	CD-A	CD-B1	CD-B2	CD-C1	CD-C2	CD-D	CD-Enacted
1	769,221	769,221	769,221	769,221	769,221	769,221	769,221
2	769,221	769,221	769,221	769,221	769,221	769,221	769,221
3	769,221	769,221	769,221	769,221	769,221	769,221	769,221
4	769,221	769,221	769,221	769,221	769,221	769,221	769,221
5	769,221	769,221	769,221	769,221	769,221	769,221	769,221
6	769,221	769,221	769,221	769,221	769,221	769,221	769,221
7	769,221	769,221	769,221	769,221	769,221	769,221	769,221
8	769,221	769,221	769,221	769,221	769,221	769,221	769,221
9	769,221	769,221	769,221	769,220	769,220	769,221	769,221
10	769,221	769,221	769,221	769,221	769,221	769,220	769,221
11	769,221	769,221	769,221	769,221	769,221	769,221	769,221
12	769,221	769,221	769,221	769,221	769,221	769,221	769,221
13	769,221	769,221	769,221	769,221	769,221	769,221	769,221
14	769,221	769,221	769,221	769,221	769,221	769,221	769,221
15	769,221	769,221	769,221	769,221	769,221	769,221	769,221
16	769,221	769,221	769,221	769,221	769,221	769,221	769,221
17	769,221	769,220	769,220	769,221	769,221	769,221	769,221
18	769,221	769,221	769,221	769,221	769,221	769,221	769,221
19	769,220	769,221	769,221	769,221	769,221	769,221	769,221
20	769,221	769,221	769,221	769,221	769,221	769,221	769,221
21	769,221	769,221	769,221	769,221	769,221	769,221	769,221
22	769,221	769,221	769,221	769,221	769,221	769,221	769,220
23	769,221	769,221	769,221	769,221	769,221	769,221	769,221
24	769,221	769,221	769,221	769,221	769,221	769,221	769,221
25	769,221	769,221	769,221	769,221	769,221	769,221	769,221
26	769,221	769,221	769,221	769,221	769,221	769,221	769,221
27	769,221	769,221	769,221	769,221	769,221	769,221	769,221
28	769,221	769,221	769,221	769,221	769,221	769,221	769,221

Table 6: District populations for congressional plans.

**B. BOUNDARY SCORES**

District	Boundary Score					
	City	County	Road	Water	Rail	Other
HD-A1						
108	41%	0%	27%	42%	3%	16%
109	51%	0%	24%	25%	4%	8%
110	45%	14%	48%	17%	0%	5%
111	24%	10%	74%	7%	0%	6%
112	39%	0%	44%	32%	0%	4%
113	39%	0%	48%	44%	2%	4%
114	41%	8%	35%	53%	0%	0%
115	37%	0%	30%	49%	0%	2%
116	10%	0%	83%	10%	0%	2%
118	0%	0%	89%	0%	0%	11%
119	0%	0%	70%	0%	0%	30%
HD-A2						
108	39%	0%	20%	45%	1%	21%
109	50%	0%	22%	26%	0%	14%
110	45%	14%	48%	17%	0%	5%
111	24%	10%	74%	7%	0%	6%
112	39%	0%	44%	32%	0%	4%
113	31%	12%	11%	82%	0%	6%
114	60%	0%	37%	46%	0%	3%
115	37%	0%	30%	49%	0%	2%
116	10%	0%	83%	10%	0%	2%
118	0%	0%	86%	0%	0%	14%
119	0%	0%	67%	0%	0%	33%
HD-B						
108	40%	0%	28%	42%	1%	18%
109	54%	0%	22%	24%	2%	9%
110	71%	22%	18%	0%	0%	28%
111	35%	7%	57%	3%	0%	15%
112	69%	0%	16%	8%	0%	20%
113	56%	9%	26%	58%	1%	3%
114	44%	0%	48%	22%	0%	11%
115	37%	0%	30%	51%	0%	2%
116	38%	0%	74%	9%	0%	14%
118	0%	0%	86%	0%	0%	14%
119	0%	0%	67%	0%	0%	33%
HD-C1						
108	40%	0%	29%	42%	3%	15%
109	56%	0%	24%	20%	5%	7%

110	70%	27%	27%	20%	0%	12%
111	28%	0%	61%	27%	1%	6%
112	88%	0%	10%	27%	0%	12%
113	50%	9%	25%	61%	1%	5%
114	27%	0%	66%	18%	0%	9%
115	37%	0%	32%	49%	0%	1%
116	39%	0%	72%	5%	0%	18%
118	0%	0%	86%	0%	1%	13%
119	0%	0%	67%	0%	1%	32%

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HD-C2

108	38%	0%	17%	42%	2%	27%
109	53%	0%	20%	24%	0%	14%
110	70%	27%	27%	20%	0%	12%
111	32%	0%	56%	24%	0%	10%
112	88%	0%	10%	27%	0%	12%
113	44%	11%	12%	71%	0%	4%
114	58%	0%	25%	50%	0%	8%
115	34%	0%	49%	16%	0%	20%
116	21%	0%	68%	13%	0%	19%
118	0%	0%	86%	0%	1%	13%
119	0%	0%	67%	0%	1%	32%

