

Rodden Decl. Ex. E

IN THE SUPREME COURT OF OHIO

Bria Bennett, et al.,

Petitioners,

v.

Ohio Redistricting Commission, et al.,

Respondents.

Case No. 2021-1198

Original Action Filed Pursuant to Ohio
Constitution, Article XI, Section 9(A)

*[Apportionment Case Pursuant to S.
Ct. Prac. R. 14.03]*

**EXHIBITS TO PETITIONERS' OBJECTIONS TO GENERAL ASSEMBLY DISTRICT
PLAN ADOPTED ON FEBRUARY 24, 2022 – VOLUME 2
(Affidavit of Dr. Jonathan Rodden and Exhibits)**

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I hereby certify that the foregoing was sent via email this 28th day of February, 2022 to the following:

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EXPERT AFFIDAVIT OF DR. JONATHAN RODDEN

I, Jonathan Rodden, having been duly sworn and cautioned according to law, hereby state that I am over the age of eighteen years and am competent to testify to the facts set forth below based on my personal knowledge and having personally examined all records referenced in this affidavit, and further state as follows:

I. INTRODUCTION AND SUMMARY

1. For the purpose of this report, I have been asked to examine whether and how the second revised redistricting plan for the Ohio State House of Representatives and Ohio Senate, adopted by the Ohio Redistricting Commission on February 24, 2022 (attached as Exhibits A and B) (“Second Revised Plan”), addresses the standards set forth in Article XI, Section 6, namely, that (A) “No general assembly district plan shall be drawn primarily to favor or disfavor a political party,” (B) “The statewide proportion of districts whose voters, based on statewide state and federal partisan general election results during the last ten years, favor each political party shall correspond closely to the statewide preferences of the voters of Ohio,” and (C) “General assembly districts shall be compact.”
2. As this Court stated in its January 12, 2022 opinion declaring invalid the General Assembly plan adopted by the Commission on September 16, 2021, “[i]f it is possible for a district plan to comply with Section 6 and Sections 2, 3, 4, 5, and 7, the commission must adopt a plan that does so.” *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-65 at ¶ 88.
3. In this report, I demonstrate that the distribution of support for the two parties across districts in the Second Revised Plan is extremely unusual, indicating that Commissioners attempted to achieve nominal statewide partisan proportionality by generating as many districts as possible with very slim Democratic majorities, while creating zero districts with similarly slim Republican majorities. Under the Second Revised Plan, virtually all the majority-Republican seats are quite safe: 52 of 54 seats with Republican majorities in the Ohio House of Representatives would have Republican vote shares above 55 percent, and the same is true

for 16 of 18 seats with Republican majorities in the Senate. The situation is starkly different for the Democrats. Of 45 seats with nominal Democratic majorities, less than half—only 22—would have Democratic vote shares above 55 percent in the House, and the same would be true of only 7 of 15 “Democratic” seats in the Senate. This striking asymmetry in the distribution of competitive and non-competitive seats has the effect of creating what is likely to be a very hard ceiling on the number of seats that can possibly be won by Democratic candidates, preserving a comfortable Republican legislative majority even in the event of an exceedingly strong statewide performance by Democrats.

4. In my previous reports submitted in this matter, I have discussed and analyzed “toss-up” districts; those seats where the expected vote share for a party is between 48-52 percent. The same asymmetry in the Second Revised Plan is obvious even when looking at only the narrowest toss-up districts for each party. Under the Second Revised Plan, every majority-Republican House seat would have a Republican vote share above 52 percent: all 54 seats in the House and all 18 seats in the Senate. On the other hand, only 26 of 45 majority-Democratic seats in the House, and only 8 majority-Democratic seats in the Senate have Democratic vote shares above 52 percent. As a result, there are a large number of ultra-competitive districts, which monolithically “lean” Democrat.
5. Using the Ohio Supreme Court’s latest guidance on proportionality, “competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share.” *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-342 at ¶ 62. Accordingly, the Second Revised Plan is far from proportional. Under either of the Court’s methodologies for assessing the distribution of competitive seats, the Second Revised Plan reflects a significantly larger Republican advantage than a 54/46 split.
6. If these toss-up seats are excluded, the Second Revised Plan reflects a 54/26 advantage in the House, or an advantage of approximately 67.5 percent to 32.5 percent of allocated seats for Republicans. In the Senate, it reflects a 18/8 advantage, which is 69/31 percent.
7. If the “tossup” seats are allocated according to each party in proportion to the statewide vote shares, the Second Revised Plan reflects a 64/35 advantage in the House, which is 65/35 percent. In the Senate, it reflects a 22/11 advantage, which is 67/33 percent. All of these projected partisan seat shares are far from the 54/46 split that the Commission purports to achieve.
8. Moreover, the Second Revised Plan produces an unusually large number of districts with Democratic vote shares of around 51 percent, indicating the application of a specific target. This is to say, it appears that the map drawers were instructed to draw as many of the Democratic-leaning districts as possible to be as close as possible to 51 percent.
9. In order to ascertain whether it was possible for the Commission to comply with both Section 6 and Sections 2, 3, 4, 5, and 7 of the Ohio Constitution, I submit my own alternative maps (with images attached as Exhibits C and D and submitted as native files to the Court on February 18, 2022). This plan is nearly identical to the plans submitted to this Court previously, with a few minor changes to address purported constitutional concerns raised in

Respondents' filings in the previous round of objections, as well as corrections for consistency to instances where lines were drawn to follow township, rather than municipal, boundaries. These had a de minimis impact on the population of districts and did not change the partisanship of the plan.

10. The alternative maps attached as Exhibits C and D comply with each of the requirements of Sections 2, 3, 4, 5, and 7. They also produce a partisan breakdown that closely corresponds to the preferences of Ohio voters. Using plan-wide averages, compactness scores reveal that these maps draw far more compact districts than those in the Revised Plan. They also split fewer counties and vote tabulation districts and are far more reflective of communities of interest. Moreover, these maps reveal that there is nothing about the political geography of Ohio that might explain an unusual bunching of districts with Democratic vote shares between 50 and 52 percent, or right at the 51 percent mark in particular, while simultaneously resulting in all Republican districts exceeding 52 percent.
11. Moreover, in and around metro areas, like its predecessors, the Second Revised Plan still uses non-compact districts and splits urban communities in unnecessary ways in order to avoid the creation of districts likely to elect Democratic candidates, opting instead to generate a series of districts with Democratic vote shares very close to 51 percent, most of which include Republican candidates who enjoy the advantages of incumbency.
12. The highly unusual distribution of partisanship across districts in the Second Revised Plan provides clear evidence that the plan was drawn to favor the Republican Party, and it is clear that efforts to generate a large number of bare-majority Democratic districts, while creating the maximum number of safe Republican districts, came at a cost in terms of compactness and the preservation of communities of interest.

II. QUALIFICATIONS

13. I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit E.
14. In my current academic work, I conduct research on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy*, *Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the

Virginia Law Review, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics*. One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy published in the last year, and another received an award from the American Political Science Association section on social networks. In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and received the Martha Derthick Award of the American Political Science Association for “the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations.”

15. I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I have recently completed a book, published by *Basic Books* in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.
16. I have expertise in the use of large data sets and geographic information systems (GIS), and I conduct research and teaching in the area of applied statistics related to elections. My PhD students frequently take academic and private sector jobs as statisticians and data scientists. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine*. I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.
17. I have been accepted and testified as an expert witness in several election law and redistricting cases: *Romo v. Detzner*, No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP v. Ferguson-Florissant Sch. Dist.*, No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections*, No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat’l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018). I also worked with a coalition of academics to file Amicus Briefs in the U.S. Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony in these cases had to do with geography, electoral districts, voting, ballots, and election administration. I recently worked as a consultant for the Maryland Redistricting Commission, and I drew a Pennsylvania Congressional redistricting plan, known as the “Carter Plan,” that was chosen by the Pennsylvania Supreme Court for implementation. *Carter v. Chapman*, No. 7 MM 2022, 2022 WL 549106 (Pa. Feb. 23, 2022). I am being compensated at the rate of \$550/hour for my work in this case. My compensation is not dependent upon my conclusions in any way.

III. DATA SOURCES

18. I have collected statewide election data for 2012 to 2020 from the Ohio Secretary of State. I also accessed precinct-level election results from the Ohio Secretary of State for statewide elections from 2016 to 2020 that were matched to 2020 Ohio vote tabulation districts by a team at Harvard University called the Algorithm-Assisted Redistricting Methodology Project.¹ Additionally, I accessed the Second Revised Plan approved by the Commission and uploaded to the web page of the Ohio Redistricting Commission, true copies of which are attached as Exhibits A and B.² For the analysis conducted in this report, I use three software packages: Stata, Maptitude for Redistricting, and ArcGIS Pro. In creating my maps, I used the same U.S. Census redistricting data used by the Ohio Redistricting Commission, as archived in the “Ohio University Common and Unified Redistricting Database.”³

IV. THE DISTRIBUTION OF PARTISAN SUPPORT ACROSS DISTRICTS: CONTRASTING THE REVISED PLANS AND THE RODDEN III PLAN

19. According to *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-65 at ¶ 108, the Commission must attempt to draw a plan with a seat share that “closely corresponds” to a breakdown of 54 percent in favor of Republicans and 46 percent in favor of Democrats.
20. Determining the proportion of districts that favor each party, based on consideration of the relevant elections identified in Article XI, Section 6, requires an aggregation of the precinct-level results of these past elections to the boundaries of a map’s proposed districts. However, precinct-level election results linked with geo-spatial boundaries were not available for the 2012 and 2014 elections, as the Commission itself acknowledged in its initial Article XI, Section 8(C)(2) Statement (accompanying the since-struck down September 16, 2021 General Assembly plan), attached as Exhibit F. As discussed in my previous reports to this Court, using the full statewide election results from 2012 to 2020, the statewide preferences of Ohio voters must be translated into state legislative maps in which 45.9 percent of seats favor Democrats and 54.1 percent of seats favor Republicans. Since there are 99 seats in the Ohio House of Representatives, a statewide vote share of 45.9 percent would be associated with 45.44 Democratic seats, which rounds down to 45 seats. Similarly, a 45.9 percent vote share would be associated with about 15.15 Democratic seats in the 33-member Ohio Senate, which rounds down to 15 seats.
21. It is my understanding that the Commission’s approach to evaluating the partisanship of each district was to add up all the votes cast for each of the two major parties in each statewide election and divide by the total number of votes cast for both of the two major parties, summing over all of those elections.⁴ I have calculated this measure of district-level

¹ <https://alarm-redist.github.io/posts/2021-08-10-census-2020/>

² <https://redistricting.ohio.gov/maps>

³ <https://www.redistricting.ohio.gov/resources>

⁴ In my previous reports, I calculated vote shares of the two major parties in each election in each district, and then took an average across all 9 statewide elections. This approach gives equal weight

partisanship for each district in the Second Revised Plan. In Table 1, I include these metrics for the Commission’s First Revised Plan, the Second Revised Plan, and the plan that I have submitted to the Commission and the Court⁵ (the “Rodden Plan” or “Rodden III Plan”).

a. The Second Revised Plan’s House Map

22. As can be seen in Table 1, the number of House districts with a Democratic vote share above 50 percent has increased from 42 to 45, creating the illusion of proportionality. However, as with the First Revised Plan, this has been achieved by generating an unusually large number of districts with very slim Democratic majorities. In fact, the number of districts with a Democratic vote share above 52 percent has actually *fallen* relative to the First Revised Plan, from 28 to 26. The appearance of proportionality was enhanced by bringing the number of bare-majority Democratic districts—those between 50 percent and 52 percent Democratic—from 14 to 19.
23. It is remarkable that 19 of the 45 Democratic-leaning districts are essentially toss-ups, while not a single one of the 54 Republican-leaning districts are in the range of 50 to 52 percent Republican vote share. Moreover, the majority of the toss-up districts with a nominal Democratic lean have *Republican* incumbents. A well-known feature of American elections is that incumbents often outperform their statewide co-partisans in their districts—sometimes by several percentage points. If we take incumbency into consideration, Republican candidates likely have the edge in many of these nominally Democratic districts.
24. It is also useful to explore alternative notions of district competitiveness. As demonstrated in Table 1, of the 45 Democratic-leaning districts, 23 are in the range of 50 percent to 55 percent—more than half. Of the 54 Republican-leaning districts, only 2—around 4 percent—are in the range between 50 and 55 percent Republican.

to each election, regardless of turnout, whereas the approach taken by the Commission, and reproduced here for purposes of comparability, gives greater weight to presidential election years with higher turnout. The two approaches yield very similar results, and lead to very similar inferences, but exact numbers of seats above and below certain thresholds can sometimes vary by a single seat.

⁵ The latest Rodden Plan was submitted to the Commission on February 15, 2022 and filed with this Court along with the Bennett Petitioners’ motion to require respondents to explain their failure to comply with the Court’s February 7, 2022 order, filed on February 18, 2022. *See* Second Clinger Aff. at ¶ 2-3. This version is nearly identical to the plan submitted to this Court along with the Bennett Petitioners’ objections to the First Remedial Plan, with the only changes being (1) the elimination of certain zero-population splits identified by Mr. Raymond DiRossi in his affidavit submitted on January 28, 2022; (2) for consistency, the correction of instances where district lines were drawn to follow township instead of municipal boundaries. These lines had only a de minimis impact on district population and did not alter the partisan lean of the districts.

Table 1: Plan Statistics, Ohio House of Representatives

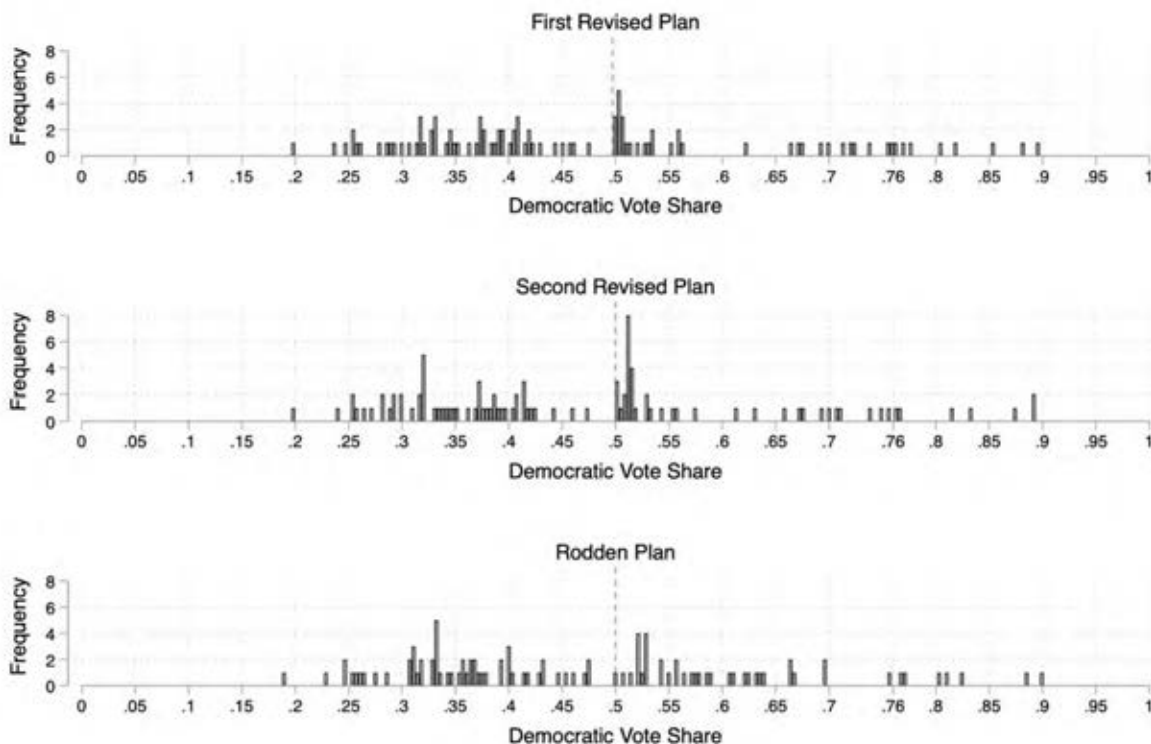
	Commission First Revised Plan	Commission Second Revised Plan	Rodden Plan
Average compactness scores			
(Higher scores = more compact)			
Reock	0.40	0.39	0.41
Polsby-Popper	0.30	0.31	0.36
Area/Convex Hull	0.74	0.75	0.79
Number of split counties	37	38	32
Number of split VTDs	112	135	96
<hr/>			
# of seats with two-party <i>Democratic</i> vote share >.5	42	45	42
Expressed as percentage of seats	42.4%	45.45%	42.4%
# of seats with two-party <i>Republican</i> vote share >.5	57	54	57
Expressed as percentage of seats	57.6%	54.5%	57.6%
<hr/>			
# of seats with two-party Democratic vote share >.52	28	26	40
Expressed as a percentage of seats	28.3%	26.3%	40.4%
# of seats with two-party Democratic vote share <.48	57	54	56
Expressed as percentage of seats	57.6%	54.55%	56.6%
# of seats with two-party Democratic vote share between .48 and .5	0	0	1
Expressed as percentage of seats	0.0%	0.00%	1.0%
# of seats with two-party Democratic vote share between .5 and .52	14	19	2
Expressed as percentage of seats	14.1%	19.19%	2.0%
<hr/>			
# of seats with two-party Democratic vote share >.55	24	22	29
Expressed as a percentage of seats	24.2%	22.22%	29.3%
# of seats with two-party Democratic vote share <.45	54	52	51

Expressed as percentage of seats	54.5%	52.53%	51.5%
# of seats with two-party Democratic vote share between .5 and .55	18	23	13
Expressed as percentage of seats	18.2%	23.23%	13.1%
# of seats with two-party Democratic vote share between .45 and .5	3	2	6
Expressed as percentage of seats	3.0%	2.02%	6.1%

25. This is a remarkable asymmetry. Imagine a massive uniform swing across all districts of 5 percentage points in favor of the Republican Party. Assuming that the partisanship score being considered here is a perfect predictor of legislative victories, this would yield an additional 23 seats, providing the Republican Party with 78 percent of the seats. However, a similar swing toward the Democratic Party—providing it with a statewide majority of votes—would yield a pickup of only 2 seats. That is to say, a vote share of around 51 percent in favor of Democrats would generate a seat share of only 47 percent, and that is only if we make the very unrealistic assumption that Democratic candidates win *every single one* of the 19 districts with a Democratic vote share between 50 and 52 percent. This striking asymmetry in the treatment of the two parties emerges from an effort to create a large number of bare-majority Democratic seats while taking care to avoid the creation of competitive Republican-leaning seats, ensuring that Republican-leaning seats are very comfortable.
26. Table 1 helps us obtain an initial understanding of the distribution of partisanship in the Second Revised Plan using the cut-points of 52 percent and 55 percent for each party, but it is also useful to visualize the entire distribution. The top panel of Figure 1 provides a histogram of the Democratic vote share across districts in the Second Revised Plan. The idea behind the histogram is to divide the entire range of possible Democratic vote shares into bins, where the height of the bin corresponds to the number of districts that fit within it. So, for example, if six districts have a Democratic vote share of .52, the line above .52 on the horizontal axis will reach up to 6 on the vertical axis.
27. Note the large density of districts bunched between .5 and .52 in both the First and Second Revised Plans. Figure 1 reveals that one of the main differences between the First and Second Revised Plans is that the Second Revised Plan has produced a very large density around 51 percent. It appears that the plan was drawn with an intentional effort to produce districts with a Democratic vote share of 51 percent. Note that the Rodden III Plan does not include nearly as many districts just over the 50 percent threshold and does not include a large peak at 51 percent, indicating that there is nothing about the political geography of Ohio that requires this type of distribution. In fact, in my experience with redistricting plans, I do not believe I have seen a distribution of partisanship quite like that displayed in the second panel of Figure 1. It clearly reflects an effort to create a large number of districts with a vote share in a very narrow range just above 50 percent.

28. Another noteworthy aspect of Figure 1 is the sparsity of districts just to the left of the 50 percent line in the First and Second Revised Plans. Almost all the Republican-leaning districts are quite far from the line. In fact, this part of the distribution is even more empty than in the First Revised Plan. There are only 3 districts in the range between 43 percent Democratic and 50 percent Democratic, and only 5 in the range between 42 percent and 50 percent. This indicates that a truly historic 7 percentage point uniform swing in favor of the Democrats, such that the statewide vote share was 53 percent, would only yield an additional 3 seats beyond the number we would expect based on a statewide vote share of 46 percent, as calculated from past elections. In this scenario, 53 percent of the vote would correspond to around 48 percent of the seats. It would take a truly remarkable 8 percentage point swing to give the Democratic Party a 1-seat majority. Again, keep in mind that all these scenarios assume that Democratic candidates would win every single one of the 19 districts where Democratic vote share falls between .50 and .52.

