

Expert Report of Dr. Jonathan Cervas

Wise v. State, 2516-CV29597 (Circuit Court of Jackson County, Missouri)

Monday, December 22, 2025 (amended December 30, 2025)

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I. Executive Summary

My name is Jonathan Cervas. I am an Assistant Teaching Professor at Carnegie Mellon University, where I teach courses in constitutional law, American politics, quantitative methods,

and voting rights and representation. I was asked by counsel for the Plaintiffs in *Wise v. State* to analyze the congressional map enacted by the Missouri legislature in H.B. 1 (the “2025 Map”).

Counsel informed me that Article III, Section 45 of the Missouri Constitution requires that congressional districts be “as compact . . . as may be.” I was also informed that the Missouri Supreme Court has defined compactness to mean “closely united territory,” which includes, but is not limited to, an assessment of the district’s physical size and shape. *Pearson v. Koster*, 367 S.W.3d 36, 48 (Mo. banc 2012). I was informed that the Missouri Supreme Court has understood the compactness requirement to allow minimal or practical deviation from compactness necessary to comply with the constitutional requirements for congressional redistricting in the Article III, Section 45 of the Missouri Constitution, to comply with or resolve potential violations of the federal Voting Rights Act of 1965 or U.S. Constitution, or to abide by a set of redistricting factors recognized by Missouri courts (political subdivision boundaries, including counties, cities, and precincts; population density; natural boundary lines; and historical boundary lines of prior redistricting maps).

First, I was asked by counsel to determine whether the 2025 Map’s reconfiguration of Congressional Districts (CDs) 4 and 5 is compact and whether the reduction in compactness of CDs 4 and 5 was a minimal or practical deviation necessary to comply with any of these other requirements or recognized factors. To answer these questions, I compare the 2025 Map to the 2022 Map and a set of eight alternative maps that I drew to satisfy all constitutional requirements and abide by recognized redistricting factors while avoiding the 2025 Map’s departures from compactness in CDs 4 and 5. I conclude that CDs 4 and 5 in the 2025 Map are less compact than their counterparts in the 2022 Map and my alternative maps. The 2022 Map and my eight alternative maps show that such a reduction in the compactness of CDs 4 and 5 was not necessary to comply with any legal requirement or recognized redistricting factor in Missouri. My alternative maps demonstrate that the legislature could have *increased* the compactness of CDs 4 and 5 while achieving its apparent goals and complying with the relevant factors Missouri courts have recognized.

Second, Plaintiffs’ counsel asked me to adjust three maps produced by another expert who used a computer algorithm to draw maps, in order to bring them into compliance with the constitutional requirement that district populations be equal. Equalizing population for such maps is a trivial task that requires minimal alteration of each simulated map, and does not meaningfully change their characteristics, including their levels of compactness.

Third, I was asked to determine whether the text of H.B. 1 clearly assigns each area of Missouri to a single congressional district in the 2025 Map. I found that it does not because the text double assigns a noncontiguous geographic area labeled “KC 811” to both CDs 4 and 5. This has the effect of making both districts malapportioned and CD 5 noncontiguous.

II. Qualifications

I am an Assistant Teaching Professor at Carnegie Mellon University (CMU). I currently teach courses for the Carnegie Mellon Institute for Strategy and Technology, which houses the university's undergraduate and master's degree-granting political science programs. I am also an uncompensated Research Associate of the non-profit Electoral Innovation Lab, which is affiliated with the non-partisan Princeton Gerrymandering Project at Princeton University.

I teach a wide range of courses at CMU, including U.S. Constitutional Law; the American Politics Graduate Seminar (also offered to undergraduates as Advanced Topics in American Politics); Regression Analysis for Political Science II (graduate); American Political Divides and Great Debates; Democracy's Data; and Representation and Voting Rights (formerly Representation and Redistricting).

Several of these courses emphasize applied analysis of democratic institutions and electoral systems. In Representation and Voting Rights, students learn how to design legally compliant legislative maps and rigorously evaluate them using statutory and constitutional criteria. In Democracy's Data, coursework focuses on hands-on quantitative analysis, including the evaluation of redistricting plans, surname analysis, racial polarization analysis, and related methods central to contemporary voting rights research.

I received my undergraduate degree at the University of Nevada Las Vegas and my graduate degrees at the University of California Irvine. My 2020 doctoral dissertation is titled "A Quantitative Assessment of the Electoral College, 1790-2020." As my curriculum vitae, attached as Appendix C, shows, I've published eleven peer-reviewed scholarly articles on topics related to political institutions, elections, redistricting, and voting rules. My work has been published in journals that specialize in political science, geography, economics, and law. These include the *Proceedings of the National Academy of Arts and Sciences*, *Presidential Studies Quarterly*, *Social Science Quarterly*, *Political Geography*, *Public Choice*, *Election Law Journal*, *Stanford Journal of Civil Rights & Civil Liberties*, and *PS: Political Science and Politics*. I have been invited to give talks to Princeton University, the University of Houston, and the National Conference of State Legislatures, and others. As part of my service commitment to the discipline of political science, I have served as a referee for the *American Journal of Political Science*, *Political Geography*, *Election Law Journal*, *Public Choice*, and *Political Research Quarterly*.

I have applied experience in redistricting, including recent work for state courts and redistricting commissions. In *Clarke v. Wisconsin Elections Commission* (Wisc. 2024), the Wisconsin Supreme Court appointed me and Dr. Bernard Grofman as co-consultants to assist in evaluating remedial State Senate and Assembly plans. Dr. Grofman and I evaluated the parties' proposed remedial redistricting plans and produced a report with recommendations to the court. The state later enacted one of the plans we evaluated.

In *Harkenrider v. Hochul* (N.Y. 2022), Justice Patrick McAllister of a New York Supreme Court (trial court) retained me as “special master to prepare and draw a new neutral, non-partisan Congressional map” upon ruling that the state’s enacted plan was unconstitutional. In affirming that ruling, the New York Court of Appeals expanded my scope of work to include drawing a new, neutral redistricting plan for the State Senate. I prepared the congressional and senatorial maps, both of which were approved by the court and implemented in the 2022 election cycle.

In 2021, I was retained by the bipartisan Pennsylvania Legislative Reapportionment Commission to provide consulting services related to the Pennsylvania State House and Senate districts for elections held between 2022 and 2030. My work supported multiple aspects of the reapportionment process, including the development and evaluation of the legislative maps. The commission adopted the final maps by a bipartisan vote, and the Pennsylvania Supreme Court unanimously affirmed the plan in March 2022.

I have also assisted court-appointed special masters in federal redistricting matters, including *Wright v. Sumter County Board of Elections and Registration* (M.D. Ga. 2020), *Bethune-Hill v. Virginia State Board of Elections* (E.D. Va. 2019), and *Navajo Nation v. San Juan County, Utah* (D. Utah 2018).

I have also served as an expert witness in voting rights and redistricting litigation. In *New York Communities for Change v. Nassau County* (N.Y. 2025, Index No. 602316/2024), I served as an expert witness for the plaintiffs in challenge to Nassau County’s redistricting map under the John R. Lewis Voting Rights Act of New York and the New York Municipal Home Rule Law. I produced two expert reports, was deposed, and provided testimony at trial. In *Wygant v. Lee* (Tenn. 2023, No. 22-0287-IV), I served as an expert witness for the plaintiffs in a case challenging the redistricting maps for the Tennessee General Assembly. I prepared an expert report, including alternative redistricting maps, was deposed, and testified at trial.

I am being compensated at a rate of \$300 per hour. The opinions in this report are my own, and my compensation does not depend on the results of my analyses, the opinions I provide, or the outcome of the case.

III. Data Relied Upon

The primary data source I used for this report and analysis comes from the U.S. Census Bureau. I downloaded population data from the Census Bureau’s Application Programming Interface (API) (which allows for data to be downloaded directly into statistical software). I also downloaded geographic data from the Census’s “Tiger/Line” website. For my analysis of the 2025 Map, I re-created the district lines by identifying the VTD and Blocks listed in H.B. 1, and after it became available, downloaded the shapefile of the 2025 Map posted on the website of the Missouri

Office of Administration, Division of Budget & Planning.¹ The 2022 Map is available as part of the Tiger/Line dataset. I used other geographic data also obtained from Tiger/Line, including the VTD, Places, and Urban Areas geographies. I obtained an estimated list of addresses for incumbent members of Congress from counsel, which I identified where they lived using the Census Bureau’s GeoCoder API.

I used Dave's Redistricting Application (DRA) as the source for the compactness scores reported in this report. DRA is a popular free, open-source web application for drawing and assessing redistricting maps. I have used this software to report these numbers in cases where I served as Special Master or Court Consultant. I computed other metrics, such as political subdivision splits and core retention, using the R statistical software. I created map images using the website mapshaper.org. I did not rely upon or reference any partisan or political data in assessing or drawing any maps.

IV. Compactness

The 2025 Map significantly reconfigures the districts that include the Kansas City area (CDs 4, 5, and 6), and most substantially alters CDs 4 and 5. This new configuration renders CDs 4 and 5 less compact than they were in the 2022 Map and far less compact than other lawful alternative maps the Legislature could have drawn. My comparative analysis of these maps shows that the 2025 Map’s departure from compactness was not a minimal or practical deviation necessary to comply with any constitutional requirements, to adhere to recognized redistricting factors, or to comply with federal law. The Legislature could have achieved all these objectives without making CDs 4 and 5 less compact. Therefore, I conclude that CDs 4 and 5 in the 2025 Map are not as compact “as may be.”

I begin with a comparison of the 2025 Map to the 2022 Map and the eight alternative maps I developed. **Figure 1** below provides a visual comparison of the boundaries of the 2025 Map, the 2022 Map, and my eight alternative maps. Full-page images of each map are found in Appendix A. **Table 1** compares the 2025 Map, the 2022 Map, and my alternative illustrative maps along various features and metrics corresponding to constitutional requirements and recognized redistricting factors.

¹ <https://budplan.oa.mo.gov/redistricting-office/2025-us-congressional-house-maps>.

Figure 1 – Boundary Lines of 2022 Map, 2025 Map, and Alternative Maps

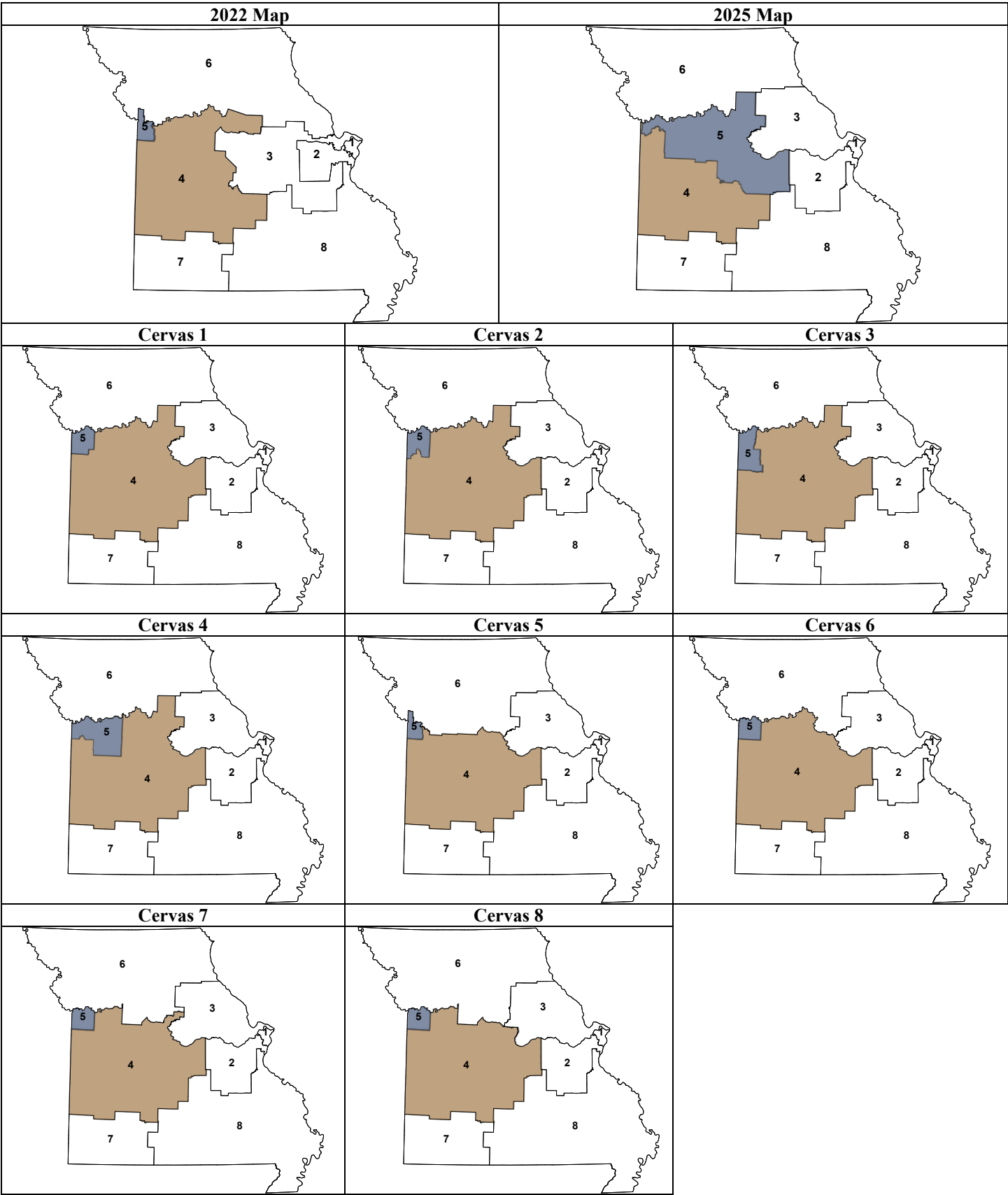


Table 1 – Metrics for 2022 Map, 2025 Map, and Alternative Maps

	2022 Map	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
Districts Altered from 2025 Map	--	--	4, 5	4, 5	4, 5	4, 5	4, 5, 6	4, 5, 6	4, 5, 6	3, 4, 5, 6
Compactness										
Reock (Map)	0.42	0.41	0.48	0.47	0.46	0.45	0.45	0.48	0.48	0.48
CD 4, 5 avg.	0.46	0.34	0.60	0.56	0.53	0.48	0.46	0.59	0.59	0.59
Polsby-Popper (Map)	0.31	0.35	0.40	0.38	0.38	0.37	0.39	0.42	0.41	0.42
CDs 4, 5 avg.	0.35	0.26	0.47	0.38	0.35	0.35	0.43	0.54	0.49	0.53
Equally Populated Districts	Y	N*	Y	Y	Y	Y	Y	Y	Y	Y
Contiguous Districts	Y	N*	Y	Y	Y	Y	Y	Y	Y	Y
Political Subdivision Splits										
# of Total County Splits	10	7	7	7	7	7	8	7	7	7
# of Counties Split	9	5	6	6	5	5	6	6	5	5
# of Total Municipal Splits	33	14	9	11	10	13	17	12	14	14
# of Municipalities Split	31	13	9	11	10	12	15	11	13	13
# of Precincts (VTDs) Split	43	42	26	28	33	25	32	26	26	25
Historical District Boundaries										
Core Preservation with 2012 Map (%)	80.7	72.6	78.4	78.4	77.4	78.9	78.3	79.4	79.8	79.8
Core Preservation with 2022 Map (%)	--	76.9	83.0	83.0	83.0	82.4	86.7	85.0	85.0	84.4

* H.B. 1’s text enacting the 2025 Map does not technically define CDs 4 and 5 to be equally populated or define CD 5 to be contiguous because it assigns the noncontiguous geographic areas labeled “KC 811” to both districts. *See* Sec. VI. For the sake of this compactness analysis, I assume the 2025 Map reflects the shapefile available on the website of the Missouri Office of Administration, Division of Budget & Planning (<https://budplan.oa.mo.gov/redistricting-office/2025-us-congressional-house-maps>), which assigns the areas labeled “KC 811” to CDs 4 and 5 in a way that makes both districts equally populated and contiguous.

I begin with a summary of my alternative maps. It is important to note that I did not draw any alternative maps from scratch. Instead, I always used the 2025 Map as my starting point and tried to maximally preserve the lines the Legislature adopted in 2025 to give deference to its goals while improving compactness.² I made no changes to CDs 1, 2, 4, 7, or 8 in any map; this means 100% of the legislature’s choices in these districts are reflected in all of my eight alternative maps.