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HD-C3

108	38%	0%	15%	42%	2%	28%
109	53%	0%	19%	24%	0%	15%
110	70%	27%	27%	20%	0%	12%
111	25%	0%	62%	17%	0%	12%
112	88%	0%	10%	27%	0%	12%
113	44%	11%	12%	71%	0%	4%
114	58%	0%	25%	50%	0%	8%
115	46%	0%	50%	27%	0%	10%
116	20%	0%	63%	14%	0%	23%
118	0%	0%	86%	0%	1%	13%
119	0%	0%	67%	0%	1%	32%

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HD-C4

108	38%	0%	21%	43%	3%	22%
109	53%	0%	20%	24%	4%	9%
110	70%	27%	27%	20%	0%	12%
111	20%	0%	63%	29%	0%	4%
112	88%	0%	10%	27%	0%	12%
113	31%	12%	12%	82%	2%	3%
114	47%	0%	40%	49%	0%	9%
115	38%	0%	21%	71%	0%	1%
116	37%	0%	69%	20%	0%	9%
118	0%	0%	83%	0%	1%	15%
119	0%	0%	66%	0%	1%	33%

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## HD-Enacted

108	36%	0%	19%	41%	2%	26%
109	46%	0%	27%	20%	0%	18%
110	45%	14%	48%	17%	0%	5%
111	26%	10%	75%	6%	0%	4%
112	38%	0%	44%	23%	0%	10%
113	30%	15%	13%	78%	0%	7%
114	67%	0%	26%	42%	0%	8%
115	40%	0%	29%	40%	0%	8%
116	9%	0%	85%	4%	0%	7%
118	0%	0%	42%	0%	4%	54%
119	0%	0%	59%	0%	4%	37%

Table 7: Boundary scores for House plans.

District	Boundary Score					
	City	County	Road	Water	Rail	Other
CD-A						
1	8%	78%	10%	53%	0%	3%
2	5%	84%	7%	49%	0%	3%
3	6%	85%	7%	32%	0%	5%
4	8%	86%	2%	55%	0%	2%
5	16%	48%	7%	79%	0%	13%
6	16%	42%	17%	32%	2%	15%
7	22%	68%	9%	40%	2%	8%
8	0%	89%	7%	44%	0%	4%
9	2%	61%	25%	27%	0%	12%
10	13%	26%	35%	2%	1%	37%
11	14%	49%	27%	26%	2%	13%
12	7%	84%	13%	63%	0%	8%
13	15%	75%	12%	67%	0%	3%
14	12%	19%	46%	21%	1%	13%
15	3%	1%	61%	4%	0%	32%
16	12%	68%	8%	33%	0%	8%
17	13%	45%	5%	47%	0%	14%
18	15%	24%	33%	5%	3%	22%
19	1%	76%	1%	46%	0%	8%
20	28%	41%	16%	13%	3%	18%
21	5%	82%	5%	37%	2%	4%
22	31%	19%	28%	24%	0%	26%
23	35%	31%	21%	37%	3%	24%
24	52%	27%	28%	30%	0%	11%
25	37%	30%	26%	32%	6%	11%
26	39%	13%	48%	7%	1%	15%
27	43%	21%	8%	67%	1%	6%

	28	3%	91%	4%	83%	0%	1%
CD-B1							
1	8%	78%	10%	53%	0%	3%	
2	5%	84%	7%	49%	0%	3%	
3	6%	85%	7%	32%	0%	5%	
4	8%	86%	2%	55%	0%	2%	
5	16%	48%	7%	79%	0%	13%	
6	16%	42%	17%	32%	2%	15%	
7	22%	68%	9%	40%	2%	8%	
8	0%	89%	7%	44%	0%	4%	
9	2%	61%	25%	27%	0%	12%	
10	13%	26%	35%	2%	1%	37%	
11	14%	52%	23%	25%	2%	15%	
12	7%	84%	13%	63%	0%	8%	
13	15%	75%	12%	67%	0%	3%	
14	12%	19%	46%	21%	1%	13%	
15	5%	20%	39%	11%	0%	29%	
16	3%	53%	15%	48%	0%	13%	
17	7%	39%	13%	49%	0%	15%	
18	9%	50%	15%	26%	0%	21%	
19	2%	77%	2%	44%	0%	6%	
20	26%	41%	16%	13%	3%	18%	
21	3%	88%	6%	25%	0%	3%	
22	31%	19%	28%	24%	0%	26%	
23	28%	32%	20%	38%	2%	26%	
24	45%	23%	34%	31%	0%	8%	
25	32%	30%	28%	33%	6%	9%	
26	36%	7%	48%	13%	0%	17%	
27	41%	22%	11%	64%	0%	8%	
28	3%	91%	4%	83%	0%	1%	
CD-B2							
1	8%	78%	10%	53%	0%	3%	
2	5%	84%	7%	49%	0%	3%	
3	6%	85%	7%	32%	0%	5%	
4	8%	86%	2%	55%	0%	2%	
5	16%	48%	7%	79%	0%	13%	
6	16%	42%	17%	32%	2%	15%	
7	22%	68%	9%	40%	2%	8%	
8	0%	89%	7%	44%	0%	4%	
9	2%	61%	25%	27%	0%	12%	
10	13%	26%	35%	2%	1%	37%	
11	14%	52%	23%	25%	2%	15%	
12	7%	84%	13%	63%	0%	8%	
13	15%	75%	12%	67%	0%	3%	
14	12%	19%	46%	21%	1%	13%	
15	5%	20%	39%	11%	0%	29%	