Figure 1: Histograms of Democratic Vote Share, House Plans



29. Considering the Ohio Supreme Court’s latest guidance on proportionality, “competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share.” Accordingly, the Second Revised Plan is far from proportional. When excluding the 19 competitive seats altogether, 32.5 percent of the seats lean Democratic, compared to 67.5 percent of the seats leaning Republican. When allocating the 19 competitive seats proportionally to each party (i.e., allocating 54 percent, or 10, of the competitive seats to Republicans and 46 percent, or 9, of

the competitive seats to Democrats), 35 percent of the seats lean Democratic, compared to 65 percent of the seats leaning Republican.

30. The Rodden III Plan, on the other hand, gets much closer to proportionality under either definition. When excluding the 3 competitive seats altogether, 42 percent of the seats lean Democratic, compared to 58 percent of the seats leaning Republican. When allocating the three competitive seats proportionally to each party (i.e., allocating 54 percent, or 2, of the competitive seats to Republicans and 46 percent, or 1, of the competitive seats to Democrats), 41 percent of the seats lean Democratic, compared to 59 percent of the seats leaning Republican. Although, admittedly, the Rodden III Plan does not achieve the perfect 54/46 split, it gets closer than the Second Revised Plan by anywhere from 6 to 9 percent.

b. The Second Revised Plan’s Senate Map

31. Let us now consider the Ohio Senate. Table 2 provides the same information as Table 1, but for the Senate. And Figure 2 provides a similar histogram. Again, the Commission’s newest plan achieves nominal proportionality, producing 15 seats with Democratic vote shares above 50 percent. Again, this was achieved by increasing the number of Democratic-leaning “toss-up” seats in the range of 50 to 52 percent, in this case from 5 to 7, and again, avoiding creating any Republican-leaning toss-up seats. This produces the same type of asymmetry described above. For instance, a two-percentage point uniform swing toward the Republican Party would, if our partisan index is a perfect predictor of victories, yield 7 additional seats. But a two percentage-point swing toward the Democratic Party would yield nothing.

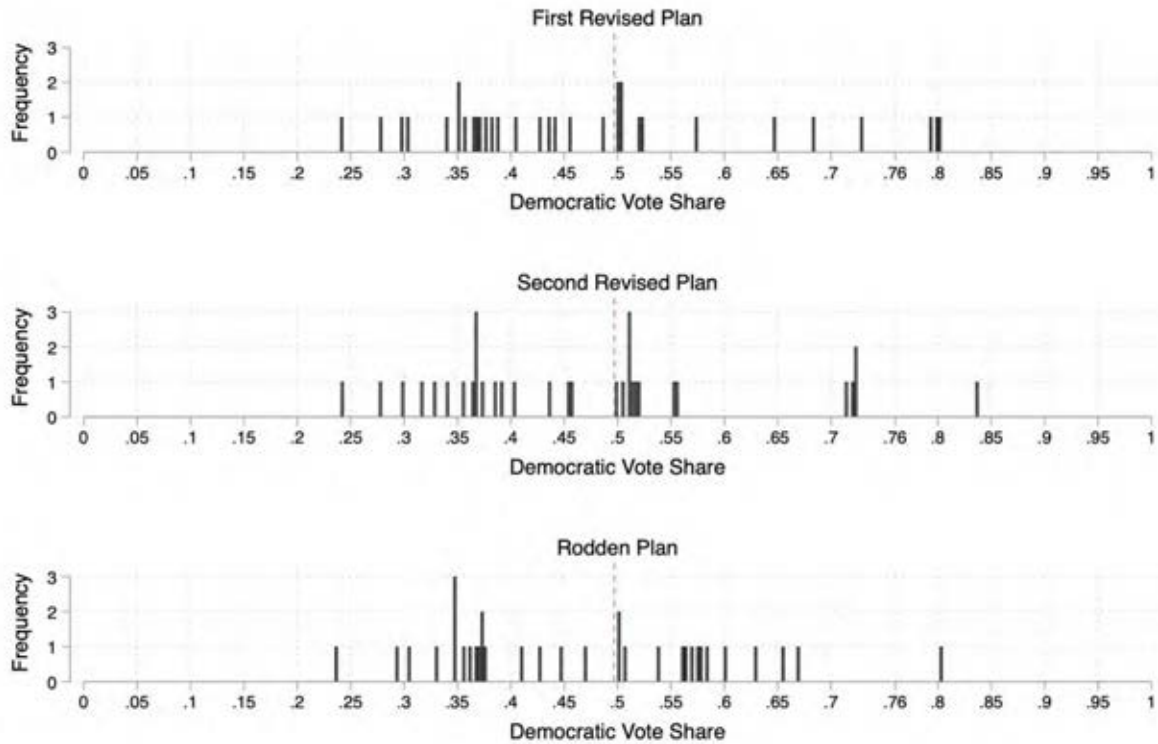
Table 2: Plan Statistics, Ohio Senate

	Commission First Revised Plan	Commission Second Revised Plan	Rodden Plan
Average compactness scores			
(Higher scores = more compact)			
Reock	0.41	0.38	0.44
Polsby-Popper	0.3	0.28	0.37
Area/Convex Hull	0.74	0.73	0.78
Number of split counties	17	15	15
Number of split VTDs	41	57	22
<hr/>			
# of seats with two-party Democratic vote share >.5	13	15	15
Expressed as percentage of seats	39.4%	45.45%	45.5%
# of seats with two-party Republican vote share >.5	20	18	18
Expressed as percentage of seats	60.6%	54.5%	54.5%

# of seats with two-party Democratic vote share >.52	8	8	12
Expressed as a percentage of seats	24.2%	24.2%	36.4%
# of seats with two-party Democratic vote share <.48	19	18	18
Expressed as percentage of seats	57.6%	54.55%	54.5%
# of seats with two-party Democratic vote share between .48 and .5	1	0	0
Expressed as percentage of seats	3.0%	0.00%	0.0%
# of seats with two-party Democratic vote share between .5 and .52	5	7	3
Expressed as percentage of seats	15.2%	21.21%	9.1%

# of seats with two-party Democratic vote share >.55	7	7	11
Expressed as a percentage of seats	21.2%	21.21%	33.3%
# of seats with two-party Democratic vote share <.45	18	16	17
Expressed as percentage of seats	54.5%	48.48%	51.5%
# of seats with two-party Democratic vote share between .5 and .55	6	8	4
Expressed as percentage of seats	18.2%	24.24%	12.1%
# of seats with two-party Democratic vote share between .45 and .5	2	2	1
Expressed as percentage of seats	6.1%	6.06%	3.0%

Figure 2: Histograms of Democratic Vote Share, Senate Plans



32. It is remarkable that of the 7 tossup districts with a nominal Democratic lean, 6 have Republican incumbents, and the seventh is an open seat. In District 13 in Lorain County, for example, which shares much of the territory of its previous manifestation, the Democratic vote share based on past statewide elections is 50.03 percent, but the incumbent Republican won the seat with 54.4 percent of the votes for the two major parties in November of 2018. In District 27 in suburban Akron, where the statewide Democratic vote share was 51 percent, Republican Kristina Roegner received 58.5 percent of the vote in November of 2018. In District 6, in Montgomery County, where the statewide Democratic vote share was 50.5 percent, in November of 2020, Republican Niraj Antani won the seat with 53.2 percent of the vote. In short, nearly all of the toss-up, nominally Democrat-leaning Senate seats are in fact seats that Republican candidates are very likely to win.

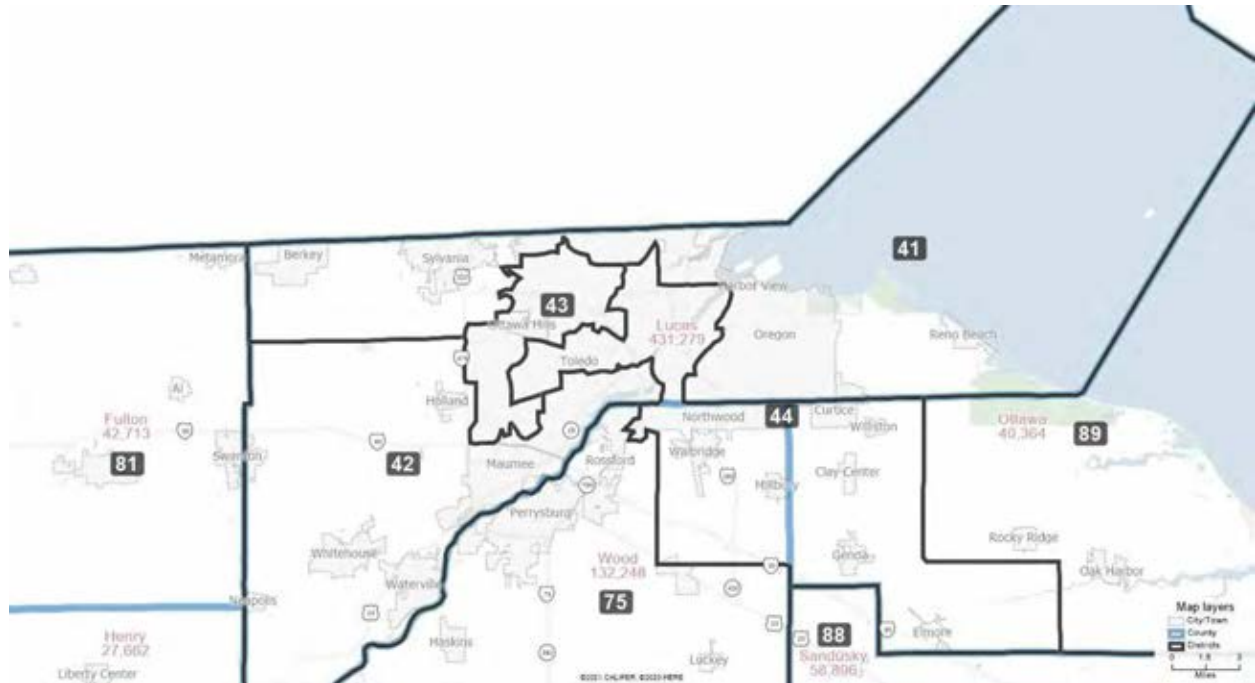
33. Again considering the Ohio Supreme Court’s latest guidance on proportionality, “competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share.” Accordingly, the Second Revised Plan is far from proportional. When excluding the 7 competitive seats altogether, 31 percent of the seats lean Democratic, compared to 69 percent of the seats leaning Republican. When allocating the 7 competitive seats proportionally to each party (i.e., allocating 54 percent, or 4, of the competitive seats to Republicans and 46 percent, or 3, of the competitive seats to Democrats), 33 percent of the seats lean Democratic, compared to 67 percent of the seats leaning Republican.

34. The Rodden III Plan, on the other hand, gets much closer to proportionality under either definition. When excluding the 3 competitive seats altogether, 40 percent of the seats lean Democratic, compared to 60 percent of the seats leaning Republican. When allocating the three competitive seats proportionally to each party (i.e., allocating 54 percent, or 2, of the competitive seats to Republicans and 46 percent, or 1, of the competitive seats to Democrats), 39 percent of the seats lean Democratic, compared to 61 percent of the seats leaning Republican. Although, admittedly, the Rodden III Plan does not achieve the perfect 54-46 split, it gets closer than the Second Revised Plan by anywhere from 6 to 9 percent. That is to say, the Rodden III Plan is much more proportional than the Second Revised Plan, even though its districts are more compact.

V. The Second Revised Plan's Treatment of Urban Areas

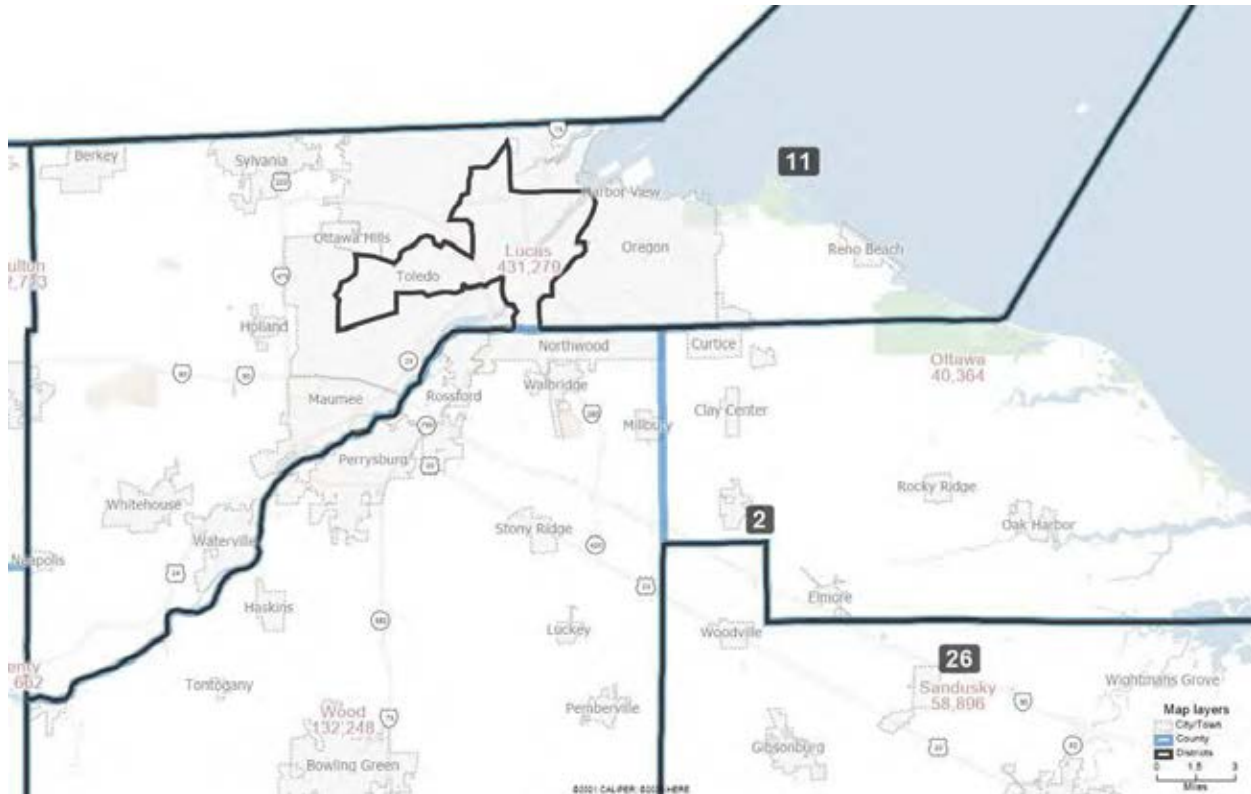
35. My previous report went into detail on the previous plan's treatment of several urban regions in Ohio, demonstrating that the House districts proposed by the Commission split up a variety of communities, often with relatively non-compact districts. While the configuration of districts has changed in some metro areas in the Second Revised Plan, this basic feature remains. As Table 1 demonstrates, the average compactness of the House districts is relatively similar to the First Revised Plan on each of three measures of compactness. However, in drawing the Second Revised Plan, the Commission increased the number of county splits in the House Plan. While reducing the number of county splits in the Senate Plan, the Commission ended up drawing a Senate Plan that is substantially less compact than its previous version. These decreases in compactness are detailed in Table 2.
36. In my previous reports, I have described the technique I used for drawing an alternative, constitutionally compliant plan. Above all, I avoided strategic splits that prevented geographically proximate urban areas from joining together to form a district, and I eschewed intentionally breaking off fragments of urban areas and subsuming them in surrounding exurban and rural areas. As can be seen in Tables 1 and 2, this led to redistricting plans with far more districts with Democratic vote shares above 52 percent than in the Second Revised Plan, and far fewer Democratic-leaning toss-up districts.
37. By keeping urban communities together and avoiding strategic splits, I also ended up with districts that are substantially more compact than those produced by the Commission, especially in the Senate Plan. I also split fewer counties in my House Plan than in the Second Revised Plan.
38. As with earlier plans produced by the Commission, some of the ways in which the non-compact districts in the Second Revised Plan disrupt communities of interest are obvious from a quick visual inspection. It appears that some of the most non-compact districts in the Second Revised Plan were created in the pursuit of drawing districts with a Democratic vote share very close to 51 percent. For instance, Figure 3 displays the districts of the Second Revised Plan in the Toledo area.

Figure 3: House Districts in Second Revised Plan, Toledo Area



39. Note the odd arrangement of District 44, which grabs part of urban Toledo and combines it with exurban and rural areas in a different county. District 41, which circumvents Toledo and produces a highly non-compact district stretching from the Eastern suburbs to the rural areas far to the West of Toledo, has a Democratic vote share of 51.2 percent, while also double-bunking two Democratic incumbents. District 42 to the Southwest also has a Democratic vote share of 51.2 percent.
40. Figure 4 then displays the manifestation of this districting strategy in the Senate. Urban parts of Toledo with relatively large Black population are extracted from the rest of the city and combined with overwhelmingly white rural areas to the South in Wood and Ottawa Counties to generate a Senate district with a Democratic vote share of 51.3 percent, but where the incumbent is a Republican.

Figure 4: Senate Districts in Second Revised Plan, Toledo Area



41. Figures 5 and 6 examine Franklin County. District 5 in the House was drawn to carve out a narrow slice of the most Republican exurbs in Franklin County, ranging from the far East to the far West of the County. This district has a Democratic vote share of 51.5 percent. In the Senate, the pattern continues all the way around the rest of Franklin County, such that District 3 is a highly non-compact donut-like district that follows the most Republican exurbs all the way from Westerville, clockwise around the outer fringes of the county, to Lake Darby, creating a district with a Democratic vote share of 52 percent.
42. In the House Plan, note that District 10 is another 51 percent Democratic district using statewide races, but it has a Republican incumbent, Laura Lanese, who won in November of 2020 with 55.5 percent of the vote.

Figure 5: House Districts in Second Revised Plan, Columbus Area

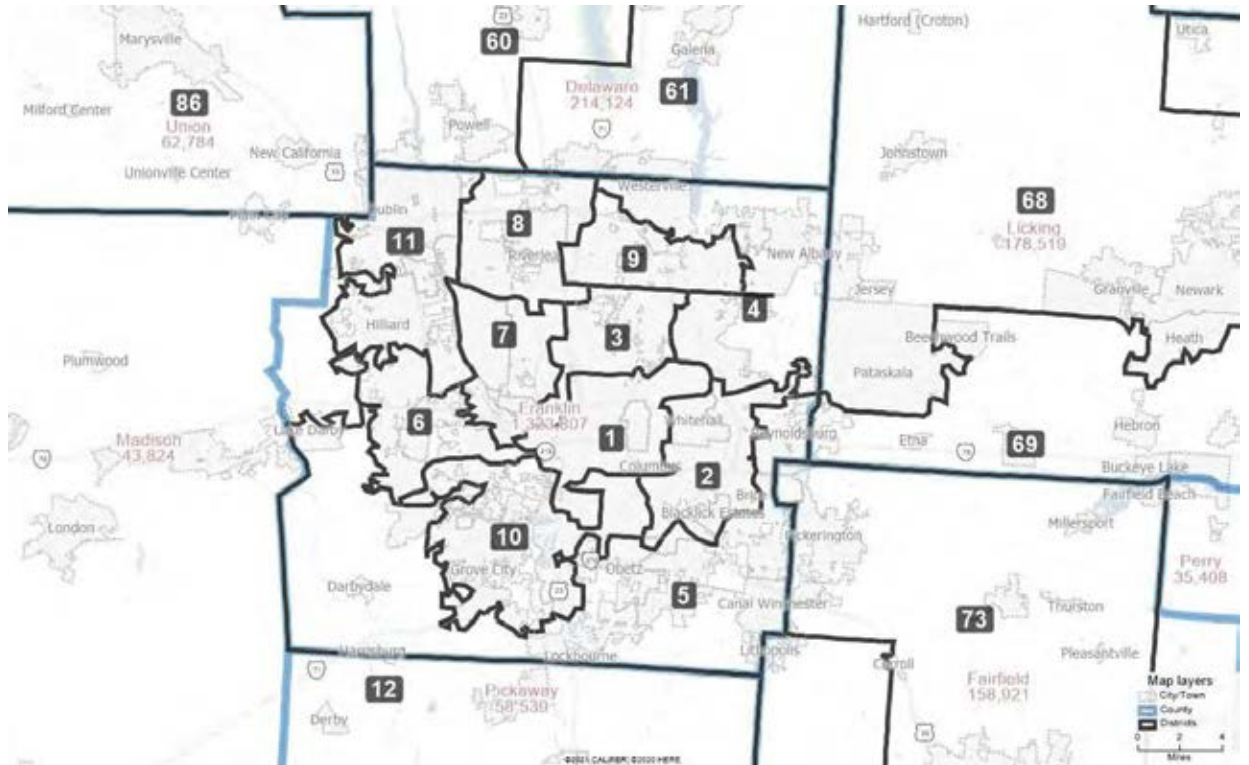
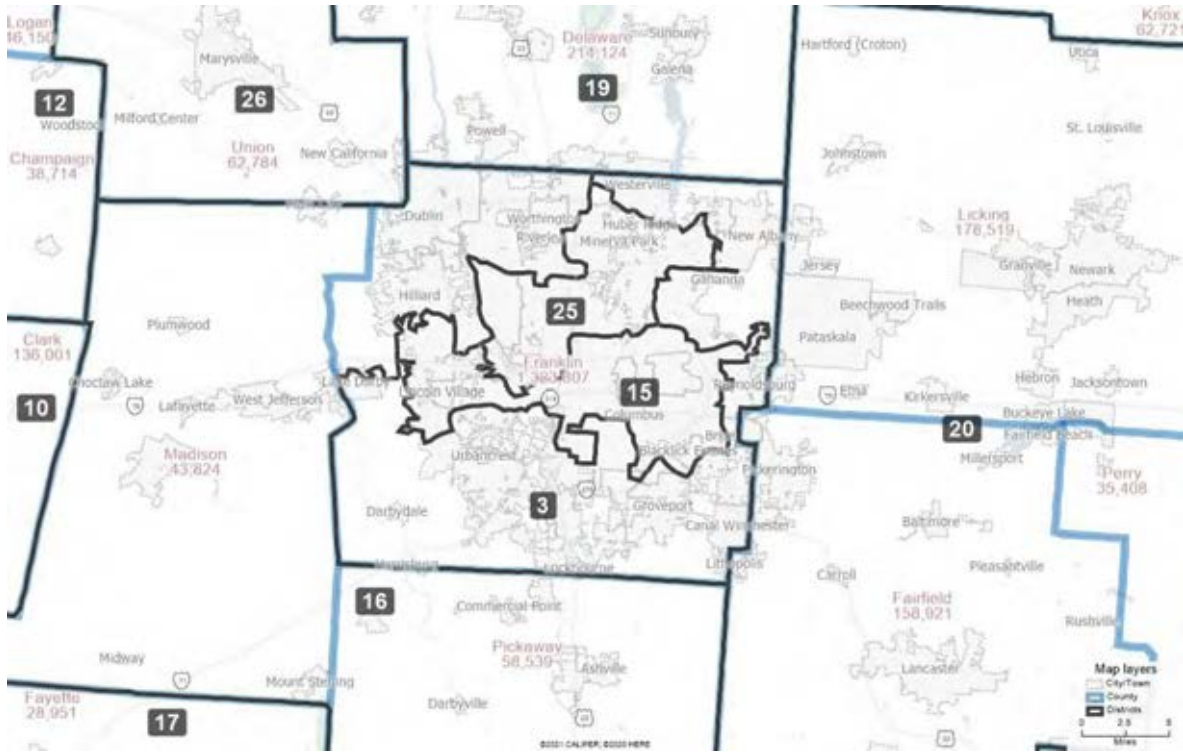


Figure 6: Senate Districts in Second Revised Plan, Columbus Area



43. Next, let us examine the Cleveland area districts. Figure 7 displays the House districts, and Figure 8 displays the Senate districts. District 15 in the House is a non-compact district in Cuyahoga County, connecting central parts of Cleveland to the Southern boundary of the County to produce a district with a Democratic vote share of 51.2 percent. District 17 reaches from the lakeshore to the Southern border of Strongsville to produce a district with a Democratic vote share of 50.8 percent.