The first four alternative maps modify only CDs 4 and 5. In Map 1, CD 5 is drawn as a compact district (square in shape), encompassing nearly all of Jackson County (excluding the small portion retained in untouched CD 6) and the northern part of Cass County. Map 2 is a variant of Map 1 in which CD 5 remains compact and includes the same portion of Jackson County but adjusts the Cass County configuration—excluding the Lake Winnebago area—to avoid pairing two incumbent congressmembers in CD 5.³ Map 3 draws CD 5 as a compact district including western Jackson County (except the small part retained in CD 6) and all of Cass County.⁴ Map 4 draws CD 5 to include nearly all of Jackson County (except the small part retained in CD 6) along with all of adjacent Lafayette and Johnson Counties. In all four of these maps, CD 4 unites the remaining compact territory comprising rural western Missouri.

The next three alternative maps modify CDs 4, 5, and 6 to produce districts that are more compact than the 2025 Map’s districts. In Map 5, CD 5 is restored to its exact compact 2022 configuration, with CDs 4 and 6 redrawn into new more compact districts. Maps 6 and 7 each configure CD 5 as a small, compact square centered on all of Jackson County and a small portion of Clay County to the north. These maps differ only in which additional county is split to accommodate that configuration: Map 6 splits a small portion of Cooper County instead of splitting Jackson County twice (as the 2025 Map does). Map 6 also uses the Missouri River, a natural boundary, to nearly fully delineate the boundary between CDs 4 and 6. Map 7 splits Boone County twice rather than splitting Jackson County twice. Finally, Map 8 is a variant of Map 7 that also splits Boone County twice, while making minor adjustments to CD 3 to further improve compactness.

A. The 2025 Map’s Compactness

Next, I assess the compactness of the 2025 Map, namely CDs 4 and 5, as compared to the 2022 Map and the alternative maps.

² This is the general framework for creating remedial maps for courts, consistent with my experience.

³ I received estimated incumbent addresses from Plaintiffs’ counsel. There is no requirement that members of Congress reside in their districts. I nevertheless include compact alternative configurations of CDs 4 and 5 that avoid pairing incumbents, to the extent the legislature sought to do so.

⁴ Incumbents who represent CDs 4 and 5 would both live in this version of CD 5.

I evaluate compactness using two quantitative measures recognized in academic literature and relied upon by courts: the Reock and Polsby-Popper scores. I have applied these measures in redistricting analyses for courts in New York and Wisconsin and have reported these metrics in my peer-reviewed academic work.

There are, of course, a wide range of mathematical measures of compactness that may be informative. I focus on Reock and Polsby-Popper in this report because they are often used in the social sciences and because they capture different features of district shape.⁵ Reock compares the area of a district to the smallest circle that can fully contain it, measuring how spread out the district is and penalizing districts that are elongated or sprawling. Polsby-Popper compares the area of a district to the length of its boundary, capturing the “smoothness” of boundaries and penalizing districts with more irregular boundaries. The Polsby-Popper score can needlessly penalize districts that follow the boundaries of inherently irregular features like river boundaries. Both scores range from 0 to 1, where 1 is most compact. Neither measure fully characterizes compactness standing alone, so they are most informative when considered together as part of a holistic assessment, including visual inspection.

There is also an important qualitative component to assessing compactness. This can be thought of as whether a district is “reasonably configured”. This involves visually assessing the size, shape, and regularity of the district given natural boundaries, political subdivisions, and other territorial boundaries. Though my analysis of these factors is set out in more detail in the next section, that analysis informed my opinion here about whether CDs 4 and 5 depart from principles of compactness.

When assessing CDs 4 and 5 in the 2025 Map on both quantitative and qualitative measures, both are less compact than their counterparts in the 2022 Map and the alternative illustrative maps. **Table 2** provides the Reock and Polsby-Popper scores map wide and for every district in the 2022 Map, 2025 Map, and my alternative maps. For the alternative maps, the districts altered from the 2025 Map are shaded light grey. A green up arrow (▲) indicates an increase in the relevant score compared to the 2025 Map, an equal sign (=) indicates no change, and a red down arrow (▼) indicates a decrease.

⁵ Minor variation in mathematical scores that rely on district shape or perimeter can arise from differences in the underlying map projection or boundary shapefiles. These differences are unlikely to affect the overall conclusions, especially when paired with visual inspection, like I do here.

Table 2 – District-Level Reock & Polsby-Popper Scores

Reock	2022 Map	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
Mapwide Avg.	0.42	0.41	0.48 ▲	0.47 ▲	0.46 ▲	0.45 ▲	0.45 ▲	0.48 ▲	0.48 ▲	0.48 ▲
1	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
2	0.41	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
3	0.30	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36 =
4	0.51	0.39	0.56 ▲	0.56 ▲	0.55 ▲	0.52 ▲	0.49 ▲	0.53 ▲	0.52 ▲	0.52 ▲
5	0.42	0.29	0.63 ▲	0.56 ▲	0.52 ▲	0.45 ▲	0.42 ▲	0.65 ▲	0.65 ▲	0.65 ▲
6	0.25	0.28	0.28	0.28	0.28	0.28	0.33 ▲	0.30 ▲	0.31 ▲	0.31 ▲
7	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
8	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42

Polsby-Popper	2022 Map	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
Mapwide Avg.	0.31	0.35	0.40 ▲	0.38 ▲	0.38 ▲	0.37 ▲	0.39 ▲	0.42 ▲	0.41 ▲	0.42 ▲
1	0.31	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
2	0.29	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
3	0.15	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.36 ▲
4	0.30	0.33	0.37 ▲	0.35 ▲	0.32 ▼	0.32 ▼	0.47 ▲	0.45 ▲	0.36 ▲	0.43 ▲
5	0.40	0.20	0.57 ▲	0.41 ▲	0.38 ▲	0.38 ▲	0.40 ▲	0.62 ▲	0.62 ▲	0.62 ▲
6	0.28	0.32	0.32	0.32	0.32	0.32	0.32 =	0.29 ▼	0.32 =	0.33 ▲
7	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
8	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Compared to the 2022 Map, the average compactness of CDs 4 and 5 together dropped in the 2025 Map. As shown in **Table 2**, the 2025 Map reduced CD 5's Reock score from 0.51 to 0.39 and its Polsby-Popper score from 0.42 to 0.29. As for CD 4, the 2025 Map increased its Polsby-Popper score from 0.30 to 0.33 but significantly decreased its Reock score from 0.40 to 0.20. These measures confirm what is clear from looking at the maps. CD 5 went from a small, reasonably configured and regularly shaped district centered on Kansas City's urban core in 2022 to one in 2025 that begins in the central part of the state in Osage and Maries Counties, collects rural western Missouri and parts of Columbia before heading west until it snakes into Jackson County and urban Kansas City. CD 4 went from a district uniting rural western Missouri in 2022 to one in 2025 that splits this rural area in half and goes deep into urban Kansas City with a narrow tentacle. The 2025 Map made CDs 4 and 5 less compact than the 2022 Map.

The 2025 Map's CDs 4 and 5 are also far less compact than those in the alternative maps. **Figures 2 and 3** below display plots for both Polsby-Popper and Reock scores at the district level for each of my eight alternative maps, and the 2025 and 2022 baseline Maps (generated from the data in Table 2). The scores for each district are shown as gray circles. I symbolize CD 4 as a orange square and CD 5 as a blue diamond so that it is easy to identify where the districts rank in each of the plans. To compare the 2025 Map with the alternatives, I have added horizontal lines to show the 2025 CDs 4 and 5 scores.

These figures show that CDs 4 and 5 are always more compact or about as compact than they are in the 2025 Map. The Reock scores for CDs 4 and 5 in my eight alternative maps are all higher than those of the 2025 Map. The Polsby-Popper scores for CD 5 in all eight of my alternative maps are significantly higher than those of CD 5 in the 2025 Map. The Polsby-Popper scores for CD 4 are also higher than those of CD 4 in the 2025 Map in six of eight plans, and similar to the 2025 plan in the two other alternatives, Maps 3 and 4. It is noteworthy that increased compactness in CDs 4 and 5 is associated with an increase in the plan wide averages. The alternative plans all show how it's possible to increase or maintain the compactness of CDs 4 and 5 while also increasing the overall average compactness across all districts.

Figure 2 – Plot of District-Level Reock Scores by Map

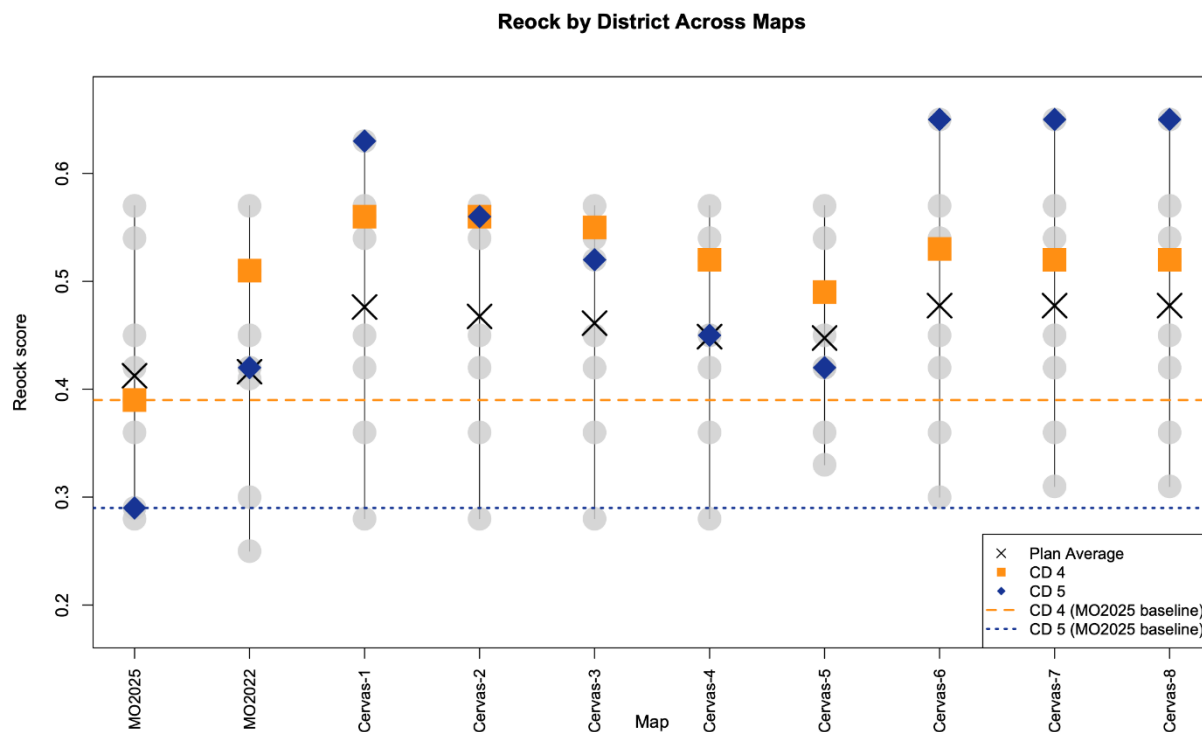
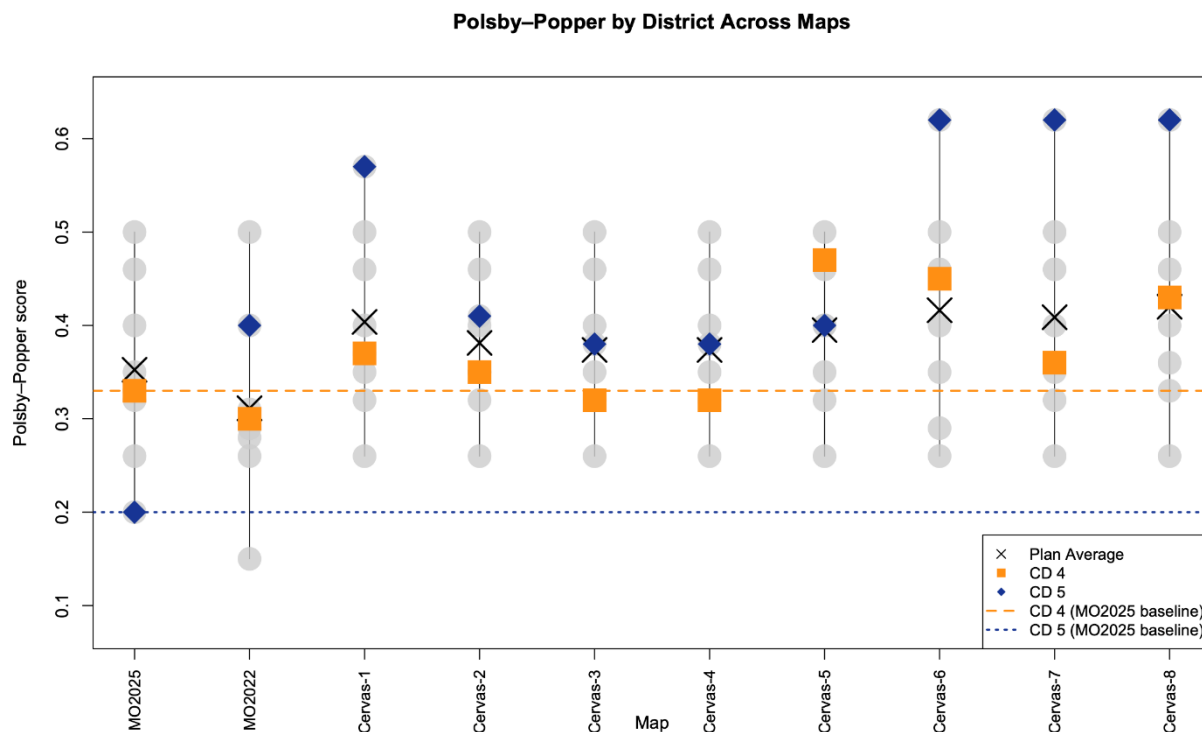


Figure 3 – Plot of District Level Polsby-Popper Scores by Map



The visual (inter-ocular) test corroborates what the data above demonstrates. In every alternative map, CD 5 is a relatively small compact district that includes the urban core of Jackson County and extends no farther than the immediately surrounding counties, while CD 4 is a compact rural district uniting rural areas in western Missouri. The 2025 Map departs from this compact configuration.

I conclude that the configuration of CDs 4 and 5 in the 2025 Map is not as compact as may be.

B. Whether the 2025 Map’s Non-Compact CDs 4 and 5 Were Necessary to Comply with Constitutional Requirements, Federal Law, and Recognized Factors

Next, I assess whether the reduction in compactness of CDs 4 and 5 was a minimal or practical deviation necessary to achieve compliance with constitutional requirements, federal law, or other redistricting factors recognized by Missouri courts. For the reasons explained below, I conclude that it was not.

1. Equal Population

The Missouri and federal constitutions require congressional districts to be equally populated. There was no new census that happened between the passage of the 2022 Map and the 2025

Map, so the relevant population data is the 2020 decennial census. Missouri's 2020 census population was 6,154,913. Equal population among eight congressional districts requires seven districts to contain exactly 769,364 people and one district to contain exactly 769,365 people. The 2022 Map and all eight of my more compact alternative maps comply with this requirement. These maps show that the 2025 Map did not need to make CDs 4 and 5 less compact to comply with the equal population requirement.

2. Contiguity

The same is true of contiguity, which is also required by the Missouri Constitution. A district is generally considered contiguous if it is composed of adjacent territory. The 2022 Map is contiguous, as are all my more compact alternative maps. These maps show that it was not necessary to make CDs 4 and 5 in the 2025 Map less compact to comply with the contiguity requirement.

3. Compactness of Other Districts

Reducing the compactness of CDs 4 and 5 in the 2025 Map was not necessary to improve the compactness of other districts or the map as a whole. In my alternative Maps 1-4, only CDs 4 and 5 were modified, while all other districts remained unchanged from the legislature's preferred 2025 configuration. To the extent the legislature improved the compactness of those other districts in the 2025 Map, alternative Maps 1-4 show that the legislature could have increased (or at least avoided meaningfully decreasing) the compactness of CDs 4 and 5 while making its desired changes to all the other districts. Nor was any reduction in CD 5's compactness required to improve CD 4's compactness and vice versa. The alternative maps show that both districts can be made more compact simultaneously.