16	3%	53%	15%	48%	0%	13%
17	7%	39%	13%	49%	0%	15%
18	9%	50%	15%	26%	0%	21%
19	2%	77%	2%	44%	0%	6%
20	28%	41%	16%	13%	3%	18%
21	3%	88%	6%	25%	0%	3%
22	31%	19%	28%	24%	0%	26%
23	35%	31%	21%	37%	3%	24%
24	47%	14%	26%	37%	0%	12%
25	37%	30%	25%	32%	6%	11%
26	39%	16%	33%	46%	0%	4%
27	10%	18%	34%	59%	0%	6%
28	1%	91%	4%	84%	0%	1%

---

CD-C1

1	8%	78%	10%	53%	0%	3%
2	5%	84%	7%	49%	0%	3%
3	6%	85%	7%	32%	0%	5%
4	8%	86%	2%	55%	0%	2%
5	16%	48%	7%	79%	0%	13%
6	16%	42%	17%	32%	2%	15%
7	22%	68%	9%	40%	2%	7%
8	2%	88%	5%	42%	0%	7%
9	14%	53%	22%	4%	7%	8%
10	16%	25%	38%	2%	2%	34%
11	13%	53%	23%	25%	2%	16%
12	7%	84%	13%	63%	0%	8%
13	15%	75%	12%	67%	0%	3%
14	12%	19%	46%	21%	1%	13%
15	5%	20%	38%	9%	0%	32%
16	10%	58%	12%	57%	0%	9%
17	8%	59%	10%	35%	0%	13%
18	19%	24%	25%	16%	7%	16%
19	2%	76%	3%	43%	0%	8%
20	29%	54%	12%	1%	3%	7%
21	7%	63%	11%	38%	0%	17%
22	30%	46%	10%	38%	0%	19%
23	29%	44%	8%	16%	0%	27%
24	52%	27%	28%	30%	0%	11%
25	37%	27%	25%	30%	4%	13%
26	39%	13%	48%	7%	1%	15%
27	43%	21%	8%	67%	1%	6%
28	3%	91%	4%	83%	0%	1%

---

CD-C2

1	8%	78%	10%	53%	0%	3%
2	5%	84%	7%	49%	0%	3%
3	6%	85%	7%	32%	0%	5%

4	8%	86%	2%	55%	0%	2%
5	16%	48%	7%	79%	0%	13%
6	16%	42%	17%	32%	2%	15%
7	22%	68%	9%	40%	2%	7%
8	9%	74%	5%	40%	0%	14%
9	13%	54%	25%	3%	6%	9%
10	16%	25%	38%	2%	2%	34%
11	13%	53%	23%	25%	2%	16%
12	7%	84%	13%	63%	0%	8%
13	15%	75%	12%	67%	0%	3%
14	12%	19%	46%	21%	1%	13%
15	5%	20%	38%	9%	0%	32%
16	11%	58%	16%	53%	0%	8%
17	7%	74%	3%	45%	0%	8%
18	16%	30%	28%	10%	6%	16%
19	2%	76%	3%	43%	0%	8%
20	29%	54%	12%	1%	3%	7%
21	10%	70%	3%	53%	0%	18%
22	30%	46%	10%	38%	0%	19%
23	29%	44%	8%	16%	0%	27%
24	52%	27%	28%	30%	0%	11%
25	37%	27%	25%	30%	4%	13%
26	39%	13%	48%	7%	1%	15%
27	43%	21%	8%	67%	1%	6%
28	3%	91%	4%	83%	0%	1%

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CD-D

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1	8%	78%	10%	53%	0%	3%
2	5%	84%	7%	49%	0%	3%
3	6%	85%	7%	32%	0%	5%
4	8%	86%	2%	55%	0%	2%
5	16%	48%	7%	79%	0%	13%
6	12%	50%	22%	32%	0%	15%
7	14%	73%	26%	55%	0%	1%
8	9%	71%	11%	60%	0%	10%
9	7%	70%	17%	29%	0%	7%
10	30%	54%	26%	21%	0%	6%
11	12%	68%	16%	26%	0%	12%
12	7%	84%	13%	63%	0%	8%
13	15%	75%	12%	67%	0%	3%
14	12%	19%	46%	21%	1%	13%
15	5%	20%	39%	11%	0%	29%
16	13%	52%	11%	43%	0%	12%
17	16%	47%	7%	44%	0%	10%
18	7%	71%	8%	23%	1%	13%
19	2%	77%	2%	44%	0%	6%
20	29%	54%	12%	1%	3%	7%
21	8%	66%	3%	39%	0%	22%