Figure 7: House Districts in Second Revised Plan, Cleveland Area

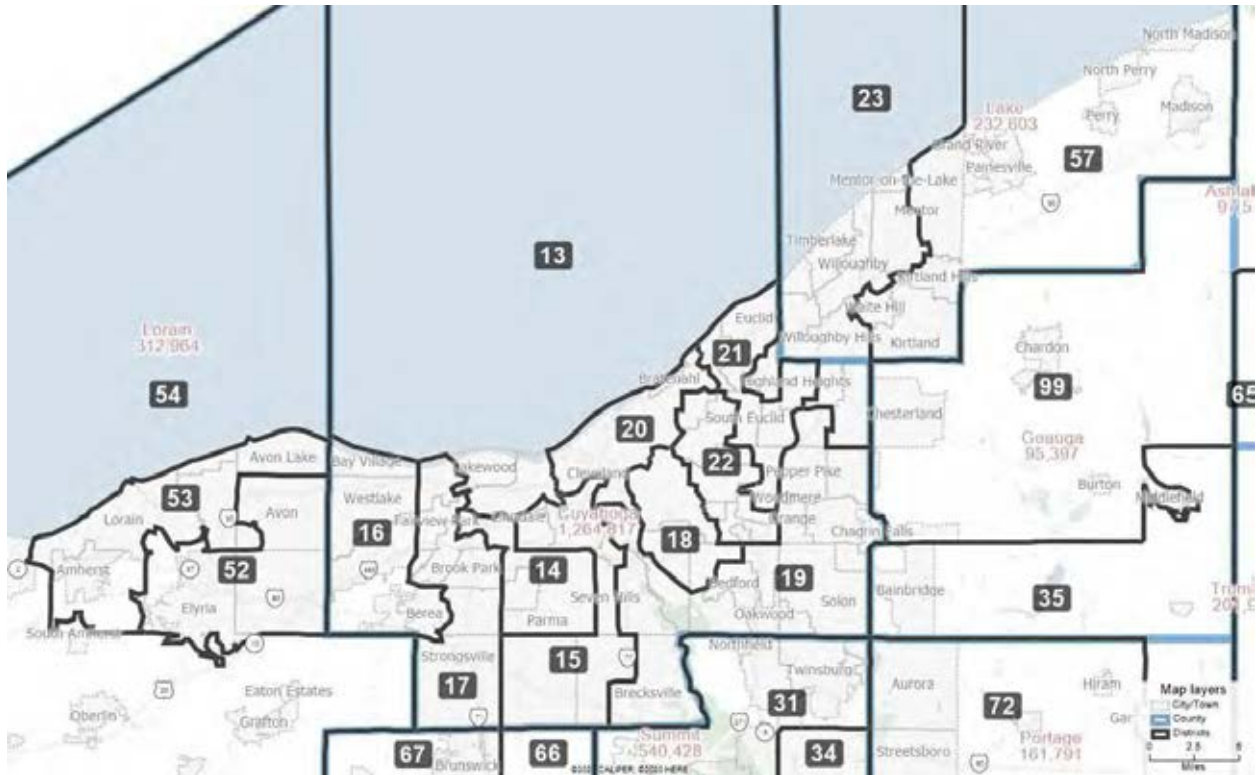
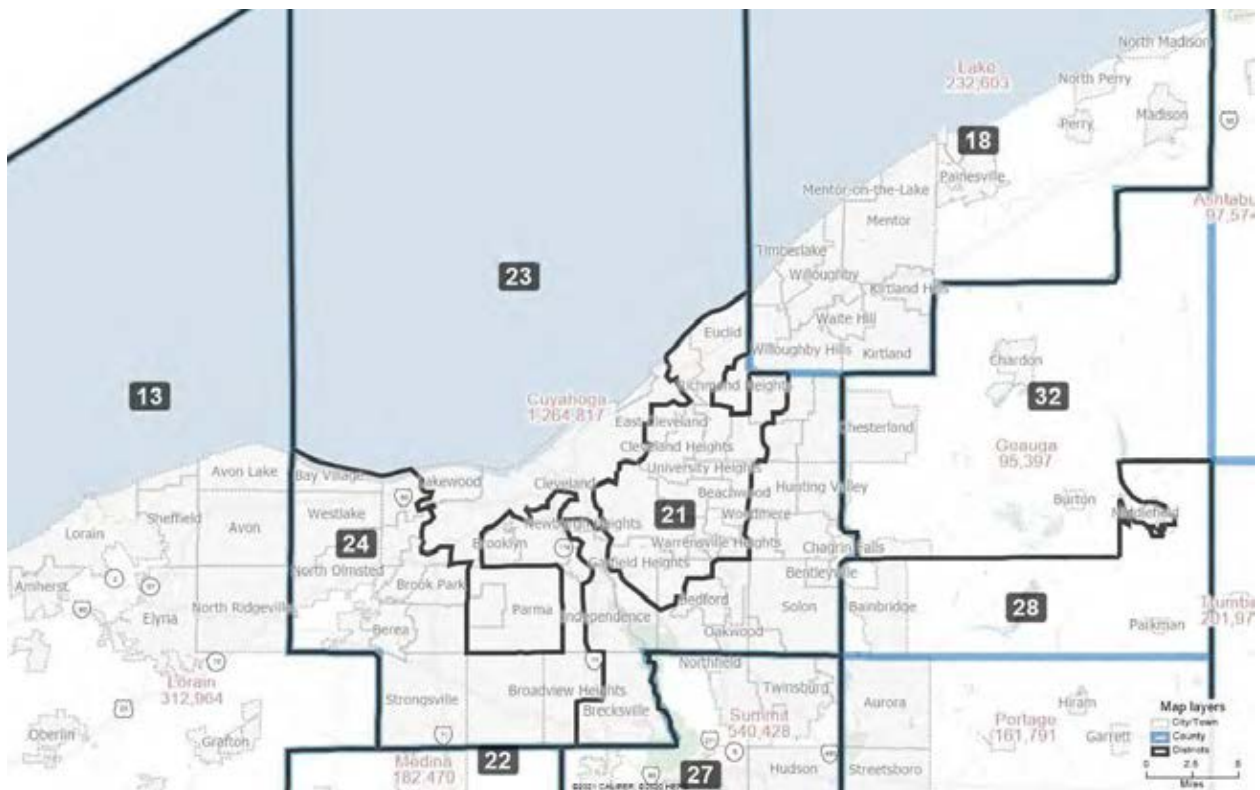
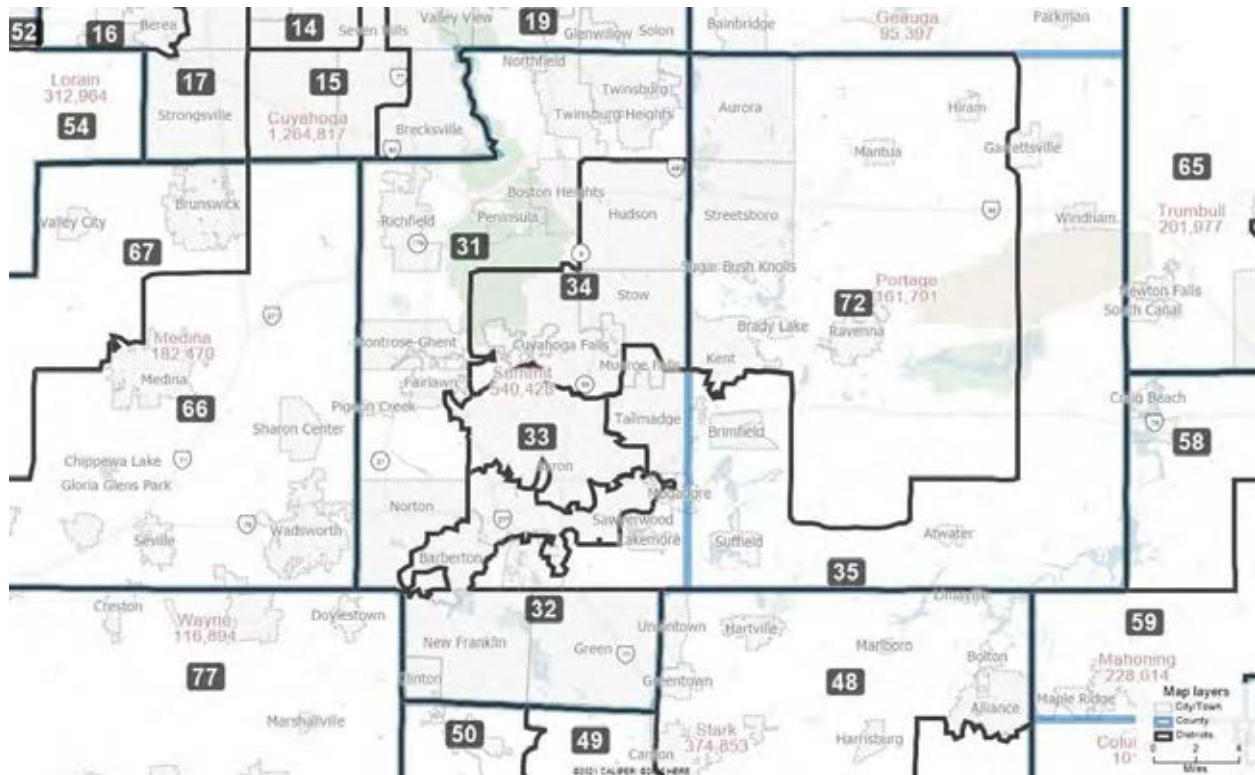


Figure 8: Senate Districts in Second Revised Plan, Cleveland Area



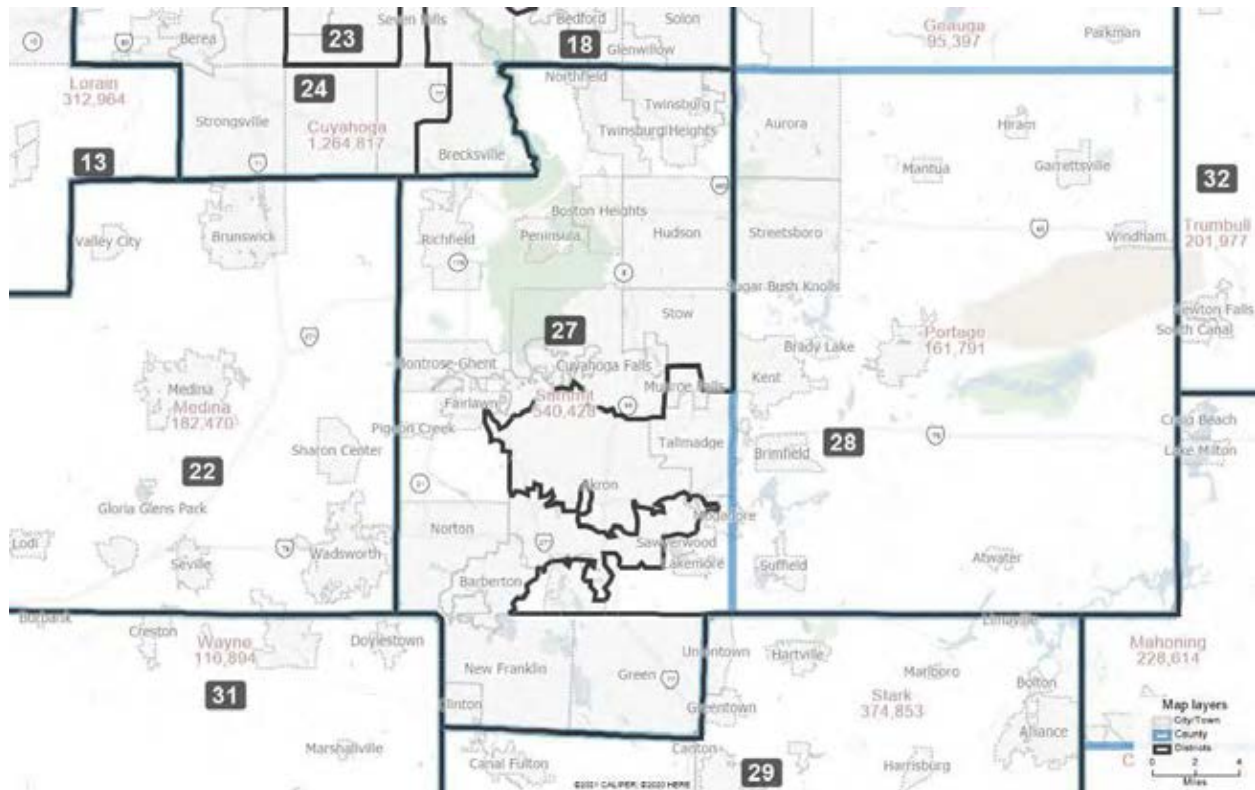
44. In the Senate, we see the same strategy as in Columbus. District 18 snakes around the city to grab exurban areas to produce a district with a Democratic vote share of 51.2 percent, but with a Republican incumbent. And District 24 does the same thing to the West, creating a district with a Democratic vote share of 51.6 percent.

Figure 9: House Districts in Second Revised Plan, Akron Area



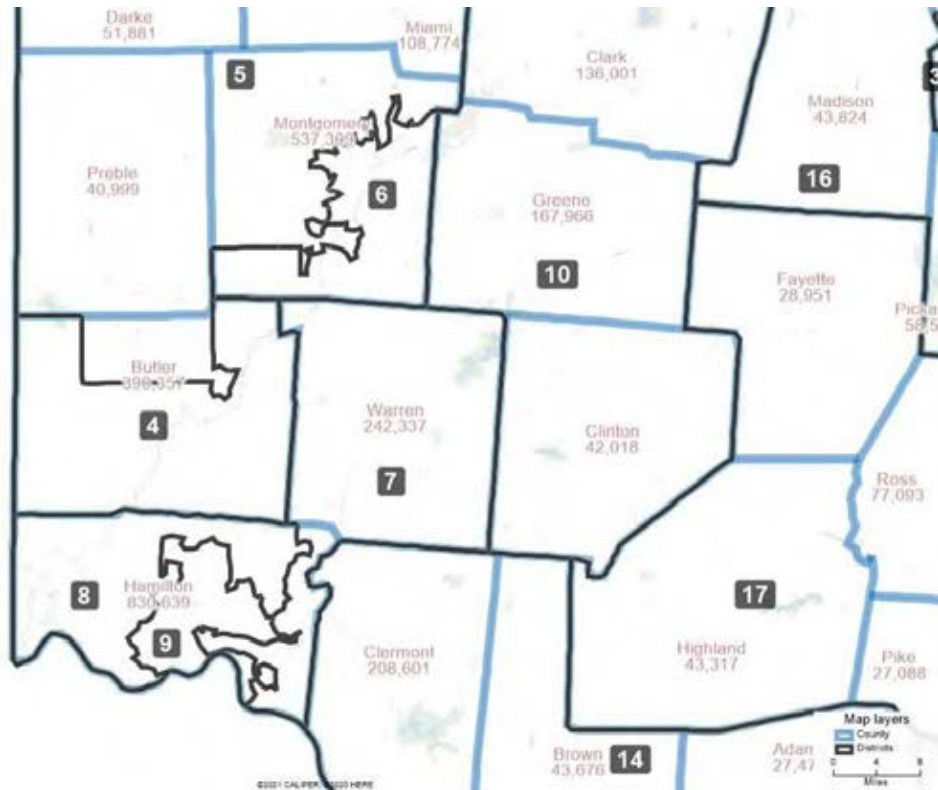
45. Figure 9 examines Akron's House districts. Again we see a similar pattern. District 31 extends from North to South on the West side of Summit County, creating a largely exurban district, but also including some urban neighborhoods, with a Democratic vote share of 50.4 percent and a Republican incumbent. Highly non-compact District 32 includes parts of central Akron, including Black neighborhoods, and extends through a narrow corridor to Stark County, creating a district with a Democratic vote share of 51.1 percent, again with a Republican incumbent.
46. Figure 10 shows the corresponding Senate districts. Just as Toledo was extracted from its surroundings, District 28 extracts urban Akron from its surroundings and combines it with rural parts of Portage County. A rather non-compact District 27 then gathers the rest of Summit County to produce a Senate district with a Democratic vote share of 51 percent and a Republican incumbent.

Figure 10: Senate Districts in Second Revised Plan, Akron Area



47. Figure 11 displays the Senate districts in the Cincinnati and Dayton areas. In Cincinnati, we see a “packing” strategy in action. The most exurban and rural Republican areas are assembled to produce District 8, while the most Republican areas on the Eastern side of the county are extracted and connected with Warren County in order to produce comfortable Republican districts, creating a single, overwhelmingly Democratic urban district.
48. Finally, Figure 11 also displays the Senate districts in the Dayton area. As in previous versions of the map, Black communities on the West side of Dayton are split and combined with more rural areas to produce District 5, which has a very comfortable Republican majority. By splitting metro Dayton in this way, however, it is possible to avoid the emergence of a reliable Democratic district, instead creating a District 6 with a Democratic vote share of 50.5 percent and a Republican incumbent.

Figure 11: Senate Districts in Second Revised Plan, Cincinnati/Dayton Area



49. While not exhaustive given the time constraints, this quick tour around metro areas of Ohio helps demonstrate how, by carefully crafting both House and Senate districts through careful city extractions and the creation of highly non-compact districts in suburbs and exurbs, it was possible to prevent the emergence of clear Democratic districts, producing instead a set of toss-up districts with Democratic vote shares right around 51 percent—usually with Republican incumbents, and in the case of the Senate, almost always with Republican incumbents.
50. It is also worthwhile to examine split vote tabulation districts (VTDs). In general, when drawing a districting plan, it is valuable to avoid splitting VTDs, even if this is not a legal requirement. Local election administrators must make sure that voters receive the correct ballot for state and federal legislative races, along with various local races, and split VTDs can create headaches, mistakes, and litigation after close races. Unfortunately, the very strict rules outlined in the Ohio Constitution sometimes require split VTDs, for instance in order to avoid a split municipality or city. However, as set forth in Tables 1 and 2, the Commission’s plans split far more VTDs than the Rodden III Plan. The Commission’s Senate plan splits more than twice as many VTDs as the Rodden III Plan. Perhaps as a byproduct of

the Commission's efforts to carry out the maneuvers displayed above, the Commission split far more VTDs in its Second Revised Plan than in its First Revised Plan.⁶

V. CONCLUSION

51. Like its predecessor, the Second Revised Plan disparately allocates competitive districts between the two major parties. In what seems to be an attempt to secure superficial proportionality, mapmakers appear to have adopted a target of 51 percent average vote share for Democratic-leaning districts and divided Ohio's urban areas in unusual ways unexplainable by any traditional redistricting criteria to meet that target. In total, the Second Revised Plan creates more Democratic "toss-up districts" than the First Revised Plan and manages at the same time to create even safer Republican districts. The result of this deliberate skewing of districts is that Democrats cannot under virtually any circumstances hope to gain seats beyond their proportional share, as calculated from past election results, in either House, while Republicans are nearly guaranteed to win more House and Senate districts than their proportional share of seats, and likely many more than their proportional share.