4. Federal Voting Rights Act of 1965

In the Governor's proclamation calling the General Assembly into special session, the Governor stated that "the State of Missouri's current congressional district map may be vulnerable to a legal challenge under the Voting Rights Act and the Fourteenth Amendment, due to a lack of compactness in certain districts."⁶ It is unclear what was meant by this statement. I am not aware of any VRA analysis conducted by the legislature in redrawing the 2025 Map, nor did the legislature identify a particular district in the 2022 Map that it thought violated the VRA or was predominantly drawn based on race without sufficient justification under the Fourteenth Amendment.

⁶ <https://governor.mo.gov/proclamations/governor-kehoe-convenes-second-extraordinary-session-first-regular-session-one>.

I understand that State officials have since indicated that this statement refers to St. Louis-based CD 1. However, this explanation does not align with the changes made to the map. For each district in the 2025 Map, I calculated the core retention rate, or the percentage of a previous district's population that remains within the new district's boundaries (see below for additional discussion). CD 1 had the highest level of core retention between the 2022 Map and the 2025 Map of all the districts that were altered. This means of all the districts changed, the legislature made the *fewest* changes to CD 1. Its demographic characteristics are also nearly the same as before. In any event, those minimal changes the legislature viewed as necessary in CD 1 could have been made without reducing the compactness of CDs 4 and 5 on the opposite side of the state, as all eight of my alternative maps (which do not alter the 2025 Map's version of CD 1) demonstrate. As a result, any changes made to CD 1 cannot explain the legislature's reduction in the compactness of CDs 4 and 5.

5. Political Subdivisions Boundaries: County Splits

One redistricting factor recognized by Missouri courts is respect for political subdivision boundaries, including counties. This is evaluated with two related but distinct measures: the number of counties that are split and the total number of county splits. The “number of counties split” counts only the number of counties divided between two or more congressional districts, regardless of how many times a county is divided. The “total number of county splits” counts every time a county is divided between districts. For example, a county divided between two districts has one county split, a county divided between three districts has two total county splits, and so on. I have explained to courts in prior engagements that the total number of county splits is the more informative metric because it reflects the actual number of times counties are crossed by district lines, and it cannot be manipulated by dividing just one county into many pieces.

The 2025 Map reduces county splits compared to the 2022 Map. Under the 2022 Map, nine counties were split, resulting in a total of 10 county splits. Under the 2025 Map, five counties are split between two districts, two of which (Jackson County and St. Louis County) are split among three districts, resulting in 5 counties split and a total of 7 county splits.

This reduction in the number of county splits does not require reducing the compactness of CDs 4 and 5. As shown in **Table 1** above, seven of my alternative maps—including Maps 1, 2, 3, 4, 6, 7, and 8—also achieve seven total county splits, matching the 2025 Map while drawing CDs 4 and 5 substantially more compact.⁷ These maps show that the legislature could have achieved the same reduction in county splits without sacrificing compactness in CDs 4 and 5.

⁷ Only one alternative map, Map 5, has an additional county split, exceeding that of the 2025 Map. This is because Map 5 redraws CD 5 precisely as it appeared in the 2022 Map, which splits both Jackson and Clay Counties to keep more of the Kansas City urban area in a single district. These splits are in addition to the county splits that result

If the legislature's main objective were instead to minimize the number of counties split, that goal also cannot explain the less compact configuration of CDs 4 and 5 in the 2025 Map. My alternative Maps 3, 4, 7, and 8 reduce the number of counties split to five, equal to the 2025 Map, without sacrificing the compactness of CDs 4 and 5.

6. Political Subdivision Boundaries: Municipal Splits

Respect for municipal boundaries is another relevant redistricting consideration. I evaluate this factor by counting the number of municipalities⁸ whose populations are split among multiple congressional districts.⁹ As for counties, I include the number of municipalities that are split, as well as the total number of municipal splits.

My analysis shows that the substantial reduction in compactness of CDs 4 and 5 cannot be explained by and does not necessitate the number of municipalities split and the total number of municipal splits in the 2025 Map. The 2025 Map splits 13 municipalities and has a total of 14 municipal splits. As shown in **Table 1** above, seven of my alternative maps split as many or fewer municipalities and include as many or fewer total municipal splits than the 2025 Map while drawing CDs 4 and 5 to be far more compact.

7. Political Subdivision Boundaries: Precinct/VTD Splits

Avoiding precinct, or voting tabulation district (VTD), splits is also a relevant redistricting consideration. VTDs are analogous to “precincts”; they are the smallest units of geography created for purposes of election administration. As shown in **Table 1** above, all eight of my alternative maps split far fewer VTDs¹⁰ (at least 9 less) while drawing CDs 4 and 5 to be far more compact than in the 2025 Plan. Thus, the legislature's reduction in compactness of those districts cannot be explained by an effort to avoid splitting VTDs.

from the districts I left unchanged. My other alternative maps show that these additional splits can easily be eliminated.

⁸ I use the term “municipalities” here as a catch-all for all legally incorporated cities, towns, and villages in Missouri. I determine where municipalities are located based on the Census Bureau's Places shapefile. I excluded census designated places (CDPs).

⁹ Cities do not always align with counties or voting tabulation districts (VTDs). Some cities cross county boundaries, and others include small census blocks with no population. For this reason, I count a municipality as “split” only when its resident population is divided between two or more districts. If no people are affected by the split, I do not include it in my total. These zero-population splits do not affect representation and can often be adjusted without practical consequence. Regardless of the method used, however, the alternative maps perform as well as or better than the 2025 Map on this measure.

¹⁰ See the previous footnote above about counting county and municipal splits with no resident population. The same method for counting applies for VTDs.

8. Population Density

Another factor that may be considered in drawing congressional districts is population density. But the 2025 Map's reduction in the compactness of CDs 4 and 5 cannot be explained by the legislature's attentiveness to population density because the 2025 Map disregards obvious population density patterns in western Missouri.

One common way to visualize population density is a dot density map, like the ones shown in **Figures 4** and **5** below. Each dot represents 100 people. Urbanized areas have a pattern of higher density, while rural areas exhibit lower density. **Figure 4** shows a dot density map with the boundaries of 2022 Map. It shows that the 2022 Map took population density into account by keeping areas with comparable population density patterns together in a district. **Figure 5** shows the same dot density map layered under the 2025 Map. It shows that the 2025 Map does not recognize population density patterns at all; it pairs dense urban areas with low-density rural areas, creating districts with large disparities in population density distribution.

Figure 4 – Population Density, 2022 Map

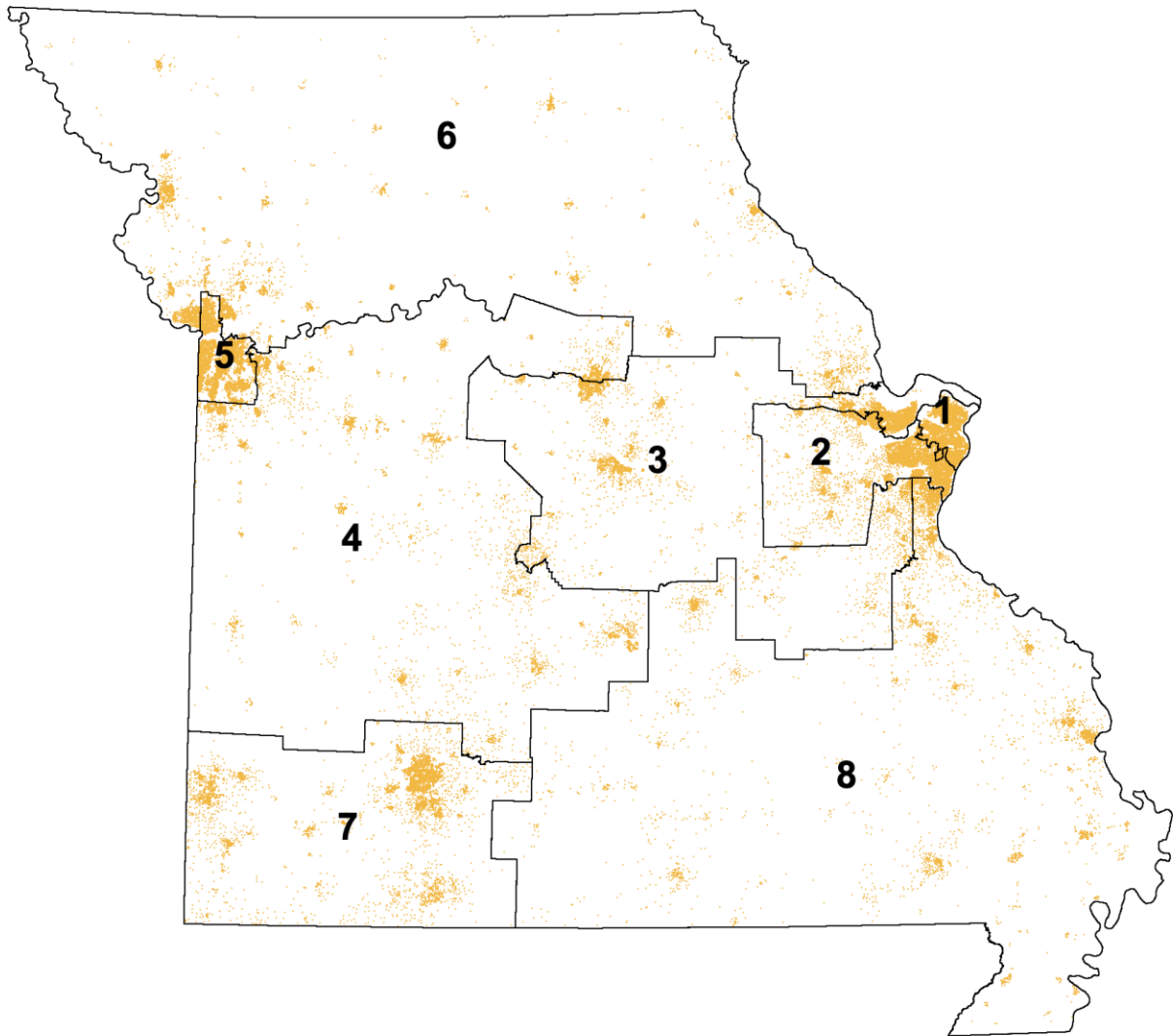
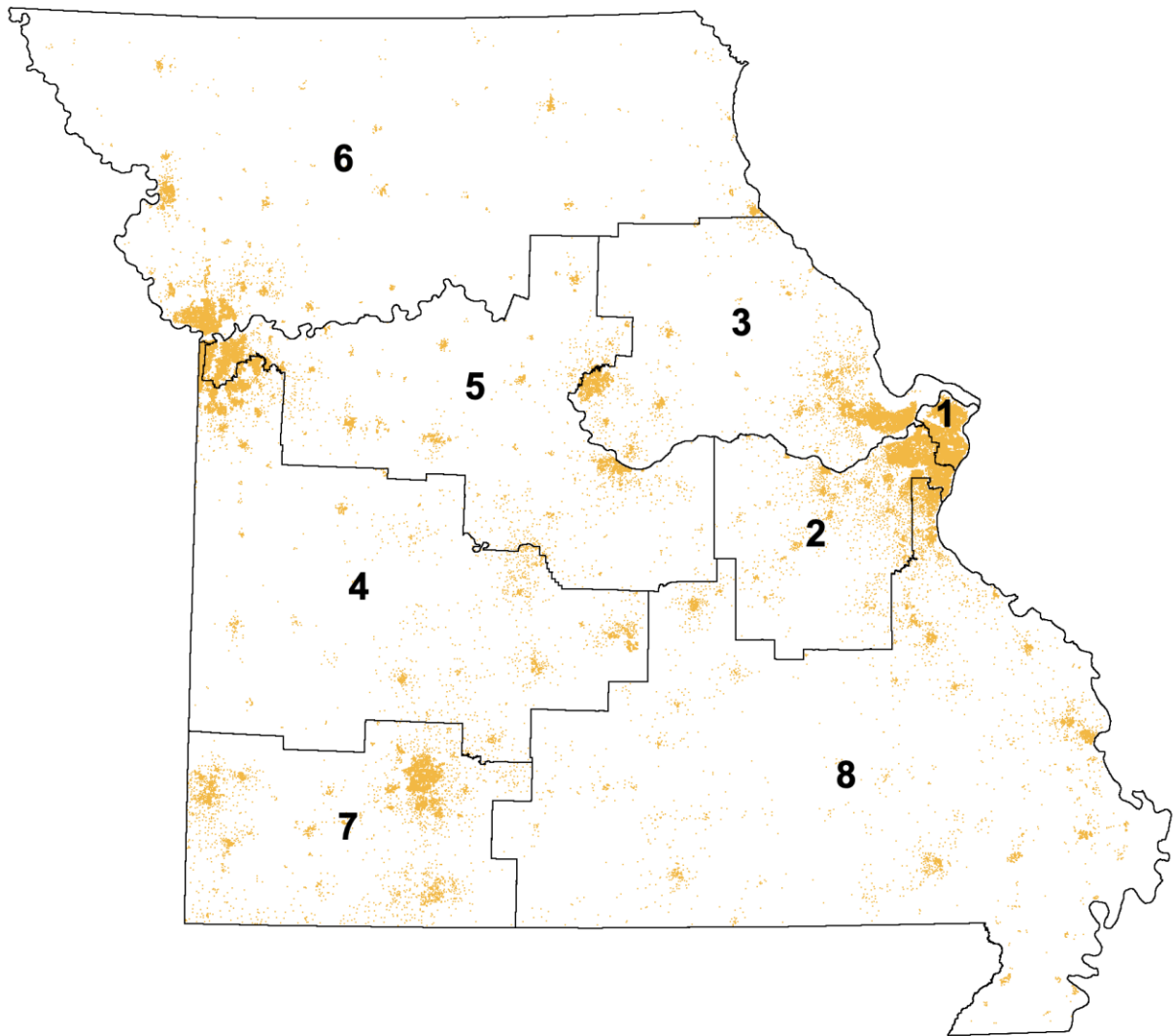


Figure 5 – Population Density, 2025 Map



Another way to assess whether districts account for population density patterns is to determine what percentage of a district population lies within an urban area, and what percentage lies in a rural area. The US Census identifies each block as either “Urban” or “Rural,” based on the density of housing units.¹¹

Table 3 below provides the percentage of the population in each district that lives in an urban area across the 2012, 2022, and 2025 Maps, as well as my alternative maps. It shows that CD 5 was an urban district in 2012 and 2022 but no longer in the 2025 Map. In 2022, for example, 98.7% of CD 5 residents lived in an urban area. In 2025, CD 5’s urban population shrank to just 67%, not much more than the urban population of CD 4. My alternative maps maintain CD 5 as an urban district.

Table 3 – Percentage of District Population Who Live in an Urban Area

District	2012 Map	2022 Map	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
1	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
2	98.4	87.3	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6
3	61.4	64.8	74.4	74.4	74.4	74.4	74.4	74.4	74.4	74.4	74.1
4	48	46.7	63.8	35.8	36.3	37	41.3	44	41.1	40.4	40.6
5	91.4	98.7	67	95.1	94.6	93.9	89.5	98.7	96	96	96
6	61.4	51	65.6	65.6	65.6	65.6	65.6	53.7	59.5	60.1	60.3
7	62	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5
8	33.3	45	45	45	45	45	45	45	45	45	45

Figure 6 below overlays the 2022 Map’s CD 4 and 5 boundaries on a map of the Census-designated urban areas in Missouri. **Figure 7** overlays the 2025 Map’s CD 4 and 5 boundaries on the same urban area map. The same pattern emerges from this data: while the 2022 Map kept alike areas together, the 2025 Map cuts through urban areas, splitting closely united urban areas with rural areas in other parts of the state.

¹¹ See https://www2.census.gov/geo/pdfs/reference/ua/Census_UA_2020FAQs_Feb2023.pdf (“Urban areas represent densely developed territory, and encompass residential, commercial, and other nonresidential urban land uses”; “Urban areas are defined primarily based on housing unit density measured at the census block level.”).