22	30%	46%	10%	38%	0%	19%
23	29%	44%	8%	16%	0%	27%
24	52%	27%	28%	30%	0%	11%
25	37%	27%	25%	30%	4%	13%
26	39%	13%	48%	7%	1%	15%
27	43%	21%	8%	67%	1%	6%
28	3%	91%	4%	83%	0%	1%
CD-Enacted						
1	8%	78%	10%	53%	0%	3%
2	5%	84%	7%	49%	0%	3%
3	6%	85%	7%	32%	0%	5%
4	8%	86%	2%	55%	0%	2%
5	16%	48%	7%	79%	0%	13%
6	16%	42%	17%	32%	2%	15%
7	22%	68%	9%	40%	2%	8%
8	0%	89%	7%	44%	0%	4%
9	2%	61%	25%	27%	0%	12%
10	13%	26%	35%	2%	1%	37%
11	14%	49%	27%	26%	2%	13%
12	7%	84%	13%	63%	0%	8%
13	15%	75%	12%	67%	0%	3%
14	12%	19%	46%	21%	1%	13%
15	3%	1%	61%	4%	0%	32%
16	1%	73%	21%	32%	1%	2%
17	9%	84%	5%	39%	0%	6%
18	6%	77%	8%	21%	0%	9%
19	11%	65%	12%	59%	0%	10%
20	28%	37%	15%	13%	3%	22%
21	9%	68%	7%	48%	0%	16%
22	36%	24%	18%	36%	0%	24%
23	29%	28%	16%	38%	9%	20%
24	36%	36%	32%	46%	0%	10%
25	64%	29%	12%	20%	0%	15%
26	11%	54%	28%	13%	0%	9%
27	10%	18%	34%	59%	0%	7%
28	1%	88%	8%	86%	0%	1%

Table 8: Boundary scores for congressional plans.

**C. COMPACTNESS STATISTICS**

District	Plan							
	HD-A1	HD-A2	HD-B	HD-C1	HD-C2	HD-C3	HD-C4	HD-Enacted
108	0.417	0.439	0.415	0.413	0.467	0.470	0.435	0.455
109	0.376	0.382	0.371	0.348	0.351	0.351	0.357	0.335
110	0.472	0.472	0.623	0.484	0.484	0.484	0.484	0.472
111	0.583	0.583	0.600	0.678	0.594	0.675	0.777	0.563
112	0.535	0.535	0.491	0.522	0.522	0.522	0.522	0.417
113	0.403	0.527	0.447	0.504	0.447	0.447	0.512	0.394
114	0.428	0.450	0.519	0.536	0.421	0.430	0.490	0.351
115	0.398	0.398	0.402	0.406	0.510	0.510	0.559	0.302
116	0.625	0.625	0.627	0.595	0.619	0.638	0.652	0.509
118	0.734	0.691	0.700	0.709	0.711	0.709	0.706	0.333
119	0.676	0.696	0.701	0.702	0.702	0.702	0.703	0.466

Table 9: Polsby–Popper compactness scores for House plans.

District	Plan							
	HD-A1	HD-A2	HD-B	HD-C1	HD-C2	HD-C3	HD-C4	HD-Enacted
108	0.372	0.416	0.372	0.373	0.463	0.464	0.420	0.485
109	0.290	0.287	0.297	0.303	0.270	0.270	0.281	0.251
110	0.427	0.427	0.590	0.434	0.434	0.434	0.434	0.427
111	0.596	0.596	0.608	0.537	0.520	0.612	0.595	0.592
112	0.496	0.496	0.495	0.378	0.378	0.378	0.378	0.425
113	0.384	0.473	0.591	0.590	0.544	0.544	0.472	0.551
114	0.498	0.439	0.388	0.386	0.377	0.429	0.352	0.355
115	0.430	0.430	0.429	0.435	0.461	0.460	0.583	0.278
116	0.469	0.469	0.610	0.536	0.470	0.515	0.498	0.356
118	0.656	0.591	0.592	0.623	0.626	0.623	0.648	0.216
119	0.584	0.600	0.599	0.582	0.582	0.582	0.580	0.285

Table 10: Reock compactness scores for House plans.

District	Plan							
	HD-A1	HD-A2	HD-B	HD-C1	HD-C2	HD-C3	HD-C4	HD-Enacted
108	0.838	0.844	0.839	0.834	0.856	0.862	0.853	0.849
109	0.739	0.755	0.756	0.707	0.742	0.741	0.740	0.726
110	0.792	0.792	0.906	0.876	0.876	0.876	0.876	0.792
111	0.891	0.891	0.893	0.977	0.932	0.941	0.988	0.882

112	0.884	0.884	0.847	0.899	0.899	0.899	0.899	0.788
113	0.741	0.863	0.797	0.809	0.802	0.802	0.861	0.767
114	0.786	0.822	0.874	0.875	0.804	0.803	0.832	0.733
115	0.809	0.809	0.813	0.817	0.838	0.838	0.895	0.723
116	0.911	0.911	0.905	0.907	0.909	0.918	0.926	0.877
118	0.952	0.945	0.947	0.946	0.942	0.946	0.937	0.788
119	0.938	0.945	0.945	0.952	0.952	0.952	0.948	0.919

Table 11: Convex Hull compactness scores for House plans.