⁶ Additionally, during my examination of the Second Revised Plan, I discovered that the plan once again contains certain "zero population splits" that (if one accepts that such divisions constitute splits for purposes of Article XI) violate the municipality and township split requirements of Section 3(D)(3) of Article XI. Again, zero population splits are splits of a subdivision where a populated region of a subdivision only exists on one side of the subdivision split. In the case of the Second Revised Plan, New Albany, Plain Township, and Columbus are split between House Districts 4 and 9. However, for both New Albany and Plain Township, populated regions of those subdivisions fall on only one side of the split. I note these splits here in case the Court agrees with the view adopted by Mr. Ray DiRossi in his affidavit filed with this Court on January 28, 2022, in which he posits that similar zero population splits in a previous version of my plan violated Section 3(D)(3). *See* Affidavit of Ray DiRossi at ¶ 27, Appx.247 (Jan. 28, 2022). I have removed all zero population splits from the latest Rodden Plan filed with this Court. *See* Second Affidavit of Derek Clinger at ¶ 2-4 (Feb. 18, 2022).

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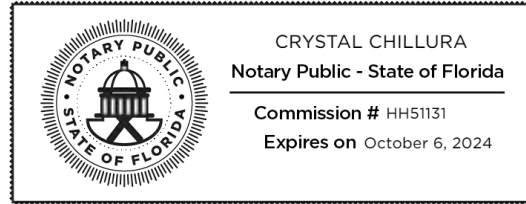
STATE OF FLORIDA COUNTY OF PASCO

Sworn to before me this 28th day of February 2022.

Jonathan Andrew Rodden Provided California Driver's License

Crystal Chillura

Notary Public Crystal Chillura Online Notary



My commission expires 10/06/2024

Notarized online using audio-video communication

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Exhibit A



Exhibit B



Exhibit C

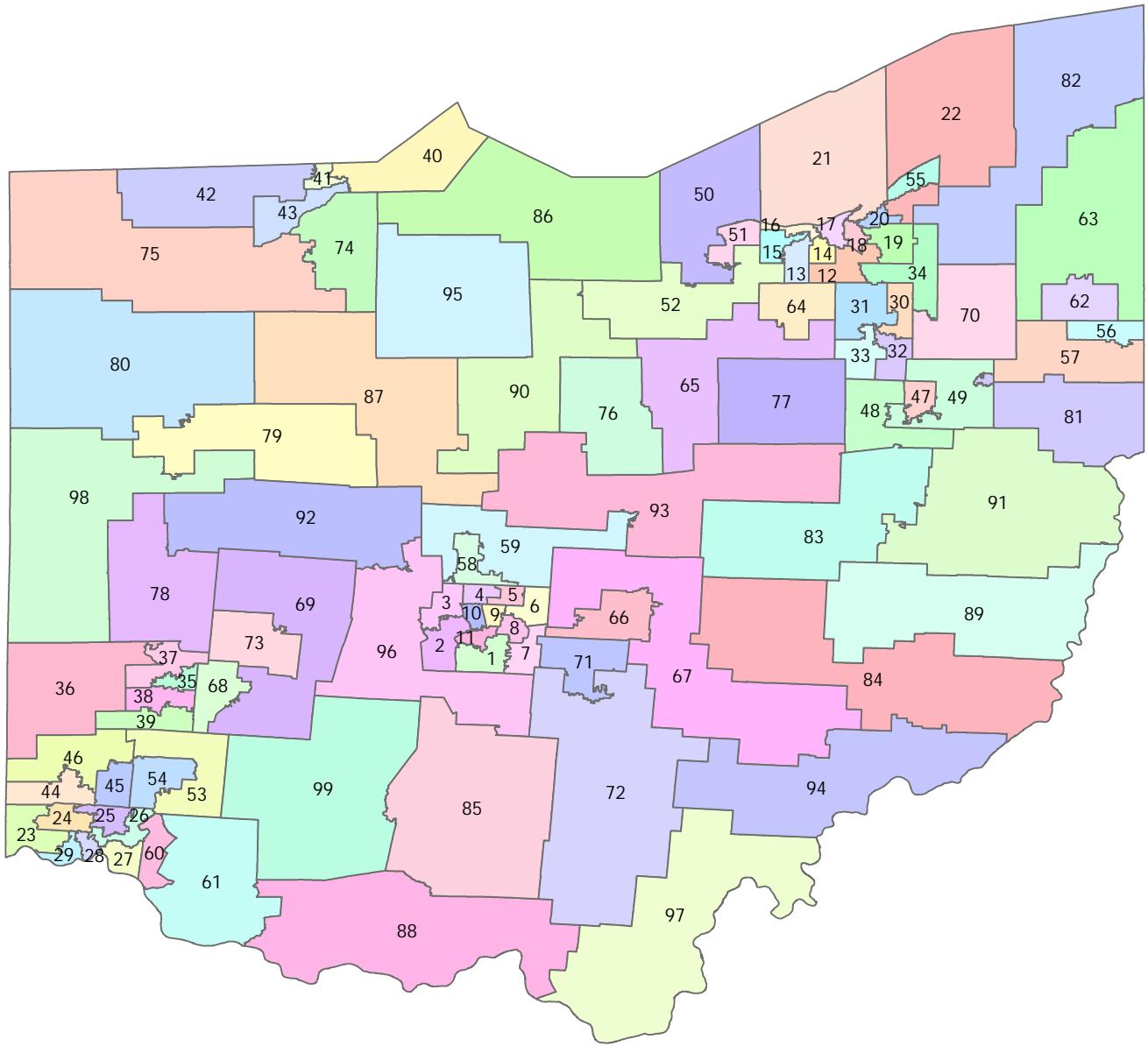


Exhibit D

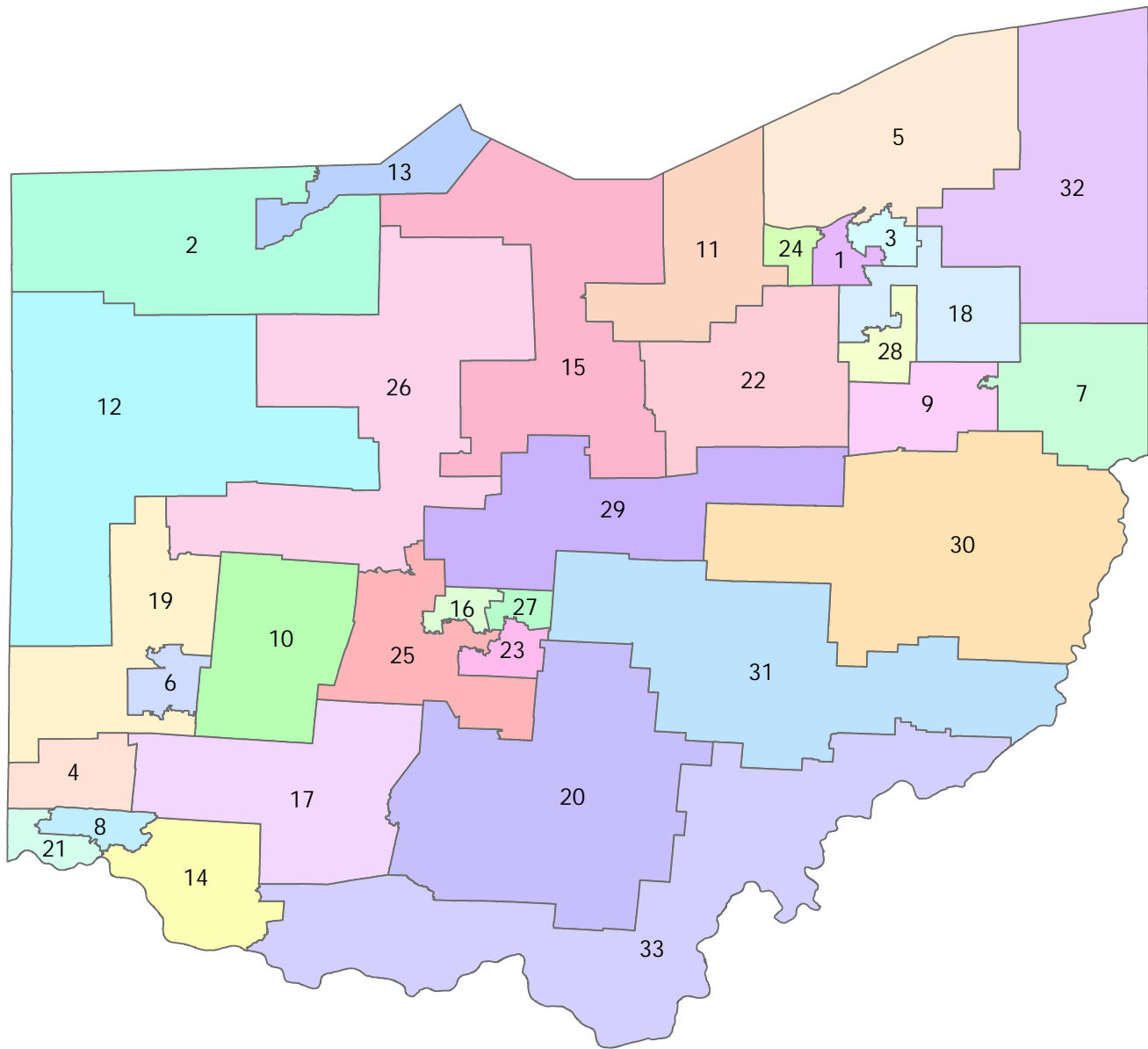


Exhibit E

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Education

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Academic Positions

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Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

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Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

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Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006-2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy
Introduction to Comparative Politics
Introduction to Political Science
Political Science Scope and Methods
Institutional Economics
Spatial Approaches to Social Science

Graduate

Political Economy
Political Economy of Institutions
Federalism and Fiscal Decentralization
Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Circuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006-2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008-2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998-2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Exhibit F

Article XI, Section 8(C)(2) Statement

Pursuant to Article XI, Section 8(C)(2) of the Ohio Constitution, the Ohio Redistricting Commission issues the following statement:

The Commission determined that the statewide preferences of the voters of Ohio predominately favor Republican candidates.

The Commission considered statewide state and federal partisan general election results during the last ten years. There were sixteen such contests. When considering the results of each of those elections, the Commission determined that Republican candidates won thirteen out of sixteen of those elections resulting in a statewide proportion of voters favoring statewide Republican candidates of 81% and a statewide proportion of voters favoring statewide Democratic candidates of 19%. When considering the number of votes cast in each of those elections for Republican and Democratic candidates, the statewide proportion of voters favoring statewide Republican candidates is 54% and the statewide proportion of voters favoring statewide Democratic candidates is 46%. Thus, the statewide proportion of voters favoring statewide Republican candidates is between 54% and 81% and the statewide proportion of voters favoring statewide Democratic candidates is between 19% and 46%. The Commission obtained publicly available geographic data for statewide partisan elections in 2016, 2018, and 2020. Publicly available geographic data for those elections was not available for elections in 2012 and 2014. Using this data, the Commission adopted the final general assembly district plan, which contains 85 districts (64.4%) favoring Republican candidates and 47 districts (35.6%) favoring Democratic candidates out of a total of 132 districts. Accordingly, the statewide proportion of districts whose voters favor each political party corresponds closely to the statewide preferences of the voters of Ohio.

The final general assembly district plan adopted by the Commission complies with all of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution. The Commission's attempt to meet the aspirational standards of Article XI, Section 6 of the Ohio Constitution did not result in any violation of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution.

Rodden Decl. Ex. F

IN THE SUPREME COURT OF OHIO

Bria Bennett, et al.,

Petitioners,

v.

Ohio Redistricting Commission, et al.,

Respondents.

Case No. 2021-1198

Original Action Filed Pursuant to Ohio
Constitution, Article XI, Section 9(A)

*[Apportionment Case Pursuant to S.
Ct. Prac. R. 14.03]*

**EXHIBITS TO PETITIONERS' OBJECTIONS TO GENERAL ASSEMBLY DISTRICT
PLAN ADOPTED ON MARCH 28, 2022 – VOLUME II
(Expert Affidavit of Dr. Jonathan Rodden)**

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IN THE SUPREME COURT OF OHIO

Bria Bennett, et al.,

Petitioners,

v.

Ohio Redistricting Commission, et al.,

Respondents.

Case No. 2021-1198

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*[Apportionment Case Pursuant to S. Ct.
Prac. R. 14.03]*

EXPERT AFFIDAVIT OF DR. JONATHAN RODDEN

I, Jonathan Rodden, having been duly sworn and cautioned according to law, hereby state that I am over the age of eighteen years and am competent to testify to the facts set forth below based on my personal knowledge and having personally examined all records referenced in this affidavit, and further state as follows:

I. INTRODUCTION AND SUMMARY

1. For the purpose of this report, I have been asked to examine the third revised redistricting plan for the Ohio State House of Representatives and Ohio Senate, adopted by the Ohio Redistricting Commission on March 28, 2022 (attached as Exhibits A and B) (“Third Revised Plan”). In previous reports, I have addressed the standards set forth in Article XI, Section 6, namely, that (A) “No general assembly district plan shall be drawn primarily to favor or disfavor a political party,” (B) “The statewide proportion of districts whose voters, based on statewide state and federal partisan general election results during the last ten years, favor each political party shall correspond closely to the statewide preferences of the voters of Ohio,” and (C) “General assembly districts shall be compact.”
2. Additionally, I have been asked to assess an additional redistricting plan created by the independent map drawers appointed by the Ohio Redistricting Commission and submitted to the Commission on March 28, 2022 (“Independent Map Drawers’ Plan”).
3. As this Court stated in its January 12, 2022 opinion declaring invalid the General Assembly plan adopted by the Commission on September 16, 2021, “[i]f it is possible for a district plan to comply with Section 6 and Sections 2, 3, 4, 5, and 7, the commission must adopt a plan that does so.” *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-65 at ¶ 88.
4. The Third Revised Plan is nearly identical to the Second Revised Plan, with 99.7 percent of Ohio residents placed in the same district as in the Second Revised Plan. In total, the Third Revised Plan changes only 451 census blocks, accounting for 31,244 people out of the state’s

population of nearly 11.8 million, which amounts to a change affecting less than 0.3 percent of Ohio's population. As with the Second Revised Plan, the distribution of support for the two parties across districts in the Third Revised Plan is extremely unusual, indicating that Commissioners attempted to achieve nominal statewide partisan proportionality by generating a large number of districts with very slim Democratic majorities, while creating 0 districts with similarly slim Republican majorities. Under the Second Revised Plan, virtually all the majority-Republican seats are quite safe: 52 of 54 seats with Republican majorities in the Ohio House of Representatives would have Republican vote shares above 55 percent, and the same is true for 16 of 18 seats with Republican majorities in the Senate. The situation is starkly different for Democrats. Of 45 seats with nominal Democratic majorities, fewer than half—only 22—would have Democratic vote shares above 55 percent in the House, and the same would be true of only 7 of 15 “Democratic” seats in the Senate. These numbers are exactly the same as in the Second Revised Plan. This striking asymmetry in the distribution of competitive and non-competitive seats has the effect of creating what is likely to be a very hard ceiling on the number of seats that can possibly be won by Democratic candidates, preserving a comfortable Republican legislative majority even in the event of an exceedingly strong statewide performance by Democrats.

5. In my previous reports submitted in this matter, I discussed and analyzed “toss-up” districts: those seats where the expected vote share for a party is between 48 and 52 percent. The same asymmetry in the Third Revised Plan is obvious even when looking at only the narrowest toss-up districts for each party. Under the Third Revised Plan, every majority-Republican House seat would have a Republican vote share above 52 percent: all 54 seats in the House and all 18 seats in the Senate. On the other hand, only 28 of 45 majority-Democratic seats in the House (2 more than in the Second Revised Plan), and only 9 majority-Democratic seats (1 more than in the Second Revised Plan) in the Senate have Democratic vote shares above 52 percent. As a result, there are, as in the Second Revised Plan, a large number of ultra-competitive districts, which monolithically “lean” Democrat.
6. Using the Ohio Supreme Court's guidance on proportionality, “competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share.” *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-342 at ¶ 62. Accordingly, the Third Revised Plan is far from proportional.
7. If these toss-up seats are excluded, the Third Revised Plan reflects a 28D/54R advantage in the House, or an advantage of 34.1 percent to 65.9 percent of allocated seats in favor of Republicans. In the Senate, it reflects a 18R/9D advantage, which corresponds to a 33.3% percent to 66.7% percent advantage in Republicans' favor.
8. Moreover, like its predecessor, the Third Revised Plan produces an unusually large number of districts with Democratic vote shares of around 51 percent, indicating the application of a specific target. This is to say, it appears that the drawers of the Second Revised Plan were instructed to draw as many of the Democratic-leaning districts as possible to be as close as possible to 51 percent, and this unusual feature remains in the Third Revised Plan. Only 2 House districts and 1 Senate district have been altered in the Third Revised Plan so as to bump their Democratic vote share above 52 percent.

9. In order to ascertain whether it was possible for the Commission to comply with both Section 6 and Sections 2, 3, 4, 5, and 7 of the Ohio Constitution, I submit my own alternative maps (with images attached as Exhibits C and D and submitted as native files to the Court on February 18, 2022).
10. The alternative maps attached as Exhibits C and D comply with each of the requirements of Sections 2, 3, 4, 5, and 7. They also produce a partisan breakdown that more closely corresponds to the preferences of Ohio voters. Using plan-wide averages, compactness scores reveal that these maps draw far more compact districts than those in the Third Revised Plan. They also split fewer counties and vote tabulation districts and are far more reflective of communities of interest. Moreover, these maps reveal that there is nothing about the political geography of Ohio that might explain an unusual bunching of districts with Democratic vote shares between 50 and 52 percent, or right at the 51 percent mark in particular, while simultaneously resulting in all Republican districts exceeding 52 percent.
11. I have not yet had the opportunity to assess whether the Independent Map Drawers' Plan meets all the criteria of the Ohio Constitution, specifically with respect to the issue of municipal splits. However, I have been asked to place this plan in comparative perspective with respect to compactness, splits of counties and vote tabulation districts, and the distribution of support for the two parties across districts. I conclude that the plan performs very well in reflecting the statewide preferences of Ohio voters. Like the Rodden Plan and Third Revised Plan, the Independent Map Drawers' Plan achieves nominal proportionality in both houses. It also allocates toss-up seats in a much more even-handed fashion than the Third Revised Plan. Excluding toss-up seats from the calculus, the Independent Map Drawers' Plan reflects a 42D/51R split in the House and a 13D/18R split in the Senate, corresponding to a 45.2 percent Democratic/54.8 percent Republican split in the House and 41.9 percent Democratic/58.1 percent Republican split in the Senate.
12. When it comes to traditional redistricting criteria, the Independent Map Drawers' Plan outperforms the Third Revised Plan on almost all dimensions. For example, the Independent Map Drawers' Plan has higher plan wide compactness scores than the Third Revised Plan in the House and Senate on every single measure, and splits the same number of counties and fewer Vote Tabulation Districts in the House; in the Senate, it splits fewer Vote Tabulation Districts as well, although it splits somewhat more counties. On traditional redistricting criteria, the plan I have submitted to the Court outperforms both the Third Revised Plan and the Independent Map Drawers' Plan.

II. QUALIFICATIONS

13. I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of

Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit E.

14. In my current academic work, I conduct research on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy*, *Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics*. One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy published in the last year, and another received an award from the American Political Science Association section on social networks. In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and received the Martha Derthick Award of the American Political Science Association for “the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations.”
15. I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I have recently completed a book, published by *Basic Books* in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.
16. I have expertise in the use of large data sets and geographic information systems (GIS), and I conduct research and teaching in the area of applied statistics related to elections. My PhD students frequently take academic and private sector jobs as statisticians and data scientists. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine*. I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.
17. I have been accepted and testified as an expert witness in several election law and redistricting cases: *Romo v. Detzner*, No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP v. Ferguson-Florissant Sch. Dist.*, No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections*, No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat’l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018). I also worked with a coalition of academics to file Amicus Briefs in the U.S. Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony

in these cases had to do with geography, electoral districts, voting, ballots, and election administration. I recently drew a Pennsylvania Congressional redistricting plan, known as the “Carter Plan,” that was chosen by the Pennsylvania Supreme Court for implementation. *Carter v. Chapman*, No. 7 MM 2022, 2022 WL 549106 (Pa. Feb. 23, 2022).