Figure 6 – Census-defined Urban Areas, 2022 Map

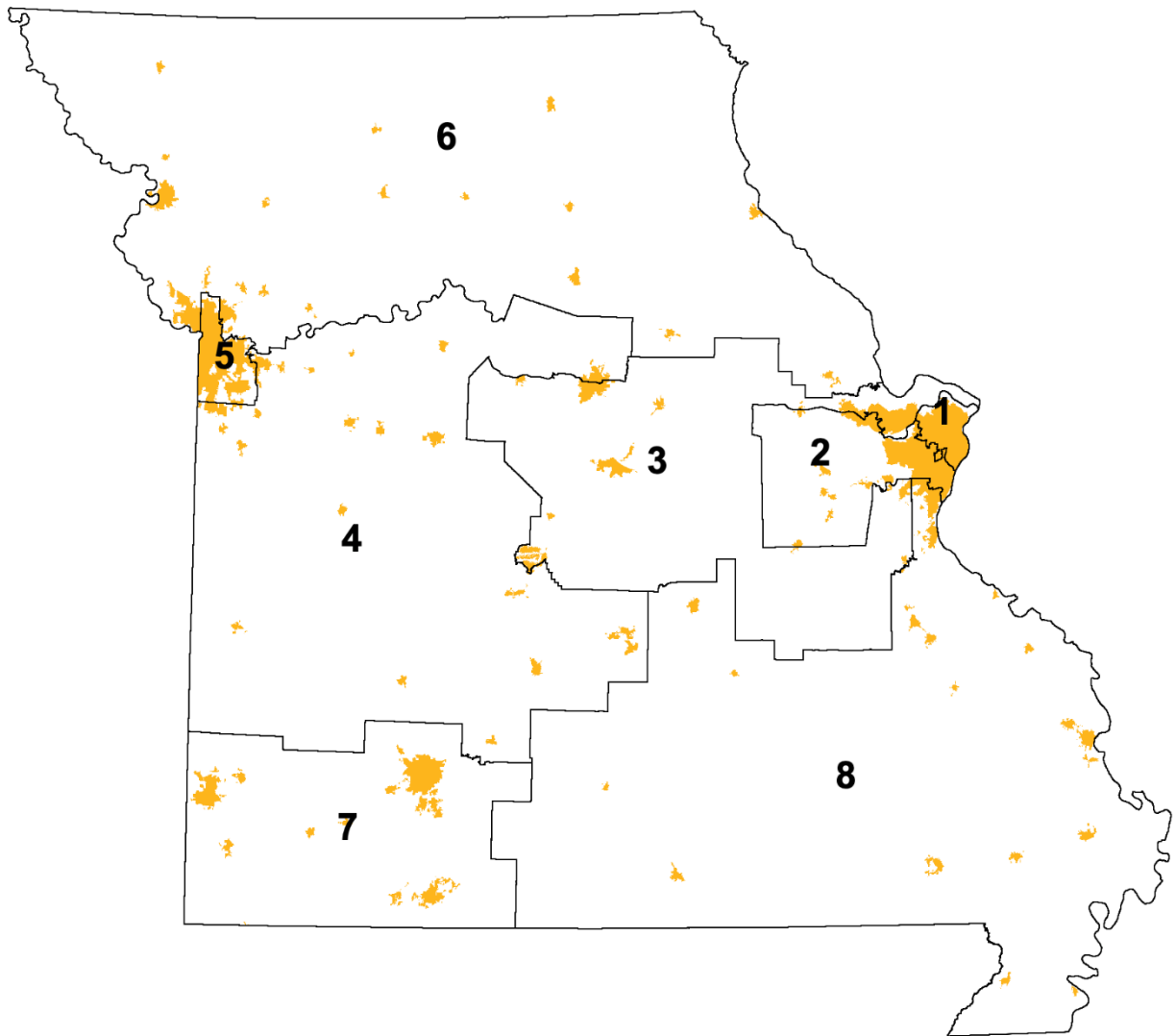
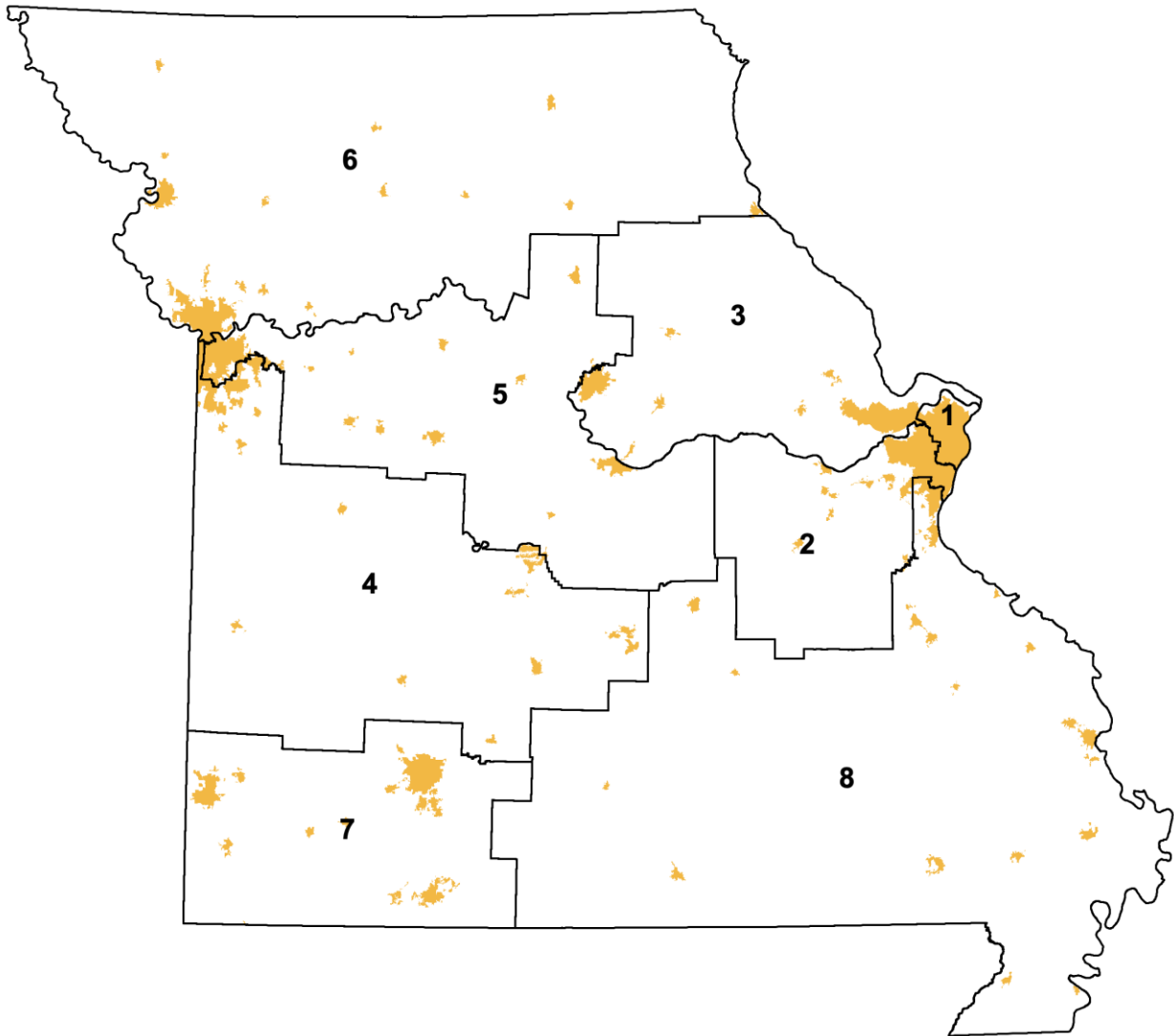


Figure 7 – Census-defined Urban Areas, 2025 Map

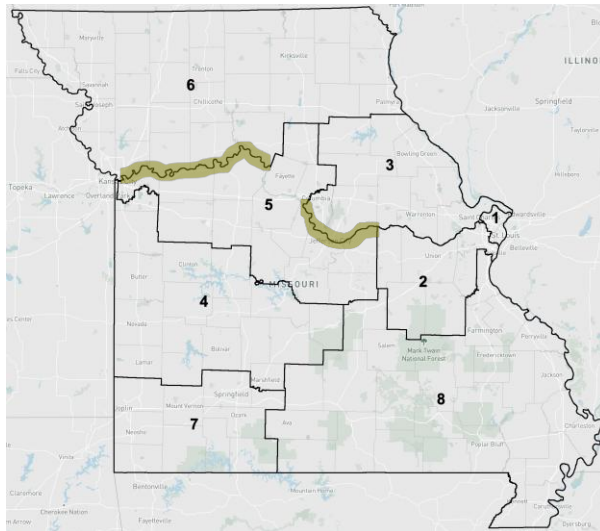


9. Natural Boundary Lines

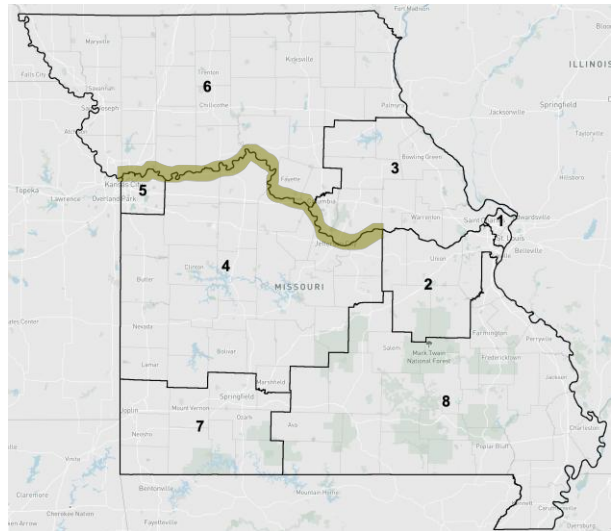
The 2025 Map noticeably uses the Missouri River as a boundary between CDs 2 and 3, CDs 3 and 5, and CDs 5 and 6. But using the river as a natural district boundary does not necessitate the 2025 Map's substantial reduction in compactness of CDs 4 and 5. For example, my alternative Map 6 uses *more* of the Missouri River as a natural district boundary while making CDs 4 and 5 also more compact.

Figure 8 – 2025 Map and Cervas 6 (CD 6 River Boundary Highlighted)

2025 Map



Cervas 6



10. Historical Boundary Lines

Another recognized redistricting factor is the extent to which a map respects historical boundary lines. This factor can be understood and measured by the core retention rate with previous congressional maps. As I note above, the core retention rate is the percentage of a previous district's population that remains within the new district's boundaries.

The most recent congressional map before the 2025 Map was the 2022 Map. **Table 4** shows the 2025 Map's rate of core retention with 2022 Map for each district. It shows that the 2025 Map makes substantial changes to CDs 4 and 5, more than any other districts, in apparent disregard for those historical boundaries. Keep in mind that no population changes necessitated the 2025 redistricting. Both plans need to use the 2020 decennial census population numbers to satisfy 'one person, one vote' requirements.

Table 4 – Core Retention with 2022 Map

District	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
Map wide	76.9	83.0	83.0	83.0	82.4	86.7	85.0	85.0	84.4
1	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9
2	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3
3	60.4	60.4	60.4	60.4	60.4	60.4	60.4	60.4	58
4	61.9	74	74	73.5	71.6	78.1	78.2	77.3	75.1
5	42.7	79.3	79.3	79.3	76.9	100	88.1	88.1	88.1
6	79.3	79.3	79.3	79.3	79.3	84.3	82.5	82.5	82.5
7	100	100	100	100	100	100	100	100	100
8	100	100	100	100	100	100	100	100	100

I also compare the 2025 and 2022 Maps’ core retention with the prior decade’s congressional map (the “2012 Map”). Although some changes are necessary to account for population growth and decline each decade, historical boundary lines and core retention are common considerations in drawing redistricting maps. **Table 5** below shows the map wide and district-level core retention numbers between the 2022 and 2012 maps and between the 2025 and 2012 maps. It shows that the 2025 Map departs from the historical boundaries of CD 4 and 5 to a greater degree than the 2022 Map. It also shows that the most significant changes to the district cores were in CDs 4 and 5 and retain far less of the district cores than my alternative maps.

Table 5 – Core Retention with 2012 Map

District	2022 Map	2025 Map	Cervas 1	Cervas 2	Cervas 3	Cervas 4	Cervas 5	Cervas 6	Cervas 7	Cervas 8
Map wide	80.7	72.6	78.4	78.4	77.4	79.0	78.3	79.4	79.8	79.8
1	96.9	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7
2	70.5	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7
3	55.6	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
4	75.8	49	68.3	68.3	63.2	70.1	68.3	68.3	71.3	71.3
5	82.7	51.4	77.9	77.9	74.4	79.7	82.7	86	86	86
6	81.5	83.4	83.4	83.4	83.4	83.4	77.5	82.9	82.9	82.9
7	96	96	96	96	96	96	96	96	96	96
8	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.1

Any reduction in the compactness of CDs 4 and 5 cannot be explained by an effort to pay respect to historical boundaries.

V. Equalizing Population of Simulated Maps

Plaintiffs’ counsel asked me to adjust three maps produced by another expert using a computer algorithm. The algorithm is designed to produce maps which create districts nearly equal in population but may deviate slightly as they avoid splitting precincts. I adjust three of these maps to equalize the population of each district in the maps. I was provided the block assignment file for each map.

After making the population corrections to these three maps, each of the adjusted versions meet the requirements of equal population and contiguity. The impact on compactness and other metrics is either none or marginal. Images of the maps as provided to me and as adjusted are in Appendix B.

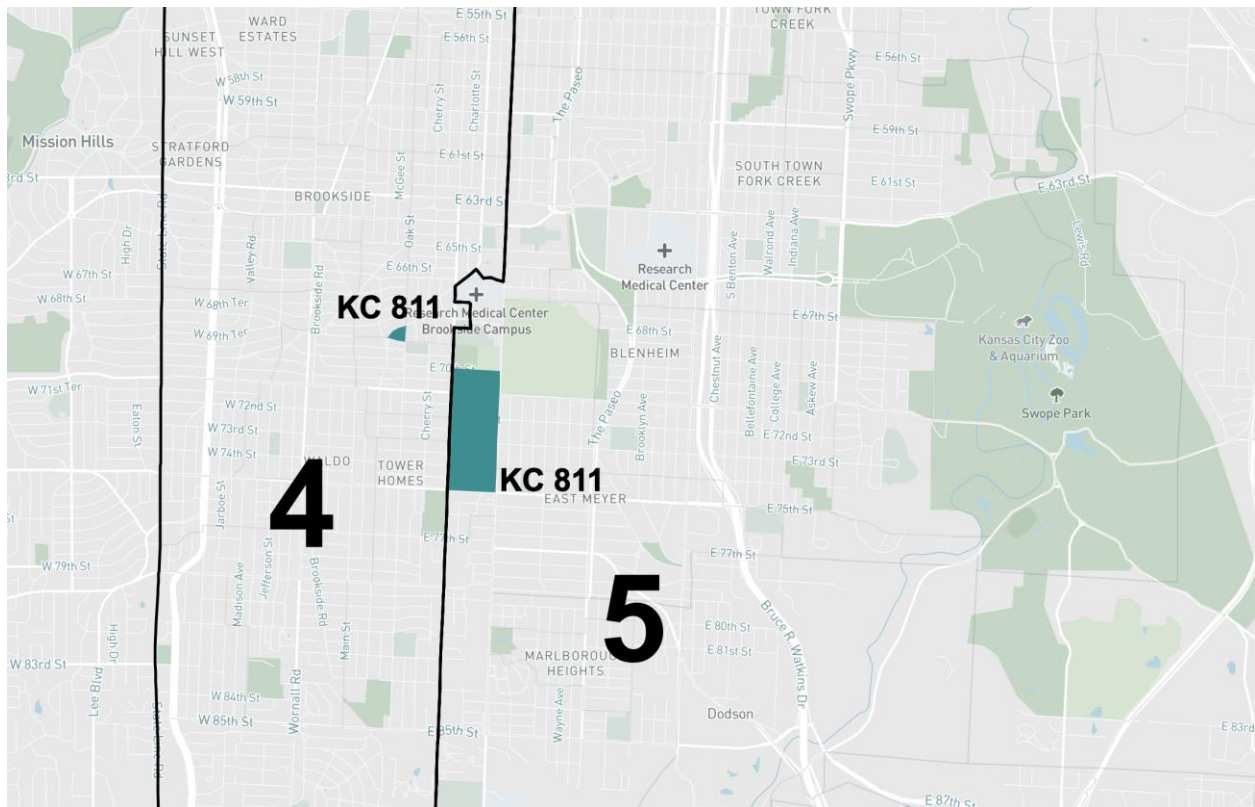
Table 6 – Simulation Map Metrics

Metric	map11029	Adjusted	map11163	Adjusted	map71871	Adjusted
Reock	0.43	0.43	0.46	0.46	0.45	0.45
Polsby-Popper	0.36	0.37	0.39	0.38	0.37	0.37
# of County Splits	7	7	7	7	7	7
# of Counties Split	6	6	6	6	5	5
# of Municipal Splits	14	15	12	12	14	14
# of Municipalities Split	14	14	12	12	13	13
# of Precincts Split	27	26	24	25	24	25
Core Retention ('12)	79.5%	79.5%	78.5%	78.4%	79.0%	78.9%

VI. H.B. 1's Legislative Text

Finally, I was asked to assess whether H.B. 1's legislative text provides clear guidance, as a technical matter, about which voting tabulation districts (VTDs) should be assigned to each district in the 2025 Map. When I reviewed the bill text prior to the state's release of a shapefile for the 2025 Map, I found that the bill's text does not provide clear guidance as to how to assign VTDs to congressional districts. Namely, H.B. 1's text assigns two VTDs, both named by the Census Bureau as "KC 811," to *both* CDs 4 and 5. *See* H.B. 1 at page 76 & 112.¹² As shown in Figure 9 below, these VTDs (depicted in teal) are not adjacent. The smaller VTD to the west has a population of 32, and the larger VTD to the east has a population of 843.