District	Plan						
	CD-A	CD-B1	CD-B2	CD-C1	CD-C2	CD-D	CD-Enacted
1	0.479	0.479	0.479	0.479	0.479	0.479	0.479
2	0.483	0.483	0.483	0.483	0.483	0.483	0.483
3	0.501	0.501	0.501	0.501	0.501	0.501	0.501
4	0.317	0.317	0.317	0.317	0.317	0.317	0.317
5	0.524	0.524	0.524	0.524	0.524	0.524	0.524
6	0.482	0.482	0.482	0.482	0.482	0.465	0.482
7	0.404	0.404	0.404	0.404	0.404	0.372	0.404
8	0.451	0.451	0.451	0.444	0.349	0.287	0.451
9	0.468	0.468	0.468	0.586	0.570	0.424	0.468
10	0.373	0.373	0.373	0.477	0.477	0.380	0.373
11	0.357	0.342	0.342	0.349	0.349	0.354	0.357
12	0.381	0.381	0.381	0.381	0.381	0.381	0.381
13	0.584	0.584	0.584	0.584	0.584	0.584	0.584
14	0.473	0.473	0.473	0.473	0.473	0.473	0.473
15	0.578	0.427	0.427	0.428	0.428	0.429	0.578
16	0.489	0.521	0.521	0.514	0.521	0.503	0.449
17	0.450	0.460	0.460	0.364	0.336	0.444	0.394
18	0.318	0.324	0.324	0.327	0.398	0.384	0.421
19	0.558	0.559	0.559	0.540	0.540	0.559	0.386
20	0.278	0.282	0.278	0.416	0.416	0.416	0.277
21	0.410	0.513	0.513	0.442	0.406	0.412	0.495
22	0.219	0.219	0.219	0.556	0.556	0.555	0.420
23	0.445	0.476	0.445	0.460	0.460	0.460	0.288
24	0.380	0.390	0.384	0.380	0.380	0.380	0.484
25	0.289	0.302	0.288	0.275	0.275	0.275	0.382
26	0.637	0.589	0.461	0.637	0.637	0.637	0.327
27	0.476	0.533	0.722	0.476	0.476	0.476	0.727
28	0.233	0.233	0.241	0.233	0.233	0.233	0.242

Table 12: Polsby–Popper compactness scores for congressional plans.

District	Plan						
	CD-A	CD-B1	CD-B2	CD-C1	CD-C2	CD-D	CD-Enacted
1	0.542	0.542	0.542	0.542	0.542	0.542	0.542
2	0.461	0.461	0.461	0.461	0.461	0.461	0.461
3	0.575	0.575	0.575	0.575	0.575	0.575	0.575
4	0.386	0.386	0.386	0.386	0.386	0.386	0.386
5	0.562	0.562	0.562	0.562	0.562	0.562	0.562
6	0.740	0.740	0.740	0.740	0.740	0.709	0.740
7	0.471	0.471	0.471	0.471	0.471	0.450	0.471
8	0.324	0.324	0.324	0.455	0.433	0.296	0.324
9	0.493	0.493	0.493	0.655	0.656	0.422	0.493
10	0.413	0.413	0.413	0.534	0.534	0.449	0.413
11	0.521	0.544	0.544	0.544	0.544	0.467	0.521
12	0.449	0.449	0.449	0.449	0.449	0.449	0.449
13	0.511	0.511	0.511	0.511	0.511	0.511	0.511
14	0.480	0.480	0.480	0.480	0.480	0.480	0.480
15	0.583	0.609	0.609	0.608	0.608	0.608	0.583
16	0.444	0.594	0.594	0.448	0.448	0.564	0.451
17	0.502	0.509	0.509	0.520	0.488	0.500	0.284
18	0.415	0.396	0.396	0.476	0.565	0.526	0.425
19	0.507	0.508	0.508	0.506	0.506	0.508	0.333
20	0.530	0.529	0.530	0.440	0.440	0.440	0.500
21	0.397	0.413	0.413	0.586	0.532	0.408	0.500
22	0.547	0.547	0.547	0.528	0.528	0.528	0.444
23	0.410	0.415	0.410	0.442	0.442	0.442	0.498
24	0.321	0.301	0.327	0.321	0.321	0.321	0.479
25	0.312	0.311	0.312	0.312	0.312	0.312	0.427
26	0.576	0.589	0.425	0.576	0.576	0.576	0.294
27	0.553	0.552	0.715	0.553	0.553	0.553	0.715
28	0.225	0.225	0.232	0.225	0.225	0.225	0.218

Table 13: Reock compactness scores for congressional plans.