III. DATA SOURCES

18. I have collected statewide election data for 2012 to 2020 from the Ohio Secretary of State. I also accessed precinct-level election results from the Ohio Secretary of State for statewide elections from 2016 to 2020 that were matched to 2020 Ohio vote tabulation districts by a team at Harvard University called the Algorithm-Assisted Redistricting Methodology Project.¹ Additionally, I accessed the Third Revised Plan approved by the Commission and uploaded to the web page of the Ohio Redistricting Commission, true copies of which are attached as Exhibits A and B, as well as the Independent Map Drawers’ Plan, true copies of which are attached as Exhibits G and H.² For the analysis conducted in this report, I use two software packages: Stata and Maptitude for Redistricting. In creating my maps, I used the same U.S. Census redistricting data used by the Ohio Redistricting Commission, as archived in the “Ohio University Common and Unified Redistricting Database.”³

IV. WHAT HAS CHANGED IN THE THIRD REVISED PLAN?

19. The first thing to notice about the Third Revised Plan is that it is virtually identical to the Second Revised Plan. I have added up the block-level population that falls into the same district in both plans, as well as the population that has been moved to a different district. For the Ohio House of Representatives, 99.74 percent of the population remains in the same district in the two plans. The boundaries for the House districts in the Third Revised Plan are exactly the same as in the Second Revised Plan throughout the state, with two very small exceptions. Figure 1 below provides a map of the boundaries of the Second Revised Plan in red, and the Third Revised Plan in black. When looking at the entire state, it is very difficult to appreciate any differences. To see the slight changes, it is necessary to zoom in on the northern part of Franklin County (Figure 2) and on the Canton area (Figure 3).
20. First, there has been a very minor movement of a boundary in the area of Worthington and Upper Arlington in Northern Franklin County. In Figure 2 also, the boundaries of the Second Revised Plan are shown in red, and the boundaries of the Third Revised Plan are shown in black. Only a handful of census blocks are involved in this change. This small change did not alter any of the partisan metrics discussed in this report for the House—both Districts 7 and 8 are extremely Democratic districts. However, for the Senate, this small maneuver brought Senate District 16 from an average Democratic vote share of 51.1 percent in the Second Revised Plan to 52.1 percent in the Third Revised Plan.
21. Figure 3 shows that some small changes were also made near Canton. First, District 49 gained a very small sliver of urban population and shed a small number of rural voters. This

¹ <https://alarm-redist.github.io/posts/2021-08-10-census-2020/>

² <https://redistricting.ohio.gov/maps>

³ <https://www.redistricting.ohio.gov/resources>

maneuver brough District 49 from an average Democratic vote share of 51.6 percent to 52.2 percent. Additionally, District 59, which combines Youngstown with surrounding rural areas, simply shed a few rural voters, bringing the average Democratic vote share from 51.9 percent to 52.8 percent. These changes did not have any implications for the Senate districts. Other than these very small changes, the Second and Third Revised Plans are identical.

Figure 1: Boundaries of Second and Third Revised Plans

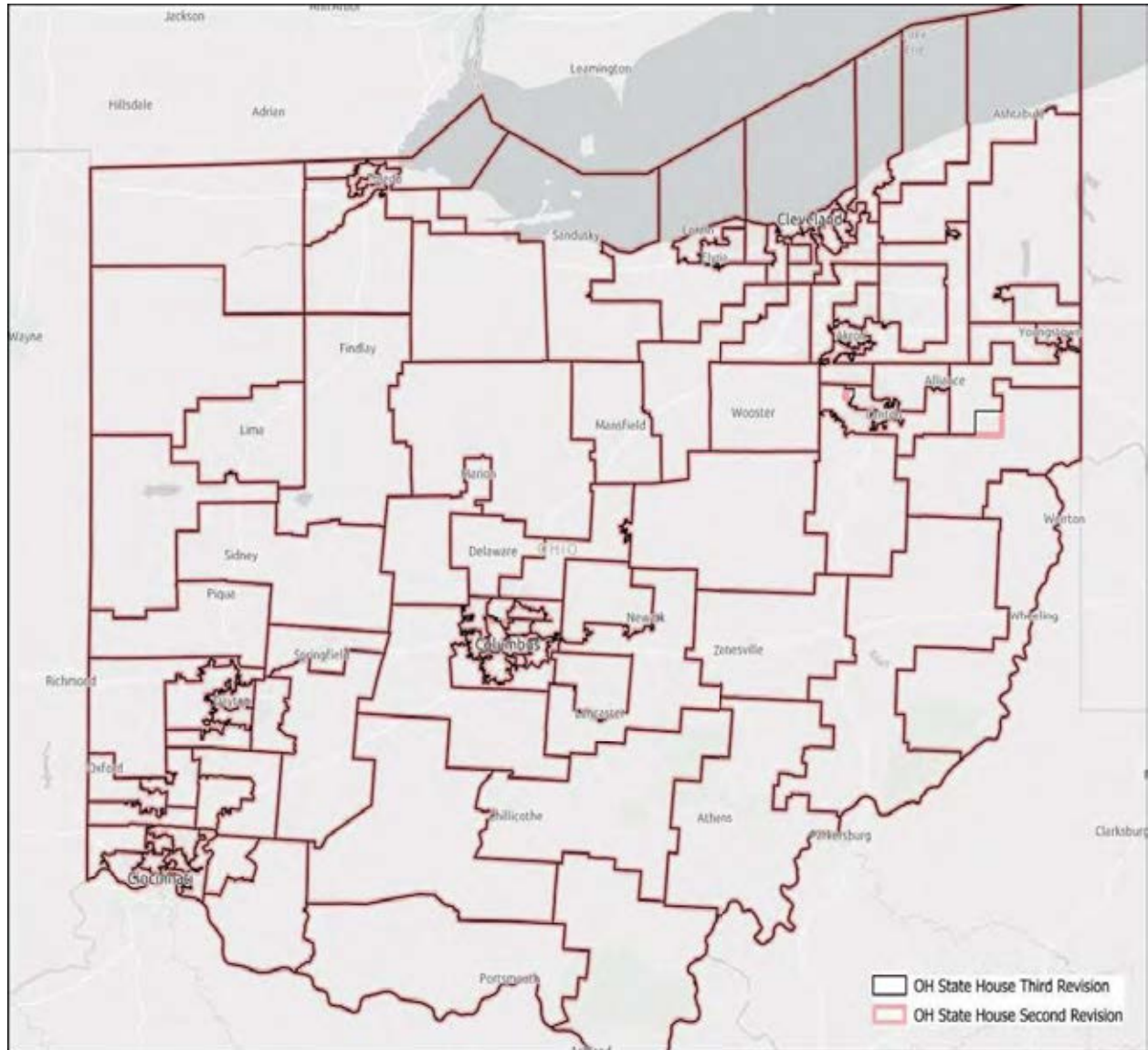


Figure 2: Northern Franklin County

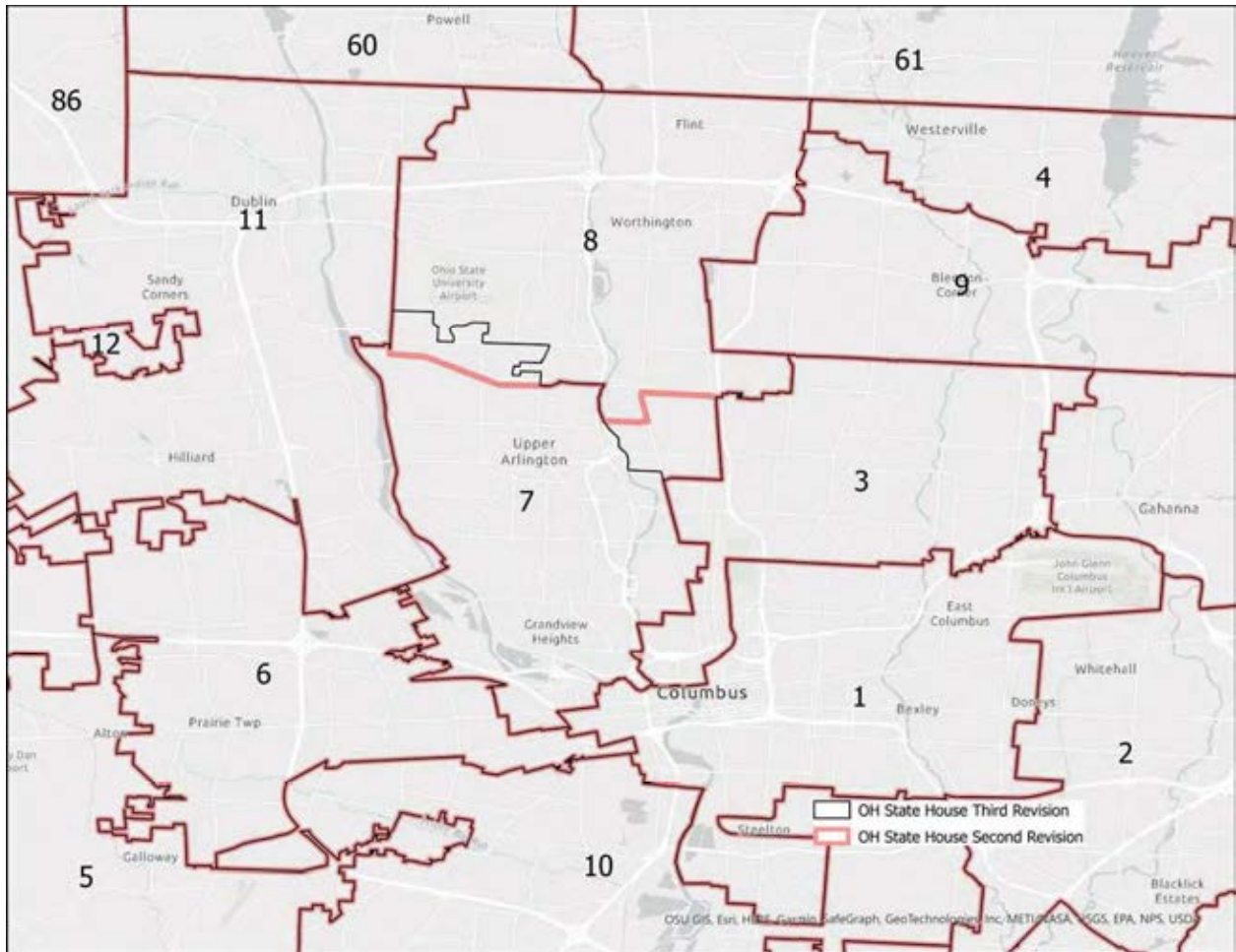
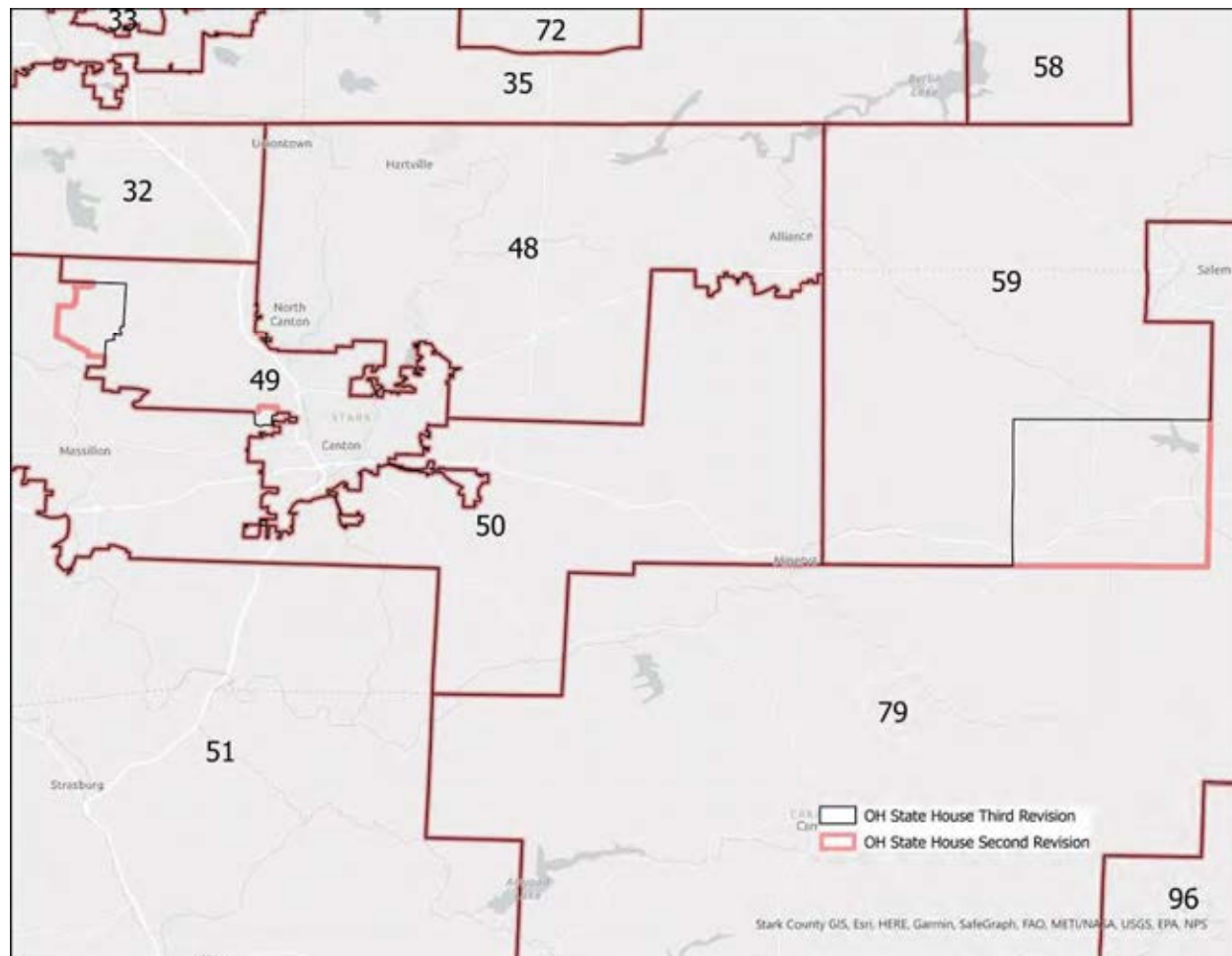


Figure 3: Canton Area



V. CONTRASTING THE REVISED PLANS, THE RODDEN III PLAN, AND THE INDEPENDENT MAP DRAWERS' PLAN

22. According to *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-65 at ¶ 108, the Commission must attempt to draw a plan with a seat share that “closely corresponds” to a breakdown of 54 percent in favor of Republicans and 46 percent in favor of Democrats. As this Court has held in interpreting Section 6(B)’s proportionality requirement, “competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share.” *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-342 at ¶ 62.

23. Determining the proportion of districts that favor each party, based on consideration of the relevant elections identified in Article XI, Section 6, requires an aggregation of the precinct-level results of these past elections to the boundaries of a map's proposed districts. However, precinct-level election results linked with geo-spatial boundaries were not available for the 2012 and 2014 elections, as the Commission itself acknowledged in its initial Article XI, Section 8(C)(2) Statement (accompanying the since-struck down September 16, 2021 General Assembly plan), attached as Exhibit F. As discussed in my previous reports to this Court, using the full statewide election results from 2012 to 2020, the statewide preferences of Ohio voters must be translated into state legislative maps in which 45.9 percent of seats favor Democrats and 54.1 percent of seats favor Republicans. Since there are 99 seats in the Ohio House of Representatives, a statewide vote share of 45.9 percent would be associated with 45.44 Democratic seats, which rounds down to 45 seats. Similarly, a 45.9 percent vote share would be associated with about 15.15 Democratic seats in the 33-member Ohio Senate, which rounds down to 15 seats.
24. It is my understanding that the Commission's approach to evaluating the partisanship of each district was to add up all the votes cast for each of the two major parties in each statewide election and divide by the total number of votes cast for both of the two major parties, summing over all of those elections.⁴ I have calculated this measure of district-level partisanship for each district in the Third Revised Plan. In Table 1, I include these metrics for the Commission's First Revised Plan, the Second Revised Plan, the Third Revised Plan, the plan that I have submitted to the Commission and the Court (the "Rodden Plan"), and the Independent Map Drawers' Plan. Table 2 provides the same information for the Ohio Senate.
25. For each plan, Figure 4 also provide histograms that allow one to visualize the distribution of support for the two parties across the House districts in each proposed plan. That is, the districts are divided into bins according to a specific narrow range of average Democratic vote share, and the height of the bin corresponds to the number of districts that fall into that bin. Figure 5 displays the same information for the Ohio Senate.

⁴ In my reports concerning the first two plans approved by the Commission, I calculated vote shares of the two major parties in each election in each district, and then took an average across all 9 statewide elections. This approach gives equal weight to each election, regardless of turnout, whereas the approach taken by the Commission, and reproduced here for purposes of comparability, gives greater weight to presidential election years with higher turnout. The two approaches yield very similar results, and lead to very similar inferences, but exact numbers of seats above and below certain thresholds can sometimes vary by a single seat.

Table 1: Plan Statistics, Ohio House of Representatives

	Commission First Revised Plan	Commission Second Revised Plan	Commission Third Revised Plan	Rodden Plan	Independent Map Drawers' Plan
Average compactness scores					
(Higher scores = more compact)					
Reock	0.40	0.39	0.39	0.41	0.41
Polsby-Popper	0.30	0.31	0.31	0.36	0.33
Area/Convex Hull	0.74	0.75	0.74	0.79	0.77
Number of split counties	37	38	38	32	38
Number of split VTDS	112	135	135	96	118
<hr/>					
# of seats with two-party Democratic vote share >.5					
Expressed as percentage of seats	42.4%	45.45%	45.45%	42.4%	45.45%
# of seats with two-party Republican vote share >.5					
Expressed as percentage of seats	57.6%	54.5%	54.5%	57.6%	54.5%
<hr/>					
# of seats with two-party Democratic vote share >.52					
Expressed as a percentage of seats	28.3%	26.3%	28.28%	40.4%	42.4%
# of seats with two-party Democratic vote share <.48					
Expressed as percentage of seats	57.6%	54.55%	54.55%	56.6%	51.5%
# of seats with two-party Democratic vote share between .48 and .5					
Expressed as percentage of seats	0.0%	0.0%	0.0%	1.0%	3.0%
# of seats with two-party Democratic vote share between .5 and .52					
Expressed as percentage of seats	14.1%	19.19%	17.17%	2.0%	3.0%
<hr/>					
# of seats with two-party Democratic vote share >.55					
Expressed as a percentage of seats	24.2%	22.22%	22.22%	29.3%	24.2%

# of seats with two-party Democratic vote share <.45	54	52	52	51	48
Expressed as percentage of seats	54.5%	52.53%	52.53%	51.5%	48.5%
 # of seats with two-party Democratic vote share between .5 and .55	 18	 23	 23	 13	 21
Expressed as percentage of seats	18.2%	23.23%	23.23%	13.1%	21.2%
 # of seats with two-party Democratic vote share between .45 and .5	 3	 2	 2	 6	 6
Expressed as percentage of seats	3.0%	2.02%	2.02%	6.1%	6.1%