Figure 9 – KC 811 VTDs



In this circumstance, H.B. 1 should have either uniquely identified the VTDs or specified which census blocks comprising the VTDs belong in CD 4 and which belong in CD 5. Census blocks

¹² Available at: <https://documents.house.mo.gov/billtracking/bills254/hlrbillspdf/3344H.01I.pdf>.

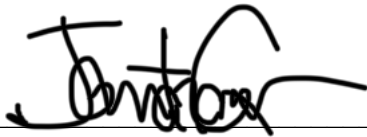
are the smallest geographic unit at which census population is reported. Instead, H.B. 1 assigns every block in both KC 811 VTDs to *both* districts, leaving it to election officials' discretion where the voters who live in these VTDs will ultimately be assigned.

The double assignment of population in the VTDs named KC 811 renders both CDs 4 and 5 in the 2025 Map malapportioned. If the VTDs are assigned to CD 4, it has 843 more people than the ideal population of 769,364 and CD 5 has 843 too few people. If the VTDs are assigned to CD 5, then CD 5 has 32 people too many and CD 4 has 32 people too few.

Because these KC 811 VTDs are not contiguous, their assignment to CD 5 also renders CD 5 noncontiguous, as shown in Figure 9 above.

* * *

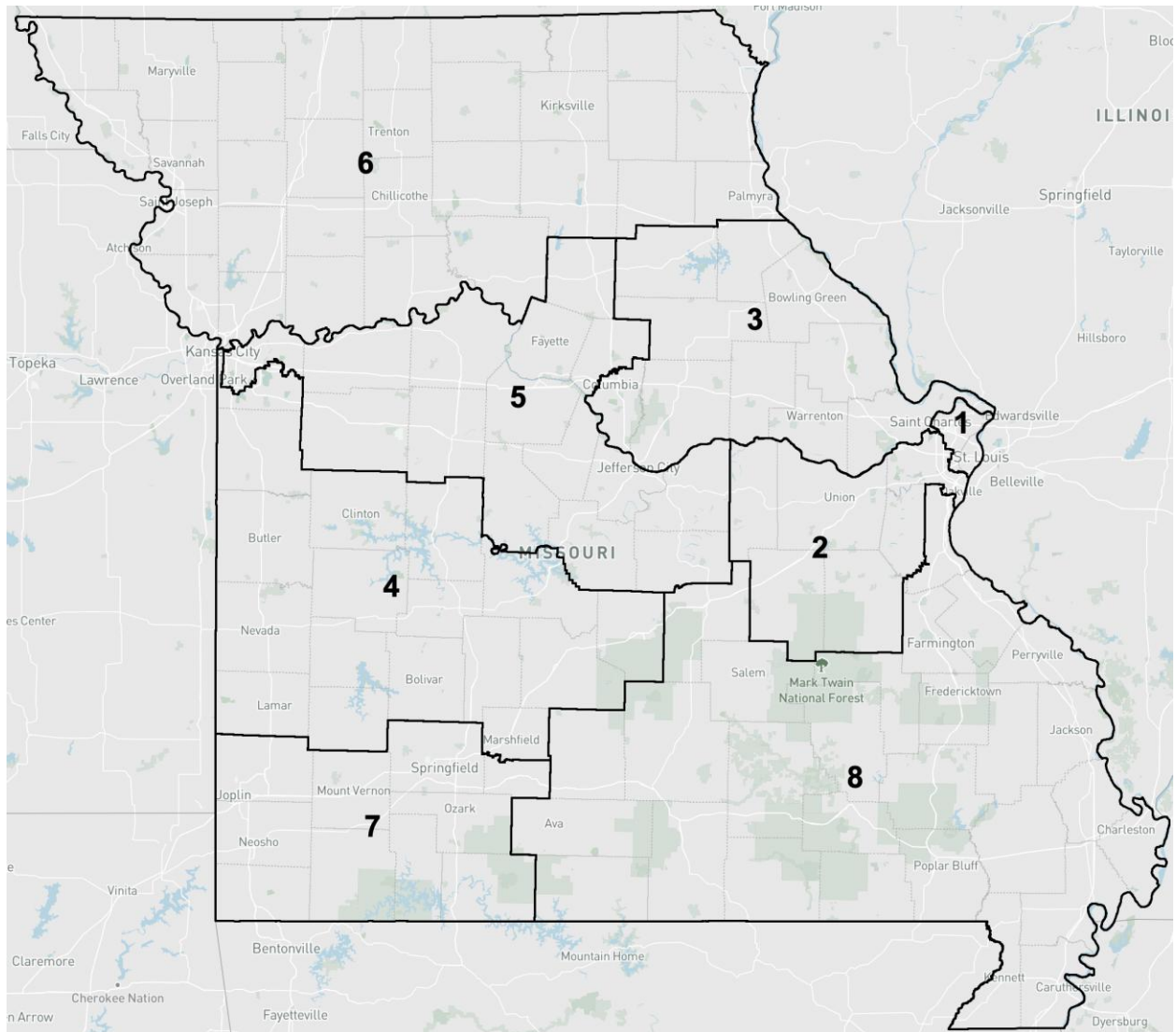
I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge. I reserve the right to revise, update, or supplement my opinions as new information becomes available to me.

A handwritten signature in black ink, appearing to read 'Jonathan Cervas', is written over a horizontal line.