District	Plan						
	CD-A	CD-B1	CD-B2	CD-C1	CD-C2	CD-D	CD-Enacted
1	0.866	0.866	0.866	0.866	0.866	0.866	0.866
2	0.822	0.822	0.822	0.822	0.822	0.822	0.822
3	0.899	0.899	0.899	0.899	0.899	0.899	0.899
4	0.755	0.755	0.755	0.755	0.755	0.755	0.755
5	0.885	0.885	0.885	0.885	0.885	0.885	0.885
6	0.922	0.922	0.922	0.922	0.922	0.890	0.922

7	0.825	0.825	0.825	0.825	0.825	0.812	0.825
8	0.780	0.780	0.780	0.739	0.694	0.677	0.780
9	0.862	0.862	0.862	0.920	0.925	0.889	0.862
10	0.751	0.751	0.751	0.841	0.841	0.818	0.751
11	0.822	0.802	0.802	0.803	0.803	0.793	0.822
12	0.746	0.746	0.746	0.746	0.746	0.746	0.746
13	0.926	0.926	0.926	0.926	0.926	0.926	0.926
14	0.830	0.830	0.830	0.830	0.830	0.830	0.830
15	0.881	0.790	0.790	0.799	0.799	0.789	0.881
16	0.891	0.873	0.873	0.881	0.881	0.876	0.735
17	0.857	0.855	0.855	0.743	0.772	0.852	0.771
18	0.772	0.836	0.836	0.763	0.839	0.798	0.825
19	0.890	0.887	0.887	0.883	0.883	0.887	0.782
20	0.794	0.793	0.794	0.864	0.864	0.864	0.773
21	0.786	0.880	0.880	0.803	0.831	0.796	0.817
22	0.796	0.796	0.796	0.936	0.936	0.936	0.740
23	0.799	0.811	0.799	0.876	0.876	0.876	0.789
24	0.795	0.867	0.814	0.795	0.795	0.795	0.898
25	0.627	0.626	0.627	0.645	0.645	0.645	0.815
26	0.921	0.898	0.803	0.921	0.921	0.921	0.769
27	0.833	0.874	0.951	0.833	0.833	0.833	0.950
28	0.550	0.550	0.550	0.550	0.550	0.550	0.551

Table 14: Convex Hull compactness scores for congressional plans.

# **EXHIBIT A**

## Curriculum Vitae

# Cory McCartan

## Curriculum Vitae

January 2025

CONTACT INFORMATION	Department of Statistics, Penn State University 325 Thomas Building, 461 Pollock Road University Park, PA 16802	(425) 770-9244 mccartan@psu.edu
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ACADEMIC EMPLOYMENT	<b>Pennsylvania State University</b> Hoben and Patricia Thomas and Thomas and Ann Hettmansperger Early Career Professor of Statistics Assistant Professor of Statistics Assistant Professor of Political Science (by courtesy)	2024 – 2024 – 2027 2024 –
	<b>New York University</b> Center for Data Science Data Science Assistant Professor / Faculty Fellow	2023 – 2024

EDUCATION	<b>Harvard University</b> Ph.D., Statistics, 2023. Committee: Kosuke Imai (chair), Xiao-Li Meng, Gary King. Dissertation: <i>Computational and Bayesian Methods for Geographic Data in the Social Sciences</i> . A.M., Statistics, 2021.  <b>Grinnell College</b> B.A., Mathematics, with honors, 2019.	2019 – 2023  2015 – 2019
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PEER-REVIEWED PUBLICATIONS	“Evaluating Bias and Noise Induced by the U.S. Census Bureau’s Privacy Protection Methods,” with Christopher T. Kenny, Tyler Simko, Shiro Kuriwaki, and Kosuke Imai (2024). <i>Science Advances</i> 10:18, ead12524.  “Measuring and Modeling Neighborhoods,” with Jacob R. Brown and Kosuke Imai (2024). <i>American Political Science Review</i> 118:4, 1966-1985.  “Census Officials Must Constructively Engage with Independent Evaluations,” with Christopher T. Kenny, Tyler Simko, and Kosuke Imai (2024). <i>Proceedings of the National Academy of Sciences</i> 121:11, e2321196121.  Letter to the editor re: Jarmin et al. (2023).  “Making Differential Privacy Work for Census Data Users,” with Tyler Simko and Kosuke Imai (2023). <i>Harvard Data Science Review</i> 5:4.  With response and rejoinder.  “Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans,” with Kosuke Imai (2023). <i>Annals of Applied Statistics</i> 17:4, 3300-3323.
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Covered by *The Washington Post*, *Quanta* magazine.

“Widespread Partisan Gerrymandering Mostly Cancels Nationally, but Reduces Electoral Competition,” with Christopher T. Kenny, Tyler Simko, Shiro Kuriwaki, and Kosuke Imai (2023). *Proceedings of the National Academy of Sciences* 120:25, e2217322120.

“Researchers Need Better Access to U.S. Census Data,” with Tyler Simko and Kosuke Imai (2023). *Science* 380:6648, 902-903.

“Recalibration of Predicted Probabilities Using the “Logit Shift”: Why Does it Work, and When Can it be Expected to Work Well?” with Evan T.R. Rosenman and Santiago Olivella (2023). *Political Analysis* 31:4, 651-661.