Figure 4: Histograms of Democratic Vote Share, House Plans

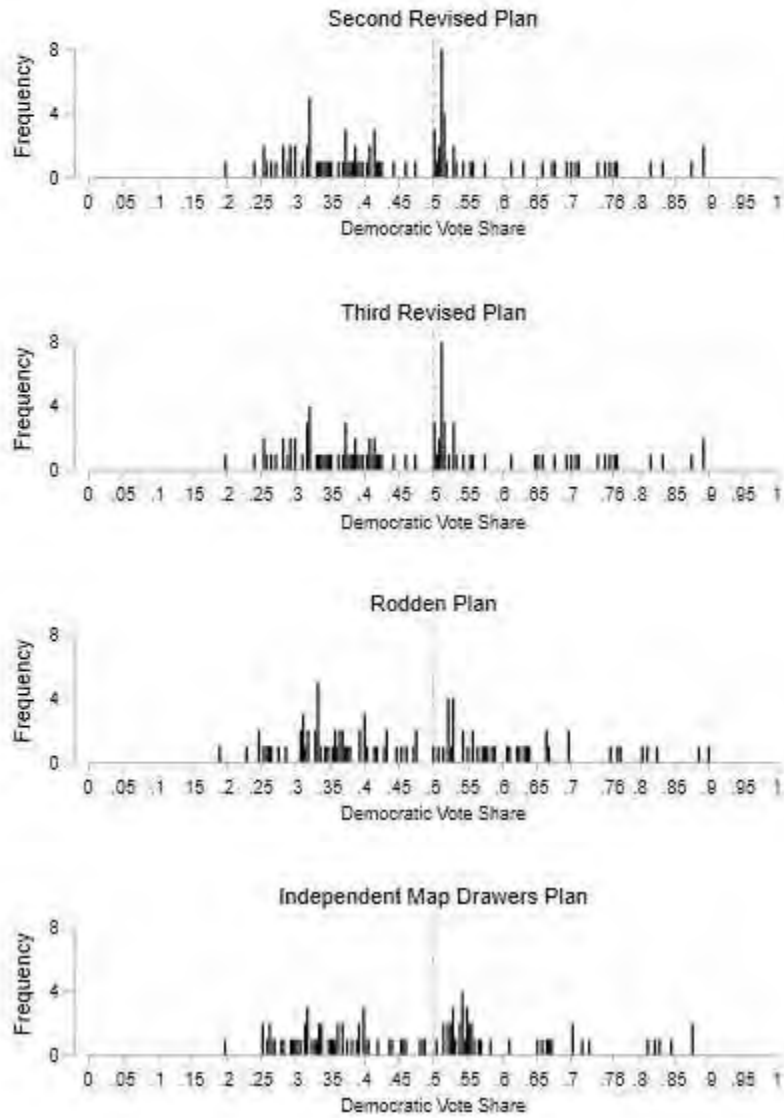
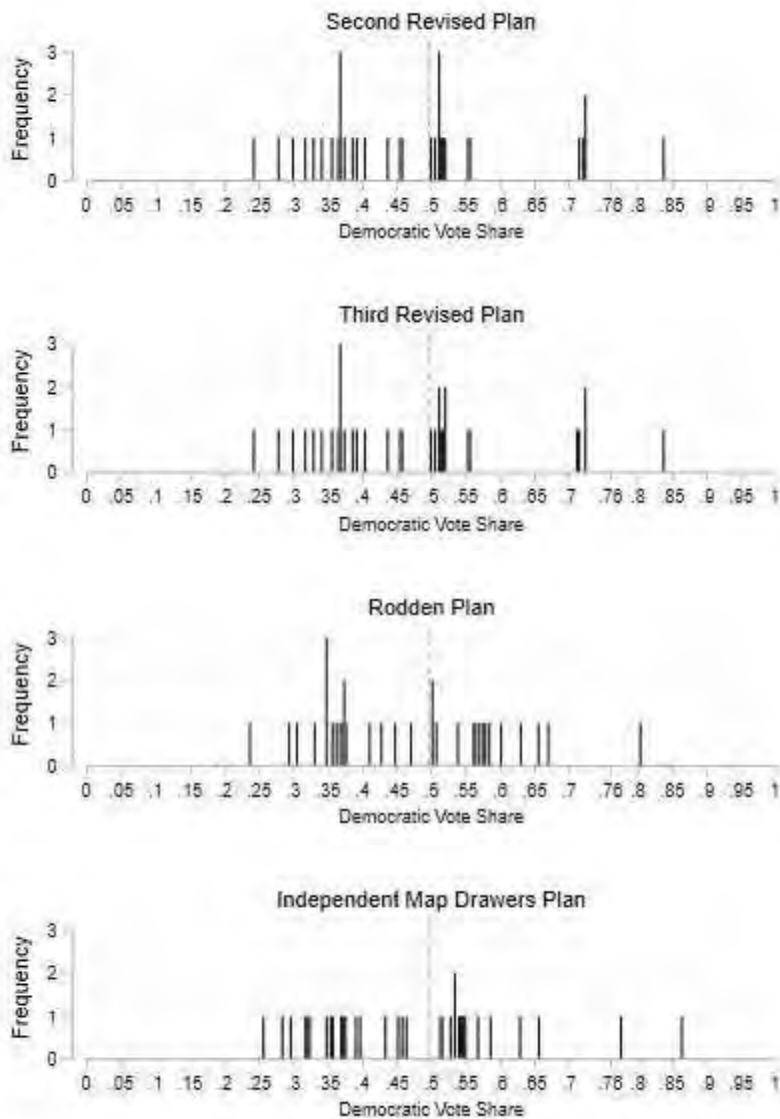


Table 2: Plan Statistics, Ohio Senate

	Commission First Revised Plan	Commission Second Revised Plan	Commission Third Revised Plan	Rodden Plan	Independent Map Drawers' Plan
Average compactness scores					
(Higher scores = more compact)					
Reock	0.41	0.38	0.38	0.44	0.42
Polsby-Popper	0.3	0.28	0.28	0.37	0.31
Area/Convex Hull	0.74	0.73	0.73	0.78	0.76
Number of split counties	17	15	15	15	22
Number of split VTDS	41	57	58	22	46
<hr/>					
# of seats with two-party					
Democratic vote share >.5	13	15	15	15	15
Expressed as percentage of seats	39.4%	45.45%	45.45%	45.5%	45.5%
# of seats with two-party					
Republican vote share >.5	20	18	18	18	18
Expressed as percentage of seats	60.6%	54.5%	54.5%	54.5%	54.5%
<hr/>					
# of seats with two-party					
Democratic vote share >.52	8	8	9	12	13
Expressed as a percentage of seats	24.2%	24.2%	27.3%	36.4%	39.4%
# of seats with two-party					
Democratic vote share <.48	19	18	18	18	18
Expressed as percentage of seats	57.6%	54.55%	54.55%	54.5%	54.5%
# of seats with two-party					
Democratic vote share between .48 and .5	1	0	0	0	0
Expressed as percentage of seats	3.0%	0.0%	0.0%	0.0%	0.0%
# of seats with two-party					
Democratic vote share between .5 and .52	5	7	6	3	2
Expressed as percentage of seats	15.2%	21.21%	18.18%	9.1%	6.1%

# of seats with two-party Democratic vote share >.55	7	7	7	11	6
Expressed as a percentage of seats	21.2%	21.21%	21.21%	33.3%	18.2%
# of seats with two-party Democratic vote share <.45	18	16	16	17	15
Expressed as percentage of seats	54.5%	48.48%	48.48%	51.5%	45.5%
# of seats with two-party Democratic vote share between .5 and .55	6	8	8	4	9
Expressed as percentage of seats	18.2%	24.24%	24.24%	12.1%	27.3%
# of seats with two-party Democratic vote share between .45 and .5	2	2	2	1	3
Expressed as percentage of seats	6.1%	6.06%	6.06%	3.0%	9.1%

Figure 5: Histograms of Democratic Vote Share, Senate Plans



26. Reviewing the data above, a few things are immediately apparent. Since the Second and Third Revised Plans are, again, virtually identical, with only the small changes mentioned above, the number of seats in each vote share range (e.g., 50-52 percent Democratic, greater than 52% Democratic) remains the same with the exceptions of only the two seats in the House mentioned above (49 and 59), and the one in the Senate (16). In each case, the seats were moved from around 51 percent Democratic to just above 52 percent.
27. The similarity between the Second and Third Revised Plans is also clear from the histograms representing the number of seats at each level of Democratic vote share, which shows that the Third Revised Plan continues the Second Revised Plan's strategy of bunching Democratic seats very close to the 50% line. Once again, this reflects a conscious attempt to

achieve the appearance of partisan proportionality, while in actuality ensuring disproportionate Republican majorities.

28. Both the Rodden Plan and the Independent Map Drawers' Plan help to confirm that this bunching of Democratic seats in the toss-up range was not the result of Article XI's requirements or Ohio's political geography. In both alternative plans, in both the House and Senate, there is a much more even distribution of seats across the histogram.
29. As this Court has held in interpreting Section 6(B)'s proportionality requirement, "competitive districts . . . must either be excluded from the proportionality assessment or be allocated to each party in close proportion to its statewide vote share." *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-342 at ¶ 62. Under either approach, the Third Revised Plan, like its predecessor, is highly disproportionate. If competitive districts are excluded (i.e., if any seats between 48 and 52 percent Democratic vote share are excluded from the analysis), the Third Revised Plan produces a breakdown of 9D/18R in the Senate (or 33.3 percent Democratic/66.7 percent Republican) and 28D/54R in the House (or 34.1 percent Democratic/65.9 percent Republican). Nor are competitive seats allocated to each party in proportion to their vote share. The Third Revised Plan contains 17 Democratic-leaning toss-ups and no Republican leaning toss-ups in the House, and 6 Democratic-leaning toss-ups and no Republican-leaning toss-ups in the Senate. In both houses, the Third Revised Plan contains *more* Democratic-leaning toss-up districts than the First Revised Plan, which was struck down by this Court for its disparate allocation of toss-up seats.
30. The Rodden Plan and Independent Map Drawers' Plan, by contrast, distribute toss-up districts more evenly. In the House, the Rodden Plan contains fewer toss-up districts overall, with 1 Republican-leaning toss-up district and 2 Democratic-leaning toss-up district in the House and 0 Republican-leaning and 3 Democratic-leaning toss-up districts in the Senate. The Independent Map Drawers Plan contains 3 Republican-leaning toss-ups and 3 Democratic-leaning toss-ups in the House and 0 Republican-leaning toss-ups and 2 Democratic-leaning toss-ups in the Senate. Excluding these toss-up districts, both come much closer to proportionality. For the Rodden Plan, the non-toss-up seat count amounts to a 41.7%/58.3% split in the House and a 40%/60% split in the Senate. For the Independent Map Drawers' Plan, this comes to a 45.2%/54.8% split in the House and a 41.9%/58.1% split in the Senate.
31. As discussed in my previous submissions to this Court, the disparity in the allocation of toss-up districts between Democrats and Republicans in the Third Remedial Plan (similar to its predecessors), ensures Republicans will attain disproportionate success in General Assembly elections. Imagine a massive uniform swing across all districts of 5 percentage points in favor of the Republican Party. Assuming that the partisanship score being considered here is a perfect predictor of legislative victories, this would yield an additional 23 House seats, providing the Republican Party with 78 percent of the seats. However, a similar swing toward the Democratic Party—providing it with a statewide majority of votes—would yield a pickup of only 2 seats. That is to say, a vote share of around 51 percent in favor of Democrats would generate a seat share of only 47 percent, and that is only if we make the very unrealistic assumption that Democratic candidates win *every single one* of the 17 House districts with a

Democratic vote share between 50 and 52 percent. This striking asymmetry in the treatment of the two parties emerges from an effort to create a large number of bare majority Democratic seats while taking care to avoid the creation of competitive Republican-leaning seats, ensuring that Republican-leaning seats are very comfortable.

32. Thus, just like its predecessors, the purported Democratic seat count in the Third Remedial Plan constitutes a ceiling for Democrats, while the purported Republican seat count constitutes a floor. Even in the best electoral environments, Democrats cannot hope to win more than their proportional seat count, while Republicans are nearly guaranteed to exceed their proportional seat count across almost all electoral environments.
33. Tables 2 and 3 also include information about traditional redistricting criteria, including splits of counties and voting tabulation districts (VTDs) as well as average planwide compactness metrics. The Rodden Plan outperforms the Third Revised Plan on every single traditional redistricting criterion, while the Independent Map Drawers' Plan outperforms the Third Revised Plan on most. On compactness, the Rodden Plan is superior to both the Third Revised Plan and Independent Map Drawers' Plan in both the House and Senate under all three measures I analyzed (Reock, Polsby-Popper and Area/Convex Hull). The Independent Map Drawers' Plan also outperforms the Third Revised Plan on all three measures in both houses.
34. Another relevant redistricting criterion is the number of split counties or voting tabulation districts. As in my previous submissions to the Court, I do not consider a county to be split if multiple districts are entirely contained within the county such that no district crosses the county boundary. Out of the three plans, the Rodden Plan splits fewer counties and Vote Tabulation Districts in the House than any of the other plans. In the Senate, the Rodden Plan ties the Third Revised Plan on county splits, but splits substantially fewer Voter Tabulation Districts. The Independent Map Drawers' Plan splits the same numbers of counties in the House as the Third Revised Plan, but a few more counties in the Senate. It splits fewer Vote Tabulation Districts than the Third Revised Plan in both houses.

V. CONCLUSION

35. The Third Revised Plan is nearly identical to the Second Revised Plan, already invalidated by this Court in *LWV III*. With the exception of moving a very small number of voters in order to move a total of three seats in the entire General Assembly from around 51 percent to just above 52 percent Democratic vote share, the Second and Third Revised Plans are in fact the same. Like the Second Revised Plan, the Third Revised Plan disparately allocates toss-up seats between Democrats and Republicans, thereby ensuring Republicans a disproportionate share of the seats in almost all foreseeable electoral environments. The Third Revised Plan therefore contains nearly precisely the same features as those identified by this Court as reasons it invalidated the Second Revised Plan in *LWV III*.

State of Texas

County of Travis

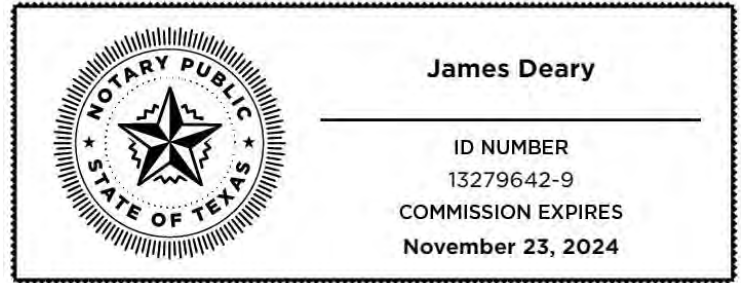
Jonathan Rodden

Jonathan Rodden

Sworn to before me this 30th day of March 2022.



Notary Public



My commission expires 11/23/2024

Notary Public, State of Texas

Notarized online using audio-video communication

Exhibit A

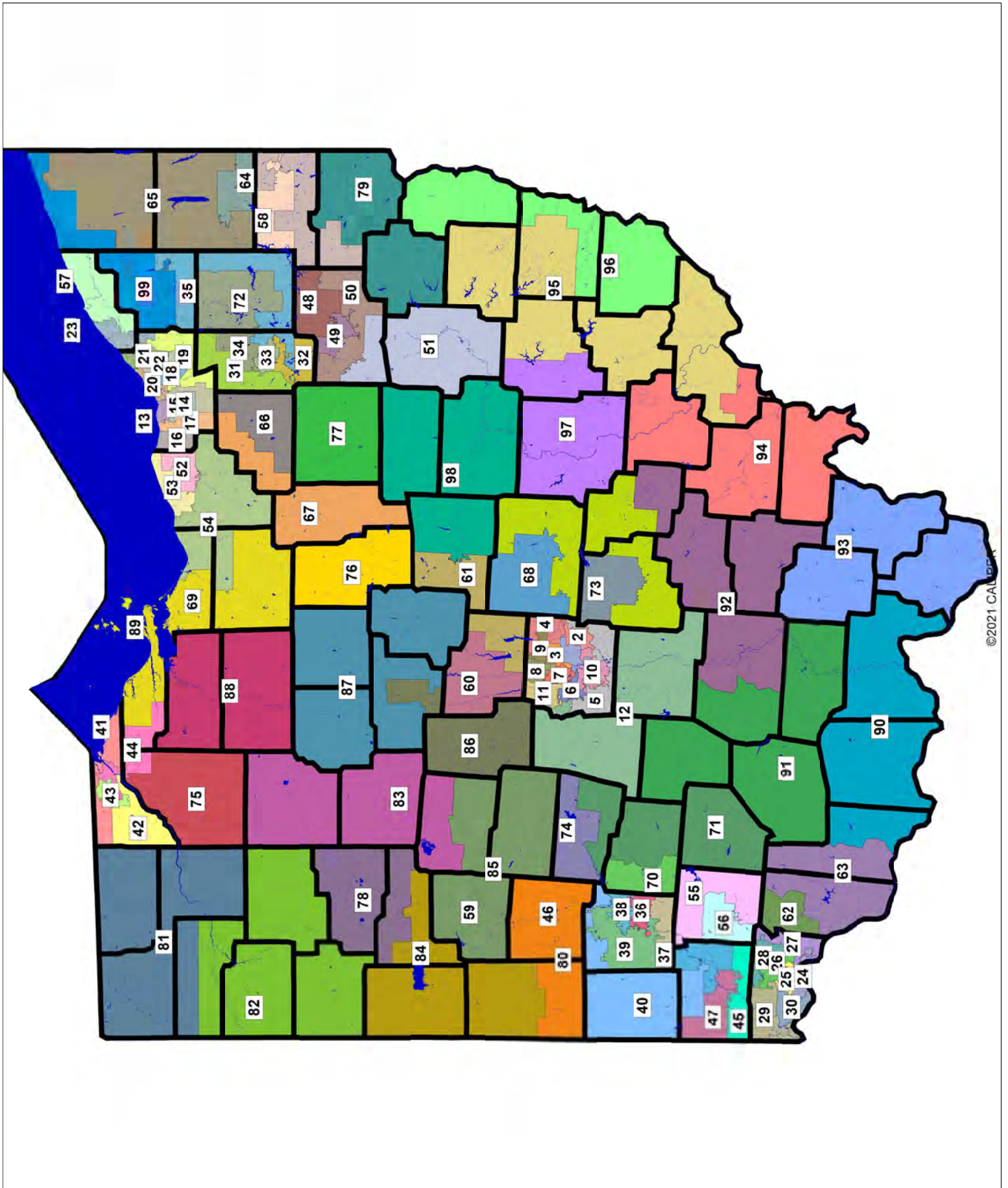
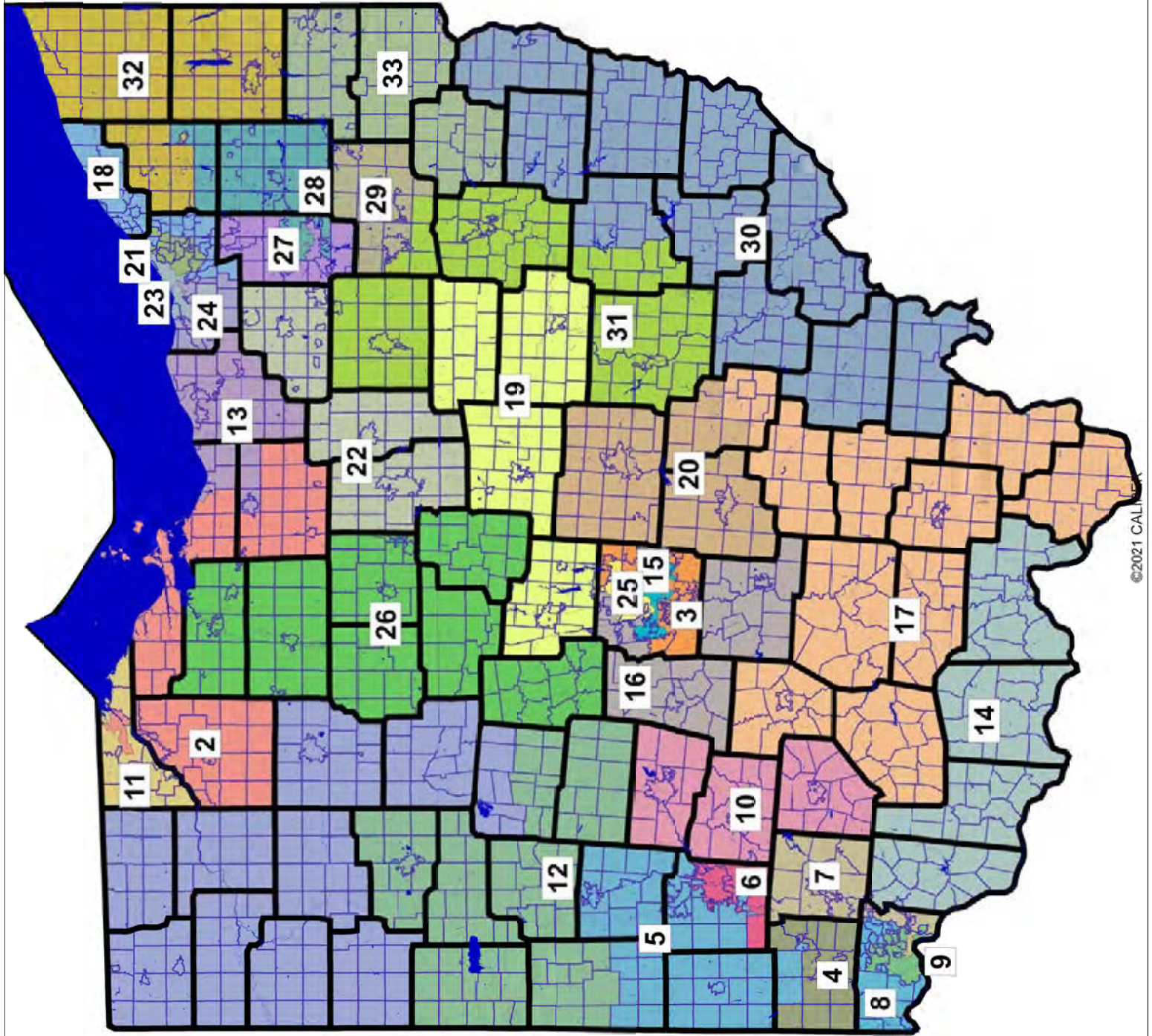