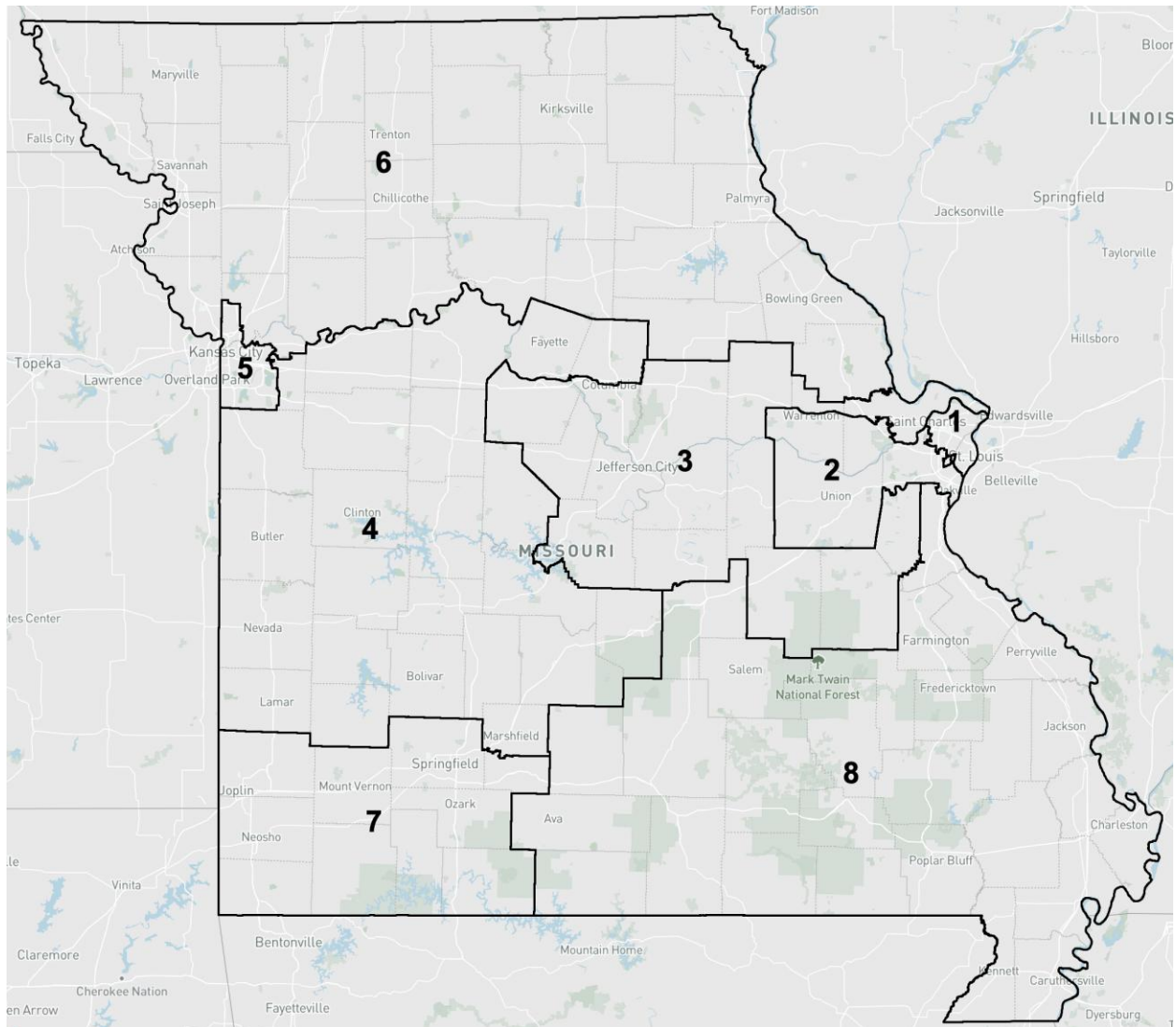
Dr. Jonathan Cervas

APPENDIX A

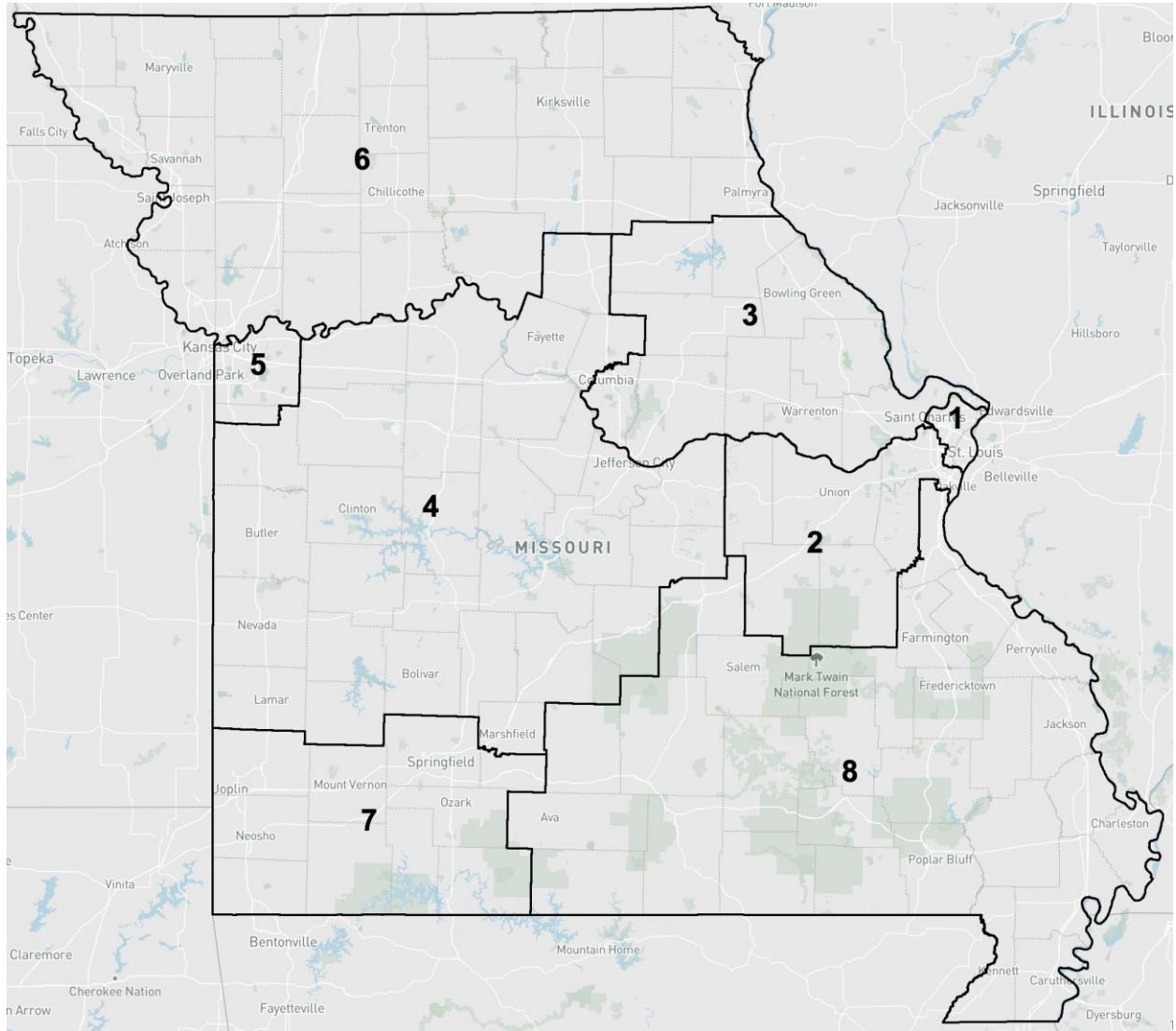
2025 Map



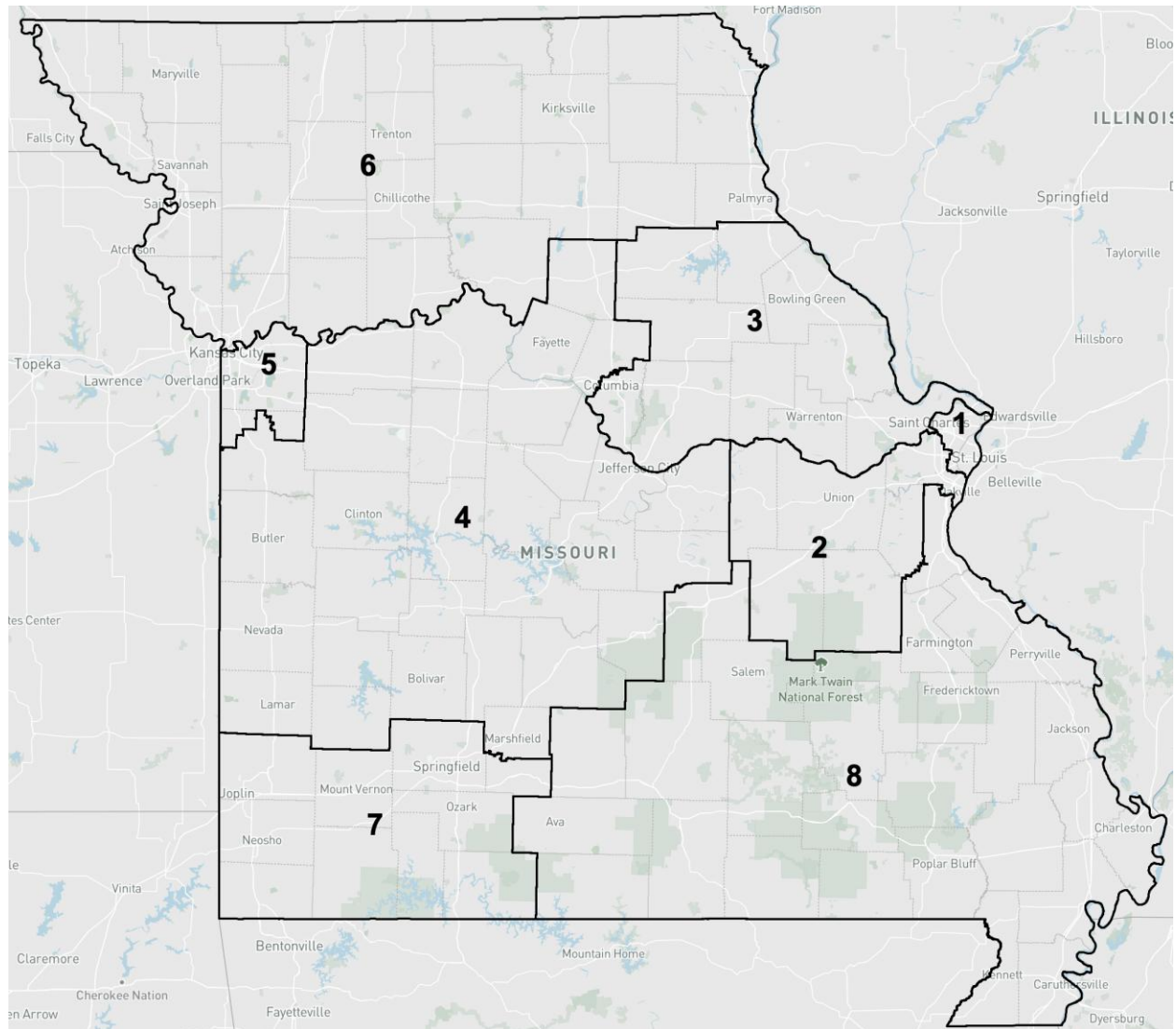
2022 Map



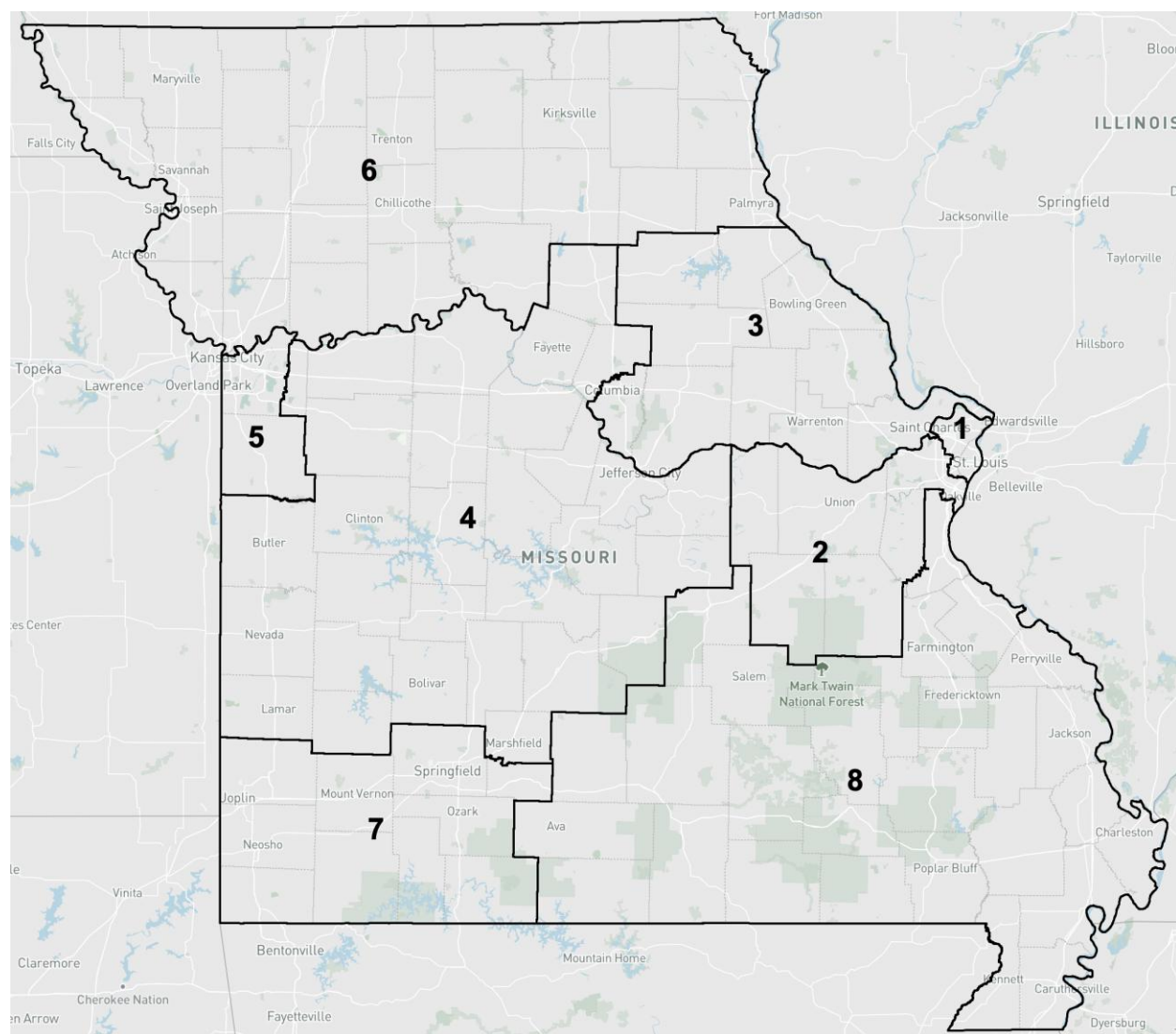
Cervas 1



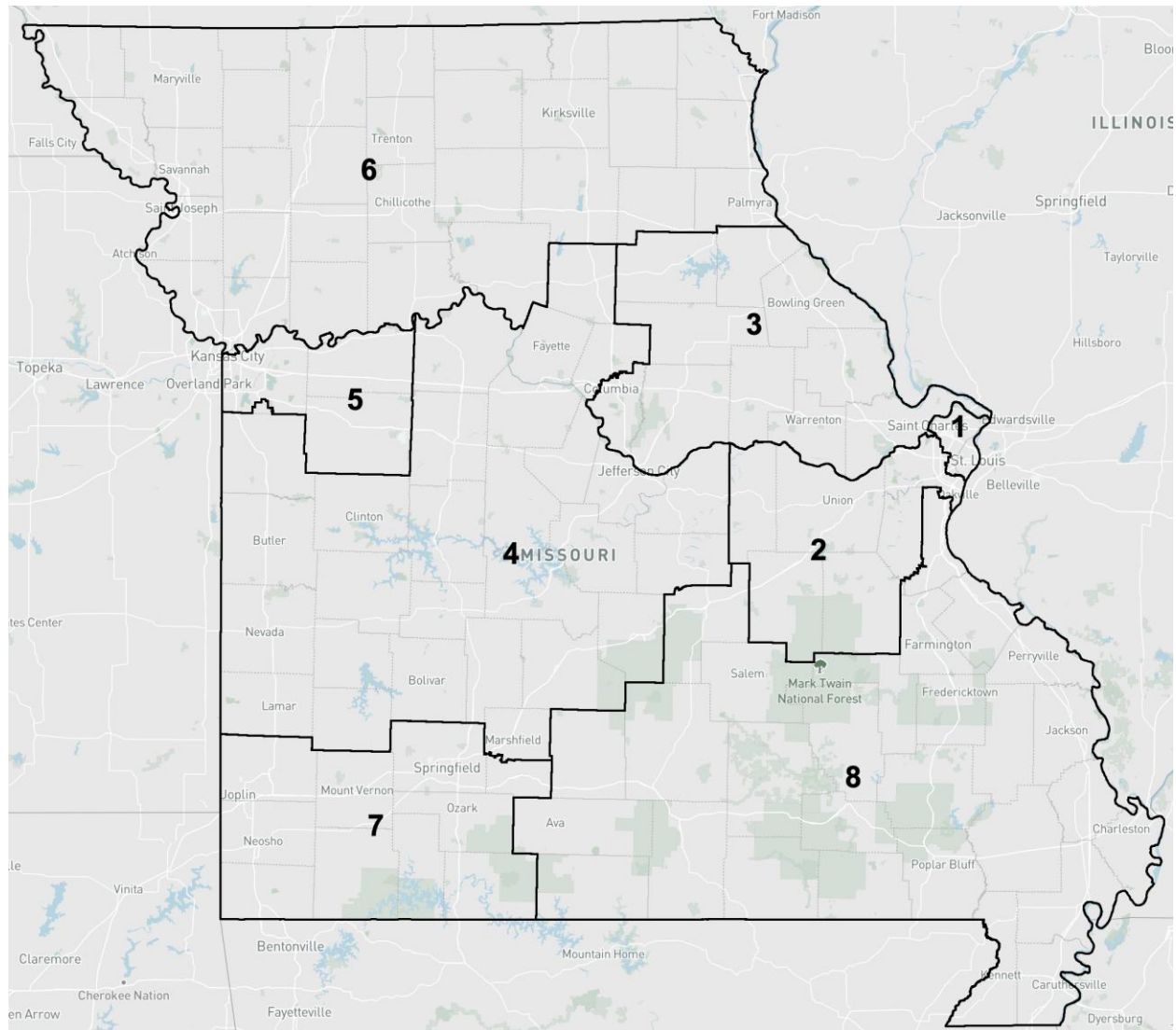
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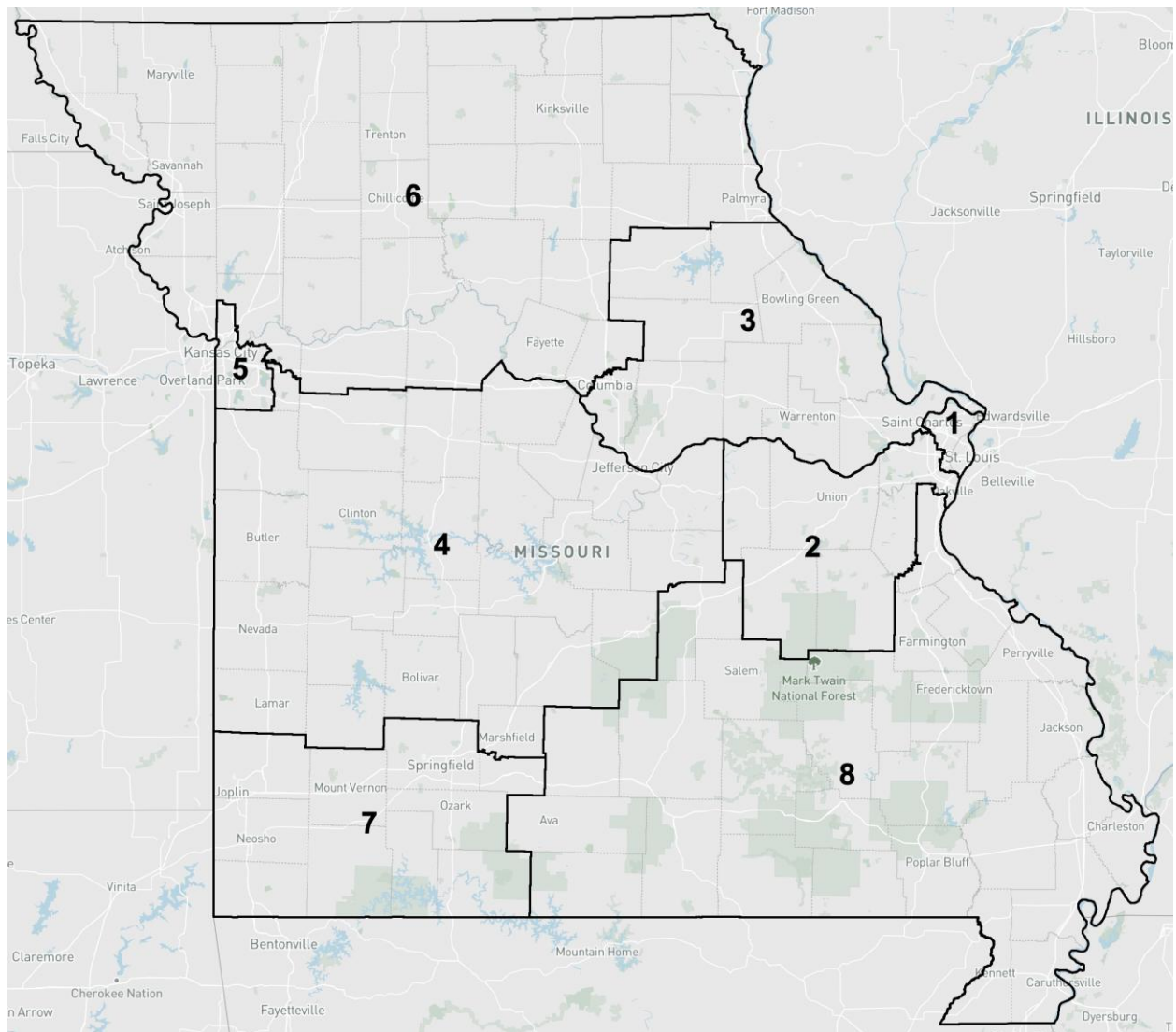
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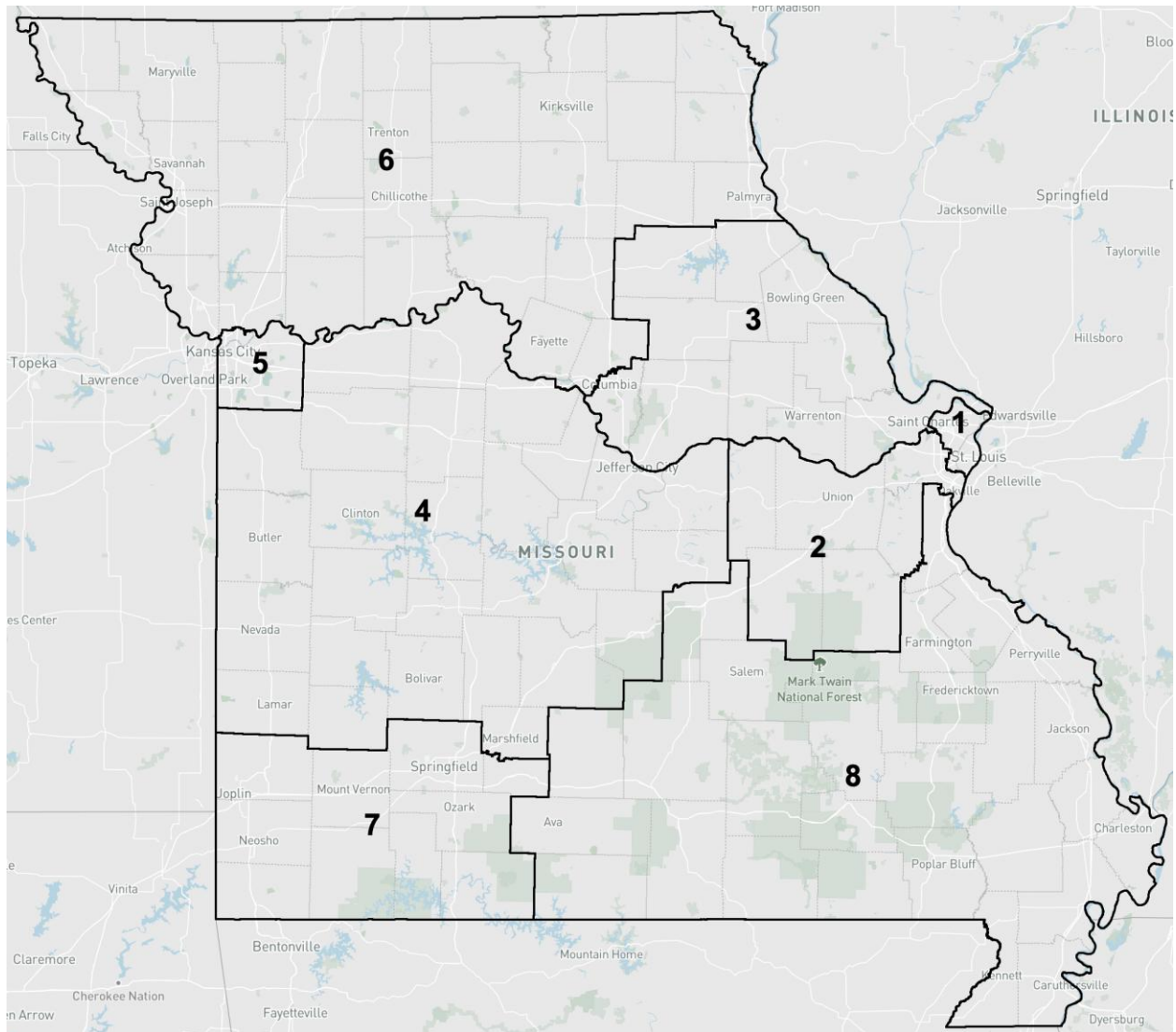
Cervus 4