“Comment: the Essential Role of Policy Evaluation for the 2020 Census Disclosure Avoidance System,” with Christopher T. Kenny, Shiro Kuriwaki, Evan T.R. Rosenman, Tyler Simko, and Kosuke Imai (2023). *Harvard Data Science Review*, Special Issue 2.

Response to boyd and Sarathy (2022).

“Simulated Redistricting Plans for the Analysis and Evaluation of Redistricting in the United States,” with Christopher T. Kenny, Tyler Simko, George Garcia III, Kevin Wang, Melissa Wu, Shiro Kuriwaki, and Kosuke Imai (2022). *Nature: Scientific Data* 9:1, 689.

“The Use of Differential Privacy for Census Data and Its Impact on Redistricting: the Case of the 2020 U.S. Census,” with Christopher T. Kenny, Shiro Kuriwaki, Evan T.R. Rosenman, Tyler Simko, and Kosuke Imai (2021). *Science Advances* 7:41, eabk3283.

Originally a Public Comment to the Census Bureau (May 28, 2021).

Covered by *The Washington Post*, the *Associated Press*, the *San Francisco Chronicle*, *NC Policy Watch*, and others.

“Geodesic Interpolation on Sierpinski Gaskets,” with Caitlin Davis, Laura LeGare, and Luke Rogers (2021). *Journal of Fractal Geometry* 8:2, 117-152.

#### WORKING PAPERS

“Redistricting Reforms Reduce Gerrymandering by Constraining Partisan Actors,” with Christopher T. Kenny, Tyler Simko, Emma Ebowe, Michael Y. Zhao, and Kosuke Imai (2024).

“Estimating Racial Disparities When Race is Not Observed,” with Robin Fisher, Jacob Goldin, Daniel E. Ho, and Kosuke Imai (2024). *NBER working paper*, Under Review.

“Individual and Differential Harm in Redistricting,” with Christopher T. Kenny (2022). Under Review.

“Projective Averages for Summarizing Redistricting Ensembles” (2024).

“Finding Pareto Efficient Redistricting Plans with Short Bursts” (2024).

#### OTHER WRITING

“Candy Cane Shortages and the Importance of Variation.” International Statistical Institute: *Statisticians React to the News* (December 21, 2021).

“Where Will the Rocket Land?” International Statistical Institute: *Statisticians React to the News* (May 12, 2021).

“Who’s the Most Electable Democrat? It Might be Warren or Buttigieg, Not Biden.” *The Washington Post* (October 23, 2019).

“I-405 Express Toll Lanes: Usage, Benefits, and Equity,” with Shirley Leung, C.J. Robinson, Kiana Roshan Zamir, Vaughn Iverson, and Mark Hallenbeck. Technical report for the Washington State Department of Transportation (2019).

SOFTWARE	<p><b>redist</b>: Simulation Methods for Legislative Redistricting</p> <p><b>redistmetrics</b>: Redistricting Metrics</p> <p><b>birdie</b>: Bayesian Instrumental Regression for Disparity Estimation</p> <p><b>easycensus</b>: Quickly Find, Extract, and Marginalize U.S. Census Tables</p> <p><b>PL94171</b>: Tabulate P.L. 94-171 Redistricting Data Summary Files</p> <p><b>adjustr</b>: Stan Model Adjustments and Sensitivity Analyses using Importance Sampling</p> <p><b>causaltbl</b>: Tidy Causal Data Frames and Tools</p> <p><b>conformalbayes</b>: Jackknife(+) Predictive Intervals for Bayesian Models</p> <p><b>alarmdata</b>: Download, Merge, and Process Redistricting Data</p> <p><b>blockpop</b>: Estimate Census Block Populations for 2020</p> <p><b>ggredist</b>: Scales, Geometries, and Extensions of ggplot2 for Election Mapping</p> <p><b>tinytiger</b>: Lightweight Interface to TIGER/Line Shapefiles</p> <p><b>wacolors</b>: Colorblind-Friendly Palettes from Washington State</p> <p><b>nbhdmodel</b>: Neighborhood Modeling and Analysis</p>
PRESENTATIONS	<p><b>Guinier Project Research Roundtable</b>, Charles Hamilton Houston Institute for Race and Justice, Harvard Law School, Panel: 2025.</p> <p><b>Southern Political Science Association</b>, Annual Meeting, Paper: 2025.</p> <p><b>Keystone State Statistics Symposium</b>, University of Pittsburgh, Paper: 2024.</p> <p><b>Frontiers in Data Science Symposium: Advances in Record Linkage</b>, Princeton University, Invited Talk: 2024.</p> <p><b>Colloquium Series</b>, Department of Political Science, Penn State, Invited Talk: 2024.</p> <p><b>Joint Statistical Meetings</b>, Invited Paper Panel: 2024, 2022, 2021.</p> <p><b>Society for Political Methodology</b>, Annual Meeting, Paper: 2024, 2023, 2022; Poster: 2022, 2021.</p> <p><b>American Causal Inference Conference</b>, Annual Meeting, Poster: 2024.</p> <p><b>Math and Democracy Seminar</b>, New York University, Invited Talk: 2024.</p>

**ACM Conference in Equity and Access in Algorithms, Mechanisms, and Optimization**, Annual Meeting, Paper: 2023.

**Political Methodology Speaker Series**, Department of Political Science, MIT, Invited Talk: 2023.

**Institute for Quantitative Social Science**, Harvard University, Applied Statistics Workshop, Paper: 2023, 2022, 2021, 2020.