Exhibit B



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Exhibit C

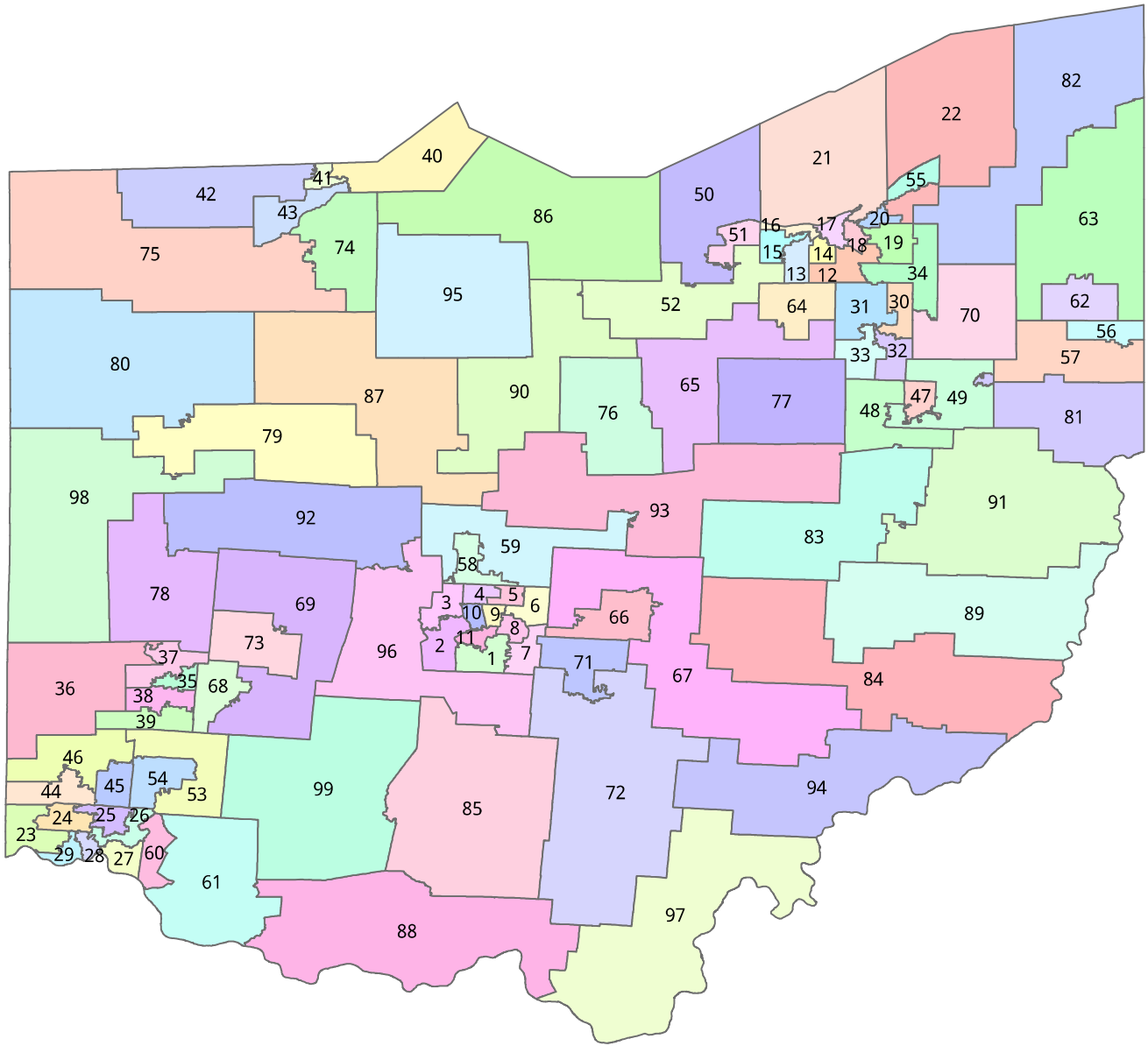


Exhibit D

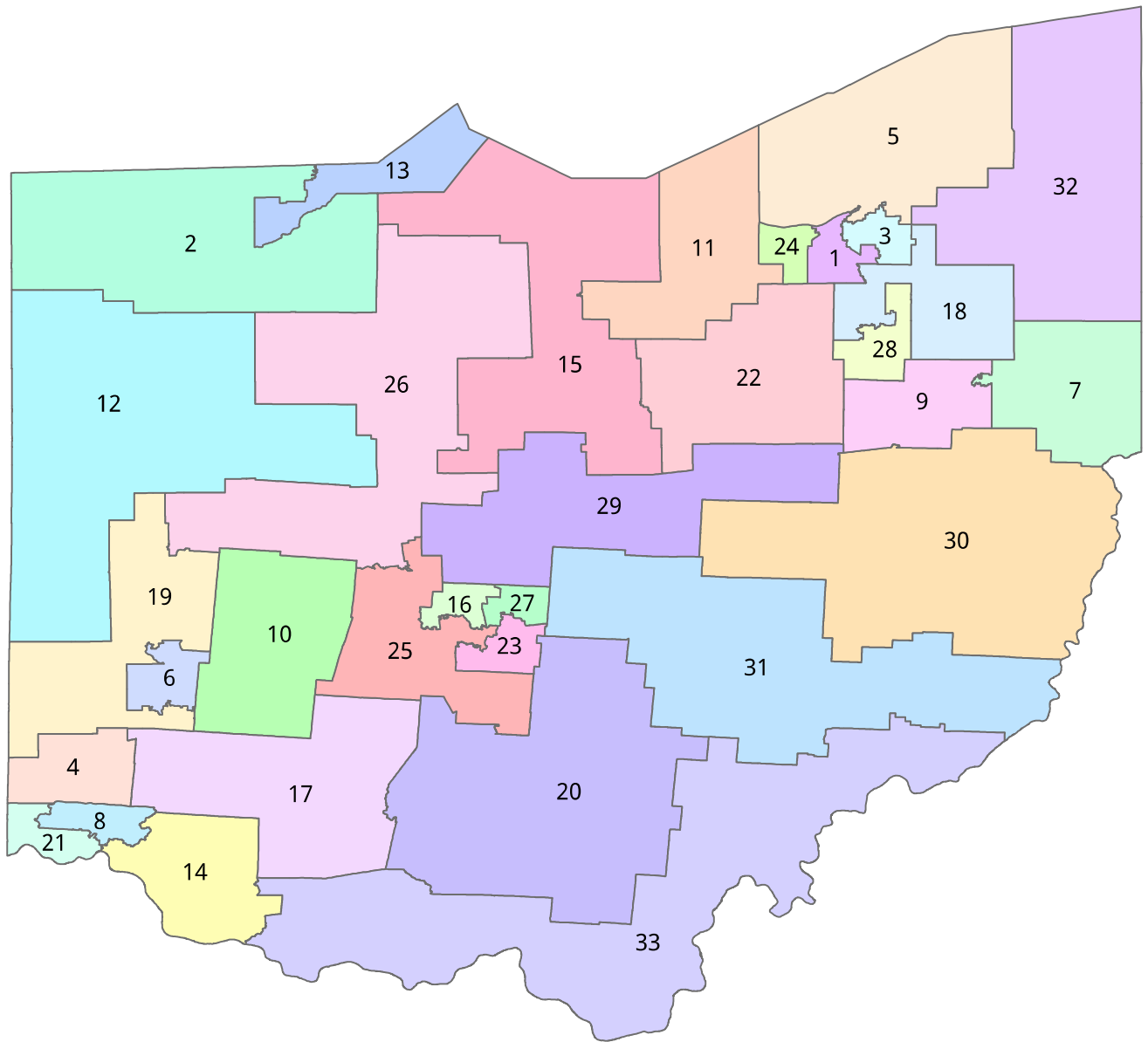


Exhibit E

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Personal

Born on August 18, 1971, St. Louis, MO.

United States Citizen.

Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

Why Cities Lose: The Deep Roots of the Urban-Rural Divide. Basic Books, 2019.

Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

Hamilton's Paradox: The Promise and Peril of Fiscal Federalism, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

Fiscal Decentralization and the Challenge of Hard Budget Constraints, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

Peer Reviewed Journal Articles

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* forthcoming (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* forthcoming (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382:2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* (with Nick Eubank, Guy Grossman, and Melina Platas).

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14,4:1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59,4: 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74, 1: 203-219 (with Chris Warshaw).

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Does Federalism Preserve Markets? *Virginia Law Review* 83, 7 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

Working Papers

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Chapters in Books

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, forthcoming 2021, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, forthcoming 2021, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

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The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierds, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

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Decentralization and the Challenge of Hard Budget Constraints, *PREM Note 41*, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies* 32,7: 897-900.

Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy
Introduction to Comparative Politics
Introduction to Political Science
Political Science Scope and Methods
Institutional Economics
Spatial Approaches to Social Science

Graduate

Political Economy
Political Economy of Institutions
Federalism and Fiscal Decentralization
Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Circuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006-2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008-2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998-2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Exhibit F

Article XI, Section 8(C)(2) Statement

Pursuant to Article XI, Section 8(C)(2) of the Ohio Constitution, the Ohio Redistricting Commission issues the following statement:

The Commission determined that the statewide preferences of the voters of Ohio predominately favor Republican candidates.

The Commission considered statewide state and federal partisan general election results during the last ten years. There were sixteen such contests. When considering the results of each of those elections, the Commission determined that Republican candidates won thirteen out of sixteen of those elections resulting in a statewide proportion of voters favoring statewide Republican candidates of 81% and a statewide proportion of voters favoring statewide Democratic candidates of 19%. When considering the number of votes cast in each of those elections for Republican and Democratic candidates, the statewide proportion of voters favoring statewide Republican candidates is 54% and the statewide proportion of voters favoring statewide Democratic candidates is 46%. Thus, the statewide proportion of voters favoring statewide Republican candidates is between 54% and 81% and the statewide proportion of voters favoring statewide Democratic candidates is between 19% and 46%. The Commission obtained publicly available geographic data for statewide partisan elections in 2016, 2018, and 2020. Publicly available geographic data for those elections was not available for elections in 2012 and 2014. Using this data, the Commission adopted the final general assembly district plan, which contains 85 districts (64.4%) favoring Republican candidates and 47 districts (35.6%) favoring Democratic candidates out of a total of 132 districts. Accordingly, the statewide proportion of districts whose voters favor each political party corresponds closely to the statewide preferences of the voters of Ohio.

The final general assembly district plan adopted by the Commission complies with all of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution. The Commission's attempt to meet the aspirational standards of Article XI, Section 6 of the Ohio Constitution did not result in any violation of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution.

Exhibit G

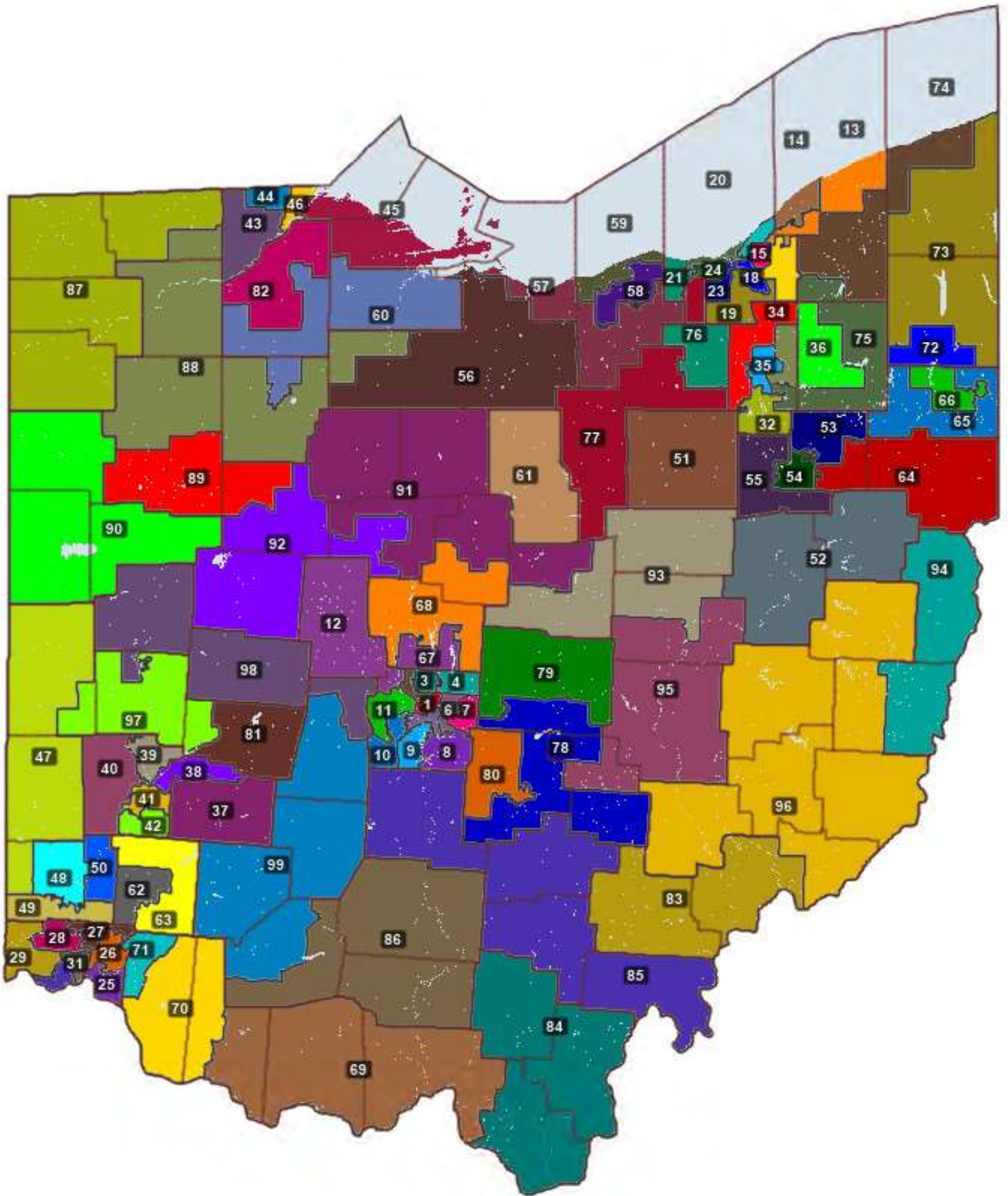
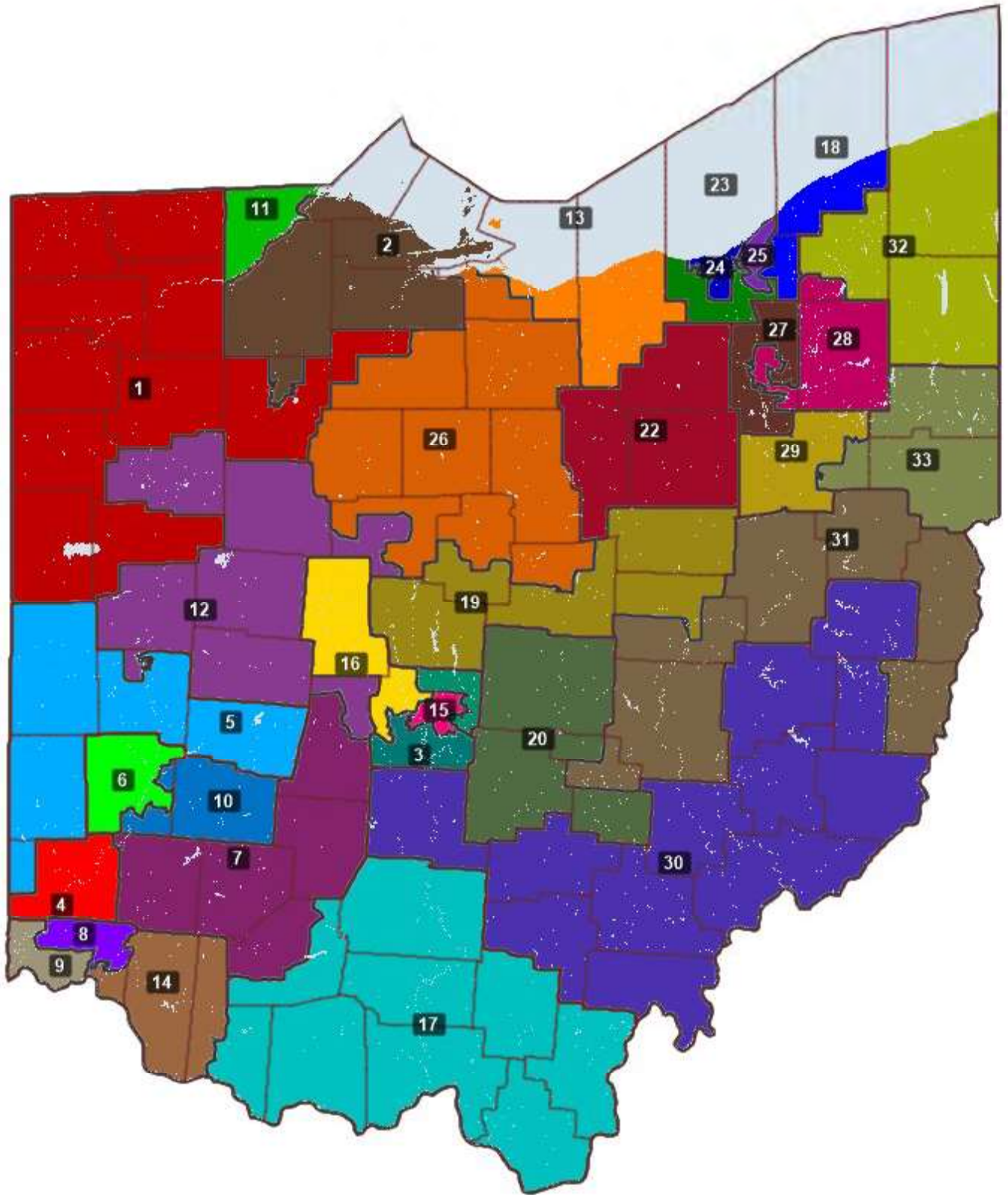


Exhibit H



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CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing was served via email on April 1, 2022

upon the following:

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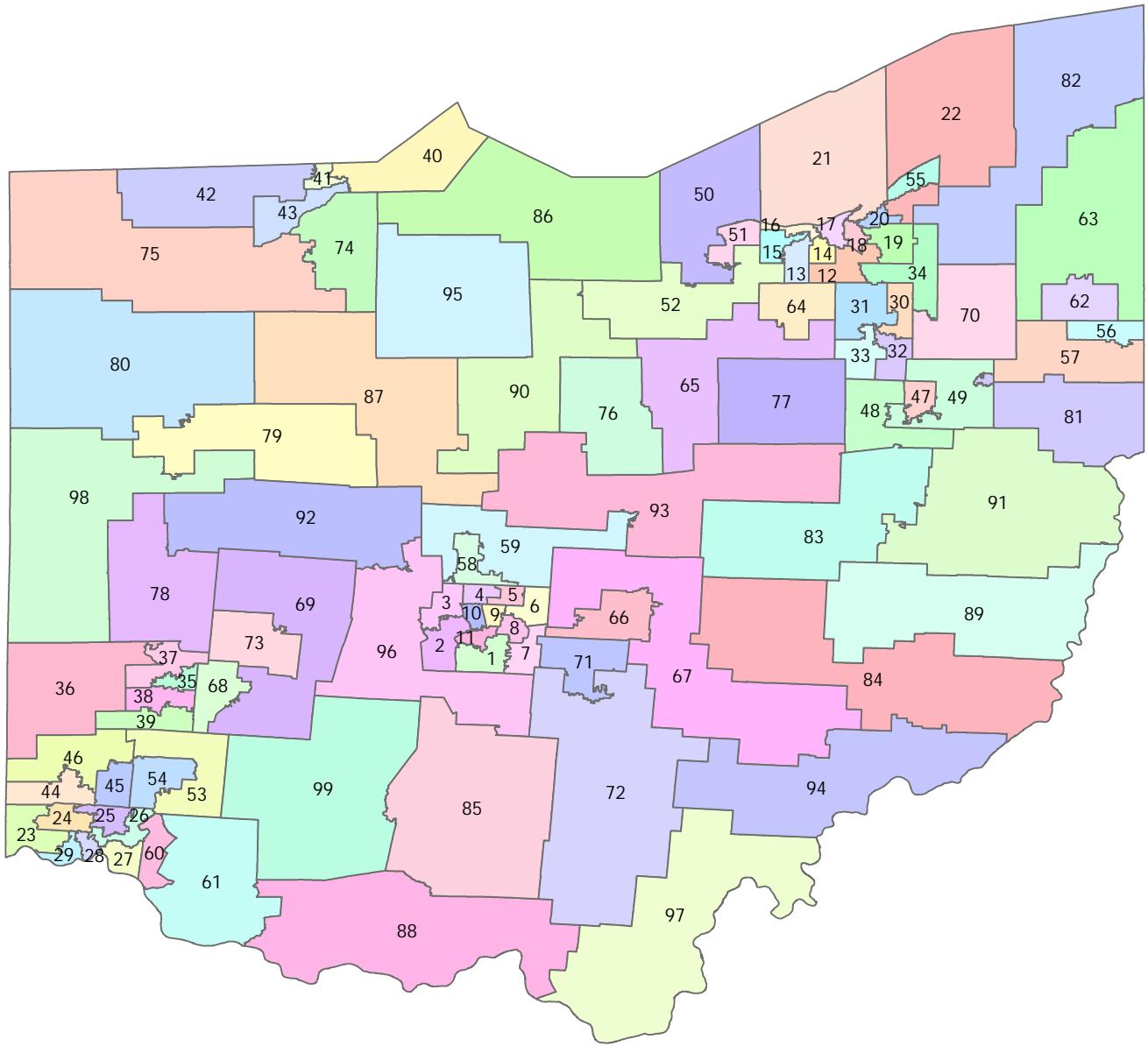
*Counsel for Respondent
Ohio Redistricting Commission*