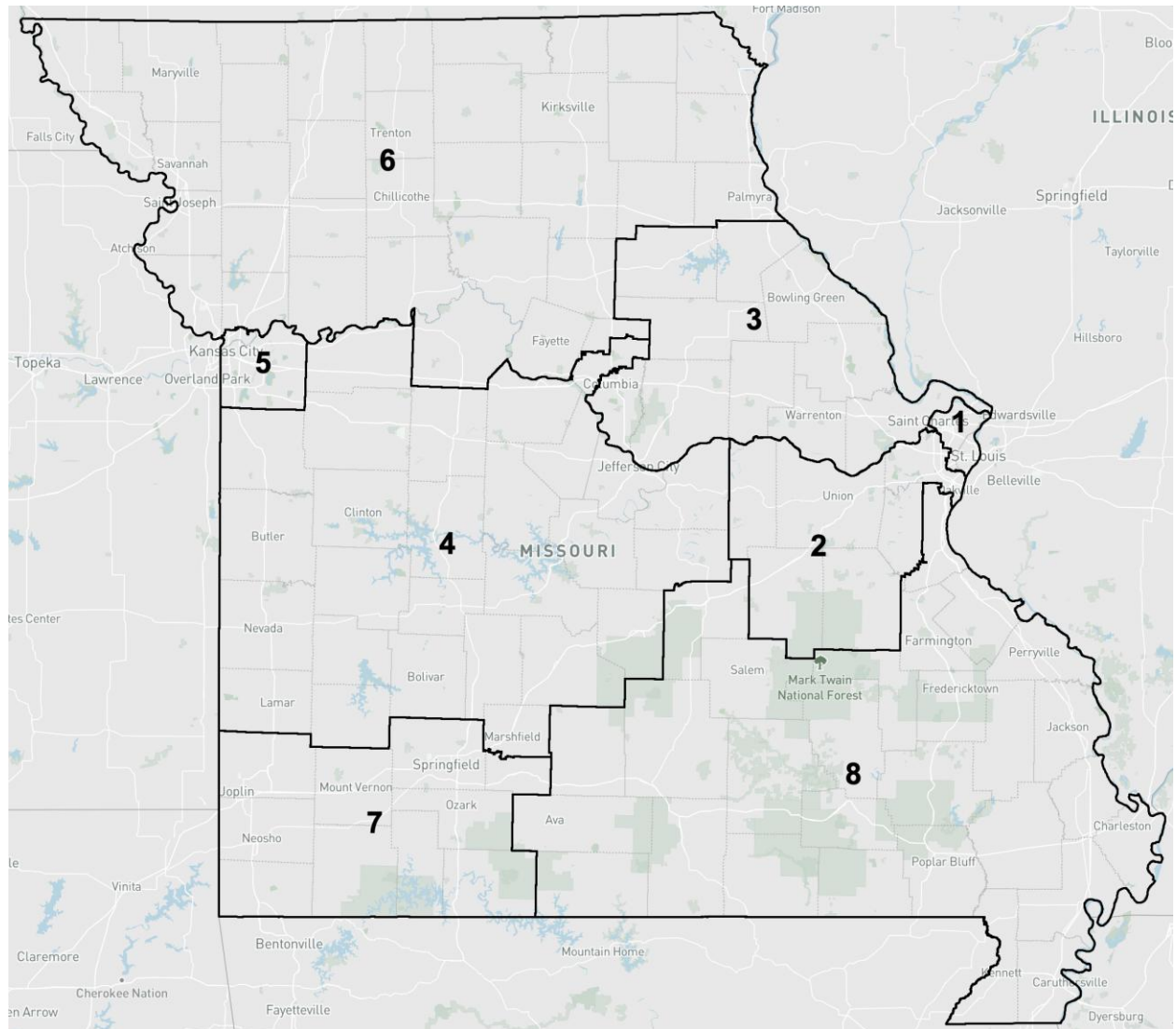
Cervus 5



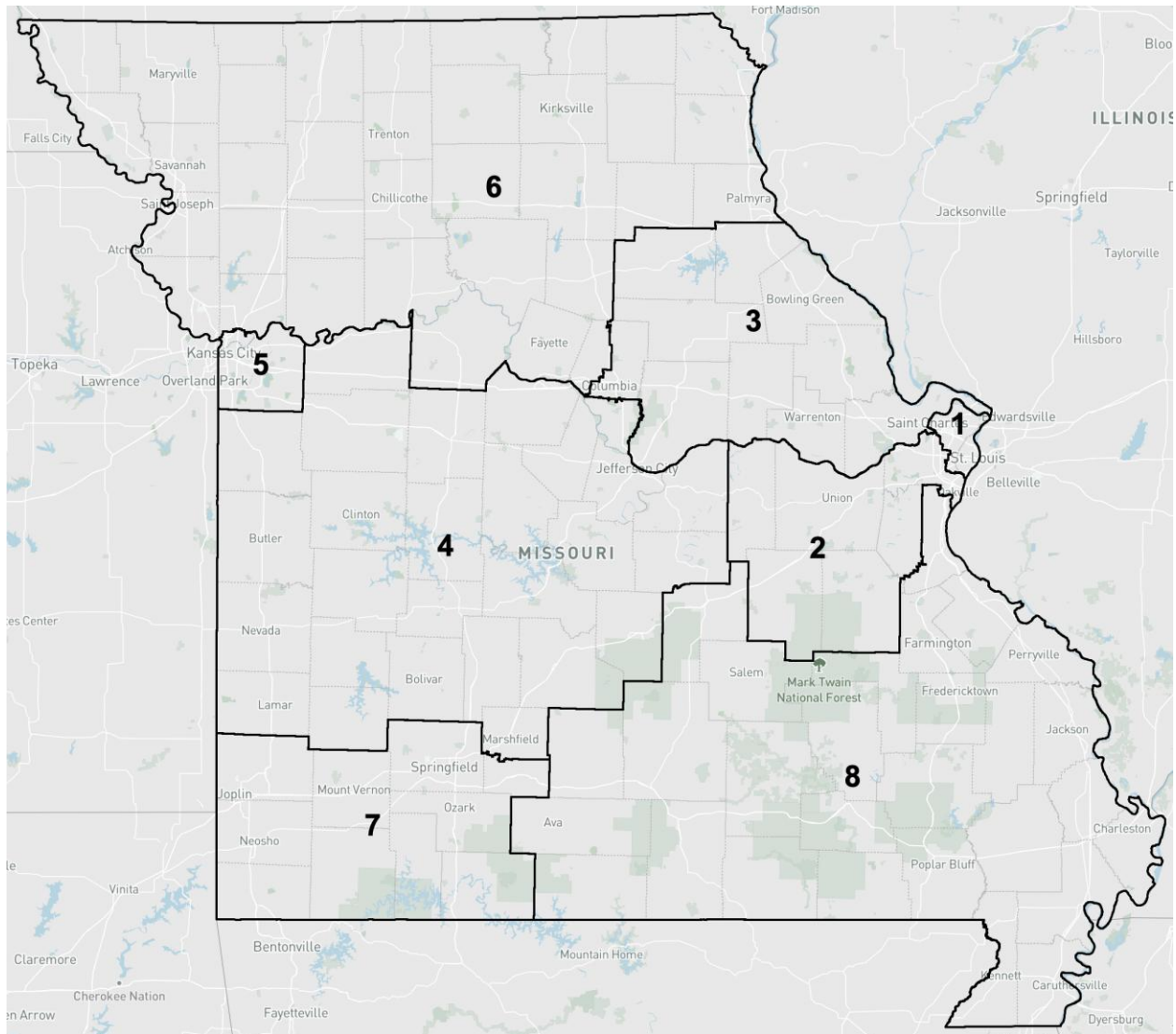
Cervus 6



Cervus 7

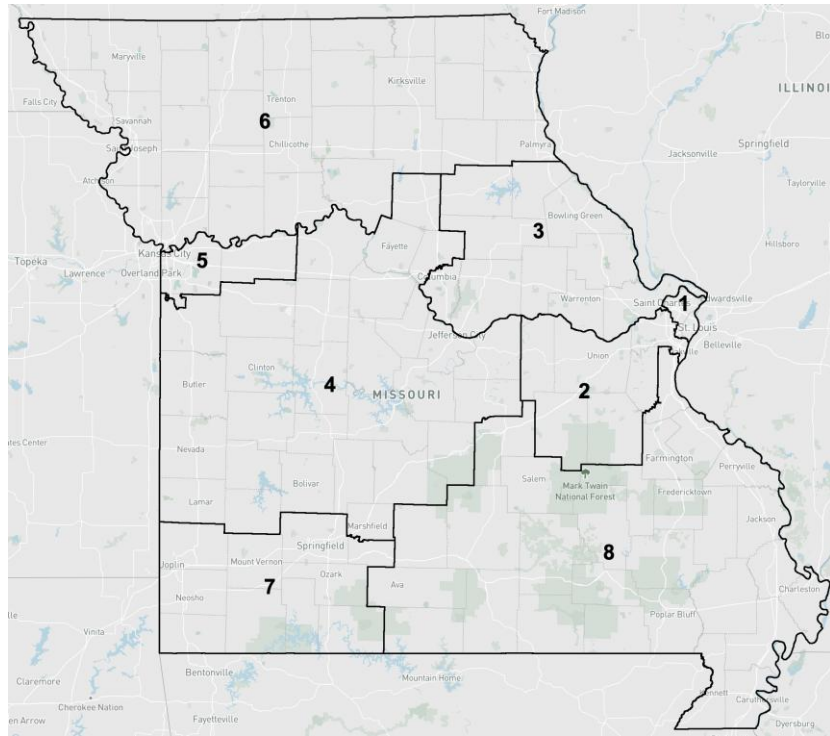


Cervus 8

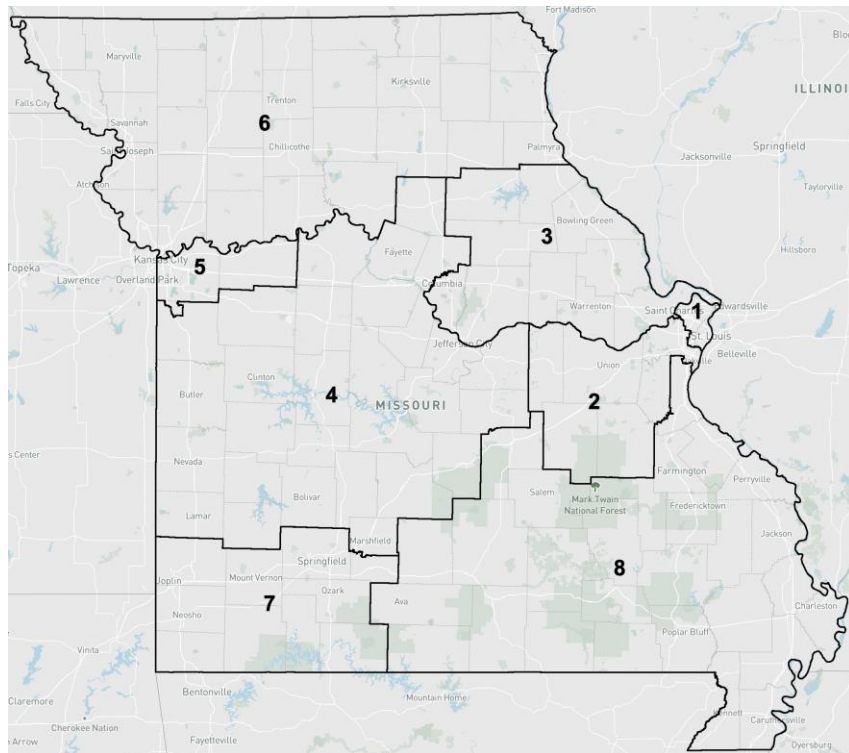


APPENDIX B

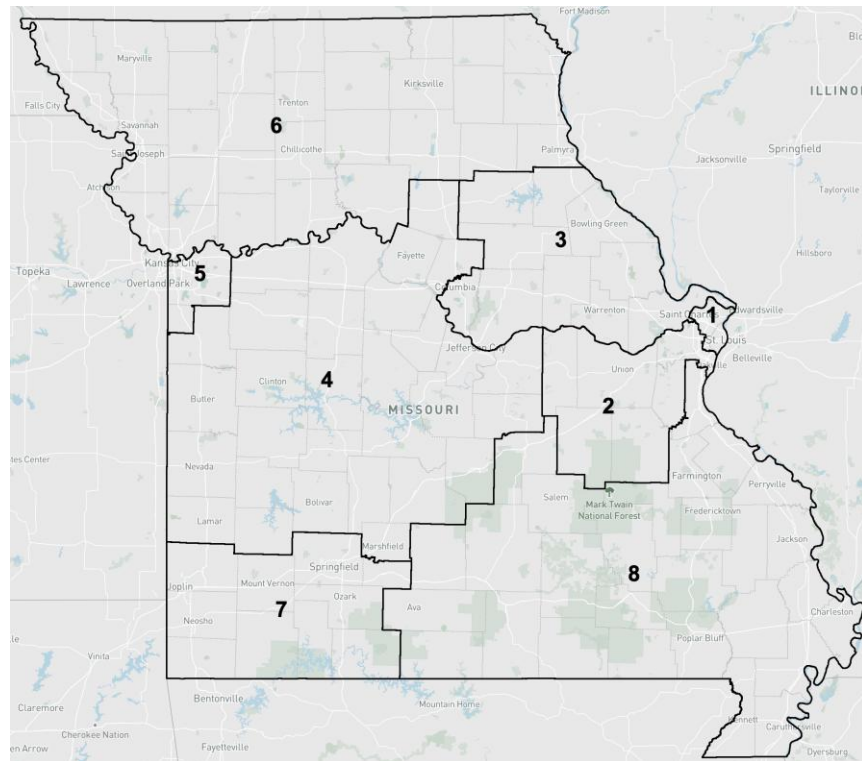
Simulated Map 11029



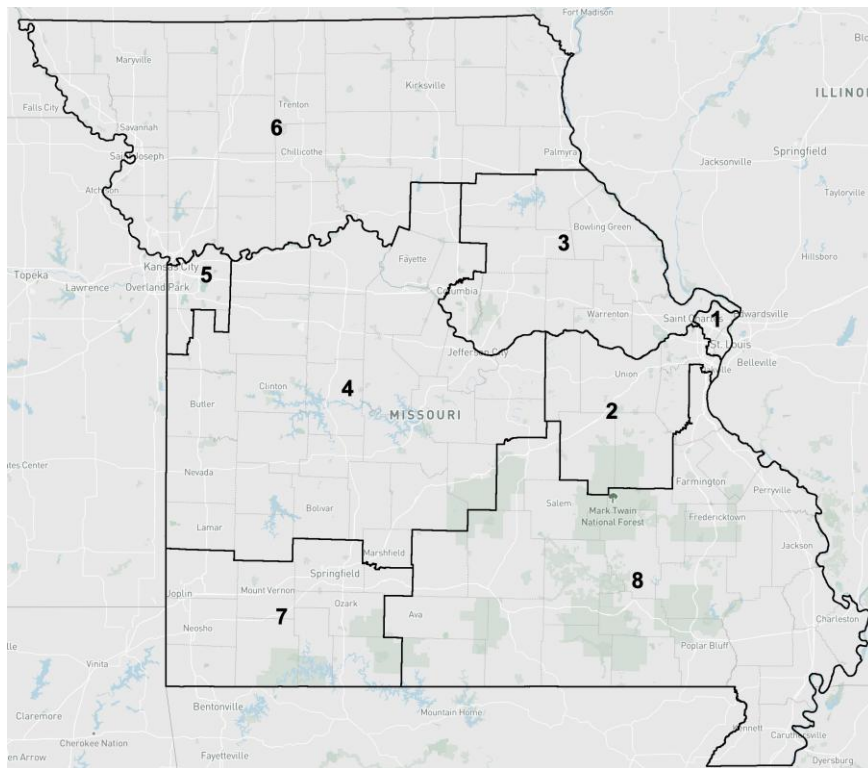
Adjusted Simulated Map 11029



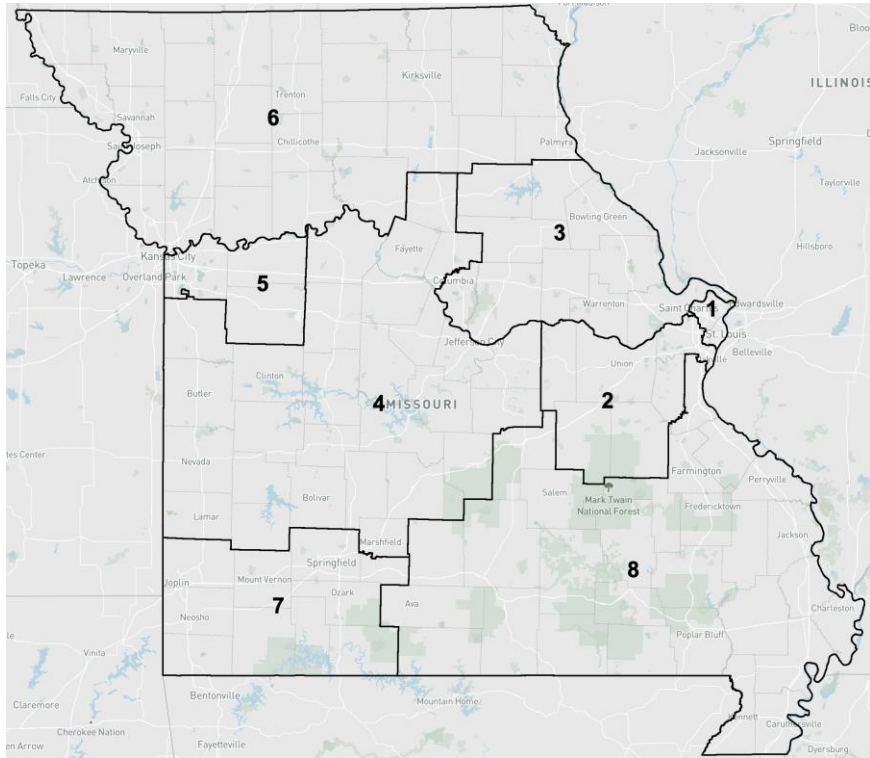
Simulated Map 11163



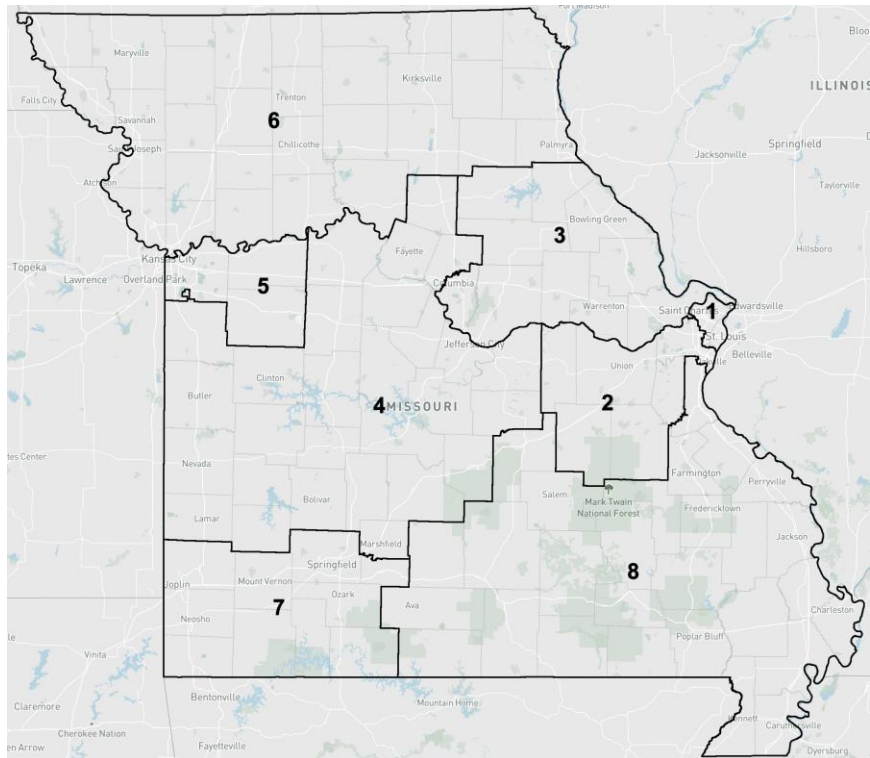
Adjusted Simulated Map 11163



Simulated Map 71871



Adjusted Simulated Map 71871



APPENDIX C

Jonathan Robert Cervas

Curriculum Vitae

Revised December 2025

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Website: jonathancervas.com
Github: jcervas
Google Scholar: Jonathan Cervas

Employment

Carnegie Mellon University

- *Assistant Teaching Professor* — 2024–Present
- *Post-Doctoral Fellow* — 2020–2024

Education

University of California, Irvine

- **Ph.D., Political Science**, August 2020
- Dissertation Committee: Bernard Grofman (Chair), Michael Tesler, Carole Uhlaner
- Dissertation: *A Quantitative Assessment of the U.S. Electoral College, 1790–2020*
- Fields: American Politics, Political Methodology, Comparative Politics

- **M.A., Political Science**, December 2018

University of Nevada, Las Vegas

- **B.A., Political Science**, 2007

Additional Training

- Workshop on Research Design for Causal Inference, **Northwestern University**, 2017
- Inter-university Consortium for Political and Social Research (ICPSR), **University of Michigan**, 2016

Publications

2025

- *Partisan Gerrymandering*. Bernard Grofman & Jonathan Cervas, Partisan Gerrymandering, in Elgar Encyclopedia of Public Choice 476 (Richard Jong-A-Pin & Christian Bjørnskov eds., 2025), <https://www.elgaronline.com/view/book/9781802207750/chapter68.xml>. Read Online]

2024

- *Statistical Fallacies in Claims about ‘Massive and Widespread Fraud’ in the 2020 Presidential Election*. Bernard Grofman and **Jonathan Cervas**. *Statistics and Public Policy*, 11(1). Read Online
- *Partisan Gerrymandering Cases in State Supreme Courts in the 2020s Redistricting Round*. **Jonathan Cervas**, Bernard Grofman, Scott Matsuda, and Justine Kawa. *Albany Law Review* (forthcoming). Read Online

2023

- *The Role of State Courts In Constraining Partisan Gerrymandering in Congressional Elections*. **Jonathan Cervas**, Bernard Grofman, and Scott Matsuda. *University of New Hampshire Law Review*, 21:2, 421. Read Online

2022

- *Using Folded Seats-Votes Curves to Compare Partisan Bias in the 2020 Presidential Election with Other 21st Century Elections*. **Jonathan Cervas** and Bernard Grofman. *Presidential Studies Quarterly*. Read Online
- *Turning Communities of Interest into a Rigorous Standard for Fair Districting*. Wang, Chen, Ober, Grofman, Barnes, and **Cervas**. *Stanford J. of Civil Rights & Civil Liberties*, 18, 101. Read Online
- *Why Donald Trump Should be a Fervent Advocate of Using Rank-Choice Voting in 2024*. **Jonathan Cervas** and Bernard Grofman. *PS: Political Science & Politics*, 55(1). Read Online

2021

- *A Systems Framework for Remedying Distortions in U.S. Democracy*. Wang, **Cervas**, Grofman, and Lipsitz. *PNAS*, 118(50), e2102154118. Read Online
- *The Unanticipated Effect of Covid-19 on House Apportionments*. **Jonathan Cervas** and Bernard Grofman. *Social Science Quarterly*, 102(5), 2432-2434. Read Online

2020

- *ZIP Codes as Geographic Bases of Representation*. Grofman and **Cervas**. *Election Law Journal*. Read Online
- *Legal, Political Science and Economics Approaches to Measuring Malapportionment*. **Jonathan Cervas** and Grofman. *Social Science Quarterly*, 101(6), 2238-2256. Read Online
- *Tools for Identifying Partisan Gerrymandering: Pennsylvania Case Study*. **Jonathan Cervas** and Grofman. *Political Geography*, 76: 102069. Read Online

2019

- *Are Presidential Inversions Inevitable?* **Jonathan Cervas** and Grofman. *Social Science Quarterly*, 100(4), 1322-1342. Read Online

2018

- *Can State Courts Cure Partisan Gerrymandering? Lessons from League of Women Voters v. Pennsylvania.* Grofman and **Cervas**. *Election Law Journal*, 17(4), 264–285. Read Online

2017

- *Why Noncompetitive States Matter: The Electoral College 1868–2016.* **Jonathan Cervas** and Grofman. *Public Choice*, 173(3–4), 251–265. Read Online

Other Publications

2024

- *Report of the Court-Appointed Co-Consultants in re Clarke v. Wisconsin Elections Commission* (Case Number 2023Ap1399-Oa, 2023 Wi 79). [Read Online]

2023

- *Memo in Support of Grofman/Cervas/Griggy Remedial Proposals.* U.S. District Court for the Northern District of Alabama, Southern Division. [Read Online]
- *Brief Of Amici Curiae Dr. Jonathan Cervas, Paul Mitchell, Dr. Samuel S.-H. Wang, Roderick Kennedy, Election Reformers Network, Common Cause New Mexico, and League Of Women Voters New Mexico In Support Of Neither Party.* State of New Mexico, County of Lea, Fifth Judicial District Court. Cervas, Jonathan et al. [Read Online]

2022

- *Report of the Special Master (Harkinrider v. Hochel).* **Jonathan Cervas**. [Read Online]

2021

- *Fracking: A Contiguity-Related Redistricting Metric.* **Jonathan Cervas** and Bernard Grofman. *Election Law Blog*. [Read Online]
- *Trump the Wrestler and the 2024 Grudge Match.* Bernard Grofman and **Jonathan Cervas**. [Read Online]
- *The GOP Scared Latinos from the Census. Now That May Cost the Party Red Seats.* Sam Wang and **Jonathan Cervas**. *Washington Post*. [Read Online]
- *Great Lobster and a More Equitable Voting System Exists in Maine.* Anjali Akula, **Jonathan Cervas**, and Elsie Goren. *Medium.com “3Streams”*. [Read Online]

2020

- *Amicus Curiae with Princeton Electoral Innovation Lab*. [Read Online]