**American Association for Public Opinion Research**, Annual Meeting, Poster: 2022.

#### TEACHING

##### **Penn State University**

STAT 597: Missing Data (special topic short course)	Fall 2024
STAT 440: Computational Statistics	Fall 2024

##### **New York University**

DS-UA 111: Data Science for Everyone	Spring 2024
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##### **Harvard University**

STAT 117: Introduction to Biostatistics (Teaching Fellow)	Spring 2021
STAT 221: Monte Carlo Methods & Other Computational Tools for Statistical Learning (Teaching Fellow)	Fall 2020

##### **Grinnell College**

MAT 215: Linear Algebra (Peer Mentor)	Fall 2017 and Spring 2019
MAT 310: Statistical Modeling (Peer Mentor)	Fall 2018
Grinnell College Math Lab	2018 – 2019

#### HONORS AND AWARDS

*Hoben and Patricia Thomas and Thomas and Ann Hettmansperger Early Career Professorship in Statistics*, 2024 (total award: \$75,000).

*Best Statistical Software Award*, for developing statistical software that makes a significant research contribution; awarded to the *redist* software package by the Society for Political Methodology, 2022.

*Certificate of Distinction in Teaching*, awarded on the basis of student feedback by the Derek Bok Center for Teaching and Learning, 2021.

*Pamela Ferguson Endowed Prize*, awarded to up to two senior students by the Grinnell College Department of Mathematics, 2018.

#### SERVICE

Reviewer: *Proceedings of the National Academy of Sciences*, *Journal of the American Statistical Association*, *Annals of Applied Statistics*, *American Journal of Political Science*, *Quarterly Journal of Political Science*, *Harvard Data Science Review*, *Public Choice*, *Multiscale Modeling and Simulation*, *Discrete Applied Mathematics*, *Election Law Journal*, *Sloan Foundation*.

Discussant: 2024 PolMeth Conference, 2024 Midwest Political Science Association Annual Conference

##### **Penn State University**

Seminar coordinator	2024 – 2025
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**New York University**

Faculty fellow hiring review	2023 – 2024
MA admissions committee	2023 – 2024

**Harvard University**

Harvard Statistics Graduate Council	2020 – 2023
Organized Ph.D. student retreat and research “lightning talks,” 2020 and 2021.	
First-year Ph.D. Student Mentor	2020 – 2023
Harvard Graduate Students Union – UAW Local 5118	2019 – 2021
Elected member, Bargaining Committee, 2020–2021 and 2021–2024 contracts.	
Interim chair, Finance and Benefits Committee, 2020.	

OTHER EXPERIENCE

**NAACP Legal Defense Fund**

2024 – 2025

Expert Witness, *McClure et al. v. Jefferson County Commission* (U.S. District Court for the Northern District of Alabama, Case 2:23-cv-00443).  
Testified by deposition and at trial.

Expert Witness, *Callais et al. v. Landry* (U.S. District Court for the Western District of Louisiana, Case 3:24-cv-00122). Testified by deposition and at trial.

**American Civil Liberties Union**

2021 – 2025

Expert Witness, *Hodges v. Passidomo* (U.S. District Court for the Middle District of Florida, Case 8:24-cv-879). Testified by deposition.

Expert Witness, *GRACE, Inc. et al. v. City of Miami* (U.S. District Court for the Southern District of Florida, Case 1:22-cv-24066). Testified by deposition and at trial.

Expert Witness, *Nairne et al. v. Ardoin* (U.S. District Court for the Middle District of Louisiana, Case 3:22-cv-00178). Testified by deposition and at trial.

Consultant (with Prof. Kosuke Imai), *League of Women Voters of Ohio v. Ohio Redistricting Commission* (Ohio Supreme Court, Case 2021–1193),  
*League of Women Voters of Ohio v. Ohio Redistricting Commission* (Ohio Supreme Court, Case 2021–1449).

**Protect Democracy**

2024

Consultant, electoral reform modeling

**Data for Progress**

2022

Consultant, Midterm election modeling

**University of Washington eScience Institute**

Summer 2019

Data Science for Social Good Fellow

**Union of Grinnell Student Dining Workers**

2016 – 2019

Founder, President (2016–17), and Advisor to the Executive Board (2018–19)

**University of Connecticut**

Summer 2018

REU Participant, Department of Mathematics

**Fred Hutchinson Cancer Research Center**

Lead Intern, Department of Biostatistics

Summer 2017

**Cray, Inc. (now HPE)**

Intern, Chapel language testing

Summer 2015