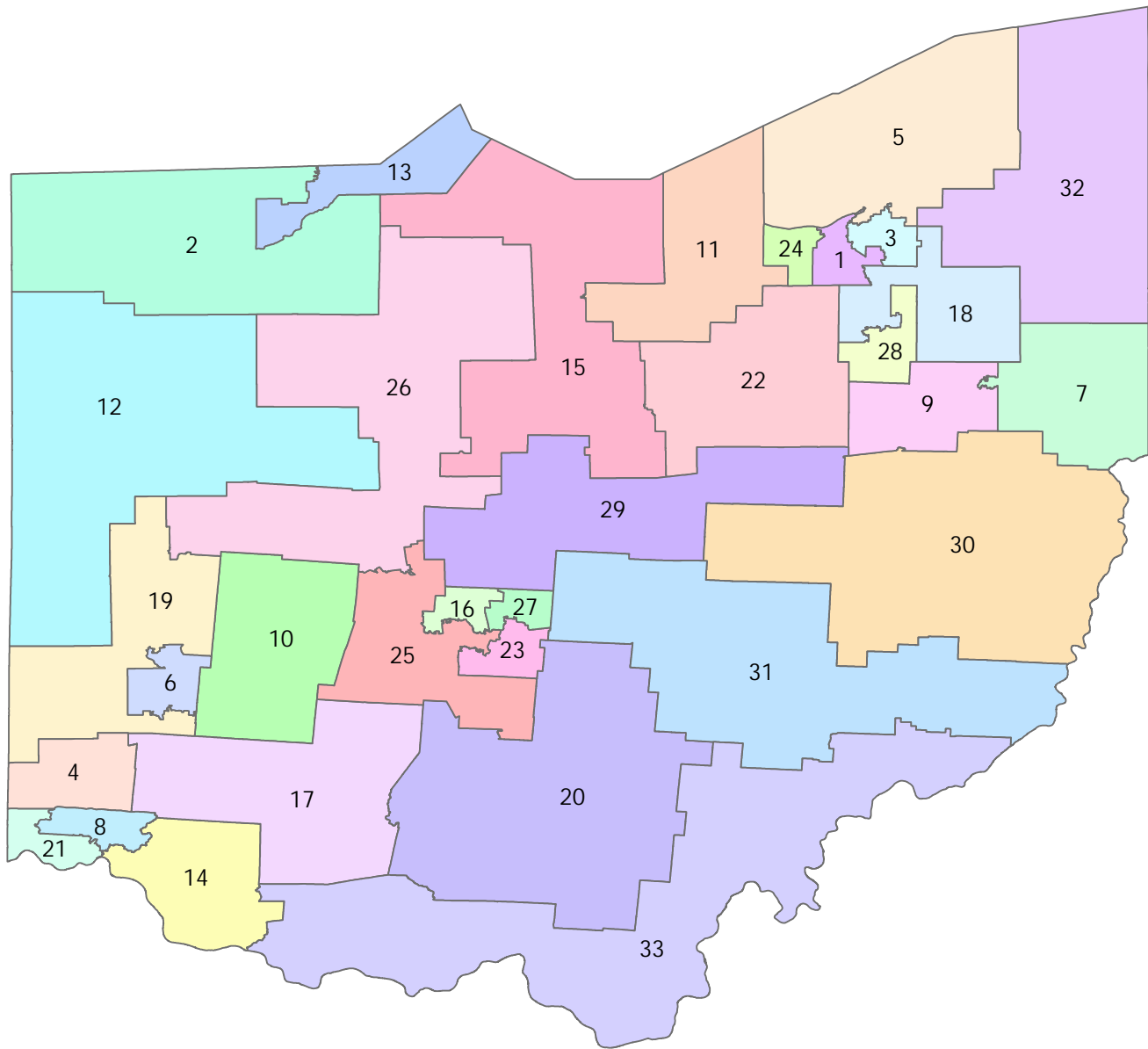
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Rodden Decl. Ex. G





Rodden Decl. Ex. H

February 15, 2022

To the Ohio Redistricting Commission:

The *Bennett* and *League of Women Voters* Petitioners hereby submit the attached, updated version of the state legislative plan created by Dr. Jonathan Rodden (the “Rodden III Plan”).

Dr. Rodden made very slight changes to his earlier plan in order to address “zero-population splits,” meaning instances in which a district technically divides a township or municipality, but only by splitting a completely unpopulated area from the populated area of a township or municipality. Because a zero-population split does not affect population, it can be “remedied” simply by reallocating the unpopulated area from one side of the “split” to another. Notably, no voters were reassigned to a different district as a result of these changes.

As explained in their objections to the state legislative plan adopted by the Commission on January 22, 2022 (the “Remedial Plan”), the *Bennett* Petitioners do not understand zero-population splits to pose a concern under Article XI, Section 3(D)(3). *See* Bennett Pet’rs’ Objections at 20 n.6. For that reason, while the *Bennett* Petitioners objected to the Remedial Plan on the basis of certain other political subdivision splits, they did not challenge the Remedial Plan on the basis of the multiple instances in which Census blocks with a population of zero were separated from their municipal corporations and townships. *See id.* at 15-20 & n.6; Affidavit of Jonathan Rodden (Jan. 25, 2022) ¶ 37 & n.5. And although Mr. Raymond DiRossi alleged that the “zero-population splits” in Dr. Rodden’s plan were constitutional violations, he did not similarly count (or even mention) his own zero-population splits in the list of technical violations committed by the Commission in the Remedial Plan. *See* Affidavit of Raymond DiRossi (Jan. 28, 2022) ¶ 27-28. Nonetheless, in an effort to avoid any unnecessary disputes as to the significance of zero-population splits, the Rodden III Plan makes minor, technical adjustments to address and eliminate such splits.

For consistency, the Rodden III Plan also corrects certain instances where district lines had been drawn to follow township boundaries instead of municipal boundaries.

The Rodden III Plan fully complies with Article XI, Section 3’s line-drawing requirements. It also fully complies with Article XI, Section 5’s requirements for the numbering of state Senate districts. Furthermore, as required by Article XI, Section 6(B), the Rodden III Plan more closely corresponds to statewide proportionality than the state legislative plans adopted by the Commission in September 2021 or January 2022.

If the Commission believes the enclosed plan has any technical violations, we welcome the Commission’s feedback and invite the Commission to use the map as a starting point and make any further adjustments it believes are constitutionally required.

Sincerely,



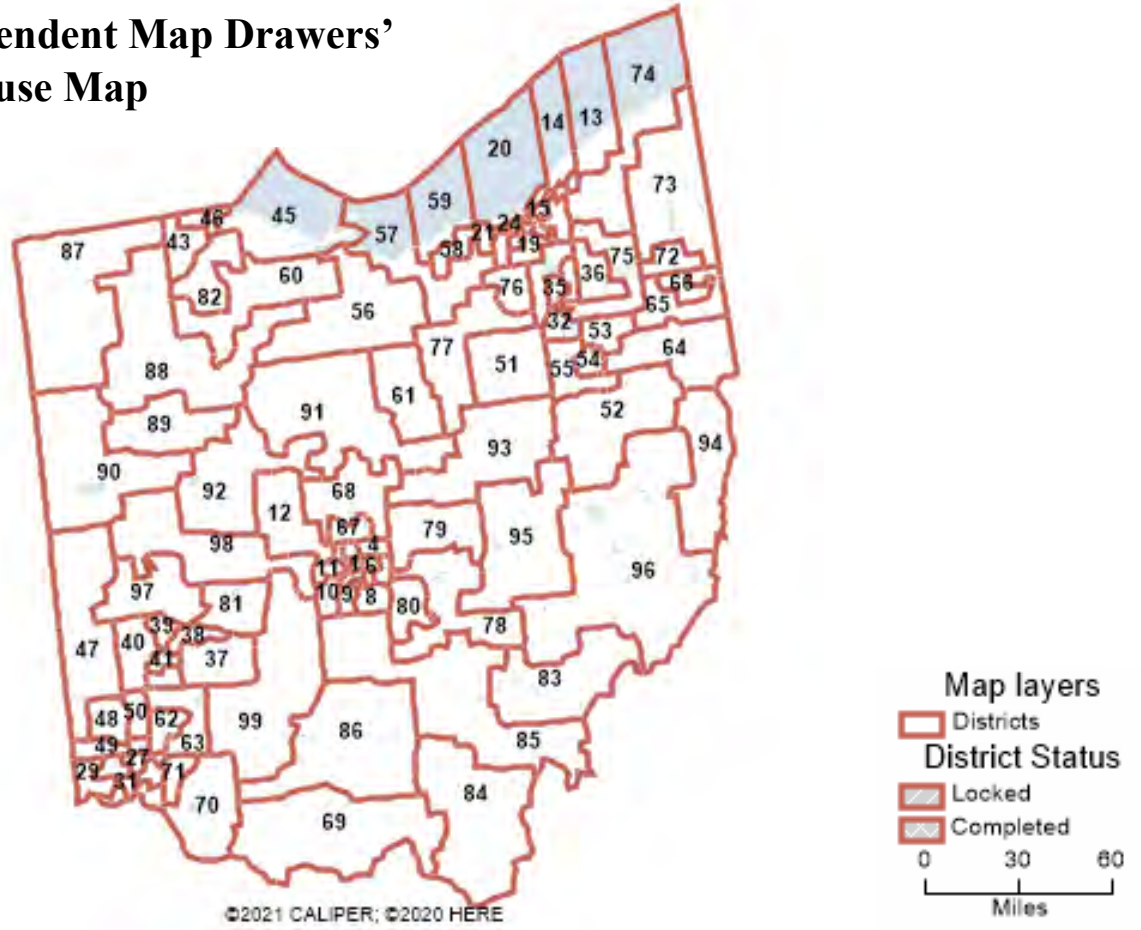
Ben Stafford
Counsel for *Bennett* Petitioners



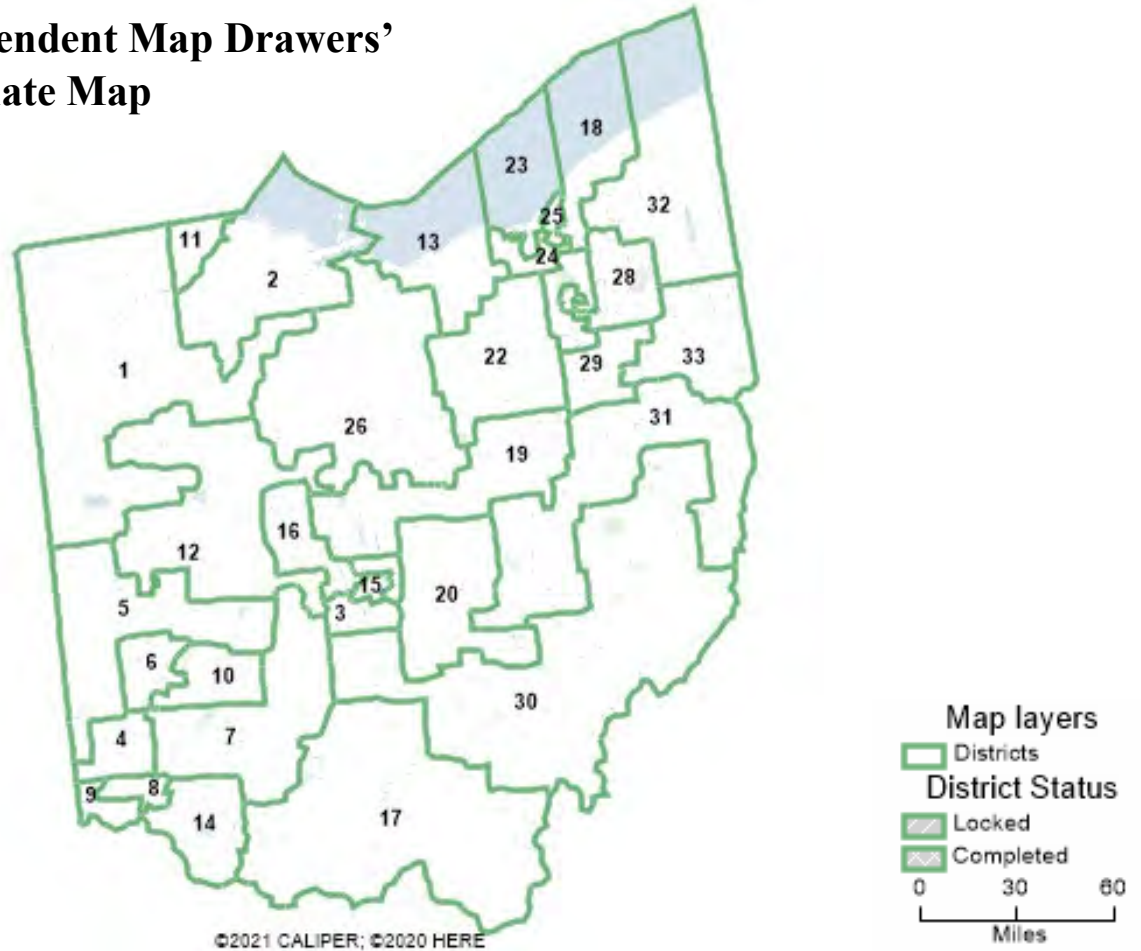
Freda Levenson
Counsel for *League of Women Voters* Petitioners

Rodden Decl. Ex. I

Corrected Independent Map Drawers' House Map



Corrected Independent Map Drawers' Senate Map



Rodden Decl. Ex. J

2020 Population of 2011 Ohio State House Districts

House District	2020 Population	Ideal Population	Deviation	% Deviation
1	116,894	119,186	-2,292	-1.92%
2	124,936	119,186	5,750	4.82%
3	132,248	119,186	13,062	10.96%
4	102,206	119,186	-16,980	-14.25%
5	101,877	119,186	-17,309	-14.52%
6	123,329	119,186	4,143	3.48%
7	119,562	119,186	376	0.32%
8	116,600	119,186	-2,586	-2.17%
9	116,195	119,186	-2,991	-2.51%
10	112,385	119,186	-6,801	-5.71%
11	106,341	119,186	-12,845	-10.78%
12	114,399	119,186	-4,787	-4.02%
13	111,364	119,186	-7,822	-6.56%
14	111,504	119,186	-7,682	-6.45%
15	111,375	119,186	-7,811	-6.55%
16	121,763	119,186	2,577	2.16%
17	116,012	119,186	-3,174	-2.66%
18	136,039	119,186	16,853	14.14%
19	133,846	119,186	14,660	12.30%
20	139,823	119,186	20,637	17.32%
21	139,857	119,186	20,671	17.34%
22	133,768	119,186	14,582	12.23%
23	136,182	119,186	16,996	14.26%
24	126,074	119,186	6,888	5.78%
25	131,643	119,186	12,457	10.45%
26	130,563	119,186	11,377	9.55%
27	116,574	119,186	-2,612	-2.19%
28	125,471	119,186	6,285	5.27%
29	118,485	119,186	-701	-0.59%
30	113,456	119,186	-5,730	-4.81%
31	117,263	119,186	-1,923	-1.61%
32	125,392	119,186	6,206	5.21%
33	113,998	119,186	-5,188	-4.35%
34	108,211	119,186	-10,975	-9.21%
35	108,971	119,186	-10,215	-8.57%
36	118,727	119,186	-459	-0.39%
37	122,719	119,186	3,533	2.96%
38	113,686	119,186	-5,500	-4.61%
39	107,022	119,186	-12,164	-10.21%
40	119,235	119,186	49	0.04%

41	118,659	119,186	-527	-0.44%
42	117,850	119,186	-1,336	-1.12%
43	115,542	119,186	-3,644	-3.06%
44	108,500	119,186	-10,686	-8.97%
45	113,664	119,186	-5,522	-4.63%
46	115,705	119,186	-3,481	-2.92%
47	121,689	119,186	2,503	2.10%
48	114,569	119,186	-4,617	-3.87%
49	116,839	119,186	-2,347	-1.97%
50	111,559	119,186	-7,627	-6.40%
51	117,607	119,186	-1,579	-1.32%
52	130,619	119,186	11,433	9.59%
53	123,220	119,186	4,034	3.38%
54	131,917	119,186	12,731	10.68%
55	122,869	119,186	3,683	3.09%
56	121,855	119,186	2,669	2.24%
57	126,805	119,186	7,619	6.39%
58	112,969	119,186	-6,217	-5.22%
59	115,645	119,186	-3,541	-2.97%
60	113,457	119,186	-5,729	-4.81%
61	119,146	119,186	-40	-0.03%
62	129,331	119,186	10,145	8.51%
63	107,384	119,186	-11,802	-9.90%
64	106,108	119,186	-13,078	-10.97%
65	129,051	119,186	9,865	8.28%
66	123,226	119,186	4,040	3.39%
67	142,650	119,186	23,464	19.69%
68	134,195	119,186	15,009	12.59%
69	126,098	119,186	6,912	5.80%
70	121,919	119,186	2,733	2.29%
71	127,215	119,186	8,029	6.74%
72	123,324	119,186	4,138	3.47%
73	117,889	119,186	-1,297	-1.09%
74	113,207	119,186	-5,979	-5.02%
75	118,689	119,186	-497	-0.42%
76	117,739	119,186	-1,447	-1.21%
77	125,790	119,186	6,604	5.54%
78	121,777	119,186	2,591	2.17%
79	116,695	119,186	-2,491	-2.09%
80	127,554	119,186	8,368	7.02%
81	113,649	119,186	-5,537	-4.65%
82	109,580	119,186	-9,606	-8.06%
83	111,822	119,186	-7,364	-6.18%

84	116,562	119,186	-2,624	-2.20%
85	108,820	119,186	-10,366	-8.70%
86	121,437	119,186	2,251	1.89%
87	109,504	119,186	-9,682	-8.12%
88	110,042	119,186	-9,144	-7.67%
89	115,986	119,186	-3,200	-2.68%
90	114,761	119,186	-4,425	-3.71%
91	119,931	119,186	745	0.63%
92	122,375	119,186	3,189	2.68%
93	115,108	119,186	-4,078	-3.42%
94	116,478	119,186	-2,708	-2.27%
95	115,360	119,186	-3,826	-3.21%
96	113,512	119,186	-5,674	-4.76%
97	116,795	119,186	-2,391	-2.01%
98	124,386	119,186	5,200	4.36%
99	106,819	119,186	-12,367	-10.38%

Rodden Decl. Ex. K

2020 Population of 2011 Ohio State Senate Districts

Senate District	2020 Population	Ideal Population	Deviation	% Deviation
1	335,051	357,559	-22,508	-6.29%
2	369,923	357,559	12,364	3.46%
3	389,681	357,559	32,122	8.98%
4	371,446	357,559	13,887	3.88%
5	350,118	357,559	-7,441	-2.08%
6	355,744	357,559	-1,815	-0.51%
7	377,822	357,559	20,263	5.67%
8	357,412	357,559	-147	-0.04%
9	356,653	357,559	-906	-0.25%
10	347,791	357,559	-9,768	-2.73%
11	337,869	357,559	-19,690	-5.51%
12	327,588	357,559	-29,971	-8.38%
13	371,529	357,559	13,970	3.91%
14	367,038	357,559	9,479	2.65%
15	398,245	357,559	40,686	11.38%
16	402,113	357,559	44,554	12.46%
17	357,414	357,559	-145	-0.04%
18	355,574	357,559	-1,985	-0.56%
19	410,613	357,559	53,054	14.84%
20	364,362	357,559	6,803	1.90%
21	334,921	357,559	-22,638	-6.33%
22	372,953	357,559	15,394	4.31%
23	334,243	357,559	-23,316	-6.52%
24	364,654	357,559	7,095	1.98%
25	344,456	357,559	-13,103	-3.66%
26	340,983	357,559	-16,576	-4.64%
27	353,299	357,559	-4,260	-1.19%
28	335,909	357,559	-21,650	-6.05%
29	342,967	357,559	-14,592	-4.08%
30	345,350	357,559	-12,209	-3.41%
31	374,925	357,559	17,366	4.86%
32	320,311	357,559	-37,248	-10.42%
33	330,491	357,559	-27,068	-7.57%