- *How Likely is Trump to Lose the Popular Vote but Win the Electoral College?* **Jonathan Cervas** and Bernard Grofman. *Medium.com “3Streams”*. [Read Online]
- *These Are the Political Consequences of Excluding Undocumented Immigrants from Apportionment*. Angela Ocampo and **Jonathan Cervas**. *Medium.com “3Streams”*. [Read Online]

2018

- *Pennsylvania Has to Draw New Congressional Districts but Getting Rid of Gerrymandering Will Be Harder Than You Think*. Bernard Grofman and **Jonathan Cervas**. *The Washington Post*. [Read Online]

Work Experience

Special Master

- *Harkenrider v. Hochul* (2022), New York Congressional and Senate Districts. Court Opinion

Court/Legislative Consultant

- Wisconsin Supreme Court (*Clarke v. Wisconsin Elections Commission*), 2023–2024.
- Pennsylvania Reapportionment Commission, 2021–2022.

Assistant to the Special Master

- *Wright v. Sumter County Board of Elections*, 2019–2020. Court Opinion
- *Bethune-Hill v. Virginia State Board of Elections*, 2018–2019. Court Opinion
- *Navajo Nation v. San Juan County, UT*, 2017. Court Opinion

Expert Witness

- *New York Communities for Change v. County of Nassau* (2024).
- *Moore v. Lee*, Tennessee Chancery Court (2022). Reports 1, 2, 3, 4, 5.

Consultant

- Town of Newburgh, NY (2024)
- Town of Cheektowaga, NY (2024)

Invited Talks

2025

- What’s the Story with Redistricting? - Heinz School of Public Policy, Policy and Politics Group, September 24, 2025.
- *Mid-decade Redistricting* — New York Law School, Hosted by Jeff Wice, September 17, 2025.
- *Disinformation and the Fight for Democracy* — University of Pittsburgh, Hosted by Ralph L. Bangs, July 15, 2025.

- *Partisan & Racial Gerrymandering and the Voting Rights Act* — New York Law School, Hosted by Jeff Wice, February 19, 2025.
- *Gerrymandering and the Voting Rights Act: A Threat to Democracy?* — University of Pittsburgh, Hosted by Ralph L. Bangs, February 11, 2025.
- *Build a 2030 Redistricting Checklist* — National Conference of State Legislatures, NCSL Annual Summit, Louisville, KY, August 7, 2024.
- *NY Redistricting Conference: What Happened and What's Next?* — Keynote Speaker, New York Law School, June 18, 2024. [Website] [Keynote Remarks]

2024

- *When Third Parties Matter* — Niskanen Center, Hosted by Matt Grossman, May 29, 2024. [Website]
- *Elections and Voting* — Sacramento State University, Hosted by Hallee Caron, March 25, 2024.
- *Elections Redistricting and Voting Rights* — New York Law School, Hosted by Jeff Wice, February 21, 2024.
- *The Issues Shaping Attitudes Around the Election* — New York University School of Journalism, Hosted by Eliza Griswold and SpotlightPA, February 19, 2024.

2023

- *Redistricting* — Carnegie Mellon University Osher Class, Hosted by Randy Weinberg, October 23, 2023.
- *Power to the People* at “A Path Towards Equality” — Hosted by SpotlightPA, October 11, 2023. [Website]
- *Elections Redistricting and Voting Rights* — New York Law School, Hosted by Jeff Wice, October 4, 2023.
- *Federal Appellate Advocacy* — University of Pittsburgh School of Law, Hosted by Hon. D. Michael Fisher, September 26, 2023.
- *Pennsylvania Redistricting: Lessons Learned and Next Steps for Reform* — Hosted by Common Cause PA, League of Women Voters PA, NAACP PA, Committee of Seventy, FairDistricts PA, and Pennsylvania Voice, May 31, 2023.
- *Voting Rights and Election Law* — Touro Law School, Hosted by Judge Phil Solages, May 4, 2023.
- *Remapping Democracy: Redistricting, Race, and Fair Elections in a Changing Legal Environment* — Government Law Review at Albany Law School, March 6, 2023. [Website]

2022

- *Representation, Race, Redistricting* — CUNY Graduate School, Hosted by Keena Lipsitz and John Mollenkopf, November 17, 2022.

- *Voting Rights and Redistricting: Reshaping American Democracy* — New York Law School, Hosted by Jeff Wice, October 20, 2022.
- *Democracy Threatened: Will Your Vote Count?* — Great Issues Forum at Redeemer, October 12, 2022.
- *Contemporary Issues in Election Law* — New Hampshire Law School, Hosted by Kyle Kopko, October 7, 2022. [Website]
- *Voting Rights and Election Law* — Hofstra Law School, Hosted by Judge Phil Solages, September 12, 2022.
- *Measuring Compactness* — Pennsylvania Redistricting with Geographers: Communities of Interest Criteria and Beyond, American Association of Geographers. [Slides]

2021

- *Voting Rights and Elections* — University of Texas at Austin, Hosted by Beto O'Rourke, Spring 2021.
- *Tools for Identifying a Partisan Gerrymander* — Princeton University Wintersession.

2019

- *2019 NCSL Capitol Forum (Legislative Options for Redistricting Post-conference)* — National Conference of State Legislatures.
- *Redrawing the Virginia Legislative Map: The Bethune-Hill Racial Gerrymandering Case* — Princeton University.

2018

- *Triple Play: Election 2018, Census 2020, and Redistricting 2021* — University of Houston, Hobby School.

2016

- *Representation of Non-Eligible Resident Populations in Legislative Bodies* — Center for the Study of Democracy Graduate Student Conference, UC Irvine.

2015

- *Asymmetry in State Grant Distribution: Why Proximity to the State Capital Matters* — Western Political Science Association, San Diego, California.

Service to the University

- Democracy Day, Co-Chair (2025)

- Faculty Senate, CMIST Representative (2025)
 - Democracy Day, Committee Member (2024)
 - *Bridging the Divide: Understanding and Addressing Political Polarization in America* (2024). Website
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Service to the Discipline

Referee: *American Journal of Political Science*, *Political Geography*, *Election Law Journal*, *Public Choice*, *Political Research Quarterly*

References

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